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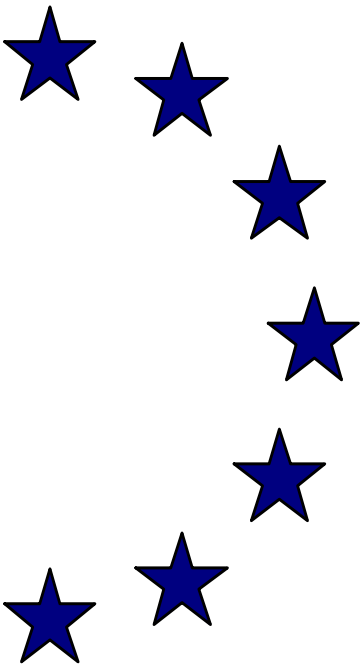

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Study on methods to analyse the impact of State aid on competition

by

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES AND BOXES

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1. EXECUTIVE SUMMARY

1.1. OVERVIEW

CRA International (CRA) has been assigned by the Directorate-General for Economic and Financial Affairs (DG EcFin) of the European Commission (EC) to conduct a study on methods to analyse the impact of State aid on competition. One of the potential benefits of an economic approach to State aid control is to make relationships between the costs and the benefits of State aid more transparent and, by doing so, to provide guidance on how to focus State aid control efforts on those areas where the damage of State aid is the greatest.

Where markets fail to deliver efficient outcomes, Government intervention, including the provision of State aid, can improve welfare. This is an accepted result in the economic literature. Many national or supra-national bodies do not provide a mechanism to monitor and discipline the State aid provided by its members. Indeed, the control of State aid in the European Union stands out. The literature reviewed in this study provides several arguments for State aid control:

- If the benefits of State aid are largely national but the costs are carried by others also, Governments can have an incentive to provide excessive aid. Since these incentives prevail in all Member States, they are jointly better off if State aid is controlled in order to reduce the negative external effects on each other.

- In some settings State aid control can resolve commitment problems. Consider, for example, regional aid. Once a firm has chosen its location, invested, and collected the local government's subsidy, the firm has an incentive to threaten to relocate in order to demand additional subsidies as the price for staying at the chosen location. State aid control can provide a credible commitment device and prevent firms from re-negotiating.

- Where Governments control funds, firms devote resources to lobby for it. Some scholars see lobbying as a waste of resources *per se*, others question whether the allocation of funds as a result of lobbying yields efficient outcomes.

- Finally, there are a number of long-run costs that stem from the distortion of incentives due to the existence of aid schemes. This is most evident in the case of Rescue and Restructuring aid (R&R aid) where firms' budget constraints are softened, similar to the budget constraints of firms in the socialist economies before their transition to market economies.

Thus, there are good reasons for an effective State aid control that devotes its resources to prevent State aid (schemes) that are likely to distort competition and trade most. Based on a review of the relevant literature, the examination of case studies, and discussions with State aid practitioners, this study aims at providing a framework for the analysis of the effect of State aid on competition and trade.

Under Article 87(1) of the EC Treaty State aid is defined as

> *« […] any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market. »*

Although the EC Treaty does not define State aid *per se*, the European Commission and the European Court of Justice have interpreted the concept widely. In past practice, the "distortion of competition" and "effect on trade" in the context of Article 87(1) have often been identified by the European Commission with very little detailed investigation. Even very minor effects on competition and trade suffice to classify aid measures as State aid.

Aid measures that have been identified as State aid can be compatible with the common market if they fulfil a number of criteria identified in Articles 87(2) and 87(3) of the EC Treaty. For example, according to Article 87(3)c aid may be compatible with the common market if it "…facilitate[s] the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest." In the context of this "compatibility test", case law provides the European Commission with much more discretion to allow aid (schemes) that are unlikely to have a significant negative effect on competition and trade. Thus, in the current legal framework, the methodology proposed in this study to analyse the effects of State aid and to prioritise State aid control should be seen in the context of the European Commission's analysis of whether State aid should be found compatible with the common market.

Based on our analysis, we provide a number of recommendations that suggest a departure from past practice. In particular, we suggest the following changes which are of immediate practical relevance for State aid control:

- **Move from an "effect on rivals" standard to a social welfare standard:** In State aid enforcement "distortion of competition" has been largely interpreted as effects that harm rivals. Future State aid enforcement should be based on a concept of "effective competition", which includes the effects on rivals' profits and on consumers. Note that this standard differs from other areas of competition policy where "distortion of competition" is often interpreted as effects on competition that harm consumers.

- **Require Member States to show significant market failure and to demonstrate that the instrument is targeted:** State aid that does not properly address a significant market failure[1] is much more likely to distort effective competition than targeted aid for mainly two reasons. First, State aid that does not remedy the market failure is ineffective and a waste of resources as there are costs to raising the funds. Second, State aid that is properly targeted to address a significant market failure is less likely to seriously distort competition as it regularly leads to an activity that would not have been undertaken by any firm in the absence of aid. The key focus of the EC should therefore initially be on the "project or scheme evaluation" to ensure that the aid is appropriately designed to target a significant market failure. Note that the EC Treaty also allows State aid if it addresses social objectives or equity concerns. Such re-distributive State aid is not concerned with efficiency ("the enlargement of the cake") but with re-distribution from some economic subjects to others ("division of the cake"). Similar to the case with market failures that are identified without asymmetric weights on the welfare of individuals or groups, Member States should be required to clearly define the equity concern addressed and explain why the chosen State aid measure is the most effective means to achieve the re-distributive objective.

- **Screening should be tailored to the market failure concern. In particular, low amounts of aid or low aid intensities should not be used as a general screening device:** Contrary to a plausible intuition, in many circumstances allowing State aid (schemes) that involve a low amount of aid or a low aid intensity will not yield a good prioritisation of the European Commission's resources. Government interventions should focus on *significant* market failures only and correcting these will involve non-marginal aid contributions. Control regimes that encourage very low levels of aid or very low aid intensities are likely to divert resources to projects where private gains are high and the beneficial impact of Government spending is low. Upper bounds on aid intensities or amounts of aid can still be useful, but only if there is knowledge about the likely amount/intensity required in order to trigger private investments with large social gains. As this will depend on the nature of the market failure and the aid instrument used, such upper bounds must be market failure and instrument specific.

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1 In this report, we use the term market failure to describe situations where State aid can potentially induce an activity in which the direct social gains are higher than the direct private gains. The direct social gains will usually comprise the gains of the beneficiaries of the activity, for example those benefiting from environmental protection, those using the subsidised Services of General Economic Interest, etc. Thus in our usage, market failure does not include a complete balancing of costs and benefits of State aid, which would require studying the unintended costs of State aid (shadow costs of raising the funds, lobbying costs, administrative costs etc.) and the effects on rivals as well as on consumers of rivals' products.

- **The analysis of the effects on rivals and consumers should focus on dynamic incentive and market structure effects** – Unlike most of the previous literature, we find that a focus on short-run price effects as derived in static economic models and used in other areas of competition policy ("unilateral effects") may often miss the point if analysed in isolation. If money is handed to a firm and if the cost of raising that money is ignored, the effect of the resulting short-run changes in output and prices on consumers is almost always positive and over-compensates for the negative effect on rivals' profits. Thus, the most significant effect on rivals and consumers results from the distortion of recipients' (dynamic) incentives to undertake effort and make appropriate (dynamic) business decisions as well as on the identification of cases in which the State aid induces an artificial market structure. Aid induces an artificial market structure if it keeps inefficient firms afloat while inducing more efficient rivals to exit the market, or if it induces the recipient to engage in anticompetitive behaviour such as predation and foreclosure. These effects are likely to harm rivals and consumers.[2]

Overall, our results differ considerably from the approach taken in the existing literature and, to some extent, from the past practice of State aid control. On a general level, however, our findings fit well with the approach that the DG Competition recently proposed in the State aid action plan to analyse whether aid is "targeted" and to employ block exemptions in order to screen out cases that are unlikely to distort effective competition. The analysis in this report yields a number of practical recommendations that may be helpful in the context of the ongoing reform process.

In particular, we propose below a framework for the analysis of individual cases and schemes. Our proposal is similar to what has now become the State Aid Action Plan in that we begin by reviewing whether there is significant market failure and whether the aid is targeted. In the workshops with European Commission officials and experienced State aid lawyers, participants commonly suggested in response to our main approach that the European Commission should only deal with State aid that inflicts serious harm on other Member States. We therefore developed an alternative approach that focuses on this concern: It selects only cases for investigation in which the aid giving Government has an incentive to provide excessive aid because it expects a benefit in its own country, while the economic burden of the aid is carried to a large extend by other Member States. Such an approach relies on the first argument in favour of State aid control that was stated at the beginning of this report. It, however, implicitly assumes that the other arguments for State aid control that we discuss above are of minor importance. We are unwilling to make this assumption at this stage, and hope our report initiates a broader discussion on the rationale for State aid control. Nevertheless, we believe that the arguments and recommendations developed throughout our report are also relevant and informative if one adopts the narrower view on State aid control embedded in our alternative approach.

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2 Note that as a result of the unilateral effects of State aid, less efficient firms may gain market share at the expense of a more efficient firm. While this could be termed "artificial market structure" effects as well, we do not include it in our definition of "artificial market structure effects" in order to keep this term distinct from "unilateral effects".

Before summarising some of the main findings of the more detailed analysis, we first describe the structure of the report. One specific aim of this report is to survey the current state of research regarding the impact of State aid on competition and to summarise the findings in the theoretical and empirical literature (Section 3). A list of the literature reviewed can be found at the end of this report. Building on the findings of the literature review, on interviews with EC officials, and on a number of case studies in the area of research and development aid (R&D aid) and rescue and restructuring aid (R&R aid), we propose a framework for the analysis of the effects on competition and trade in State aid cases (Section 4) and for screening purposes and policy evaluation (Section 5). Section 6 develops an alternative screening methodology for individual cases that is based on the assumption that Governments will only provide excessive aid that harms welfare when a sizeable portion of the burden is carried by other Member States. We discuss the proposed methodology in the context of two policy areas: R&D aid (Section 7) and R&R aid (Section 8). A detailed description of the case studies can be found in an enclosure to this report. This executive summary provides an overview of the main results of our analysis and presents the main policy recommendations that follow from this analysis.

1.2. MOVE FROM "EFFECTS ON RIVALS" TO A SOCIAL WELFARE STANDARD

In order to study the "impact on competition", we need to define an appropriate concept of competition. While this may seem like a simple task, the right approach is by no means obvious:

- The legal framework leaves some room for interpretation and, while past practice seems to have focused on the impact of State aid on rivals' profits, other parts of EC competition policy now explicitly equates "distortion of competition" with "harm to consumer welfare".

- Previous studies on the effect of State aid have equated distortion of competition with either the impact on rivals' profits or social welfare (with potentially different weights on consumer surplus and profits).

- There are obvious arguments as to why simply equating "distortion of competition" with "less rivalry" is not appropriate. Competition should be a means to an end and not an end in itself.

Different interpretations of "impact on competition" lead to different policy conclusions. For example, if markets are concentrated and goods are not very differentiated, State aid that lowers the perceived marginal costs of the recipient or that leads to entry is likely to have a particularly strong negative effect on rivals' profits. If we chose "reduction of rivals' profits" as the interpretation of "distortion of competition", we would find a significant effect in markets with these characteristics. At the same time, we observe that it is precisely in this market structure that the short-run effect on consumers (and, indeed, the combined effect on rivals and consumers) is likely to be beneficial, suggesting "no distortion of competition" from a consumer or even a total welfare perspective, if the shadow costs of raising the funds are ignored.

Thus, we begin the literature review by discussing different concepts of "competition" and their applicability in the context of State aid. As a result of this review, we propose to use

a concept of “effective competition” that includes an analysis of the impact on competitors and consumers. Our concept leaves sufficient room to include equity considerations and to capture the effect on trade in a specific way.

In this context, it is interesting to note that there is a gap in the general literature on State aid with regards to effects on consumers. Existing studies on the effect on competition either focus on the effect on rivals’ profits or are restricted to a very peculiar setting not suitable for developing a general methodology. It is therefore insufficient to simply draw on existing results. Careful analysis based on the broader objective function is required.

1.3. REQUIRE MEMBER STATES TO SHOW SIGNIFICANT MARKET FAILURE AND TO DEMONSTRATE THAT THE INSTRUMENT IS TARGETED

If one defines “targeted” aid as an appropriate aid (scheme) used to address significant market failure, we find that in many cases targeted aid does not harm effective competition. As we will discuss in detail in this report, an appropriate aid (scheme) has to be assessed in a number of dimensions including the amount of aid, the aid intensity, the aid instruments used, the duration and frequency of aid as well as the conditions attached to it. The targeted market failures must be significant in order to justify the general costs of State aid schemes, which include the shadow costs of raising the funds, the transaction costs and the costs of induced lobbying activity. Also it must be shown that State aid is the appropriate method of addressing the market failure in question.

More generally, the initial focus of State aid control should be on whether aid is indeed targeted. To see why, consider the following:

- If State aid is targeted, it induces a new or additional activity for which the direct social gains are higher than the direct private gains. That is, it leads to an additional socially desirable activity that would not have been pursued in the absence of State aid. For a number of market failures, this implies that one would not expect a direct effect on rivals that operate without subsidies, as the same logic would apply to them.

- Targeted State aid is limited to the amount required to induce the desired activity. Thus, those competition concerns that relate to the fear that recipients may receive “excessive” aid are addressed if aid is properly targeted.

1.4. SCREENING SHOULD BE TAILORED TO THE MARKET FAILURE CONCERN. IN PARTICULAR, LOW AMOUNTS OF AID OR LOW AID INTENSITIES SHOULD NOT BE USED AS A GENERAL SCREENING DEVICE

When investigating the impact of State aid on welfare there are strong arguments for taking the nature of the market failure that is to be addressed into account. The literature on State aid provides little guidance for the selection of practical criteria for assessing the effect of State aid on effective competition. However, the analysis of the effects of State aid on competition may benefit from project appraisal literature that takes into account the shadow costs of raising funds and provides tools for assessing the social costs and benefits of a project. Due to the importance of the objectives and the specific context of State aid in determining its impact on competition and trade, it is unlikely that the same

framework can be used for all policy areas. As such, we submit that the specific criteria to be used to investigate the impact on competition and trade depend on the objective of the State aid.

To illustrate our claim above, consider a general screening approach that allows aid without further investigation whenever it falls below a uniform and very low aid-intensity threshold. First, suppose aid measures are targeted at specific projects. Private investments that are undertaken with low aid intensities may not to be conditional on the aid. Moreover, given the indirect costs of generating and administering the funds for State aid, projects with a small spread in social and private gains are unlikely targets for welfare improvements. Thus, for project based aid that addresses specific market failures, schemes that encourage small aid intensities are likely to harm welfare. Governments should provide aid (schemes) only if the market failure is significant. The aid intensity must be adapted to the amount necessary in order to trigger the private investment that leads to (significantly) larger social gains.

The same conclusion does not hold for general measures used to promote an activity indirectly by improving the commercial environment for specific activities with minimal selectivity and minimal administration costs (we refer to this as activity-specific aid). Here, relatively small amounts can be beneficial as the administration costs are much lower. Such aid instruments, like general tax breaks for firms that undertake a minimum amount of R&D activity, are not aimed at addressing a significant market failure through a specific project, which may require a significant amount. Rather, they are aimed at increasing the attractiveness of certain activities, which are assumed to be socially underprovided, without discriminating between firms active in the field. This argument is developed in more detail in Section 7.2.4.

1.5. THE ANALYSIS OF THE EFFECTS ON RIVALS AND CONSUMERS SHOULD FOCUS ON DYNAMIC INCENTIVE AND MARKET STRUCTURE EFFECTS

We believe that standard models that are used to explain unilateral effects – for example, in merger control – should be of limited relevance in the context of State aid. There are different reasons for this.

- In some cases targeted aid will lead to a change in market structure without negatively affecting rivals. For example, a subsidy to a bus route that is intended to finance a non-commercial service to a remote area is unlikely to harm private transport to this remote area – since a commercial service is not viable in the first place.[3] In such cases, there is little role for a standard unilateral effects analysis.

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3 In practise, a subsidised rival that also receives State aid (say a rail link) or a non-subsidised rival who provides an activity that cannot be separated could suffer. A concrete example would be an overlap of the routes of a commercial urban bus services with a non-commercial service that operates part of the same route in the urban area. Again, however, standard unilateral effects analysis is of limited use.

- Even in those cases where rivals are harmed through higher output or lower prices of the aid recipient, consumers benefit from the higher output or lower prices. Indeed, most short-term effects on output and pricing typically benefit consumers and will have a limited and positive effect on welfare if the indirect costs of State aid are ignored. Thus, these "unilateral effects" are unlikely to make an otherwise desirable State aid undesirable. The analysis of the competition effects should therefore focus on other aspects, such as artificial market structure effects and the (dynamic) incentive effects of State aid discussed below.

There is a role, however, for unilateral effects analysis for tracing the gains and losses of State aid. Especially in our alternative approach, this is helpful when assessing whether there is a significant effect on trade and whether Governments, therefore, may have incentives to provide excessive aid.

Nevertheless, the analysis of which aid induces significant harm to effective competition should focus on the distortion of recipients' (dynamic) incentives to provide effort and undertake appropriate (dynamic) business decisions as well as identify cases in which the State aid induces an *artificial market structure.* Aid induces an artificial market structure if it keeps inefficient firms afloat while inducing more efficient rivals to exit the market or if it induces the recipient to engage in anticompetitive behaviour, such as predation and foreclosure. These effects are likely to harm rivals and consumers.

As an important example for such incentive effects, consider aid to a failing firm. R&R schemes are likely to have significant distortive effects as they soften the budget constraint of the recipient and lead to overinvestment and lack of effort. Moreover, rivals' incentives can be hurt as well since their rewards are less correlated with their performance.

1.6. A PROPOSED FRAMEWORK FOR THE ANALYSIS

Based on the general results briefly reported above, we propose the following framework for the analysis:

- Step 1: Is the objective worth pursuing?
- Step 2: Is the aid (scheme) appropriate?
- Step 3: Definition of the relevant market for affected products
- Step 4: Analysis of the counterfactual scenario
- Step 5: Decision and remedies

The logic developed in these steps can be applied to the assessment of individual cases as well as schemes and it should be equally useful when developing new guidelines for both. Clearly, depending on the context in which the methodology is applied, not all steps are of the same relevance and some straight forward adjustments may have to be made if individual cases are covered by specific guidelines or if the methodology is applied to schemes. For instance, when assessing schemes the European Commission may not be able to undertake all the steps itself because it cannot identify the individual aid

recipients. Even for such schemes, however, it can check whether the Member States performed such an analysis when designing the scheme. Alternatively, when individual cases are covered by existing specific guidelines, the identification of relevant market failure and the appropriateness of the instrument can often be assessed relatively quickly on the basis of these guidelines.

In the following, we present the main elements of each step and some of the key recommendations that we derive from our analysis.

1.6.1. Step 1: Is the objective worth pursuing?

The first step addresses two questions:

- *Market failure*: Is there proof of a significant market failure?
- *Effectiveness*: Has past aid been shown to be effective with regard to the policy objective?

One of our central results is that the analysis of the distortions of effective competition should focus on the analysis of whether State aid is properly targeted to address a significant market failure (which may, according our definition, include equity concerns). A first step in this analysis is to check whether the State aid (scheme) addresses an objective worth pursuing.

In the analysis, we further derive the following recommendations:

- **The European Commission should – in collaboration with the Member States – develop a more systematic process of past policy evaluation**: There should be a more systematic process to evaluate the performance of State aid (schemes) with respect to the stated objectives of State aid. This process should lead to a regular update of the evaluation criteria used in State aid cases. Member States should have an active role in this effort. The European Commission should both collect and disseminate the experience gained in Member States (and also in its own aid schemes). To do so, it should make its knowledge regarding the effectiveness of various schemes and all collected data (where legally feasible) publicly available. In addition, the European Commission should regularly update the methodology and block exemptions used in State aid control based on the policy evaluation results. While it will require some time before the beneficial impact of these changes can be noticed, the effort should begin immediately.

- **State aid control should encourage Member States to explicitly identify the significant market failure they attempt to address**: In the past, notifications have rarely analyzed market failures explicitly. Governments should state specifically the market failure that they attempt to address with the aid (scheme) in question. The analysis of whether the objective is worth pursuing should become a central part of State aid control. By implementing this change, which can be done with little delay, the European Commission will encourage a clearer definition of the objectives of the aid (schemes), which should enable a more focused analysis of the benefits and costs of state aid (schemes).

- **Where possible quantification of benefits and costs should be attempted by Member States**: Governments should be encouraged to estimate the expected benefits and costs of State aid. While this is often difficult, such cost-benefit approaches are currently used in other policy areas by some "donors" including the World Bank and, to some extent, the European Commission itself. Standard project evaluation techniques are likely to be helpful in the required estimation attempts.

Clearly market failures and the benefits of remedying them are often very difficult to quantify. While we believe that there will always be an inherent difficulty in doing so, we also feel that much more valuable empirical information could be generated if Member States would evaluate their schemes more consistently (ex ante and ex post). Moreover, there are a number of evaluation techniques that can be used. For example, a simple first test of whether a significant market failures claim is credible is to investigate whether such activities are undertaken in other countries with or without government support.

1.6.2. Step 2: Is the aid (scheme) appropriate?

The second step addresses the following questions:

- *Amount of aid and aid intensity:* Is the amount of aid and the aid intensity appropriate?

- *Aid instruments:* Which aid instruments (grants, loans, etc.) are the most appropriate for specific policy areas? Is aid the least distortive policy instrument available to achieve the objectives? What is the interaction with other policy instruments in place (are there measures for the "effective rate of assistance")?

- *Duration and frequency of aid:* What is the effect of the duration and frequency of aid on the assessment of the impact of aid?

- *Conditionality:* What is the appropriate conditionality of aid by policy area ("focus of aid")?

- *Shadow costs of funds:* What is the appropriate shadow cost for the Government funds used and does it vary by country and over time?

- *Transaction costs and lobbying:* Under which conditions is State aid likely to trigger certain transaction costs (such as the cost of the administrative burden or the cost of associated lobbying activities induced by various forms of State aid)?

State aid is used to achieve different purposes. There should be a focus on identifying the right instruments for each State aid purpose and Member States should develop an overall framework within each country to coordinate the alternative instruments they employ.

It is important to distinguish between different types of state aid schemes. We refer to aid schemes that intend to make a particular activity (such as R&D) more attractive by a general, minimally selective aid scheme (such as a tax break for R&D expenditure) as an activity-specific measure. These schemes should be open to all firms or all firms that are active in the sector that engages in the selected activity. They will sometimes not classify

as State aid but even if they do, they can be allowed with relatively low aid intensities if they address an appropriate market failure.

Other aid (schemes) attempts to target aid to specific, selected projects that have been identified as worth promoting. This aid typically accrues to selected firms or projects and intuition suggest that they are associated with significantly higher transaction costs. Such aid should be limited to projects for which the selected firms can prove that they would not have been undertaken by a private investor and that the social benefit is considerably greater than the private benefit. Aid intensities for such schemes are therefore likely to be significant, which means that low aid intensities are not a good screening criterion for such project-based schemes.

More specifically we derive the following recommendations:

- **The amount of aid and the aid intensity screen employed by the European Commission should be adapted to take the market failure addressed and the instrument used into account**: For project-based aid (schemes), low amounts of aid or low aid intensities should not be used as a *general* screening device. Rather there should be an evaluation of the required aid intensities for different kind of market failures and different aid instruments. This policy recommendation contrasts with attempts within the European Commission to employ an "across the board" de minimis approach.

- **Amount of aid and aid intensity screens can be useful if adapted to the market failure concern and the instruments used (e.g. to shift the "burden of proof")**: While generally the burden of proof is with the Member States (due to the illegality presumption of Article 87(1)), guidelines and block exemptions can (and should) be used to facilitate the approval of aid that is unlikely to harm competition. In this context, market failure and instrument specific upper bounds on the amounts of aid and aid intensity can be used to shift the burden of proof to the European Commission should it want to challenge the appropriateness of the State aid.[4] This approach has been adopted, for instance, in the Risk Capital Communication of the European Commission and seems pragmatic. The implementation of this recommendation requires careful analysis of the additionality and effectiveness of aid as well as the potential distortive effect on competition within the specific context of a given market failure and a given proposed aid instrument. Thus, this recommendation can be implemented in ongoing efforts to develop and revise guidelines and block exemptions as, for instance, in the ongoing consultation process with regards to innovation aid.

4 This could mean that there is a safe harbour below a threshold or that there is a threshold above which the European Commission will definitely examine cases individually. The right approach will depend on the circumstances.

- **The European Commission's State aid control should consider more explicitly the appropriateness of the aid instrument**: The chosen aid instrument is important when evaluating an aid scheme since it has direct implications on whether the aid is properly targeted to a market failure. While this is already done in some policy areas (again the Risk Capital Communication is one example, limitations regarding the instruments in rescue and restructuring aid cases is another), there is scope for a more systematic evaluation of the aid instruments, as well as a thoughtful consideration of better alternatives. We report some relevant results on different instruments in Section 3.7 and in Section 7.2.4 on R&D aid. Unfortunately, there is very limited research on the appropriateness of aid instruments and we would encourage further efforts to explore this issue in focussed and targeted projects.

- **Ideally Member States should report more explicitly on the interaction of schemes and instruments**: Governments should be encouraged to explain how a given aid (scheme) specifically targets a market failure within the context of the activity or sector that it encourages. Conceptually, State aid (schemes) must be analysed in the context of other government activities to foster an activity, a firm or a sector. We would encourage further investigation as to the feasibility of such an approach.

- **The European Commission should be more lenient towards schemes with an open allocation process than towards ad hoc aid**: Schemes are preferable to ad hoc aid. Schemes that are targeted at projects should be open to all firms and the award of the funds should be based on a transparent and fair allocation procedure. When possible, tendering regimes should be employed. Such a requirement maximises the effectiveness of aid, ensures that the amount of aid is not excessive, and avoids distortions of competition and effects on trade in the bidding process. This recommendation reflects the spirit of the Altmark decision and can be implemented immediately.

- **Member States and the European Commission should evaluate shadow costs of funds**: Governments should undertake efforts to measure the shadow costs of using funds for State aid and require a level of benefits of State aid that is above the identified costs. For many cases, State aid control is only desirable because of the existence of shadow costs of funds. Nevertheless, so far the European Commission rarely, if ever, explicitly estimated the shadow costs of funds in State aid cases. The current scientific and practical knowledge about the level of shadow costs in Member States is very scarce although attempts to measure shadow costs exist (not least for European Commission aid schemes). The approach to measure shadow costs can be informed by the literature on project evaluation. This recommendation will require some discussion and coordination and potentially further research until a generally agreed methodology to measure shadow costs can be used in State aid cases.

1.6.3. Step 3: Definition of the relevant market for affected products

The third step addresses the following questions:

- *Affected products:* What is the change in behaviour caused by the aid and which products of the aid recipient are affected?

- *Market definition:* What is the relevant geographic and product market for the affected products?

Standard market definition techniques developed in the context of competition policy need to be adapted to account for the fact that prices will typically decrease (rather than increase), and may do so by a large amount. Previous work in this area provides useful guidance and we review the relevant literature in Sections 3.8.1 and 4.5.2. In many cases, however, the intent of State aid is to change the market structure. In those cases, it may often be best to move directly to the analysis of the counterfactual scenario.

Note that knowledge of the relevant market will also inform the market failure analysis as it allows the identification of the relevant other firms that are active in the field. For some market failures, the fact that rivals do or do not receive subsidies can be informative to assess the degree of the market failure.

1.6.4. Step 4: Analysis of the counterfactual scenario

The fourth step addresses the following questions:

- *Analysis by channel:* Through which channels is competition and trade likely to be affected and how? We consider the following channels: marginal cost reductions that affect output and pricing (unilateral effects), improvements in product quality, entry of the recipient firm or exit of rival firms, foreclosure and predation, changes in the incentives to innovate, changes in the incentives of the recipient, and effects on dynamic competition.

- *Application of counterfactual scenario techniques:* What would happen without the State aid? This question can be addressed using a simulation model, market characteristics approach, recipient characteristics approach, closest competitor analysis or using techniques from other fields.

It is important to identify the appropriate counterfactual for two reasons: By properly specifying the scenarios "with aid" and "without aid", the benefits of aid can be properly assessed. Secondly, the comparison of the two scenarios informs the analysis of the effects on rivals' profits and on consumers. Where relevant markets cross borders, this will also allow the determination of the effect on trade.

- **The European Commission should not use short-run price effects ("Unilateral effects") as the first screen for the effect on competition**: In most cases, we expect the main concern of State aid to arise due to their negative dynamic incentive effects or their artificial market structure effects. If seen in isolation, short-run price effects that do not change the number of firms in the market ("unilateral effects") are unlikely to harm welfare even if they do have a negative effect on rivals' profits. In this context, we find that when rivals' profits are hurt most, consumers benefit most (which underpins the importance of the choice of the welfare standard for evaluating these effects). If dynamic incentive effects and artificial market structure effects are unlikely, however, tracing the unilateral effects can be helpful as a step to determine whether the existence of market failures is likely and to investigate the distribution of the burden and the gains of State aid across Member States (see the "alternative methodology" developed in Chapter 6).

- **A complete analysis of the incentives to provide excessive aid must take into account effects on, inter alia, foreign consumers**: When assessing the incentive of Governments to provide excessive aid, one needs to consider not only the burden on foreign rivals and the gain to local consumers (and the recipient firm) but also the potential losses of national rivals and gains to foreign consumers (see the "alternative methodology" developed in Chapter 6).

- **In the analysis of the competition effects, the European Commission should analyse artificial market structure and dynamic incentive effects first**: Aid to large firms requires particular scrutiny regarding the potential effects on foreclosure and predation. Aid that soften the budget constraints of firms or distorts dynamic incentives in other ways should be analysed with a negative presumption. A more systematic investigation of these competition effects can be implemented immediately.

- **The European Commission can use market characteristics to assess how competition effects spread:** Market characteristics like measures of industry concentration can be helpful to gauge the expected effects. For example, for a given price reduction due to State aid, higher concentration suggests larger negative effects on rivals' and larger positive effects on consumers (assuming no artificial market structure and no dynamic incentive effects).

- **The European Commission can use the characteristics of the recipient to assess the likely effect on competition:** Characteristics of the aid recipient can be used as one element in the assessment of the likely effects on effective competition. There are, however, no general results and the characteristics will have to be evaluated in the context of each case.

- **Governments should be encouraged to provide the two scenarios "with aid" and "without aid":** If Member States can make a plausible claim that in a "without aid" scenario the good would not be provided, competition effects are much less likely to exist. But even in these cases, one must consider whether there are other instruments that are (obviously) better suited to address the market failure in question, in which case the relevant alternative scenario becomes one "with another aid instrument".

1.6.5. Step 5: Decision and remedies

In step five the following questions are addressed:

- *Weighing of evidence:* How can trade-offs be resolved?

- *Burden of proof:* Who should carry the burden of proof?

- *Cut-off points:* What are appropriate points where the analysis can stop?

- *Remedies:* What are appropriate remedies and "compensating" measures?

The detailed methodology and the thresholds depend on the market failure that is addressed and on the aid instruments used. It should also be noted that in those cases

where countries outside the European Union provide significant support to their industry, the European Union and its Member States should retain the flexibility to respond with a variety of instruments. The optimal response will depend on the specific circumstances of the case. Thus, we do not propose a uniform approach.

1.7. SCREENING METHODOLOGY AND POLICY EVALUATION

Screens can be used to approve or disapprove cases quickly without in-depth analysis. Given the heterogeneity of market failures and aid instruments, we do not propose general screening criteria that would put the European Commission in a position to allow State aid cases without further analysis. Only if the European Commission puts strong emphasis on subsidiarity, cases where the relevant market is confined to the Member State can be approved independent of the market failure addressed – an issue we address in more detail in 1.9 below. We argue, however, that even in cases in which effects are local, the European Commission should be concerned.

As explained above, we find a number of necessary conditions for the approval of State aid (i.e. the aid addresses an objective worth pursuing, the aid is well targeted). Contrary to previous approaches and suggestions, we do not propose to use a low amount of aid or a low aid intensity as a screening criterion. Rather, we propose to develop screening methodologies tailored to the market failure and the aid instruments used. This provides support to the approach by the European Commission to use block exemptions in order to channel the resources to the most important cases. While these block exemptions also use aid intensities as criteria, they are adapted to the specific market failure in question and therefore have less risk of inducing a response by Governments to channel aid into low aid intensity schemes, which may not trigger additional activities to address significant market failures.

From our analysis of the effects on competition, we find that market structure effects and effects on dynamic incentives are likely to be the most harmful for welfare. This leads to another potential screening criterion that takes into account the relative financial constraints and the market position of the aid recipient.

In summary we derive the following recommendations:

- **The European Commission should tailor the screening to the market failure and the aid instruments**: The European Commission should request more detailed specifications of the market failures that are to be addressed and develop an understanding of appropriate aid instruments for these market failures. Based on this understanding, screening can be adapted to the market failure and the aid instruments used.

- **Low amounts/intensities are not suited**: Contrary to previous approaches and suggestions, we do not propose to use a low amount of aid or a low aid intensity as a general screening criterion.

- **Financial and market position of recipient firm**: If aid is targeted to address a significant market failure, the European Commission should focus on scrutinising aid to firms that are less financially constrained than their competitors and that have a paramount market position.

- **Use of schemes**: Member States and the European Commission should be encouraged to move further towards the use of schemes, to rationalise the number of schemes, and to explicitly position schemes in an overall framework of State aid.

1.8. AN ALTERNATIVE APPROACH TO INDIVIDUAL CASES: LIMITED HARM TO FOREIGN RIVALS AND CONSUMERS

We develop an alternative methodology for individual cases based on the premise that the European Commission should only interfere if there was a suspicion of policy coordination failure between Member States (which could for example arise due to the strategic trade motives). To do so, we *assume* that Member States' decisions maximise the welfare of their citizens – so that there can be no role for State aid control if the State aid does not negatively affect other Member States.

Maintaining the assumption that Member States' State aid decisions are in the best interest of their citizens, we derive two additional screening steps, which we suggest should be used prior to applying the standard analysis. These two screening steps are meant to filter out cases in which the net welfare effect on all other Member States is positive, so that there is no incentive to provide excessive aid. If the State aid case is not filtered out in these screening steps, we suggest that the European Commission proceeds according to the steps outlined in Section 1.6 above and described in more detail in Chapter 4 below.

Once we consider the possibility that a particular State aid case has a negative impact on other Member States, the State Aid decision inevitably involves a trade-off between the (presumed) welfare benefits to the State Aid giving country and the (possibly negative) impact of the policy on other Member States. We propose to resolve this trade-off on the basis of a welfare standard.

In summary, under this alternative approach, we suggest the following procedure:

1. Step 1: National definitions of the relevant markets are a sufficient criterion for finding aid to be compatible with the common market.

2. Step 2: If there is no indication of likely anticompetitive behaviour by the recipient (i.e. predatory behaviour or foreclosure) and the other Member States jointly are not significant net-exporters, then the aid should be presumed to be compatible with the common market.

3. Step 3-7: Follow the steps 1-5 outlined under 1.6 in exactly the same order.

This screen filters out cases often deemed inappropriate for the European Commission to investigate. Local transport, swimming pools and local services, like dentists, are some well known examples that our screen filters out. When applying the screening methodology, market definition must be carefully adapted to the State aid context. In particular, where bidding markets (for local services) are international (as they usually should be) and where there are complementary inputs or downstream goods, the analysis must extend to include these markets as well. The alternative screening methodology is described in more detail in Chapter 6.

1.9. FIRST STEPS TOWARDS A METHODOLOGY FOR R&D AID

In principle, State aid for research and development is considered a worthwhile objective. The Barcelona European Council set the target of *increasing* overall spending on R&D in the European Union up to 3% of GDP by 2010 (with two-thirds of the funds coming from the private sector).[5] In the literature review, we identified both theoretical arguments acknowledging relevant market failures and empirical evidence that State aid can encourage private investments in R&D. Thus, there is some evidence that R&D aid can foster innovation and that this is an objective worth pursuing. Here, the focus of the analysis is on how this should be done optimally.

We find support for the approach of the European Commission to allow higher aid intensities for research that is more distant from the market. Indeed, one should investigate whether the market failures directly associated with R&D activities (mainly information spillovers) provide a case for supporting pre-competitive research. Other market failures, like imperfect capital markets, may best be targeted with other measures (like subsidies to promote risk capital provision).

Market failures are likely to be more pronounced when the results of R&D efforts are difficult to appropriate. Thus, required aid intensities are often higher when it is more difficult to appropriate the returns from the R&D efforts. Results from fundament research are difficult to patent. In addition, information spillovers are likely to be significant in the case of fundamental research. Thus, it is unlikely that a firm can fully appropriate the returns from fundamental research. In contrast, it is far more likely that a firm can appropriate most of the results from pre-competitive research. Thus, there is support for the approach of the Commission to distinguish between State aid to fundamental, industrial or pre-competitive research for the purpose of State aid control. The three categories developed seem a plausible proxy in order capture the degree of this positive externality from the research activity.

While supporting this general approach of simplifying the analysis and distinguishing different types of R&D, we would also encourage the European Commission and the Member States to analyse the underlying market failures more directly. For example, in highly specialised fields, firms may be able to internalise the benefits of fundamental research and the need for subsidies may be reduced. In other areas, social benefits can be maximised and the appropriate use of funds can be better ensured if information spillovers are forced, e.g. by requiring publication of results. This leads to the following recommendations:

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5 "Progress report concerning the reduction and reorientation of State aid", Communication from the Commission to the Council, 16th October 2002.

- Beyond the characterisation as fundamental research, industrial research or as pre-competitive development activity, the **European Commission should attempt to identify market failures more directly**: In many R&D State aid cases, the European Commission already employs industry experts to assess whether the aided activity is to be categorised as fundamental research, industrial research or as a pre-competitive development activity. As industry experts, these advisors should be instructed more clearly with regards to the market failures to identify. In a number of cases, the European Commission has also studied whether such activity is undertaken in other countries without Government intervention. Such benchmarking should be conducted on a more systematic basis in order to assess the severity of the claimed market failure. R&D activity that is close to the market is less likely to require aid based on R&D market failures at all. Rather, our case studies suggest that the request for aid and the desire to hand out aid for pre-competitive research and development seems often driven by a desire to attract companies to a region or to support national firms in competition with rivals that receive subsidies.

- **The right balance between university and industry research requires more attention:** Fundamental research is undertaken to a large extent by universities. It is a priori not clear why industry needs to engage in fundamental research, in particular since it has an interest to channel the aid into areas where the private (and not necessarily the social) gains are the highest. One counterargument is that if research is too basic, it may not lead to marketable products and therefore it may not lead to a benefit to society. At some point, the input of industry is required as they can best identify those projects that have market potential and will therefore generally be beneficial to society. State aid practitioners are aware of this tension but there is very little systematic research into the optimal balance between university and industry research and the success of past State aid schemes. Further research in this area would be fruitful.

- **The European Commission should put R&D aid to "large" firms under particular scrutiny:** Large firms have the potential to provide internal financing of R&D projects in order to overcome capital market failures. Indeed large R&D firms are to a large extent assessed by their ability to provide a steady cash-flow to finance R&D. Moreover, information can be more effectively kept within large firms. Large firms can optimise the information flow between more basic research programmes and managers with detailed knowledge about the market potential of various research activities. Thus, there is less need to support large firms' R&D activities compared to supporting those of small firms. Moreover, there are a number of disadvantages associated with State aid for large firms. Large firms are more likely to generate some of the competitive distortions discussed in Section 3.6.4. Industry experts regularly claim that some scientists do not work well in the context of large organisations and that radically different ideas may have a better chance of getting pursued in small spin-offs from universities rather than large established organisations. Thus, on the one hand, there are arguments to provide more support to small firms. Especially the existence of capital market failures suggests such an approach. On the other hand, becoming large can be an efficient response by the firm to a number of market failures. Thus, State aid schemes should not provide a disincentive for firms to grow. Moreover, one cannot argue that a priori large firms can overcome all market failures associated with R&D activities and hence should not be eligible for any State aid. Rather, State aid to large firms requires more careful scrutiny.

- **Some product market failures may be best addressed through measures in the product market itself:** All market failures discussed above relate to problems associated with R&D activity for products that ultimately yield a proper return on the product market. Another potential reason to support R&D is that market failures in the product market lead to private gains that are smaller than the social gains. Examples may include orphan drugs, products for environmental protection, products that can in turn be used for further research (like space missions). Clearly, this issue can be tackled by either directly addressing the market failure through creating higher private returns in the product market or by R&D aid for such research areas. Under some circumstances, it may be preferable to subsidise demand rather than to subsidise production as this may make the subsidy levels more transparent and as it may lead to better allocative incentives. Identifying the precise conditions for decisions like these seems a valuable area for further research.

We review a number of aid instruments used in R&D aid, and we find that different aid instruments are likely to be complementary. General measures, potentially allocated through the tax regime, have a number of advantages as they may shift resources in the economy to R&D intensive activities and at the same time:

- Minimise administrative costs for donors and recipients;

- Minimise the need for governments to pick winners;

- Provide aid to all firms, including those that do not employ aid specialists; and

- Minimise potential distortions by avoiding asymmetric effects.

Project-specific aid schemes should be assessed differently than general measures. Here, the relevant analysis is to carefully study additionality. In order to do so, it is helpful to identify the rival firms within the innovation market and to investigate the level of aid that they receive. In those cases where there is intense competition and rivals do not receive project-specific aid, the programme should not be approved. More generally, we recommend:

- **Member States should use aid instruments as complements and the European Commission should take this into account in State aid control:** There are arguments for using a number of different instruments, which implies that there should be coordination between the different schemes. For example, capital market failures linked to firm size are best addressed through measures that relate to capital market initiatives, while others may be better addressed by direct support to R&D activities. State aid schemes with very detailed requirements lead to high (administrative) costs for recipients and donors. It follows that such schemes should be rare and targeted only to those areas in which the wedge between social and private gains is large. These schemes are therefore likely to require significant aid intensities. Low aid intensities are likely to make sense only if they are provided in very general measures accessible by a very broad class of firms.

- **Member States should rationalise and focus aid (schemes):** One conclusion of our interviews with State aid practitioners is that some countries employ a wide range of different schemes – some recipients even referred to aid measures as a "jungle". There seems to be a clear case to encourage Member States to rationalise and focus aid schemes. This would allow the European Commission to focus their resources on the evaluation of general schemes in order to promote measures that are best suited to enhance effective competition. Governments are not used to evaluate the administrative costs of interventions. For example, the regulatory burden of market regulation is almost never measured (a notable exception is the Netherlands). In the context of State aid, such a cost-benefit approach is essential. It is likely to lead to much less detailed interventions and more detailed monitoring of those activities in which specific requirements are formulated.

- **R&D aid should be awarded through open and transparent allocation mechanisms:** If aid is granted based exclusively on market failures associated with the innovation market, we see no reason for Governments to provide ad hoc aid to individual firms. We would encourage the move to (a few) coordinated schemes that are open and transparent and designed to properly target the market failures identified.

Indeed, to reiterate the claim above, we do not see a convincing case for ad hoc aid to individual firms. Market failures in R&D should best be addressed by schemes that are open to all firms that meet the requirements. The allocation of aid should be transparent and based on objective criteria.

1.10. FIRST STEPS TOWARDS A METHODOLOGY FOR R&R AID

The rescue and restructuring guidelines justify R&R aid by the

> *"…social or regional policy considerations, by the need to take into account the beneficial role played by small and medium-sized enterprises in the economy, or, exceptionally, by the desirability of maintaining a competitive market structure when the demise of firms could lead to a monopoly or to a tight oligopolistic situation."*[6]

Contrary to R&D State aid, the economic case for R&R State aid is much less clear. The arguments are based on externalities on workers, customers, and other stakeholders of a firm closing down that are not taken into account by shareholders. Such externalities, however, exist for all bankruptcies and the demise of inefficient firms is an essential element of dynamic competition that fosters technological progress and efficiency. This is generally acknowledged, and the European Commission therefore approaches R&R State aid with a much more sceptical attitude than other policy areas. We find empirical and theoretical evidence that R&R State aid is harmful for dynamic competition in general and for the incentives of the recipient firm in particular.

- The expectation of a "soft budget constraint" leads to overinvestment, reduced effort by the recipient and a misallocation of resources more generally. The performance of the socialist economic systems should serve as one convincing example for why this concern is important. Evidence that the same mechanisms apply in market economies is also provided by empirical studies on the issue.

- Firms that may potentially benefit from R&R aid have an incentive to engage in wasteful lobbying activity.

- Many recipients of R&R aid do not survive despite the aid.

Thus, in general we believe that R&R aid should be viewed with significant scepticism. Furthermore, those market failures that *may* justify R&R aid, do so only on a temporary basis. This provides strong support for the use of a "one-time, last-time" principle similar to the one advocated by the EC.

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6 Community Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty, 2004, C 244/02, 1.10.2004. On the other hand, in her recent speech on State aid, Commissioner Kroes did not mention R&R aid as a policy area worth pursuing.

Based on our analysis we derive the following recommendation:

- **The European Commission should seriously consider linking R&R aid to bankruptcy proceedings or alternative procedures that minimise the distortion of dynamic incentives:** Firms that enter bankruptcy proceedings are often said to suffer from losing customers. Due to this induced loss, the firm's survival chances are significantly impeded. Because State aid increases the chance that a firm will survive, a company receiving State aid loses fewer customers. While true, this is not a strong argument for providing State aid outside bankruptcy proceedings. Firms enter bankruptcy proceedings because they failed. The elimination of failing firms is one key element of dynamic competition. Creditors, workers, and owners of the company have the appropriate interests to invest in the company if they see a viable business plan for rescuing and restructuring the firm. If they let the firm slip into bankruptcy proceedings, it is a strong indication that there is no better alternative (although it could sometimes also be due to a coordination failure between stakeholders). Indeed, as it was pointed out in several interviews, providing R&R aid to failing firms is mainly aid to creditors and the firm's current management. Thus, R&R aid seriously distorts the dynamic incentives provided by a hard budget constraint. To avoid this State aid should be linked to measures that put the critical decision makers at risk. Linking aid to bankruptcy proceedings seems a simple and practical approach.

It should be noted, however, that bankruptcy proceedings vary significantly across Member States. It is beyond the scope of this report to study the implications of each national procedure for the effect of an approach that links State aid to bankruptcy procedures. Thus, more detailed research that considers the variety of national procedures may be valuable to test our intuition that linking R&R State aid to bankruptcy proceedings is a simple and practical general approach.

Independent of the detailed approach chosen, the key elements should be to provide a strong disincentive for all stakeholders to rely on the Government to bail them out when in difficulty.

- **The European Commission should not use compensatory measures as a "punishment scheme":** Compensatory measures should only be adopted if they can effectively mitigate a clearly specified competition concern.

The problem with current compensatory measures is that these measures are often not tailored to the distortion of competition. Indeed, often the distortion of competition is not even carefully assessed. One aim of compensatory measures is to provide companies with a disincentive to ask for State aid in the first place, or a sort of punishment for having accepted State aid. Allowing State aid in order to support the rescue and restructuring efforts and then harming the firm by a punishment mechanism seems contradictory and difficult to justify. [7] Disincentives to ask for State aid in the first place should be targeted at the relevant decision makers, in particular but not only, the management without artificially making the rescue and restructuring efforts more difficult.

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7 Compensatory measures may also lack credibility because they may be contradictory to one of the aims of rescue and restructuring aid, which is to create a viable company.

Linking R&R aid to bankruptcy proceedings has other advantages as well. If failing firms consist of multifunctional units that are inefficiently bundled together, there can be no proper competition for the company's units until they are unbundled and clearly defined. Because there may be social externalities if a failing firm folds too fast, it may sometimes be helpful to provide State aid for a limited period to prepare the failing firm for a sell-off and to find appropriate solutions for the employees. We suggest that this task is better pursued by a liquidator than by the current management. Among other reasons, the fact that the firm is failing should cast doubt on the effectiveness of its current management and a liquidator has the ability to restructure not only the firm's assets but should also be in a position to change the management where appropriate. Moreover, social considerations can feed into the activity of the liquidator, whereas the management may act primarily in the interest of the shareholders.

Maintaining failing firms for a longer time in order to provide employment in regions where economic activity is scarce seems an "investment in the past". A more viable solution should identify measures to attract profitable industry to the area.

Another concern that is mentioned in the R&R guidelines is that the exit of a firm may increase market power of the remaining firms. While often true in the short-run, there is a clear trade-off between allocative and dynamic efficiencies. The negative dynamic effects of R&R aid include the following: They provide a disincentive to enter the market (as firms would have to compete against subsidised rivals), which is especially problematic in markets with high firm turnover. Furthermore, if firms make losses consistently, a restructuring that allows for further exploitation of scale economies may be necessary. In addition, if the firm only faces a liquidity crisis, debtors should have an incentive to keep the firm alive even absent the State aid. The aid recipient will also have less of an incentive to appropriately plan his business and to make necessary (and potentially unpopular) adjustments himself. In summary, addressing market power concerns through R&R State aid does not seem to be an attractive option.

Saving large firms can be politically attractive. Politicians face significant pressure from the electorate to save jobs "at home". While affected individuals in failing firms can organise to lobby for State aid, tax payers are less well organised to prevent inefficient use of their funds. Thus, there are a number of arguments to provide Governments with a commitment device that helps them to constrain State aid to failing firms. A very strict R&R State aid control would fit into such an environment.

Altogether, we find that R&R has difficulty passing the first hurdle of our proposed methodology. Keeping a failing firm alive or initiating a Government sponsored turnaround does not seem to be an objective worth pursuing. At best, we find some support for State aid in the context of bankruptcy proceedings in order to smoothen the transition to a new structure or to liquidation, while ensuring that managers and owners are held accountable.

2. INTRODUCTION

2.1. BACKGROUND

Governments at all levels (local, regional, state, national or supranational) give financial assistance to firms in various ways. Often, financial assistance has the effect of distorting competition in the markets in which the firms compete, especially in industries with imperfect competition. Moreover, each jurisdiction may have an incentive to support its own firms in order to capture a larger share of the oligopoly rents to be earned in the industry. In the absence of rules constraining subsidies, this can lead to an inefficiently high level of subsidies. Moreover, at Barcelona on 16 March 2002, the European Council renewed its call to Member States

> *"to reduce the overall level of State aid as a percentage of GDP by 2003, and onwards, and to redirect aid towards horizontal objectives of common interest, including cohesion objectives."*[8]

Several laws at the European level aim at a strict control of State aid that lessens competition. The general legal framework is well known to the EC officials to whom this report is addressed. However, two points are worth highlighting:

- The legal framework provides limited guidance on the interpretation of "distortion of competition and trade" and the relevant case law does not put great emphasis on the effect on competition and trade, as "some" effect is usually reasonable to assume.

- There is recognition within the EC that in order to prioritise efforts of State aid control it is necessary to get a clearer view on the distortive effects of different kinds of aid. The debate around the significant impact test reflects this interest.

2.2. TASK

Against this background, the DG EcFin of the European Commission (EC) seeks a study to improve the economic basis for analysing the impact of State aid on competition. The task is interpreted widely, i.e. the study should construct an analytical framework for evaluating the domestic and cross-border competition effects. Thus, the framework should inform about both the analysis of the distortion of competition and the effect on trade. Moreover, the EC is interested in the impact on rivals and on consumer welfare. In particular, the aim is to develop a set of criteria and indicators that can be used

- To assess the importance of the impact of individual aid awards on competition;

- As a starting point for developing some general rules that can be applied to State aid schemes; and

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8 "Progress report concerning the reduction and reorientation of State aid", Communication from the Commission to the Council, 16th October 2002

- To contribute to the development of a method for identifying State aid that is unlikely to have a significant impact.

For this purpose, the study should contain four main parts:

- Review of previous studies on the impact of State aid and subsidies on competition.
- Analysis of the Commission's current practice regarding the evaluation of State aid on competition through examining relevant cases and interviewing Commission officials.
- Presentation of an analytical framework for assessing the competitive impact and the impact of State aid on competition, taking into account the
    - Definition of the relevant markets.
    - Market structure and share of the recipient firm as well as other firms in the market.
    - Structural problems of the sector concerned.
    - Role of technology and innovation.
    - Entry and trade barriers.
    - Demand-side characteristics, including demand growth.
- Analysis of aid schemes that apply to a group of companies, leading to the identification of typical results, which apply to a wide range of circumstances. The analysis should lead to the identification of criteria and indicators to identify State aid cases whose impact on competition is negligible.

2.3. CRA'S APPROACH

In this section, we describe our approach to the four tasks described above. It is our view that the invitation to tender provides a good structure for approaching the issues at hand and we have structured our work around the four identified tasks, which we discuss in turn.

- Phase I: The results of Phase I have been reported in the first interim report. The aim was to review the literature on State aid and related relevant literature, including economics of market power, trade, market failure and allocation methods.
- Phase II: Analysis of the EC's current practice: Systematic selection of cases covering a range of different contexts in which aid is usually granted (e.g. rescue and restructuring aid or R&D aid). Interviews with selected Commission officials. Review of existing and proposed methods. Study of representative cases.

- Phase III (second interim report): Development of a framework for the analysis of the effect of State aid on competition. Proposed definition of the "effect on competition" with a focus on the effect of State aid on competitor profits and consumer welfare based on an analysis using an appropriate counterfactual and taking into account any cross-border effects. The use of a set of criteria (developed in consultation with the Commission) to assist in defining a methodology, which is both effective and practical to implement. Use of a roundtable with up to ten EC representatives to evaluate and enhance the proposed framework and follow-up with selected participants. The methodology was developed with a focus on the most relevant economic context, taking into account

    - Aid characteristics: aid instrument (grants, loans, guarantees, tax advantages, etc), conditions attached to the aid, eligibility criteria, allocation mechanism used, amount of State aid.

    - Context of aid: e.g. rescue and restructuring aid, aid for public services, R&D support, investment aid.

    - Market characteristics: e.g. nature of competition in relevant markets, size of the recipient, trends in demand and supply, barriers to entry and trade, role of innovation.

    - Channels through which competition is affected: effects on price and output; effects on entry and exit; effects on location choice; effects on innovation and unintended side effects (transaction costs, shadow costs etc.)

- Phase IV: Effect of aid schemes: Builds on the phase III framework and will be developed in parallel to phase III. Particularities should also be tested in the roundtable.

Phase V (final report): Conclusions and recommendations.

2.4. LEGAL FRAMEWORK

2.4.1. General State aid provisions

Under Article 87(1) of the EC Treaty, Member States are prohibited from granting State aid that distorts competition and trade in the EU. State aid is defined under Article 87(1) as

> *« […] any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market. »*

Although the EC Treaty does not define State aid *per se*, the European Commission and the European Court of Justice have interpreted the concept widely. State grants and other less obvious forms of public "financing" such as tax relief, interest relief, State guarantees or holdings and the provision of goods and services at below market rates have all been

identified as State aid. Generally, State aid rules apply to measures that satisfy the following four criteria:

- Transfer of State resources – Aid needs to be (ultimately) granted by the State, where "State" is interpreted widely, including public banks and regional authorities.

- Economic Advantage – Aid should constitute an economic advantage that the receiving firm would not have received in the normal course of business.[9]

- Selectivity – Aid must affect the balance between the firms receiving the aid and their competitors. Measures that apply to all firms in a Member State are "general measures" and not State aid.

- Effect on competition and trade – Aid must have a potential effect on competition and trade between Member States.

The legal requirement that aid must have a potential effect on competition and trade between Member States is easily satisfied. For example, the Vademecum "Community Rules on State Aid" (version 1/9/2003) states:

> *"It is sufficient if it can be shown that the beneficiary is involved in an economic activity and that he operates in a market in which there is trade between Member States."*[10]

Indeed, there have been only very few cases where the effect on competition and trade was analysed by the EC in detail and played a role in the decision taken.[11] Thus, in summary, the legal definition of State aid captures a wide variety of aid granted by Member States and there is a presumption that aid is incompatible with the common market.

Articles 87(2) and 87(3), however, contain a number of criteria which either make the aid compatible or allow the aid to be considered as being compatible with the common market.

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9 One of the principal instruments to determine the existence of State aid is the market economy investor principle (MEIP). The principle also ensures equal treatment between State-owned or controlled enterprises and those operating in the private sector. In assessing State aid measures under the MEIP, the Commission examines whether a private investor, motivated by profit only and in similar circumstances would have provided the same aid. If the MEIP is fulfilled, it can be (legally) concluded that the recipient would have received the same benefit under market conditions. In this case, the measure does not constitute State aid. If the recipient received the same benefit under market conditions, there is also no effect on competition because the benefit would have been available to all companies.

10 According to past practice, it is also sufficient that intra-Community trade is *foreseeable* in the future.

11 The Brighton West Pier (C(2002)942fin) and the Freizeitbad Dorsten (SG(2001)D/285046) cases are some of the few examples where the Commission found that the aid would have no effect on competition and intra-community trade.

According to Article 87(2) aid granted to individual consumers for social purposes, aid addressing damages caused by natural disasters or other exceptional occurrences and aid addressing the consequences of the division of Germany is compatible. While potentially relevant in terms of the funds devoted to objectives listed under Article 87(2) in terms of the number of cases in which the European Commission considers declaring aid compatible with the common market, Article 87(3) is more important.

Article 87(3) states that the following types of aid *may* be considered to be compatible with the common market:

a) Aid to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment.

b) Aid to promote the execution of an important project of common European interest or to remedy a serious disturbance in the economy of a Member State.

c) Aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest.

d) Aid to promote culture and heritage conservation where such aid does not affect trading conditions and competition in the Community to an extent that is contrary to the common interest.

e) Such other categories of aid may be specified by decision of the Council acting by a qualified majority on a proposal from the Commission.

The Commission is empowered by Article 88 and 89 to determine whether a particular aid is compatible with the Treaty and to make regulations setting out the procedures for making this determination. The applicable rules and guidelines are discussed in the following section.

2.4.2. State aid guidelines and rules

The Commission has adopted a number of guidelines and frameworks to explain its State aid policy in areas such as regional, sectoral and horizontal aid.

Regional aid addresses the development of areas with low living standards, high unemployment or other disadvantages compared to the national or EU average. Regional aid is covered by Article 87(3)(a) and (c). The current system is laid down by the guidelines of March 1998 **(**Guidelines on national regional aid OJ C 74 10.3.98), which brought together several previous communications. The Multi-sectoral framework on regional aid for large investment projects issued in 2002 covers regional aid that is intended to promote initial investments **(**Multi-sectoral framework on regional aid for large investment projects OJ C 70, 19.3.2002).

Sectoral rules address State aid to particular industries and horizontal rules cover aid that is aimed at problems which may arise in any industry or region. The industry-specific or sectoral rules cover the following industries.

- *Sensitive sectors*: Over the years special rules have been adopted for a number of sectors that have experienced severe economic problems. At present, the sectors concerned are the coal and steel industry, synthetic fibres sector, motor vehicles sector and shipbuilding. The present rules for sensitive sectors are under review.[12]

- *Agriculture, fisheries and aquaculture:* Article 36 of the EC Treaty provides that the Treaty rules on competition are to apply to production and trade in agricultural products only to the extent determined by the Council. Moreover, State aid rules in the agricultural sector have to be coherent with the Community's common agricultural and rural development policies. Rules for agriculture, fisheries and aquaculture also have to be compatible with the Community's international obligations, in particular the WTO Agreement on Agriculture. In practice however, all the regulations establishing the common organisation of the market provide for the application of the State aid rules (Articles 87, 88 and 89 EC) to the agricultural products concerned.[13] Rules applying to the production and marketing of products of agriculture and fisheries to sectors can be found in Community guidelines for the examination of State aid to agriculture and the guidelines for the examination of State aid to fisheries and aquaculture.[14]

- *Transport*: General State aid rules (Art. 87 and 88) apply to transport, although there are a number of exceptions (e.g. transport equipment is not eligible for aid and the *de minimis* regulation does not apply).[15] Sector specific rules exist for air transport, maritime transport and inland transport.[16]

Most of the issues we discuss in this report are related to specific economic effects that are potentially relevant in many different sectors.

Horizontal rules are applied cross-industry and are not targeted at particular regions or sectors. The Commission has adopted frameworks, guidelines and block exemption regulations to guide the application of horizontal rules. Of particular relevance is aid for

- Services of General Economic Interest
- SMEs
- R&D

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12 Vademecum on Community Rules on State Aid, last updated 1/9/2003. The regulation that treats aid to the steel and coal industry after the expiry of the ECSC Treaty in June 2002 can be found in the Official Journal: OJC C 152, 26.6.2002, p.5. See http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/c_152/c_15220020626en00050012.pdf for the Communication from the Commission concerning certain aspects of the treatment of competition cases resulting from the ECSC Treaty.

13 Community guidelines on State aid in the agricultural sector (OJ C 28 of 01.2.2000).

14 The guidelines can be found in the Official Journal C 28, 1.2.2000, p.2 and C19 of 20.1.2001, p. 7.

15 See http://europa.eu.int/comm/secretariat_general/sgb/state_aids/transports.htm for a list of decision containing State aid cases in the transport sector.

16 These rules can be found on http://europa.eu.int/comm/dgs/energy_transport/state_aid/transport_en.htm.

- Environmental protection
- Rescue and restructuring of firms in difficulty
- Employment
- Training

De Minimis

Commission Regulation 69/2001 on *de minimis* aid exempts aid granted to an enterprise that is below the threshold of €100,000 over a period of three years and respects certain conditions. [17]

State Aid in Structural Fund Programmes

The General Regulation for the Structural Funds for the period 2000-2006 lays out a number of provisions regarding the treatment of State aid. These rules apply to areas such as human resource measures and infrastructure measures.[18] The basic principle in the structural fund programmes is that all structural funds operations must be in conformity with EU competition rules.

2.4.3. Relationship between the legal concepts and economic analysis

In Section 3.2 of this report, we discuss different economic interpretations of the distortion of or effect on competition and trade. In order to avoid confusion, we discuss below that this economic interpretation, which is required for any policy that wishes to prioritise the enforcement action in State aid is quite different from the legal concept set out in Article 87(1), which defines what kind of aid is to be classified as State aid. We also point to the recent initiative by the European Commission to develop a "Significant Impact Test" that would allow to prioritise enforcement according to the expected effect on competition and trade. Finally, we refer to the WTO rules, which attempt to address some similar concerns as the EC State aid rules, but on a more global level.

Interpretation of Article 87

In Article 87.1, both distortion of competition and effect on trade seem to be simple yes/no variables, though the former at least is subject to the usual de minimis principle. The effect on trade appears to have been introduced as a means of applying the principle of subsidiarity. As such, the legal framework does not seem to provide guidance on the appropriate welfare standard and the relative weights on the effects on competition and trade when judging the *degree* of the distortion of competition and trade.

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17 Commission Regulation (EC) No 69/2001 of 12 January 2001 on the application of Article 87 and 88 of the EC Treaty to de minimis aid.

18 Communication from the Commission, Multisectoral Framework on regional aid for large investment projects, Official Journal C 70, 19/03/2002.

Some of the following paragraphs, however, do refer to the "magnitude" of effects. In Article 87.3 sub-paragraph (c) the magnitude of the effect on trade is a major element in determining whether derogation should be granted in favour of an aid. This sub-paragraph allows the Commission to authorise "aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest".

While (c) makes no mention of competition distortions, except in so far as they constitute distortions of trading conditions, sub-paragraph (d) permits derogations in favour of "aid to promote culture and heritage conservation where such aid does not affect trading conditions and competition in the Community to an extent that is contrary to the common interest".

It is interesting to note also that the Multisectoral Framework merges the effect on trade and the impact on competition in the single concept of "undistorted competition in the internal market". Likewise, in the Rescue and Restructuring Guidelines (2004/C224//02) the terms "adverse effects on trade" and "distortions of competition" appear to be interchangeable.

We note that the legal interpretation of the "distortion of competition" and the "effect on trade" is by no means obvious and provides little guidance for prioritising State aid control efforts. For the purpose of this project, we have therefore adopted a purely normative approach. We would therefore like to emphasise that whenever, in the remainder of this report, we refer to the effect on or the distortion of competition and trade, we do not refer to the concept as defined in Article 87(1) and the relevant case law but to an economic definition that allows prioritisation and an assessment of the degree of the distortion. In Section 3.2 we discuss alternative economic concepts available and define the terminology applied throughout this report.

In fact the European Commission itself has attempted to refine its methodologies to prioritise State aid enforcement, the significant impact test. We will discuss this test in the next section and then move on to discuss alternative concepts used by the WTO.

Significant Impact Test

While the legal framework and the relevant case law does not put great emphasis on the effect on competition and trade, the European Commission aims to focus its resources on those cases where a significant impact on competition and trade between Member States is to be expected.

For this purpose the Commission had developed two different approaches to identify State aid of a lesser concern, a limited amount of State aid test (LASA) and a limited effect on trade test (LET). These approaches have been set out in two draft communications from the Commission.[19]

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19 See the "Draft Communication from the Commission: A new framework for the assessment of lesser amounts of State aid" and "A new framework for the assessment of State aid which has limited effects on intra-Community trade".

The Significant Impact Test (SIT) initiative has not been pursued further by the European Commission and the more relevant current initiative is the State Aid Action Plan that is discussed in the next section. The discussion surrounding the SIT, however, is still relevant for this project. It is for this purpose that we report this initiative here.

LASA

In the approach regarding the limited amount of State aid (the so-called LASA approach), State aid would have been considered compatible with the common market under Article 87.3.c of the EC treaty if the aid did not exceed 30% of the costs incurred to achieve Community objectives. Moreover, the total amount of LASA that an enterprise could have received for all projects financed, would have been limited to €1 million over any three-year period, including any co-financed Community contribution.

The LASA approach was intended to apply to all sectors of the economy, with the exception of activities relating to the production, processing and marketing of products falling within the scope of Annex 1 of the EC Treaty, aid granted to transport companies for investments in road haulage vehicles or inland waterway vessels and mining companies dealing with the exploitation of coal. LASA could have been granted to all enterprises, including large enterprises.

In order to qualify for approval under the LASA scheme, aid measures had to contribute towards one of the Community objectives such as the promotion of research and development, protection of the environment, creation of new and better employment, promotion of training, risk capital and development of SMEs and regional development. Aid that would never have been approved under LASA includes aid to companies in financial difficulties, aid that is granted to reduce the indebtedness of a company and aid to intra-Community and extra-Community export related activity. Additionally, LASA would not have been permitted in the form of tax exemptions and tax deductions. LASA schemes included both horizontal and ad hoc individual measures.

LET

The second approach was based on the limited effect on trade (LET) and intended to exempt State aid for economic activities that are unlikely to produce any significant cross-border effects. This included in particular sectors that are not exposed to such intense competition at Community level. These sectors are included in the appendix to the draft communication laying out the LET framework.

Additional conditions included the fact that aid should be linked to eligible expenses directly incurred in carrying out the activities concerned. The amount of aid that could have been granted to a single beneficiary was limited to 30% of the costs incurred for the development of the activity. Moreover, LET aid had to be awarded through a scheme that is open to all companies willing to carry out the identified activities within the jurisdiction of the granting authority. To prevent that beneficiaries use aid to reinforce their market power, a single beneficiary would not have been allowed to receive more than 10% of the total budget. The aid could have been awarded through a tender procedure.

Conditions in which LET aid may not have been granted follow those of LASA schemes, namely a prohibition of LET aid for firms in financial difficulty, to remove debt or in the case of intra-Community and extra-Community export related activity.

Criticism

While State aid would have remained subject to notification under the SIT and Member States would have been required to keep a national register of the aid granted under the SIT, the approach intended to permit faster and more efficient clearance of cases of lesser concern.

In discussions with experts from the Commission, a number of criticisms concerning the SIT methodology were pointed out:

- The screening capacity of the SIT with regards to identifying relevant cases and screening out irrelevant cases was questioned. For example, in the Dorsten swimming pool case (*N258/2000*), there is a negligible effect on trade but if the SIT were applied, the Commission would have to deal with large swimming pools.[20]

- The list of sectors mentioned in the literature on LET and LASA mentioned a list of sectors which the Commission did not establish because the necessary data was not available for all sectors.[21]

- Another problem identified was that only a small amount of aid may be involved in a State aid measure, and this State aid measure has a negligible effect on competition, but if it is given to a major player like EDF, then this was thought to be a case that one would want to deal with. The example of the high-voltage electricity grid was mentioned, a natural monopoly, which is often owned by a company that is dominant in the industry. While the grid may be a natural monopoly and State aid for this function may be appropriate, there is still concern whether the EC should allow subsidies to a large dominant player in the industry.[22]

Other comments were that the SIT was too simplistic and mechanistic. Still, it was viewed to be important to find a method to sort out the 'important' cases because the Courts have judged that a lot of measures fall under State aid.[23]

It should be noted that the Significant Impact Test was dropped by DG Comp and the current approach is described in the State aid action plan.[24]

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20 Other cases in which the Commission took the view that there was no effect on competition include the Ecomusee case (NN136/2001) involving the activities of museums and the Brighton Pier case, which involved running a heritage centre.

21 Meeting with DG COMP, 31 May 2005.

22 Meeting with DG COMP, 31 May 2005.

23 Meeting with DG COMP, 13 June 2005.

24 Comments from DG ECFIN, 21 March 2005.

The State aid action plan

The State aid action plan (SAAP) is a consultation document that was launched shortly before the finalisation of this study. The SAAP aims to initiate a reform that leads to "less and better targeted aid" and "a refined economic approach". The SAAP further addresses the procedures of State aid control aiming at more effective procedures, better enforcement, higher predictability and enhanced transparency. Finally, it emphasises the "shared responsibility" between the Commission and Member States.

Focusing on the substantive proposals of the SAAP, there are a number of elements that are related to this study:[25]

- The SAAP emphasises the need to "better focus and target certain State aid towards the objectives of the re-launched Lisbon Strategy". Emphasising whether the objective of State aid is worth pursuing is a central part of the methodology proposed in this report.

- The SAAP emphasises the need to analyse market failures in order to "evaluate better whether State aid could be justified and acceptable, would represent the most appropriate solution, and how it should be implemented to achieve the desired objective without distorting competition and trade to an extent contrary to the common interest". The SAAP explicitly names externalities, public goods, imperfect information, coordination problems and market power as areas of market failure.

The SAAP identifies a number of key priority areas for State aid including innovation (e.g. through R&D aid), stimulating entrepreneurship (e.g. through risk capital), investing in human capital (e.g. through training aid), provision of Services of General Economic Interest (SGEI), a more focused regional aid policy, environmental protection and setting up modern transport, energy and information and communication technology infrastructures. A further aim is to simplify and consolidate the existing block exemptions and to issue a "general block exemption" that will set clear "positive" and "negative" priorities.

Definition of "injury" and "serious prejudice" under the WTO Subsidies Code

Under the WTO rules injury to competition is determined on the basis of (a) the volume of the subsidised imports and the effect of the subsidised imports on prices in the domestic market for like products and (b) the consequent impact of these imports on the domestic producers of such products (Article 15). "Serious prejudice" usually arises as a result of adverse effects (e.g., export displacement) in the market of the subsidizing Member or in a third country market. "Serious prejudice" arises in the following circumstances:[26]

(a) The effect of the subsidy is to displace or impede the imports of a like product of another Member into the market of the subsidising Member.

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25 See Competition Policy Newsletter Number 2, Summer 2005.

26 Art. (6) of the Tokyo Round Subsidies Code, available at http://www.worldtradelaw.net/tokyoround/subsidiescode.pdf.

(b) The effect of the subsidy is to displace or impede the exports of a like product of another Member from a third-country market.

(c) The effect of the subsidy is a significant price undercutting by the subsidised product as compared with the price of like product of another Member in the same market or significant price suppression, price depression or lost sales in the same market.

(d) The effect of the subsidy is an increase in the world market share of the subsidising Member in a particular subsidised primary product or commodity as compared to the average share it had during the previous period of three years and this increase follows consistent trends over a period when subsidies have been granted.

The European Commission's mandate is focused on ensuring that competition "in the internal market" is not distorted and it is therefore not the Commission's role to be the "arbiter of all sorts of local subsidy disputes, as long as these issues have no link to either competition in the internal market as a whole or the competitiveness of the Community industry".[27] Given that the EU seems in principle to express concerns only when there are significant external effects across Member States such as economic external effects through intra-EU trade, a definition of harm to competition in the sense of the WTO definition of "injury" and "serious prejudice" to competition which focuses on the effect of State aid on the cross-border trade of the product concerned may be useful to filter cases.

Effect on competition in trade in goods and unfair pricing cases

Redressive measures in trade in goods are based on measures of injury and aim to deter price dumping and other unfair pricing practices. These practices can inspire the development of methodologies to analyse the effect of State aid on competition and trade. Depending on the industry in question, however, the methodology requires potentially significant adjustment. One relevant recent example of a regulation that requires the calculation of "injury" in the context of a particular industry is Regulation 868/2004, which is concerned with unfair pricing practices in the airline sector, and, in particular, with unfair pricing practices of non-EU carriers.

The Regulation empowers the Commission to apply redressive measures, typically in the form of duties, upon non-EU carriers in order to nullify the benefit of any subsidies or non commercial advantages those carriers have received where the benefit of such subsidies - including unfair pricing practices causes injury to competing Community carriers. The Commission wishes to implement the Regulation by as close an analogy with its practices and procedures in the field of trade in goods as is practicable. This implies imposing duties that are no greater than the lesser of:

- ***The Undercutting Margin***: which for trade in goods is the difference between the EU producer's price and the lower price of the non-EU producer for the same product, expressed as a percentage of the EU producer's price; and

27 http://europa.eu.int/comm/commission_barroso/kroes/themes/state_aid_en.html.

- ***The Underselling Margin***: which for trade in goods is the difference between the EU producer's theoretical price if it wished to cover all its costs for that product including an element of reasonable profit and the lower price of the non-EU producer for the same product, expressed as a percentage of the non-EU producer's price; and

- ***The Subsidy Value***: for cases dealt with under the subsidy provisions of the Regulation in Article 4, this would be the value of the benefit of the subsidy to the non-EU producer.

3. REVIEW OF LITERATURE REGARDING THE IMPACT OF STATE AID

3.1. INTRODUCTION AND KEY RESULTS

Different interpretations of "impact of competition" lead to different policy conclusions. For example, if there is market power and goods are not very differentiated, State aid that lowers the perceived marginal costs of the recipient or that lead to entry is likely to have a particularly strong negative effect on rivals' profits. If we chose "reduction of rivals' profits" as the interpretation of "distortion of competition", we would find a significant effect in markets with these characteristics. At the same time, it is precisely in this market structure, when the short-term effect on consumers (and, indeed, welfare) is likely to be beneficial, suggesting "no distortion of competition" from a consumer or even social welfare perspective.

Thus, we begin the literature review by discussing different *concepts of "competition"* and their applicability in the context of State aid. One important result of this review is that, for the remainder of this report, we propose to use a concept of "effective competition" that includes an analysis of impact on competitors and consumers. Our concept leaves sufficient room to include equity considerations and to capture the effect on trade in a specific way.

The literature provides some arguments why one may want to diverge from a social welfare standard in practice. In particular, we discuss distributional concerns, imperfect information and strategic behaviour, division of labour and legal constraints as potential reasons for choosing different approaches. The review does not lead to a convincing justification for abandoning a social welfare standard:

- Distributional concerns may suggest putting a lower weight on profits than on consumer welfare because profits may benefit citizens outside the common market or because it is believed that a Euro gained due to lower prices has a more desirable distributional impact than a Euro gained through higher capital income.

- Imperfect information and strategic behaviour arguments have been developed in the merger control context. There they have provided some arguments for putting a lower weight on profits. There is no such analysis in the State aid context where actors are Governments.

- Division of labour or subsidiarity arguments are sometimes used to suggest a focus on the impact on foreign rivals' profits. Such an approach would make use of the results of the strategic trade literature, which finds that Governments may have an incentive to provide excessive aid when the benefits tend to arise within the country and the burden is carried outside the country, due for example to the "business stealing effect". This would argue for an approach that focuses in a first step on the negative effects of State aid on foreign rivals' profits. We find that such an approach unduly neglects the impact on foreign consumers. Furthermore, Governments may provide excessive State aid for other reasons. There is theoretical support and empirical evidence for many other reasons for Government failure in modern democracies.

- The current legal environment provides only limited guidance for the appropriate criterion to prioritise State aid control.

In order to analyse the distortion of effective competition that is caused by State aid, we need to have a clear view of the welfare of consumers and competitors in the absence of State aid. Indeed, State aid is given for specific objectives. If these objectives have been formulated with thought, we would expect that in a world without State aid at least some market actors are worse off. In many situations where State aid is provided, the effect on competition and trade needs to be assessed by comparing a "with aid" situation to a situation "without aid" that is characterised by market failure. We therefore argue for an integrated approach, which takes into account the potential benefits of State aid. Ignoring the objectives of State aid would lead to wrong conclusions regarding the distortion of effective competition.

Thus, in Section 3.2, we continue reviewing the main implications of the literature that is relevant for the analysis of the *intended benefit of State aid*, i.e. we ask what is the market failure or equity concern addressed by State aid. State aid without a benefit distorts competition and should be ruled out *per se*. If there is a benefit, the relevant counterfactual for assessing the impact of State aid on competition needs to be a world without this benefit. One important result of our approach is that it essential for the assessment of the distortion of competition to consider the intended benefit as it may determine the counterfactual used in the analysis of State aid cases.

The rationale of State aid is usually based on either the belief that there is market failure that can be reduced by providing State aid or a by equity considerations that motivate State aid to increase social and regional cohesion. The literature on market failures and regional development is vast and the measurement of the precise impact of market failures is notoriously difficult. We neither attempt to provide a full survey on each of the areas nor to explore all issues related to measurement problems. Rather the aim is to show that in some situations considering the nature of the market failures is potentially as important to identify a correct methodology for assessing the distortion of effective competition as other considerations. To see the point consider the following examples:

- Innovation has many characteristics of a public good. Investment into basic research may be well below socially desirable levels as the returns associated with innovation are often difficult to appropriate given that ideas spread easily. Properly targeted State aid may therefore lead to the provision of a public good that would, in the absence of State aid, not be provided. If, in the absence of State aid, there is no market for the public good, State aid cannot distort competition. Potential problems may arise if, and only if, State aid also changes the production conditions for (related) private goods.

- One argument for SME aid is that smaller firms suffer from a market failure caused by capital market imperfections. This kind of market failure is thought to affect small firms much more than large firms. Hence, SME aid that aims at correcting this market failure may not distort competition between SMEs and large firms.

- Regional aid is often justified on the grounds of equity considerations as well as with reference to ideas to provide a "critical mass" of economic activity that triggers other investments and kick starts development of a sector in the region or, indeed, the entire region. If equity considerations matter, welfare in less developed areas may get a significant weight in the welfare considerations so that even if State aid negatively affects growth in other areas may be tolerated.

- Rescue and restructuring aid may only be justified with reference to temporal adjustment problems. Thus, one obvious criterion for assessing the distortion of competition is whether aid for this purpose is truly one-off and limited in time. This argument does not apply to other aid schemes. Capital market imperfections that constrain SME financing may be more effectively addressed by providing continuous access to a credit facility with a grant element than by providing a one-off subsidy.

These discussions have another interesting implication. We find that the concepts found in the literature on market failure provide some arguments for having different "guidelines" or "rules" for different contexts of aid, as is current EC practice. An across the board method to measure the effects on competition may be inappropriate. In this report, we attempt to undertake a first step to developing a methodology for the assessment State aid in the context of R&D and R&D aid.

We purposely limit the review in Section 3.2 to "intended" benefits. There is a separate body of mainly empirical literature that studies the *effectiveness of State aid*. In Section 3.3 we therefore review some of the literature on the effectiveness of State aid. This literature has interesting implications for a methodology that attempts to capture the effects of State aid on competition:

- The literature shows that State aid generally is effective, in the sense that giving aid has an impact on a measure of the objective of aid. While this is insufficient evidence to argue for or against State aid (there are some negative side effects to consider as well, see below), it does underpin the claim that assessing the potential benefits is important.

- An intuitive, but important, finding is that quite generally there are diminishing returns to aid on an aggregate level. Higher levels of aid reduce the effectiveness of aid. In the case of sectoral aid to railways it was found that for high levels of aid intensity (aid relative to cost) an increase in aid that increases the aid intensity further might reduce the effectiveness of aid. Aid that triggers additional investments, however, may enhance efficiency. These results suggest that there may be arguments to limit the amount of State aid relative to an appropriate measure that is likely to differ by objective.

- There is clear evidence that the financial instruments used (we also refer to the "aid instruments") have an impact on the effectiveness and therefore also on the effect on competition. Moreover, aid for one purpose (say SME) may also serve another objective (innovation). Indeed, the two aid schemes may be complementary with higher aid for SME making R&D aid more effective and vice versa (there is evidence of this and other complementarities). More generally, we find authors that argue that State aid should not be investigated in isolation but in the context of other activities of Government intervention.

The empirical literature on the effectiveness of State aid focuses on the effectiveness relative to the objectives. There is, however, also a large body of literature that highlights a number of unintended side effects or *general cost of State aid*. In particular, at least two types of unintended side effects can be identified. First, raising the funds for State aid will usually lead to shadow costs of aid that are larger than the actual amount raised. Second, the existence of aid may divert resources to unproductive lobbying activities, costly accounting and surveillance activities by the State and the firm, and thereby increase 'transaction costs'. Even if the exact size of these unintended side effects will always remain subject to debate, it is important to keep these costs of State aid in mind when determining the strictness of State aid control.

State aid differs from competition policy in that the European Commission controls Government behaviour and not the behaviour of private, profit maximising firms. When developing a methodology for State aid control one may therefore want to argue that the European Commission should focus on those situations where the interaction between Governments leads to *incentives for Governments to provide excessive aid*. In Section 3.4 we therefore review three classes of models that study these incentives. One class, which is routed in the strategic trade literature, focuses on the market stealing effect of State aid (committing to lower prices can shift production to the domestic firms) and the beneficial effect of lower prices considering different distributions of consumers and producers across the common market (where the State aid policy applies) and foreign markets. This class of models find that

- If producers have strong market power, welfare maximizing Governments of Member States may have an incentive to provide subsidies that reduce marginal costs.

- If producers are located inside but customers are located (exclusively) outside of the common market, Governments do have an incentive to provide excessive State aid (with respect to welfare in the common market) and the welfare of the common market's citizens is increased if the State aid is banned.

- If producers and customers are all located in the common market, marginal cost reducing State aid can help in overcoming the oligopolistic distortion (i.e. a market failure) to the benefit of welfare in the common market. If funds, however, are generated through distortionary taxation this result breaks down for reasonable levels of shadow costs.

- A Member State that has a large share of the overall market demand has a greater incentive to provide excessive State aid. The reason is that it internalises more of the benefit of the State aid to consumers, but faces the same "profit" stealing incentives.

Another class of models, routed in the public finance literature, studies the Governments' incentives in a setting where Governments provide public goods and Government competition influences the allocation of local public goods. This literature develops reasons to be sceptical of even non-discriminatory State aid. The reasons are the same as the reasons for tax harmonization on capital taxation across Member States. We conclude that absent such tax harmonization, non-discriminatory State aid may not be a fruitful area for intervention.

Finally, there is work that considers recent results from the trade and geography literature and takes into account locational externalities of firms. Governments bid for these firms to motivate them to locate in their jurisdiction. While a theoretically appealing benchmark has been developed in which State aid eliminates the distortion of competition – because it leads firms to internalise all externalities of their decisions – we find that these results are of very limited applicability. Mainly, we believe the modelling assumption are too strong and not robust, and that there are reasons to believe that uncontrolled State aid leads to considerable distortions of competition in practise.

All classes of models show that State aid that results from "Government competition" can have positive effects but also point to conditions under which Government competition leads to levels of State aid that reduce welfare (compared to a "no aid" situation). As indicated above, some of these models operate with quite strong and restrictive assumptions. We therefore hesitate to derive strong conclusions from these models.

As the summary above shows, a number of important implications for assessing the distortions of competition follow from reviewing the literature that does not explicitly focus on the distortions of competition and trade that may result from State aid.

With this background, we move on in Section 3.5 to review the existing literature that more explicitly focuses on the *effect of State aid on competition and trade*. This literature is relatively scarce and recent. We carefully review two studies that focus on the effect of State aid on rivals' profits in a setting that abstracts from market failures (other than imperfect competition). The analysis yields a number of quite robust results. The effect on rivals' profits is generally greatest

- the higher the amount of State aid,
- when product differentiation is in the intermediate range,
- the higher concentration in the market.

While this literature provides valuable insights on the likely effects on rivals' profits its conclusions are of limited relevance for an assessment of the impact of State aid on effective competition. Precisely when State aid is likely to have a strong negative effect on rivals' profits (e.g. because the recipient lowers prices) it is often most likely to have the strongest positive effect on consumers (lowering prices that were previously inflated due to market power). Indeed, if market power were the only market failure (as assumed in these models) State aid would be forbidden exactly when it has the potential to improve welfare. In all other situations modelled like this it is clearly wasted. Indeed, with the potential exception of innovation aid, the benefit to consumers is generally greatest

- the higher the amount of State aid,
- when product differentiation is in the intermediate range,
- the higher concentration in the market.

Moreover, State aid is analyzed in a setting that seems of limited relevance in practice, i.e. when the aid addresses no market failure other than imperfect competition (reducing

market power is currently not a prime objective for State aid). However, State aid is rarely (if ever) given to directly address imperfect oligopolistic competition. Rather aid is often given to address other market failures. Where aid is given to address market failures other than imperfect competition, the literature uses the wrong counterfactual (a world without market failure).

Indeed, we find a crucial gap in the State aid literature that studies the distortions of competition. We lack general models on State aid that study the effects on rivals *and* consumers in realistic settings. To be clear, the work on measuring the impact on rivals' profits is an important and valuable step in the right direction. It is, however, insufficient to derive policy conclusions.

It is well known that the instruments and methods used to grant State aid can be decisive for their impact on competition. The empirical literature suggests that different *aid allocation mechanisms* also imply different effectiveness (Section 3.6). Often it is not the subsidy as such but the selectiveness that causes the concern of a negative effect on competition (aid is only considered as State aid if it is selective). Even schemes that appear open to all firms may have asymmetric effects. Although the lack of open and transparent competition for Government funds is a common source of inefficiencies, a general formula that links more asymmetry to more distortion of competition does not hold. Aid that leads to entry in an oligopolistic market with imperfect competition is asymmetric ex ante (only entrants can potentially benefit) and ex post (the entrant enjoys the subsidy, incumbents do not). However, rather than distorting competition such a subsidy reduces distortion of competition. Moreover, there may be excessive entry as a result of subsidies, an issue that has been discussed for example, in the context of aid to regional airports.

We find that in the context of developing a *practical methodology and measurement techniques*, the literature on identifying market power in the competition policy context is relevant (Section 3.7). It provides useful techniques to identify market power in order to evaluate the use of these techniques in the context of State aid investigations. For example, we can draw on standard market definition techniques that have been developed in the context of competition policy. Previous work, however, also suggests that we need to account for some differences between market definition in antitrust and State aid cases (Fingleton et al. 1998):

- Aid to a firm may potentially spread to all products produced. A necessary first step to identify the initial product market affected is therefore to consider all of the markets in which it sells output and purchases inputs. For each of these markets, substitutability in demand can be used to define a set of relevant competitors.

- Second, as the recipient may lower its costs of production, it can be important to identify markets into which it may enter when receiving aid. In contrast to antitrust cases, however, supply side substitutability of other firms into the relevant market is likely to be much less important because State aid typically leads to lower prices and thereby makes such entry less likely.

- Third, special care needs to be taken to investigate markets for complementary products (e.g. necessary inputs) also. To define the relevant markets in these complementary products, demand side substitutability should be used.

- Fourth, one sometimes also needs to consider the markets for complementary products of the recipient's direct competitors.

Given the breadth of the relevant literature a clear challenge in this project is to maintain focus. When reviewing the academic literature in the above mentioned fields and regarding the impact of State aid on competition we have focused on

- Methods relevant for the measurement of the impact of State aid on competition and

- Results that are immediately relevant for the understanding of the relationship between different aid instruments, the market structure, and the impact on competition.

In Section 4 we make use of the candidate criteria identified in the literature. For each criterion listed we found arguments in the literature that it may be relevant for an assessment of the likely distortive effect on competition.

3.2. CONCEPTS OF COMPETITION AND TRADE

To analyze how State aid affects and potentially distorts competition and trade, we need to *operationalise the notions of competition and trade*. Most thoughts how to handle trade follow from the discussion on the notions of competition, which we therefore discuss first. At the end of the chapter, we also discuss the interpretation of "effect on" or "distortion of" that will be used throughout the report. This latter definition is relevant for identification of the appropriate counterfactual, which could be a world with "no aid and no other intervention" or a world with "no aid and optimal intervention".

There are different definitions for competition within the field of economics. Prominently, Stigler (1987) defines it as 'a rivalry between individuals (or groups or nations), and it arrives whenever two or more parties strive for something that all cannot obtain.' This definition encompasses a great variety of situations. Defined this broadly, it is apparent that 'more competition' is not good *per se*. Nations engaging in a war is perhaps a good example of undesirable competitive behaviour. A reasonable definition of distortion of competition for the purpose of this study must be one that protects *desirable rivalry* within the European Union. Furthermore, the above definition allows for rivalry between politicians, Governments, and even animals and does not focus on 'economic market interactions'. We will consider how 'economic market interactions' are distorted by the Member States' aid, i.e. the rivalry between suppliers and customers within the common market or parts thereof.

Economists view competition as desirable rivalry if it increases welfare. The most common welfare criterion in the literature is that of total or social welfare, typically interpreted as the sum of producer surplus (i.e. profits) and consumer surplus (the difference between the willingness to pay for a good and the price) in all markets. In order to distinguish rivalry from desirable rivalry, some authors have used the term "effective competition" to refer to rivalry that enhances welfare (e.g. Vickers 1995).

The EC Merger Guidelines also link competition and a welfare criterion. They use the terms "enhance competition" and "benefits to consumers" interchangeably (European

Commission 2004). In past practice, "distortion of competition" within the State aid context appears to have been interpreted mainly as the effect on rivals' profits.

In order for "distortion of competition" to be meaningful in a normative context, it needs to be linked to a welfare criterion. What is less clear is the relative importance of profits and consumer welfare in this standard.

The previous work on distortions of competition in the State aid context provides only limited guidance on the appropriate approach. As discussed in the introduction to this chapter, there is significant variation in the approaches chosen. To see this consider the following examples:

- Garcia and Neven (2004) develop a model to analyse the effect on competitors' profits. They can distinguish between domestic and foreign competitors. A recent report by Frontier Economics (2004) takes a similar approach.

- The Economic Impact Test group in DG Comp identifies "avoiding negative spill over of State aid on other Member States" as the most convincing goal for State aid control. They base their arguments on practical and legal considerations (see Non-Paper).

- Collie (2000 and 2002) analyses the effect of State aid on social welfare also considering the shadow costs of raising the funds. Besley and Seabright (1999) focus on a social welfare standard and Harbord and Yarrow (1999) also consider effects on social welfare.

- Fingleton et. al. (1999) develop a methodology of market definition in the State aid context considering effects on producer and consumer surplus and tracing the effects across national boundaries. They emphasise the need to trace the distribution of gains and losses in order to distinguish between effects on producers and consumers (p. 83). In the context of their study, they defer the normative question regarding the weights put on producer vs. consumer surplus to others (p. 86).

- There may also be a desire to harmonise the welfare standards used in competition policy and State aid control and move to a common consumer welfare standard.

In summary, a review of the previous literature provides little guidance as the weight put on profits ranges from 100% (current practice, Garcia and Neven (2004)) to zero (proposals to align competition policy and State aid control).

Adopting a purely normative point of view, ignoring practical or legal constraints, which criterion is best? We argue that the logical starting point is to consider social welfare of the EU citizens.[28] A priori there is no justification for why the well being of an EU citizen should be considered when he is consuming a good but the well being of the same citizen should be neglected when he benefits as a producer (say indirectly through holding

28 Note that in specific cases the European Commission may also be obliged to take into account the interest of other European Economic Area (EEA) countries and limitations that follow from the rules of the World Trade Organisation (WTO).

stocks) or suffers as a taxpayer. We acknowledge that there are many good practical reasons for a departure from a pure social or total welfare standard. The current approach, however, is that social welfare considerations are often not explicitly considered in the competition policy context and the reasons for a departure are not provided. Similarly, in State aid control a pure consumer welfare standard seems difficult to reconcile with current practise as it may lead to a very permissive State aid control policy. As our discussion in Section 3.5 shows, State aid will often lead to lower prices and thereby benefits consumers at least in the short run.

Thus, we propose to be clear that the "ultimate" objective of Government intervention should be social welfare. A departure from this criterion "in practice" needs to be argued and there are many valid arguments in the debate. Being explicit about the ultimate objective has an important advantage: With such an approach, we can analyse the context of Government intervention and propose different "practical" objectives for say merger control than for State aid and still operate within a common and consistent framework.

Having established total welfare of EU citizens as the appropriate ultimate objective, we propose the following definition of distortion of effective competition through State aid:

> *State aid distorts effective competition whenever it lowers the total welfare of EU citizen, where the definition of total welfare may allow for some redistributive aims.*

What then are potential arguments for regulatory authorities and Governments in favour of putting a lower or higher weight on producer surplus "in practice"? We identify a number of different reasons that are discussed in the literature. We choose the following categories to organise the arguments:

- Distributional concerns
- Imperfect information and strategic behaviour
- Division of labour and simplicity
- Legal constraints

If one finds arguments for putting a low weight on one objective, other complementary considerations like the aim to reduce enforcement costs and to enhance legal certainty may well suggest giving it zero weight in practice.

3.2.1. Distributional concerns

From a political perspective, higher profits of firms often seem to have a much lower value than a gain in consumer surplus caused, for example, by lower prices. While there is agreement among economists that there is no reason why a Euro impact on a particular individual should not be affected by the individual's identity as a consumer or a shareholder, there are attempts to justify a higher weight on a gain in consumer surplus

based on distributional considerations.[29] A higher weight on consumer surplus could be justified if the average wealth level of the affected consumers is lower than the average wealth levels of the affected shareholders.

The case for this approach, however, has not been made. We are not aware of relevant analysis in the context of State aid policies. An analysis of merger control in the Canadian context leads to an interesting result. In Canada a balancing weights approach was required by the Court of Appeal in a recent much discussed merger decision (the Superior Propane case). This approach required taking into account the distributional impact of the merger. An analysis by Ross and Winter (2004) suggests that the implied weights are very close to (0.5, 0.5), i.e. the weights of a total surplus standard. More generally Ross and Winter conclude:

> *"Unless merger law is to be used more extensively for redistribution of income than Government policies designed specifically for that purpose, the merger decision [based on distributional consideration], except in very rare cases, will result in the same outcome as the decision reached by the total surplus criterion" (Ross and Winter, 2004)*

Based on this analysis it is not clear why different distributions of wealth across shareholders or consumers should be a powerful argument for putting zero weight on income out of shareholdings.[30]

Another distributional issue appears if the Government or regulatory body is only concerned with welfare in its jurisdiction. This may provide a rationale for putting lower weight on firms' profits if non EU-citizens hold considerable ownership in the relevant firms. However, it is still not a reason to put a weight of zero on profits.

Regional aid may be handed out for the purpose of increasing the welfare of citizens in disadvantaged regions. In principle, however, the notion of equity is consistent with a welfare criterion in which those (or in general poor) citizens are given a disproportionate weight.[31]

Thus, we conclude that distributional concerns provide only a weak argument for putting a lower weight on profits than on consumer welfare. The argument based on the fact that profits may benefit citizens outside the common market and should therefore be given a lower weight than the welfare of European consumers is a somewhat more promising line of reasoning to justify that a Euro gained due to lower prices has a more desirable impact than a Euro gained through higher capital income.

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29 See Ross and Winter (2004) for a survey of the discussion in the merger context.

30 The Commissioner responsible for the *Superior Propane* case made an analytical error, which has triggered debate about the appropriate standard. Since Canada is one of the very few countries using a welfare approach that seems more explicitly grounded in economic theory this may lead to premature general conclusions that a social welfare approach is unworkable.

31 A peculiarity of this approach is that a rich citizen in a poor area receives a higher welfare weight than a poor citizen in a rich area.

A priori, we do not see a good reason for why the European Commission should use different weights in the welfare function in State aid control than in competition policy. Any differences would have to be justified based on differences between the two policy areas. We believe that this is an interesting area for further discussion and investigation.

3.2.2. Imperfect information and strategic behaviour

Imperfect information and strategic behaviour may affect the process of Government intervention. As a result one may want to deliberately bias the objective function of the enforcement agency in order to achieve the optimal outcome in terms of social welfare.

In the merger control context, a society that aims at maximizing total welfare and delegates merger control to a competition authority may want to instruct this authority to bias its decisions in favour of consumers. Various reasons have been put forth in the literature for why merger decisions that are based on a consumer welfare criterion may achieve higher total welfare than if the competition authority used a total welfare standard.

One reason is that firms, in contrast to consumers, can influence the outcome in their favour through lobbying and rent-seeking activities. Society may therefore want to bias the decision standard in favour of consumers. Röller and Neven (2000) highlight this in a model where lobbying takes place through monetary bribes or in kind transfers to the regulator and realistically consumers are presumed not be organised in a lobby. Intuitively, the competition authorities merger decision is based on both the merits of the case and the lobbying expenditure of the parties involved. A consumer standard thus makes it more expensive for firms to change the regulators decision. Because consumer are not represented in the lobbying process, biasing the welfare standard in their favour can lead to decisions in which the welfare of all groups – i.e. the firms that engage in lobbying and consumer who do not – has similar weight on the overall decision.

Lagerlöf and Heidhues (2004) highlight that the informational advantage of merging firms regarding efficiencies and their incentives to use this information strategically, can also explain why merger decisions regarding efficiencies should be based on a welfare standard that is biased against firms. In their model, lobbying activities of firms do not involve side payments to regulators. Rather firms choose to report their (useful) information selectively to the competition authority. This reporting can occur in regulatory hearings or through informal channels. Among other things, they find that when the benefits of this informational lobbying are greater to the firm than to society as a whole, which can be interpreted as a situation in which the firms gain but consumers are worse of, firms have an incentive to invest excessively into this form of informational lobbying. A consumer standard avoids this potential overinvestment problem (though in general a pure consumer standard is not optimal in their model).

A tougher merger standard, such as consumer surplus, may also induce firms to choose better merging partners as Besanko and Spulber (1993) highlight.

It is noteworthy in this context that while merger decisions are based on a consumer standard, competition authorities are concerned with lowering the cost burden that the merger proceedings place on firms. Hence, they do not fully ignore the profit of firms. This

is in line with viewing a consumer standard as an instrument that helps to achieve outcomes that are desirable from a welfare standard.

Imperfect information and strategic behaviour arguments have been developed in the merger control context. There they have provided some arguments for putting a lower weight on profits. There is no such analysis in the State aid context where actors are Governments. Intuition based on the results of Neven and Röller above, however, suggests that – especially domestic – rivals should not be given excessive weight in State aid cases. Consumers, who typically benefit, are not organised and hence State aid decisions induced through lobbying will tend to neglect these benefits. State aid decisions are also likely to undervalue the consequences on tax payers, who face similar problems to organise as consumers do. Thus, economic intuition suggests that not only the benefit to consumers but also Government funds should be given weight in State aid case. Developing similar political economy approaches as the ones discussed above within the context of State aid may lead to further interesting results.

3.2.3. Division of labour

A prominent argument in the literature on State aid is that if Governments have the right incentives to provide State aid, then there is no need for the European Commission to intervene (Besley and Seabright, 1999). Thus, the European Commission may want to focus on those cases where the Government does not have the right incentives. As our review of the relevant literature in Section 3.4 shows, broadly speaking, it develops two arguments for why Governments may provide excessive amounts of State aid.

- First, Governments may provide excessive State aid if the benefits accrue mainly within the national boundaries whereas the burden is for firms and/or consumers in foreign countries. This may lead to an argument for focusing State aid enforcement on those situations where foreign firms are hurt (note that generally foreign consumers will benefit).

- Second, Governments may suffer from a lack of ability to commit to a specific aid level, which can lead to soft budget constraints and/or distort intergovernmental competition especially in the context of attracting greenfield investments. With the EC monitoring the Government, this commitment can be given and beneficial aid flows.

A third, typically more informal, argument for the EC to monitor State aid is based on the susceptibility of Member States Governments to rent-seeking activities of firms. Roughly, speaking, politicians may hand out State aid that benefits firms and is not in the interest of their citizens more generally due to various forms of political failure. If voters could better control their Governments, then ineffective State aid would be prohibited increasing welfare. Broadly speaking, there are at least two important fundamental reasons for why voters may not be able to fully control their politicians (Persson and Tabellini, 2000).

- First, it is impossible for society to give its politicians a complete contract, which would have to specify a payoff depending on all relevant performance measures and every decision the politician may take. Indeed, it is simply impossible to foresee the decisions politicians will have to face. Facing incentives through a highly incomplete contract only, politicians can extract considerable rents from being in office.

- Second, each voter has an insufficient incentive to get informed (she stays rationally ignorant) about electoral alternatives, because the probability of affecting the outcome of an election is minuscule. With voters being largely uninformed, politicians are not monitored closely enough and may take actions in their own, rather than in the general, interest. Clearly, many other reasons for political failure in modern democracies exist.

From this political economy perspective, the question is whether political failure together with the competition between Member States leads to bigger distortions than if the decision is undertaken on a European level. Given the experience with the common agricultural policy as well as the coal and steel industries, some authors have questioned whether policies that are set at the European level are more successful in resisting rent-seeking activities of interest groups. Nevertheless, if one views State aid as being largely a result of political failure, then needing the approval of another Governmental agency, such as the EC, can help by providing additional checks and balances. Furthermore, the mere fact that the EC analyzes various State aid cases and thereby provides information to voters could be beneficial.

To summarise, division of labour arguments can be used to suggest a focus on the impact on foreign rivals' profits and foreign consumers. Such an approach would make use of the results of the strategic trade literature, which finds that Governments may have an incentive to provide excessive aid when the benefits tend to arise within the country and the burden is carried outside the country. This would argue for an approach that focuses on the effect of State aid on foreign rivals' profits. There are, however, also a number of other arguments that suggest that Governments may provide excessive State aid for other reasons. There is theoretical support and empirical evidence for 'Government failure' in modern democracies, which could lead to excessive and distorted aid.

3.2.4. Legal constraints

In the past distortion of competition has often been interpreted by the EC as the impact on rivals (see Appendix I). This may make some sense - especially if emphasis is put on the "effect on trade". The reason is that the negative effect on trade will mainly materialise through the effect on producers (as foreign consumers are likely to benefit). In Article 87.1, both distortion of competition and effect on trade seem to be simple yes/no variables, though the former at least is subject to the usual de minimise principle. The effect on trade appears to have been introduced as a means of applying the principle of subsidiarity. As such, the legal framework does not seem to provide guidance on the appropriate welfare standard and the relative weights on the effects on competition and trade.

Some of the following paragraphs, however, do refer to the "magnitude" of effects. In Article 87.3 sub-paragraph (c) the magnitude of the effect on trade is a major element in determining whether derogation should be granted in favour of an aid. This sub-paragraph allows the Commission to authorise "aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest".

While (c) makes no mention of competition distortions, except in so far as they constitute distortions of trading conditions, sub-paragraph (d) permits derogations in favour of "aid to promote culture and heritage conservation where such aid does not affect trading conditions and competition in the Community to an extent that is contrary to the common interest".

It is interesting to note also that the Multisectoral Framework merges the effect on trade and the impact on competition in the single concept of “undistorted competition in the internal market”. Likewise, in the Rescue and Restructuring Guidelines (2004/C224//02) the terms “adverse effects on trade” and “distortions of competition” appear to be interchangeable.

We note that the legal interpretation of the “distortion of competition” and the “effect on trade” is by no means obvious and provides little guidance for prioritising State aid control efforts. For the purpose of this project, we have therefore adopted a purely normative approach.

3.2.5. Distortion, competition, market failure, equity and welfare

In the public debate on the objectives of State aid, it is often stressed that State aid shall address not only market failure but should also be designed to achieve social objectives. Economists often prefer to concentrate on market failures. This need not imply two different approaches but may simply reflect different understandings of the term “market failure”. If market failure is defined as a situation where the market does not achieve welfare optimal outcomes, it may well encompass “social” objectives like social cohesion and environmental protection. Ultimately it depends on the definition of “welfare”.

The most standard definition in (partial-equilibrium) economics is one of **total welfare** interpreted as the sum of consumer surplus, producer surplus and government revenues, which should be weighted by their shadow cost. A somewhat broader definition allows for different weights to be put on consumer and producer surplus. An even broader definition includes equity considerations through putting different welfare weights on the surplus obtained by different citizens, thereby allowing to emphasise the welfare of relatively poor citizens or citizens in relatively poor areas. In this report, we adopt the very broad **social welfare** concept that allows for different weights to be put on different citizens. Furthermore, we say that the market fails if it does not maximise the chosen social welfare function subject to the given resource and technological constraints. Thus, we adopt a (unusually broad) definition of market failure, which includes efficiency as well as equity considerations. Given this definition, the state should only intervene whenever the market fails.

Although we thus potentially include equity considerations into our welfare function, this has a surprisingly minor impact on the policy recommendations we derive below. The reason is that within the proposed methodology, our policy recommendations will only be affected if State aid is the optimal instrument to achieve redistributive concern. Typically, however, this is unlikely.

Another dimension of the definition of market failure is the nature of the effects covered. In theory, market failure is defined to describe a situation where the market outcome is not efficient, i.e. there is a better alternative solution that makes someone in the economy

better of and allows to fully compensate those that are worse of. Thus, the theoretical concept of market failure is derived from a welfare concept. Since we define distortion of effective competition in the same way, we could use the two terms synonymously. However, given that in practice “market failure analysis” and “distortion of competition” analysis are seen as two different elements, we use, for the purpose of this report the following definitions:

- State aid **distorts effective competition** whenever it lowers the total welfare of EU citizens, where the definition of total welfare may allow for some redistributive aims and where the analysis includes the effects of remedying the market failure, the general cost of intervention and distortions of competition in the narrow sense. The benchmark for the assessment is the better of two worlds, one with an optimal intervention or one with no intervention.

- We reserve the term **market failure** for situations where State aid can potentially induce an activity in which the direct social gains are higher than the direct private gains. The direct social gains will usually comprise the gains of the beneficiaries of the activity, for example those benefiting from environmental protection, those using the subsidised Services of General Economic Interest, etc. Thus, in our usage, market failure does not include a complete balancing of costs and benefits of State aid, which would require studying the general costs of State aid and the distortions of competition in the narrow sense. Hence, *in our terminology a market failure is a necessary but not sufficient condition for Government intervention* to be desirable.

- The term **distortion of competition** will then capture the indirect effects of State aid, which result from the effects on the rivals’ activities and the incentives of the recipient. We do not limit this term to the effect on rivals’ profits, as in previous studies on this issue. We find no convincing reason to a priori exclude the effect on the consumers of the rivals’ products. If rivals or consumers in other countries are affected, there is also a **distortion of trade**.

- Finally, we have the **general cost of providing State aid**, which include the shadow costs of raising the funds and the transaction costs due to lobbying and other activities.

In some situations the distinctions between these categories may be blurred. The decision to use these categories is driven by the desire to keep as close to common usage of the terms as possible.

3.2.6. Impact of competition on welfare

To apply our definition of distortion of effective competition, a first building block is to analyse through what channels the rivalry between firms affects social welfare. We start with a broad conceptual distinction.

- *Allocative efficiency.* We say that a (product) market allocation is allocative efficient if the consumers' marginal willingness to pay is equal to the marginal (social) cost of production for the goods in question. Furthermore, slightly abusing terminology, we restrict attention to the use of resources across society at a given point in time. In markets with many customers, if the market price is equal to the marginal cost of production, the allocation is efficient. Rivalry, for example, can help achieving allocative efficiency by reducing firms' ability to exploit market power through excessively high prices (over and above marginal cost) and\or insufficient service and\or insufficient quality. It may also help to produce necessary information on the relative scarcity of products.[32]

- *Productive efficiency.*[33] A firm achieves productive efficiency if it uses the available technology to produce its chosen level of output in the least costly manner. There is empirical support for the intuitive idea that rivalry between firms encourages them to produce in the least costly manner and that absent this rivalry firms become 'inefficient'.[34] Society achieves productive efficiency if the amount supplied in a given market is produced in the least costly manner given the available technology. Rivalry can help by selecting the most efficient competitors. It can also allow for important performance comparisons between different firms and managers. In the presence of scale economies (for example, if firms have a given fixed cost and constant marginal cost), increasing rivalry by increasing the number of firms induces a productive inefficiency as the scale economies in a market with more firms are not fully exploited (e.g. there is duplication of fixed cost in the example given).

- *Dynamic efficiency.* Rivalry *may* induce firms to innovate more to the advantage of consumers and society as a whole.

The proposed basic economic approach to measure the "*effect*" is simple and standard in existing State aid analyses: we propose to develop a methodology that compares the situation with State aid with the counterfactual situation assuming there had been no State aid in the market – including a comparison of the prices and quantities, potential effects on product quality or positioning, as well as the incentives to innovate in the two states of the world.

To estimate the effect of the subsidy on trade our approach calls, among other things, for estimates of the welfare of all consumers and all producers in all EU jurisdictions affected by the subsidy. Such analysis may include potential entrants, where a strong case for entry in the absence of State aid can be made.

In many cases the effect on consumers may be positive whereas the effect on competitors is negative. The methodology will discuss options to address this trade-off in

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32 Hayek (1945) argued that in a perfectly competitive market, market prices are all agents need to know in order to take the right decisions. In a sense market prices are a sufficient statistic for a highly complex environment and this statistic is the result of competition between economic actors.

33 See Vickers (1995) for how competition between firms can lead to productive efficiency.

34 Think of Hicks (1935) who stated that 'the best of all monopoly profits is a quiet life'.

practice, which in theory could be approached by weighing the two measures of the surplus.

For the aim of this study it is important to realise that from a purely theoretical perspective distortion of effective competition *cannot* be appropriately captured by:

- *Changes in market allocation*: It is often suggested that if Government intervention through State aid changes the market allocation, then it should be regarded as distorting competition. This reasoning is not, however, a good policy guide. If the Government hands out State aid for legitimate reasons, then it must aim at changing the market outcome for at least some participants. If this is undesirable *per se*, as the above test suggest, then all State aid should be declared illegal. As we will discuss below, there can be valid reasons for Governments to hand out State aid in order to correct for market failures.

- *Lower rivals' profits*: If a Government hands out State aid to correct for market failure, there can be no presumption that it will increase the profits of all firms. Suppose due to capital market failures, small firms are inhibited from engaging in profitable and welfare increasing investment activities. Then (in some cases) State aid to small firms may increase total welfare. But there can be no presumption that this kind of State aid will not at the same time reduce profits of large rivals. European State aid rules should not protect larger rivals in these circumstances. A policy that focuses on rivals' profits would lead to misguided policy decisions in these circumstances.

- *Higher prices*: Consider a sectoral aid program that reduces all firms' perceived marginal cost in a perfectly competitive industry. This will simultaneously lower the price and lower welfare, as true marginal costs remain unchanged. Hence, subsidies that lead to lower prices can distort competition.

- *Lower consumer surplus*: In the above example, the subsidy leads to lower prices and thereby increases the consumer surplus in that sector at the cost of Government spending. In a perfectly competitive market, however, the increase in Government spending is greater than the increase in consumer surplus because consumers value the added unit produced less than its marginal cost. Hence even with non-distortionary taxation, overall welfare falls when the subsidy is introduced.

- *Fewer firms*: Market power of firms tends to decrease in the number of firms in an industry. One may be tempted to conclude that competition policy should ensure a high or maximum number of firms in an industry. To the see the fallacy of this conclusion, consider a Cournot-type industry whose production technology exhibits fixed cost and constant marginal costs. As the number of firms is increased, rivalry leads to lower prices, thereby increasing consumer surplus. This effect tends to increase allocative efficiency. Due to the duplication of fixed cost, however, the cost of producing a given amount in the market place increases, i.e. the productive efficiency is lowered. This is a simple example where increasing the number of firms reduces the firms ability to exploit economies of scale and thereby may hurt overall welfare. Thus the number of firms is not an appropriate measure of competition.

- *More heterogeneity across firms*: Consider a homogenous good Cournot industry with two firms, one of which has high marginal cost and the other of which has low marginal cost. Then the firm with lower marginal cost will have a higher market share. Consider now a State that charges a per-unit tax from the low cost firm and subsidises the high cost firm per-unit of output. For simplicity, suppose that the tax and subsidies rates are chosen such that the firms' perceived marginal costs are equal to each other after the State intervention. In this case, the firms will have the same market share after the State intervention. (In the specific example given, the total sales also remain unchanged – if no firm exits the marketplace – as the total equilibrium quantity in a homogenous Cournot model depends only on the market demand curve and the sum of marginal costs.) Such State intervention, however, will reduce welfare as it redistributes market share from relatively efficient to relatively inefficient firms.

- *Fairness or level playing field*: Firms sometimes argue that due to their location decision, they have a disadvantage versus rivals. If the State then intervenes in order to compensate for this disadvantage, one may argue that it creates a level playing field. Such arguments, however, are misguided. Indeed, it is the difference in production conditions across locations that typically generate the benefits from trade expected from the common market. To equalise the production conditions in the name of fairness will typically lead to a welfare loss. Indeed, we have already established that it is not appropriate to equalise production conditions (and thus market shares) in the above Cournot example. It should be emphasised, however, that this does not rule out aid in order to attract business to disadvantaged regions if this addresses a valid market failure. But there is no presumption that such aid will lead to level playing fields in all industries.

- *Lower HHI*: The Hirshmann-Herfindahl Index (HHI) is also an inappropriate measure of welfare.[35] First, suppose firms are symmetric. Then as the number of firms increases, the index always falls. But, as we illustrated above, competition cannot be appropriately captured by the number of firms. Furthermore, consider the above two-firm Cournot example. If the market share is split equally across the firms, the HHI index is minimised for the given number of firms. But, if firms differ in their productive efficiency, then an equal splitting of the market is undesirable.

Our literature review has shown that from a theoretical perspective all measures are either flawed or incomplete. This does not imply that none of these criteria may be useful in practice. It does, however, suggest that one needs to justify why one or more of the criteria chosen are workable proxies for the distortionary effect on effective competition.

3.3. INTENDED BENEFITS OF STATE AID

In order to identify criteria to prioritise State aid control it is helpful to consider both the rationale of State aid and the rationale of State aid control. A more economic approach to State aid control should make both, the costs and the benefits of State aid more explicit.

[35] It may, nevertheless, be a useful, though imperfect, screening device to prioritise cases.

Indeed, the Lisbon objective of "less and better targeted aid" can only be achieved by focusing aid on those areas where the benefits are potentially the greatest.

State aid is usually justified because it can reduce market failure and promote equity (for a survey see Meiklejohn 1999). The latter is often discussed in the context of social and regional cohesion. There is a vast body of economic literature studying different kinds of market failure and economic and other literature studying social and regional cohesion. The purpose of this Section is to sketch some of the implications of the literature rather than to survey the literature. To see the point consider the following examples:

- Properly targeted State aid may lead to the provision of a public good that would, in the absence of State aid, not be provided. If, in the absence of State aid, there is no market for the public good, State aid cannot distort competition.

- Asymmetric distribution of information is known to lead to capital market imperfections that – at least arguably – particularly affect small firms. Aid that is properly targeted at small firms and effectively alleviates this market failure does not distort competition with large firms.[36]

- Rescue and restructuring aid can only be justified with reference to temporal adjustment problems. Thus, one obvious criterion for assessing the distortion of competition is whether aid for this purpose is truly one-off and limited in time.

These exemplary discussions have another interesting implication. We find that the concepts found in the literature on market failure provide some arguments for having different "guidelines" or "rules" for different contexts of aid, as is current EC practice. An across the board method to measure the effects on competition may not be appropriate.

Previous discussions of the benefits of State aid have pointed to further requirements in order to justify State aid:

- First, a proper assessment of the benefits would have to take into account not only the benefits of State aid but also whether State aid is the best (e.g. least distortive or least "costly") instrument for achieving that benefit (e.g. Verouden 2005; Garcia and Neven 2004, Meiklejohn 1999).

- Second, State aid may interact with other measures of State intervention. Thus, a proper evaluation of the benefits of State aid would have to consider the complementary action, possibly in the form of a more general "effective rate if assistance" measure (Messerlin 1999). Indeed, empirical analysis of State aid provides evidence of significant complementarities across different State aid schemes as well as between State aid schemes and EU structural funds (Röller et al. 2001).

- Third, given the shadow costs of raising the funds for State aid, one would want to avoid aid where it is not an effective and cost-efficient way of correcting a market failure. For a study on the effectiveness of aid see (Röller et al. 2001).

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[36] It could, however, distort competition between eligible small firms and non-eligible small firms (e.g. in another Member State). Also, it will distort competition if some small firms do not suffer from capital market imperfections.

By providing State aid, Governments may address various market failures that we list below.[37] Before doing so, we want to emphasise the well known fact that the existence of a market failure (compared to a first-best welfare benchmark) does not guarantee the existence of a welfare-improving Government intervention. A market failure is thus by no means a sufficient reason for Government intervention via State aid. Nevertheless, we will argue below that it is important to keep the (potential) market-failure motivation for Government action in mind when assessing the impact on competition.

- **Externalities**: Externalities arise if either the welfare of a consumer depends not only on the goods consumed but also on goods consumed or produced by others or the profits of a firm depend not only on its own use of factors of production but also on the use by others. Externalities are important in the context of innovation where it is difficult to appropriate the returns to knowledge. It matters in the context of training when employees transfer skills. Pollution is an example for negative externalities. Finally, firms' location decisions may lead to positive externalities for the region by encouraging other firms to also locate there.

- **Provision of public goods:** Some goods, like street lighting or radio and television broadcasting before the introduction of encoding and decoding techniques, can be consumed by one person without reducing the availability to others (non-rivality of consumption). Furthermore, it is difficult to prevent access to the good for those consumers that are not willing to pay for it (non-excludability). Public goods combine these two characteristics (non-rivality and non-excludability) and – unless firms have indirect means to charge for providing these – they will not be produced absent the State intervention. State aid can be used to ensure the provision of public goods.

- **Provision of merit goods:** If consumers underestimate the utility of a certain good and Governments have a clear and superior view on the optimal level of consumption, State aid can provide incentives to increase consumption. Examples for goods that are sometimes considered merit goods include education, cultural and health services. Note that these examples also involve the presence of externalities, e.g. because individuals benefit from the health and education of others.

- **Asymmetric or imperfect information:** Market failure may also result when firms or consumers have imperfect information and have to operate in an uncertain environment. In extreme cases the lack of perfect information can lead to incomplete or missing markets, which may justify State intervention. One example that is particularly relevant in the context of State aid is the incompleteness of capital markets, which is generally presumed to affect especially small firms.

- **Market rigidities:** Structural unemployment is sometimes explained with labour market rigidities. Where this cannot or is not tackled directly, subsidies have been used to lower labour costs. Where the subsidies are not available to all firms on the same terms, they constitute State aid.

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37 Market failures are usually discussed in textbooks on public finance or public economics (e.g. Leach 2004). For a review in the context of State aid see Meiklejohn (1999).

- **Frictional problems:** Frictional problems can be the result of individual firms or a sector or, like in the former communist countries, the entire economies require restructuring. Temporal one-off aid is then argued for in order to smoothen transition and avoid a sudden jump in unemployment.

- **Market power:** A firm (or group of firms jointly) has market power if its demand curve is downward sloping. In this case, by changing it chosen level of output the firm affects the prevailing market-clearing price. When increasing its output by one unit, the firm affects its revenue in two ways: On the one hand it sells an additional unit, which raises revenues by the market price. On the other hand, the increase in output lowers the market-clearing price, and hence the firm receives less for all those units it sells, reducing the incentive to increase output compared to a situation where market prices remain unaffected by individual output decisions (perfect competition). Hence, a firm that enjoys market power typically chooses a price above its marginal cost. This is the well-known allocative distortion that arises if firms have market power. In such case a State intervention that induces the firm to choose higher output levels would eliminate or reduce a market failure. To our knowledge, the reduction of market power is not considered as an explicit objective of State aid by the EC (or, indeed, the Governments providing the aid). Surprisingly, the literature on the competition effects of State aid has focused on the impact of State aid in settings where the only market failure is market power. There are, however, considerable arguments why market power, or its causes, should be addressed by structural policy (e.g. merger control) and efforts to reduce barriers to entry or expansion.

- **Coordination failure between Governments:** Governments also point to the necessity of being able to respond to subsidies granted by other Governments. While one of the reasons for State aid control is precisely the intent to prevent inefficient competition between Governments, the ability and the occasional implementation may be seen as important in international negotiations on reducing aid (see Messerlin 1999 for a comparison of the WTO rules and the EU State aid rules). We do not elaborate much on the role of State aid as a retaliatory measure but discus some general principles below.

Finally, State aid is also justified not on efficiency but on pure equity considerations. Demands for a uniform price for services of general economic interest across all regions and consumer groups are justified based on equity arguments. Regional policy is motivated to improve social and regional cohesion.

In the following, we review how market failures interact in different contexts of aid. In particular, we discuss regional aid and the following horizontal aid schemes:

- Services of General Economic Interest
- SMEs
- R&D
- Environmental protection
- Rescue and restructuring of firms in difficulty
- Employment

- Training

The discussion is not intended to provide a full overview of the relevant issues. Rather the intention is to show that a more detailed study of the context of aid is highly relevant for developing criteria to evaluate the distortion of competition.

3.3.1. Regional aid

The production of economic goods is often clustered in small geographic areas. One explanation, dating back to Alfred Marshall, is the existence of locational scale economies at an industry level, so-called “external economies”. Marshall provided different reasons for why external economies may arise in a geographically concentrated industry:

- The ability to support specialised supplier. An industry cluster provides a pooled labour market for specialised labour. This labour market pooling is to the advantage of workers and firms alike if there are firm specific labour demand shocks.

- Knowledge spillovers and informational diffusion through the informal exchange of information and ideas at the personal level is facilitated when an industry is concentrated in a small geographic area.

In the presence of external economies, however, location decisions can be path dependent, i.e. the existence of firms in a given area induces other firms to locate in its vicinity. Government then may have an incentive to influence these location decisions, either to help disadvantaged regions or because the location of too many firms in a given area can lead to congestion effects.

The Treaty of Rome motivates regional aid on equity considerations and on long-term growth considerations. One aim of regional aid is to achieve convergence, which may be achieved if regions with a low initial level of income per capita achieve higher growth rates of income per capita. The empirical literature shows that regional aid may foster convergence, with the EU regional funds being more effective than national funds (Röller et al. 2001, p. 112). One potential disadvantage of regional aid is that it may counter comparative advantages and slow down beneficial specialisation. For example, Midelfart-Knarvik and Overman (2002) argue that countries that have specialised according to their comparative advantage have achieved higher growth rates. EU aid that was successful in attracting R&D-intensive industries to countries and regions with low endowments of skilled labour is therefore characterised as distortive since it lowers the EU growth potential. In their study R&D State aid was found to be ineffective in attracting additional R&D-intensive industries to the donor countries. Generally the empirical results seem to be very mixed with some research pointing to positive effects of Government interventions and others offering a more sceptical view (see Röller et al. 2001, p. 97 for a summary of six relevant studies).

3.3.2. Services of General Economic Interest (SGEI)

As discussed above, the provision of pure public or merit goods should not lead to competition concerns as the relevant counterfactual is a situation without a market for the good. In practice, problems arise if providers of public or merit goods also provide

complementary services that are private goods. If public broadcasters receive State aid and also offer news and other services on the Internet, other providers of these private goods may be harmed.

Thus, while State aid for the provision of pure public and merit goods cannot, by definition, distort competition (the goods would not be provided in the absence of the State aid). Problems may arise in practise because the providers of public goods also provide (complementary) private goods. The analysis of the distortion of competition in this area should therefore focus on how targeted the aid is and the additional benefits that accrue to the provider of the public or merit good.

In cases involving public services, the assessment of the distortion of competition needs to take into account the costs of a public service obligation. Compensations for public service obligations fall outside of the legal scope of State aid.

The Altmark case is interesting in this context because it set some standards for cases in which costs that result from a universal service obligation can be compensated without falling under State aid. The European Court of Justice, however, has identified a number of cumulative conditions:

- The universal service obligation must be clearly defined.
- The parameters on the basis of which the compensation is calculated must be established in advance and in an objective and transparent manner.
- The compensation must not exceed the costs of the universal service obligation plus a reasonable profit.
- If the aid recipient had not been identified in a proper process (e.g. a tendering regime), the legal compensation is limited to the cost of a typical firm plus a reasonable profit.

The Altmark case is interesting as it shows that State aid cases can be avoided by choosing the appropriate instrument for allocating the State aid.

Particular issues arise if costs are shared between the public service activity and a "competitive" activity. Hence, public services such as postal services, banking, rail, bus transport and broadcasting pose a problem because a judgement needs to be made whether compensation for carrying out the obligation – such as a universal service obligation – actually constitutes State aid. The Commission's proposal for future public service obligation compensation suggests to exempt small public service operators and to create a framework for large-scale funding under Art. 86(3).[38]

38 "Recent developments in EC State Aid Policy", presentation given at the IBC Advanced EC Competition Law Seminar in London, April 2004, see http://www.lw.com/resource/publications/_pdf/pub984_1.pdf.

3.3.3. Small and Medium-sized Enterprises (SMEs)

Market failure may also result when firms or consumers have imperfect information and have to operate in an uncertain environment. One example that is particularly relevant in the context of State aid is the incompleteness of capital markets. Since banks lack perfect information about projects pursued by firms that ask for credit, banks cannot simply use a higher interest rate to compensate for riskier projects. By raising the interest rate banks attract more applications for high-risk projects, which are less affected by high interest rate than low risk projects as the latter have a higher probability of repayment. Moreover, by raising interest rates, banks create incentives for managers to choose riskier projects as the returns to successful projects decline.

In order to reduce the difficulties associated with imperfect information about the behaviour of firms and their managers, banks and other financial institutions have developed screening methodologies, such as studying the track record of the directors, to decide whether or not to provide a loan. Given that such screening costs are often independent of the credit volume and may be higher for smaller, less well-known firms, it is often argued that SMEs suffer more from credit rationing than larger firms.

Another implication of this literature is that the availability of internal financing will affect the possibilities of firms to pursue investments, which are worth undertaking. As a result, State aid can affect firm behaviour even if it is neither tied to a reduction of marginal costs of production nor conditional on specific business decisions of the recipient. Moreover, start-ups, which usually rely on significant external financing, are likely to be particularly affected.

Finally, projects differ in terms of the associated uncertainty. If banks have a clear understanding of the risks associated with an investment project the negative consequences for external financing are less pronounced. Innovative or long run investments, associated with significant uncertainty, are, however, more likely to be negatively affected.

Generally asymmetric and imperfect information can explain why capital markets are imperfect. As imperfect capital markets are more likely to negatively affect small firms, this may provide an argument to choose the size of the recipient firm as a criterion for the distortion of competition. Moreover, aid that intends to address market failure due to imperfect capital market should focus on projects of considerable uncertainty.

Commission Regulation 70/2001 on aid to SMEs exempts certain categories of aid granted to SMEs which fall below certain prescribed ceilings, concerning the aid intensity and the total project costs, together with the total amount of gross aid.

Apart from the fact that SMEs may suffer more from certain market failures than large firms other arguments are sometimes put forward in favour of SMEs: relative to large firms they may be more effective in employment creation, may be more flexible and adaptable and ease shifting resources from declining to expanding sectors (Harbord and Yarrow, 1999, p.91). These characteristics, however, are less directly linked to a justification for aid.

3.3.4. Research and Development (R&D)

It is often difficult to fully appropriate the returns associated with innovation as knowledge and ideas spread easily. At the same time, the dispersion of knowledge and ideas comes at little cost, yielding great benefits of sharing it. As a result, social benefits of innovation are often larger than private benefits, which leads to an inefficiently low level of private investment in R&D. Clearly, patenting innovations is one way to increase the private incentives to innovate. Not all ideas, however, can be patented. In particular, basic research can be less well protected than activities closer to the commercialisation stage. It is also argued that it is easier for large firms to get protection for innovations than for SMEs. Thus, State aid may potentially help increasing innovative activities to a socially desirable level and can support information dissemination (e.g. through industry-science networks).

Regarding State aid for research and development, the Barcelona European Council set the target of increasing overall spending on R&D in the Union up to 3% of GDP by 2010 (with two-thirds of the funds coming from the private sector).[39] However, cases involving aid for R&D need to be carefully examined for the effect on incentives for research and development. Aid should not just simply replace the firm's own expenditure and take the role of operating aid. A number of conditions have been identified for aid for basic research to be effective (Röller et al. 2001, p. 31; Guellec et al. 2003, p. 226):

- First, higher investment must indeed lead to more basic research.
- Second, the public good (basic research) needs to be an input for R&D and must not crowd out other input goods. If the research is too basic it may not lead to marketable products. If it is too applied it may crowd out private research. There must be "additionality" coming from Government funding.
- Third, there may be other factors that prevent R&D (like lack of funding), which may render more basic research that could be induced by aid ineffective.
- There may be negative side effects like increased wage levels of scientists that create costs (e.g. for applied research) that outweigh the benefits.

The general result of the empirical literature is that R&D aid does have a positive effect on private research expenditures.[40] Two additional interesting points that result from the empirical research is that aid is more effective when it is stable over time (Guellec et al. 2003). Firms may not invest in additional R&D if they are uncertain of the durability of Government support. Moreover, there is evidence of a complementarity of R&D and SME aid. For example, a higher level of aid to small firms appears to make R&D aid more effective (See Section 3.3.1). This is consistent with the argument that market failure associated with funding through imperfect capital markets tends to be larger, the smaller

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39 "Progress report concerning the reduction and reorientation of State aid", Communication from the Commission to the Council, 16th October 2002.

40 See Röller et al. (2001, p. 35) for a review of nine studies. Their own results with regards to State aid also confirm these empirical observations.

the company is. It is further argued that market failures tend to affect newer enterprises and activities more than well-established ones. It is also argued that market mechanisms are less capable of correctly assessing and adequately funding fundamental research. The common view is that public support bears greater risks of distorting competition the closer the activity to its commercialisation phase.

3.3.5. Environmental protection

State aid may be used to encourage firms to comply with environmental standards or reduce the burden of mandatory requirements imposed on firms to reduce pollution. Moreover, to the extent that the negative externality of a good is not fully internalised, State aid to substitutes can be used to allocate resources more efficiently (though it is unclear whether it is the appropriate form of addressing this market failure). This argument is sometimes used in the context of subsidies to public transport that aim at shifting traffic from roads to rail or from individual to public transport.

3.3.6. Rescue and restructuring of firms in difficulty

Frictional problems can be the result of individual firms or a sector or, like in the former communist countries, the entire economies require restructuring. Temporal one-off aid may help to smoothen the (structural) transition and avoid a sudden jump in unemployment. After the liberalisation of the former communist countries, the general uncertainty and the bundling of multifunctional units provided extra arguments for providing aid to firms in need of restructuring (Röller and von Hirschhausen, 1999):

1) If there is uncertainty about which parts of the multifunctional units are available for restructuring there cannot be competition for the parts. Subsidising the conglomerate until it is unbundled can then be helpful.

2) If prices are not stable in the short-run as the entire economy gets restructured it may be difficult to develop business plans that would be a prerequisite for identifying valuable business units.

3) As discussed above, there may be positive externalities from regional or sectoral investment (e.g. bandwagon effect). If so, maintaining a critical mass of production activities in a region may help keeping the location viable.

While these arguments may to justify short-run interventions, it seems difficult to refer to these benefits more than ten years after the liberalisation occurred as is done in Germany for example. It seems imperative to limit the time for aid in order to prevent an inefficient firm from asking for more and more subsidies.

If a subsidy to a failing firm is based on a Government policy of giving aid according to a pre-determined formula to all firms, which meet specific criteria, this subsidy scheme may preserve rivalry within a country. Nevertheless, restructuring aid poses particular problems with regard to the impact on competition. For example, one needs to estimate the effectiveness of the State aid measure in terms of increasing the probability of the firm's survival and its effect on the competition in the market. Also the aid amount is typically correlated with the loss of the firm that receives the State aid, weakening the

incentives this firm to minimise that loss. The literature on these issues is discussed in Section 3.6.6.

3.3.7. Employment

Structural unemployment is sometimes explained by labour market rigidities. Where this cannot or is not tackled directly, subsidies have been used to lower labour costs. Where the subsidies are not available to all firms on the same terms, they constitute State aid. Ireland is often used as an empirical example in which subsidies may have helped creating employment (Cassidy and Strobl, 2004).

Regional policies often address problems caused by a lack of factor mobility, e.g. to convince firms to take advantage of lower labour costs in some areas. The problems caused by a lack of mobility are often increased by the externalities of agglomeration, discussed above. These considerations provide arguments for State intervention to correct regional imbalances. While in principle developed regions could be taxed, implementing State aid often seems easier (also avoiding that firms locate outside of the jurisdiction).

Commission Regulation 2204/2002 on employment aid exempts aid for the creation of new jobs in assisted areas and for the recruitment of disadvantaged and disabled workers. Member States may assume up to 50% of one year's costs for disadvantaged workers, and up to 60% for disabled workers.

3.3.8. Training

Firms and employees may underinvest in training and development – or education more generally. A number of reasons for this have been discussed in the literature.[41] Employees may shy away from beneficial investments if they are risk averse, they may suffer from financial constraints or they may have difficulties signalling the level of their acquired knowledge to future employers. Finally, education may lead to a number of positive externalities. For example, the contribution to organisational success cannot always be traced back and rewarded.

Firms may provide less than optimal training to employees due to difficulties in appropriating the rents if employees are free to change employers. This affects training of employees that improves skills that are transferable between firms. Firms may not invest in such training as other firms may “free ride” by hiring trained employees from firms with training schemes. Subsidies may help to create incentives to provide training at a level that is socially desirable.

Training aid for general or specific training within certain aid intensity limits is exempted. Aid falling within these block exemptions is exempted from the notification requirement. The block exemptions stipulate that aid granted under each Regulation may not be cumulated with other forms of State aid. In addition, Member States are required to

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41 Much of today’s economic literature on the issue is based on Becker (1964). Ritzen and Stern (1991) provide an overview of the relevant market failures in training.

comply with certain transparency and monitoring requirements to prevent abuse of the block exemption system.

3.3.9. Summary

The sketch of potential external effects and other market failures discussed above is not sufficient for a solid argument to include certain criteria in the State aid control process. Nevertheless, the discussion points to candidate criteria that may play a role when considering the nature of the market failure:

- In the context of aid to innovative firms, the size of the firm may matter. Standard theory suggests that smaller firms suffer more from the relevant market failures discussed than larger firms. Moreover, there are theoretical arguments to underpin the EC's existing approach to focus State aid for innovation on basic research projects and to avoid funding the development of products that are close to the marketing stage.

- Support for training efforts should focus on those skills that are transferable rather on firm specific skills.

- The effectiveness of environmental policies often depends on the relative costs of certain input factors. If road and air transport is not priced to reflect true social costs, rail transport may have to be subsidised in order to internalise some of the negative externalities of pollution. Thus, a sectoral analysis is required to assess whether State aid is the right measure or whether other regulatory mechanisms are more efficient. The distortive effect of State aid cannot be judged without assessing the desirability of shifting traffic from one mode to another.

Often, the existence of market power determines mainly the intensity of undesired side effects. For example, if aid is provided to a dominant firm, it may lead to a number of undesirable side effects. We consider these more extensively in Section 3.5. In principle, however, alleviating the consequences of market power can also be a potential benefit of State aid.

One implication, however, should be clear. If State aid addresses a market failure in a targeted way, the distortive effect on effective competition is zero, independent of the dominance of the recipient.[42] It is only to the extent that in practice there may be spillover effects to not targeted markets or activities in which concerns arise. It follows that aid for dominant firms should only be allowed if it is tied to the activity that suffers from the market failure.

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42 In practice, it is often difficult to appropriately "target" State aid. Note further, that even targeted State aid may have an effect on rivals' profits. The conceptual observation is that State aid that effectively addresses a market failure and has no unintended side effects improves social welfare.

3.4. EFFECTIVENESS AND GENERAL COSTS OF AID

Even if one identifies the existence of market failures or equity concerns, State aid may not be effective in addressing them. There are a number of additional "hurdles". First, raising the funds for State aid requires taxation which has not only a distributional effect but also leads to distortions that raise the "shadow costs" of funding State aid. Below we briefly discuss some empirical estimates on the shadow costs of raising funds. Another hurdle is that the exact size of the market failure is often not measurable. Governments may know that problems are likely but lack detailed knowledge about the size and nature of the problems. Thus, giving aid to support activities or firms where qualitative analysis suggests market failures may still be ineffective. We therefore summarise previous results on the effectiveness of State aid.

3.4.1. Effectiveness

Studies on the effectiveness of State aid determine how well State aid achieves the intended benefits. In an ideal world this would involve a measure of the market failure in order to identify the effectiveness in addressing this market failure. Given the practical difficulty of measuring market failure, or the welfare loss due to market failure, most studies measure effectiveness relative to an indicator for a policy objective (which in turn can be justified by market failure or equity concerns).

In a recent study for DG EcFin the following indicators were chosen in order to measure the effectiveness of State aid with regards to specific objectives (see Röller et al. 2001):

- Horizontal aid for R&D: Impact on private spending on R&D
- Horizontal aid for SMEs: Impact on the share SMEs employment and turnover
- Sectoral aid for Railways: Impact on (an index of) passenger kilometres and ton kilometres
- Regional aid: Impact on the variation of value added and employment across regions

A particular aim of the study was to identify the factors that are likely to have an impact on the effectiveness of State aid. While one of the conclusions is that the importance of factors depends on the context (objectives) of aid, a few findings have been found to hold across contexts. Generally it is found that State aid has a positive effect on the objective. For example the following effects were found to be statistically significant. A 1 Euro per capita increase in a year of

- R&D State aid increases private R&D per capita over the following 5 years by almost 2 Euros (p.57).
- SME State aid increases the SME turnover share over the following 5 years by 1.2% (p. 89).
- Regional State aid reduces the coefficient of variation of value added across regions over the following five years by 0.72% (p.111). However, aid to a-regions does not affect convergence.

For all aid instruments, the effectiveness of aid shows diminishing returns: the higher the level of aid, the lower its effectiveness. For the analysis of sectoral aid to railways an "aid intensity" index was constructed showing that a higher level of aid relative to total costs decreases railway efficiency, while there is a significant and positive effect on railway efficiency if aid intensity is held constant.

Moreover, aid schemes can serve multiple purposes and some are complementary. For example, the effectiveness of an additional Euro SME aid on private R&D spending is similar to that of R&D aid (p. 58). Moreover, a higher level of SME aid increases the effectiveness of R&D aid (p. 60). EU regional funds are more effective than national State aid in reducing the coefficient of variation of value added across regions (p. 112) and, national State aid and EU regional funds are complementary with a higher level of one increasing the effectiveness of the other.

The aid instrument matters. In a comparison of "subsidies" (grants, interest rate subsidies, soft loans, and guarantees), "tax relief" (relief from taxes and social charges and tax deferrals) and "equity" (where the Government takes equity states) generally finds that subsidies are the most effective aid instrument (for R&D, SME and regional aid) with tax relieves only being as efficient as subsidies for regional aid. The critical element of the effectiveness of sectoral aid to railways is whether the aid leads to additional investment (so that the aid intensity does not increase).

There is considerable variation of the effectiveness of aid across countries. For example, the impact of State aid on railway efficiency is negative for all Mediterranean countries, Finland and Ireland but positive for Austria, Belgium, France, Germany, and Luxembourg.

Thus, assuming that the chosen indicators for the objectives have some relation to market failures and equity concerns, an approach to forbid all State aid may reduce welfare.

3.4.2. Shadow costs

Although the existence of "shadow costs" of Government spending is generally accepted, these costs are rarely modelled explicitly. Collie (2000 and 2002) shows that ignoring shadow costs has an impact on the qualitative results. Taking into account "reasonable" levels of shadow costs, he finds that Governments have an incentive to provide excessive State aid whereas in a world without shadow costs State aid spending is generally beneficial in his models. Similar changes in results are likely for the model of Besley and Seabright (1999) discussed in Section 3.4.

Taxation results in changes in behaviour, for example if, as a result of taxation, people buy less preferred substitutes or companies use suboptimal production methods. This change in behaviour results in a cost to society associated with changing a given tax rate. The size of the burden depends on several factors such as the elasticity of demand and supply as well as the marginal tax rate.[43] Based on a review of empirical estimates by

43 The factors that lead to the shadow costs of Government spending are surveyed in textbooks on public finance or public economics (e.g. Leach 2004).

Snow and Warren (1996), Collie (2000 and 2002) uses a shadow price of 1.2 as a "plausible value". This implies that raising 1 Euro for State aid imposes a deadweight loss of 20 cents. Shadow costs, however, may vary significantly between countries and over time. Measuring shadow costs for public funds is not a simple task. Empirical identification of shadow cost requires assumptions and methodological decisions, which can influence the final estimate (see Kleven and Kleiner 2003).

Note that the deadweight loss per Euro raised is likely to increase in the amount of overall Government spending. There are limits to raising funds through the least distortionary form of taxation (a lump-sum tax). Marginal excess burdens are therefore likely to vary across countries and over time.[44] They usually range from 1 (lump sum taxation is possible) to 1.5 (Anderson and Martin 1998, p. 22; Devarajan et. al. 1997).

While theoretically and empirically very relevant, there is little explicit use of the shadow costs in theoretical models and practical appraisal in the context of State aid control. Shadow costs, however, are often taken into account to some extent in project appraisals by the funding institutions. This applies to Governments and international institutions.[45]

3.4.3. Transaction costs

State aid may be costly because it leads to a focus of firm resources on rent-seeking activity rather than on productive activities. In addition, it binds State resources on monitoring firms' behaviour and significantly increases firms' administrative costs (see Section 3.4.7).

3.5. INCENTIVES FOR GOVERNMENTS TO PROVIDE EXCESSIVE AID

3.5.1. Overview

State aid control differs from competition policy because the actor whose behaviour is investigated is a Government and not a private entity. Thus, a relevant question is why Governments need control by a supranational institution like the European Commission. Governments are likely to make their own (welfare) assessments and subsidiarity considerations may therefore suggest that there is no need to intervene. Indeed, it is sometimes pointed out that State aid control is unique to the European Union and that there is no reason for having such a control.

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44 For methods to identify the marginal costs of funds spent by Governments see Anderson and Martin (1998). Diewert and Lawrence (1996) estimate the marginal excess burdens for taxation using data from the New Zealand economy between 1971 and 1991 (Diewert and Lawrence 1996). The authors find that the marginal excess burden associated with increasing general consumption taxation grew from an estimated 4.9% to 13.7% (with an average excess burden of 8.3%). For further estimates of shadow costs in the context of privatisation , see e.g. Galal et al. (1994).

45 The evaluation units within the European Commission study the costs and benefits of funding. Indeed, cost benefit analysis is often explicitly required (e.g. by the Structural Funds Regulation (1260/99), Cohesion Fund (1264/99) and ISPA the Structural Instrument for Pre-Accession Countries (1267) and there is a general guide for project appraisal by the European Commission (2002). For empirical results for selected European Commission programmes, see for example Florio and Vignetti (2003).

In this section, we explore some of the arguments that have been discussed in the literature to show that Governments may have an incentive to provide excessive State aid so that welfare in the common market can be increased by State aid control.

This discussion is potentially important for developing a practical methodology to measure the distortion of competition and trade. If one can identify criteria that lead to an incentive for Governments to provide excessive aid, there may be an argument to focus State aid control on these areas and not on others. Indeed, previous suggested methodologies build on arguments of that nature (Besley and Seabright 1999).

We begin by reviewing the literature that analyses incentives for Governments in a setting with only one kind of market failure, imperfect competition. We then continue analysing the incentives for Governments in the presence of externalities.

We continue by discussing the public finance view on Governmental competition, which takes into account the need to provide public goods. We then introduce the 'new trade and geography' view on location externalities and explain why this view provides reasons for Government intervention. Finally, we discuss an important paper by Besley and Seabright that builds on parts of these older literatures and argues that State aid in general may be desirable but also identifies some situations in which it is not.

3.5.2. State aid, market power and strategic trade

We begin by reviewing the strategic trade literature in which State aid (or subsidies) is considered that reduces a given firm's marginal cost (e.g. Brander and Spencer (1985), Collie (2000), Eaton and Grossman (1986)). The literature abstracts from cohesion objectives or market failures other than imperfect competition. The main aim is to study the incentives of Governments to provide aid to national firms that are active in international markets, and the impact of such aid on foreign firms and consumers. One crucial question is whether the interaction between the firms and the Governments in various countries leads to "excessive subsidies", i.e. subsidies above a level that enhances welfare or is welfare optimal.

3.5.3. A model with consumers and producers based in the common market

As State aid reduces firms' marginal cost, it induces them to compete more fiercely by setting either a higher quantity or a lower price. Through this channel, the subsidy affects both the equilibrium market price and the equilibrium quantity supplied. The literature studies two different effects that may arise:

- Governments in such a set-up may have an incentive to hand out aid in oligopolistic industries as it redirects market share from foreign rivals towards their own firms.

- Aid, however, also leads to a reduction in market price and thereby reduces the market failure originating in the market power that firms enjoy in oligopolistic industries.

A prominent example is Collie (2000) who models State aid as a production subsidy to firms in given country, which is assumed to lower the receiving firms' marginal costs of production. In his model, there is a given number M of identical countries, in each of

which a single firm produces a homogenous good. All firms have identical and constant marginal costs of production. Furthermore, he abstracts from any fixed cost. Firms aim to maximise profits. The Government of each country is assumed to maximise the welfare of its own home country's citizen. The home country's welfare is defined as its citizens' consumer surplus plus its firm's profit minus the cost of raising the necessary funds for its chosen level of State aid.

The homogenous good is sold on the common market established by all member countries *M*. In the common market there are no tariffs, trade barriers between the states, or taxes. Thus, the firms, which are assumed to compete in a Cournot fashion (firms compete in quantities, this is often seen as a proxy for competition in markets where capacity constraints matter), face a common aggregate market demand curve. After all countries have simultaneously set their level of State aid, firms choose their respective quantities. Absent State aid, profit-maximizing behaviour induces the firms to produce a quantity at which the marginal revenue of producing an extra unit is equal to the marginal cost. A firm that increases its output by one unit affects its revenue in two ways:

- On the one hand it sells an additional unit, which raises revenues by the market price.
- On the other hand, the increase in output lowers the market-clearing price, and hence the firm receives less for all those units it sells, reducing the incentive to increase output compared to a situation where market prices remain unaffected by individual output decisions (perfect competition).

Hence, with imperfect oligopolistic competition the equilibrium price is above marginal cost, the well-known market distortion induced by strategic interaction when firms' behaviour has an effect on output and market prices.

State aid, by subsidizing the firms' marginal cost, can in principle overcome this market failure. An increase in the subsidy level of an individual country increases the production of its firm. Although this increased production in the home country reduces the production of the foreign rivals due to strategic substitutability, the foreign rivals jointly reduce their production by less than the increase of the home country's firm.

For a moment, suppose Governments have access to lump sum taxation, so that the shadow cost of the State aid is simply the amount of aid handed out. Then a small increase in a given country's subsidy has two effects:

- First, it lowers the community market price as overall output increases; and
- Second, it increases the home country's output as both the overall market output increases and market share is redirected from foreign competitors to the home country's firm.

The former effect benefits the home country's consumers proportional to the amount they consume and hurts its firm proportional to the amount it produces. Holding the amount traded fixed, a decrease in the market price thus simply redirects benefits from producers to consumers. In the symmetric environment of Collie (2000), the equilibrium market outcome is symmetric and thus each country produces as much as it consumes, which implies that this redirection or 'terms of trade' effect is irrelevant. The latter effect

increases the home countries welfare as long as the price is above marginal cost for two reasons. First, the redirection of market share towards the home county's firm increases its profits and, second, the reduction in the market price reduces the oligopolistic distortion discussed above. The competition between Governments thus drives prices down to marginal costs and leads to the Pareto-optimal outcome if Governments have access to lump sum taxation.

Collie, however, also notes that Governments do not rely on lump sum taxation and that due to distortionary taxation, the shadow cost of Government expenditure exceed unity. He shows that the strategic "subsidy competition" between welfare maximizing Governments that use distortionary taxation gives rise to excessive subsidy levels. To understand why, suppose subsidy levels are symmetric and consider the welfare benefit to all countries jointly of an increase by one unit in the home country's subsidy only. As discussed above, this increases the home country's production, decreases productions in all foreign countries, but nevertheless increases the overall production of all countries in the common market jointly. This overall production increase benefits society because it reduces the oligopolistic distortion; this benefit is identical to the equilibrium mark-up over marginal cost times the increase in overall production. To see why, observe that the mark-up measures the difference in the marginal consumers' willingness to pay for an extra unit, which is equal to the price, and the marginal cost of producing an extra unit. The reduction of the oligopolistic distortion, however, comes at a cost because – due to distortionary taxation – the shadow cost of a unit of Government funds is greater than one. This cost has two components:

- First, as an increase in the home country's subsidy leads to an increase of total production of all countries, the subsidy is paid to more units. Call the extra subsidy handed out to these new units the marginal effect of a subsidy increase.

- Second, the home country has to pay the increased subsidy level to each unit produced in the home country; in particular the home country pays a higher subsidy for those units that would have also been produced absent the increase in subsidy level. We refer to increase in the total amount of subsidy handed out to those units as the inframarginal effect.

Now consider the welfare effect on the home country – rather than all countries jointly – of raising its subsidy by one unit. By increasing its subsidy, the home country "steals" business from the other countries. Each unit of business it attracts, both from the other countries and through the expansion of the market, pays the market price. The resource cost to the home country of producing an extra unit is the constant marginal cost of production. Ignoring the subsidy cost, the benefit of increasing *sales by one unit* is hence the same to the home country as it is to all countries jointly: namely the equilibrium mark-up. An increase in the home country subsidy by one unit, however, increases the amount that the home country sells by more than the amount that all countries sell jointly. Thus the home country benefits more than all countries jointly through increasing its subsidy by one unit as this has a bigger effect on its sales. On the cost side, however, the home country also has a higher marginal effect of increasing its subsidy as the group of all countries jointly since its sales increase by more. Its inframarginal subsidy effect, however, is the same. Because the marginal benefit of increasing sales are greater than

the marginal cost, this implies that the home country benefits relatively more than all countries jointly. Hence, the Government chooses an excessive subsidy level.

Using reasonable levels of the true shadow cost of Government funds in both a linear and a constant elasticity market demand curve example, Collie shows that this excessive subsidy problem is so severe that prohibiting State aid of this form increase total welfare. Of course, prohibiting, rather than limiting, State aid is an extreme measure but one that illustrates the incentives nicely. Observe that if the subsidy were given by a welfare maximising European Commission rather than the Member States, the EC would have no incentive to subsidies excessively in order to steal market share. Thus, it would offer the optimal level of subsidies to overcome the oligopolistic distortion, taking into account the shadow cost of Government funds. For high levels of shadow costs, this level may well be zero.

Thus, by introducing a mild form of "political failure", which requires Governments to rely on distortionary taxation, into the strategic model of State aid competition, Collie shows that restrictions on State aid handed out by individual Governments can increase welfare. Collie (2002) extends the above analysis by introducing differentiated products and allowing for both Bertrand and Cournot competition in the above setup. He finds that under both Cournot and Bertrand oligopoly, if products are sufficiently close substitutes and shadow cost of Government funding sufficiently high, then prohibiting subsidies will increase total welfare through a similar mechanism as above. If products are sufficiently differentiated, however, a prohibition of subsidies will reduce the welfare of all countries. The reason is that with sufficient differentiation, the negative effect of a country's subsidy on foreign producers is outweighed by the positive effect on foreign consumers.

Thus, based on this analysis the incentive to provide welfare reducing State aid is particularly strong if

- There is market power but firms provide sufficiently close substitutes so that there is a sizeable negative externality on firms in other countries.
- Shadow costs of raising the funds are high.
- A relative large share of the overall market demand originates in the Member State.

To see the last point, consider the following. In Collie's model, Member States are modelled symmetrically. These symmetric Member States balance two effects: On the one hand, they want their firms to steal market share, which provides an incentive for excessive subsidies. On the other hand, they prefer it if the other Member State incurs the cost of reducing the oligopolistic market failure; that is there is a free-rider effect, which provides an incentive to give insufficient subsidies. A straightforward extension would be a two-country model in which consumers are asymmetrically distributed. Suppose, for simplicity, that all consumers live in a Member State referred to as the 'home' country and that there is one firm located in this Member State and another in a Member State referred to as the 'foreign' country. In this scenario, the home country would not face a free-rider effect as it captures all the benefits of a lower market price to consumers. Hence, as it still has an incentive to help its firm steal market share from its foreign competitor, it would have an incentive to provide excessive subsidies. We

conclude that the incentive to provide welfare reducing State aid is higher if a relative large share of the overall market demand originates in the Member State.

3.5.4. Models with consumers based outside the common market

Collie (2000, 2002) assumes that all customers and all producers are located within the customs union. At the other extreme, the classic strategic trade literature (see for example, Brander and Spencer (1985) and Eaton and Grossmann (1986)) supposes that producers are located in one of two countries and sell to customers all of which are located in a third country. In the benchmark model, there is a single firm in each of the two countries. The Government of each producing country first simultaneously chooses a per-unit subsidy (or tax) with the aim of maximizing its own country's total welfare. Then, knowing the respective aid or tax levels, the firms choose their competitive behaviour, i.e. quantity if the product market competition is a Cournot game or price if it is a differentiated goods Bertrand game.

The welfare effect of State aid on a producing country itself is identical to its effect on its firm's profit minus the shadow cost of the Government funding. The older literature abstracts from the fact that Government funds are raised through distortionary taxation. Thus, either the subsidy paid or the tax collected is simply a transfer and does not affect a country's welfare directly in these models.

For a moment, suppose only one country, which we refer to as the home country, could choose to subsidise its firm's production. By subsidizing the production of its firm, the Government lowers its firms perceived marginal cost of production. A lower perceived marginal cost of production turns its firm into a tougher competitor in the third country market. If product market competition is modelled as Cournot competition, then as a firm becomes a tougher competitor and increases its quantity, rivals respond by reducing the amount they produce.

By appropriately varying the subsidy level, the home country's Government in effect determines the quantity its firm will supply in the market game. Its firm's foreign rival optimally responds by choosing the quantity that maximises its profit given the quantity determined by the home country Government. The home country thus acts as a Stackelberg leader, setting its quantity before the foreign country's firm. This gives it a strategic advantage as precommitting to a high quantity reduces the quantity of the foreign firm, i.e. the Government can redirect business.

Consider now the case in which both countries can choose to subsidise their firm. Given the behaviour of the other country, each country has the same incentives to use subsidies as discussed above. This gives rise to a Prisoners' dilemma type of outcome. Loosely speaking, as both countries are in a symmetric situation, they will in equilibrium set the same level of subsidy, and their respective firms will choose the same quantities. Thus each country has a market share of 50% – as is the case without any subsidy. The subsidies will induce both firms, however, to compete more fiercely, which leads to lower mark-ups above the true marginal cost and hence to lower industry profits net of subsidies.

In this case, an agreement between the countries not to use subsidies is beneficial to the producing countries (although it hurts the third country's residents) even absent

distortionary taxation. The reason is that from the perspective of the producing countries, the subsidy does not alleviate a legitimate market failure but is simply used as a strategic weapon to engage in "stealing" market share.

We are left to consider the case in which the product market interaction takes the form of differentiated Bertrand competition. In this case, firms compete in so-called strategic complements, i.e. a firm facing higher rival prices has an incentive to set higher prices itself. Thus, if a firm could credibly set its price before its rival (i.e. act as Stackelberg leader in the pricing game), it would have an incentive to set a higher price as this would induce its rival to compete less severely. Similar, the Government of a producing country has an incentive to tax its firm's production, as this would induces the firm's foreign rival to also increase its price. Hence, within the above framework national welfare maximizing Governments have an incentive to give aid only if their firms' compete in Cournot fashion. Precisely in this case, however, a ban on these subsidies would increase the producing countries welfare.

3.5.5. Summary of the strategic trade literature

To summarise, in the strategic trade literature State aid is modelled as reducing a given firm's marginal cost. As State aid reduces the receiving firms' marginal cost, it induces them to compete more fiercely by setting either a higher quantity or a lower price. The focus of the literature is on the incentive for Governments that maximise national welfare to provide excessive aid. Learning about the incentives of Government can be very important for the EC when developing criteria for prioritising State aid control. Arguments to rely on subsidiarity are less powerful when Governments have an incentive to provide excessive aid. The strategic trade literature shows that

- If producers are located inside but customers are located (exclusively) outside of the common market, Governments do have an incentive to provide excessive State aid (with respect to welfare in the common market) and the welfare of the common market's citizens is increased if the State aid is banned.[46]

- If producers and customers are all located in the common market, marginal cost reducing State aid can help in overcoming the oligopolistic distortion (i.e. a market failure) to the benefit of welfare in the common market. However, if funds are generated through distortionary taxation, this result breaks down for reasonable levels of shadow costs.

- A Member State that has a large share of the overall market demand has a greater incentive to provide excessive State aid. The reason is that it internalises more of the benefit of the State aid to consumers, but faces the same "profit" stealing incentives.

46 This strong conclusion is based on the fact that countries pursue only those policies that increase the welfare of their citizens and therefore refrain from handing out State aid to Bertrand-type industries.

- As the incentive to provide excessive aid stems from the negative externality on other countries, factors that increase that externality tend to increase the incentive to provide excessive aid. Thus, goods need to be sufficiently substitutable (homogenous) across borders in order for the incentive effects to matter.

While these results provide interesting insights regarding the incentives of Governments to provide excessive aid, the characteristics of the models limit the relevance of the results.

The literature largely abstracts from the effects on firms' entry and exit decisions, firms' investment decisions, innovation, evolution of market structure, differences in marginal costs, or differences in size between firms. It largely ignores market size. More importantly, it does not model the various characteristics of different State aid schemes such as the selectivity of aid given (individual, sectoral or horizontal aid). It considers a single industry in isolation and cannot answer the question whether aid at various stages of the value chain has different impact. The literature makes strong assumptions about the knowledge and incentives of Member States' Governments. They are national welfare maximisers that correctly understand the competitive process in each market for which they provide State aid.

Furthermore, the only market failure it explicitly considers is that of the oligopolistic distortion induced through market power. Most aid in the European Union, however, is justified on other grounds such as social cohesion, increasing R&D, environmental benefits, providing necessary resources or funding for SMEs, etc. It remains an open question how such considerations interact with the mechanisms uncovered in the strategic trade literature.

To see the limited guidance provided by the results, note that the symmetry across firms and the permanent nature of the aid imply that the models do not relate to rescue and restructuring aid. To address questions of rescue and restructuring, one would have to allow a firm to potentially exit the industry absent the State aid given. The work is also not concerned with innovation aid, because the technology of the firms is given and dynamic aspect of the firms' rivalry is not taken into account.

The work does not focus on services of general economic interest. In as far as greenfield investment aid lowers (quasi) fixed costs or changes the technological choice of the firm(s), this aid form is also not appropriately modelled. Nevertheless, insofar as such aid – through for example lowering the cost of capital – lowers the firms' marginal cost the above identified strategic effects are relevant.

Aid to small and medium sized firms, which can be handed out on a permanent basis, may sometimes indeed lower marginal costs of production. (Although, presumably, such aid is most likely to affect marginal costs when the access to, for example, cheaper external capital or free advice allows firms to invest into better technologies.) It is somewhat rare, however, that small firms enjoy the considerable market power that is presumed in the strategic trade literature. Thus, the model seems mainly applicable to

investment aid to large firms – even though the link between the investment aid and the reduction in marginal cost is not explicitly considered.[47]

One major shortcoming of these strategic trade based models is their static nature with a focus on allocative distortion of market power, which thus ignores any dynamic efficiency or productive efficiency implications. Nevertheless, some of the intuitions, especially with regard to the location of consumers, may be useful in addressing other forms of State aid as well.

3.5.6. Welfare effects in a competitive market with strategic trade

A prerequisite for distortionary Government intervention that is in the interest of its citizens in the strategic trade literature is that its firm(s) has (have) considerable market power. It is important, however, that sectoral State aid to a competitive industry can be distortionary absent market power of the domestic firms and still in the Member States' interest.

Suppose a Member State whose domestic consumption accounts for a significant share of the overall (world) market consumption decides to subsidise a perfectly competitive domestic import-substituting industry. Then this subsidy will increase this country's production. The increased supply leads to a lower price for this good. This imposes a terms-of-trade loss on foreign producers. This subsidy thus leads to a distortion of trade absent market power of individual firms. Furthermore, due to the terms-of-trade effect, such a sectoral subsidy scheme can increase the welfare of the Member State's citizen at the detriment of the welfare in the exporting countries.

We conclude that sectoral aid can distort competition in the absent of considerable market power of the receiving firms. Such sectoral aid can nevertheless be in the interest of a single Member State if it is a large (net) consumer. If net exporters are also Member States, then by banning such aid the EC increases EU welfare.

3.5.7. State aid and the provision of public goods (public finance literature)

Starting with Tiebout, there is a considerable literature in public finance that argues that the competition between Governments induces an efficient allocation of local public goods (Tiebout, 1956). In this literature citizens and firms migrate to those jurisdictions whose choice of taxes and public goods best fits their preferences. Agents through 'voting with their feet' induce Governments to select efficient policies and Government competition, though perhaps imperfect, helps to achieve desirable outcomes. When public goods are not local, competition will in general not lead to efficient outcomes but otherwise it is often a desirable phenomenon. In these models there is typically no role for State aid, as in the efficient allocation each jurisdiction will have a homogenous group of workers and firms. But somewhat relaxing this assumption, Governments may use State

47 In particular, the formal results may be misleading if the necessary government subsidy that induces a given reduction in the firms' marginal cost is not proportional to the amount the firm produces.

aid to appropriately tailor the mix of taxes and local public good provision to each firm, and it should not be viewed as in instrument to strategically distort competition *per se*.

Realistically, however, labour is relatively immobile across Member States. Capital, on the other hand, is relatively mobile within the European Union.[48] This raises the questions whether tax and subsidy competition between Member States leads to an efficient allocation. Oates and Schwab (1988) investigate a model with multiple jurisdictions in which capital is perfectly mobile and labour completely immobile. The median voter in each jurisdiction sets a capital tax rate and an environmental standard, which regulates the level of 'local' pollution. In a benchmark model they show that if jurisdictions are homogenous, then competition between jurisdictions leads to efficient outcomes – with a zero tax rate for capital. If, however, there are reasons that imply that the optimal tax rate on capital is nonzero, the efficiency result breaks down. The need to finance local public goods, for example, would imply that a positive tax rate on capital is desirable in their framework. Consider, for example, a local public good such as a park that benefits the citizens living in a given jurisdiction. Jurisdictions that consider taxing capital realise that an increase in the tax rate to finance such a local public good will drive out capital. Hence, each jurisdiction is only willing to raise the tax rate up to a point at which the cost of the public good, which includes the negative effect of a smaller capital stock, equals the benefit. But capital that is driven away from one jurisdiction will move to another and hence the social cost to all jurisdictions is less than the cost to each one of them leading to insufficient taxation. Applying the analysis to subsidies, we find, of course, the reverse result: Aggressive subsidies to attract capital may be harmful due to the negative externality on other countries where capital becomes scarce, even in competitive environments.

This literature, therefore, provides a reason to control the total amount of State aid that Member States may hand out; this is an interesting conclusion. State aid can be undesirable even if it is handed out on a non-discriminatory basis, i.e. as negative taxation. Indeed, as selectivity is not a central component of these models, its main message is about general taxation. The main message thus is that it is necessary to control State aid if taxes are harmonised across Member States. While there are reasons to do so, absent such harmonization of tax rates, however, ruling out non-discriminatory aid should have little impact on Member States ability to attract capital. We therefore do not view generic aid as a priority.

3.5.8. Trade and geography: The importance of location externalities

The premise of this literature (Krugman 1991) is that there are significant agglomeration effects that explain why certain areas are heavily populated and filled with economic activity and others are relatively deserted. As discussed above, agglomeration effects can be driven by Marshallian external effects. In addition to these, the literature typically also considers linkage effects. Once a considerable number of producers locate at a given location, others have an incentive to follow because the location now offers good access to large markets (customers) and provides good access to goods that producers or their

48 Indeed, financial capital is highly mobile within the European Union and beyond. Capital that has been invested into real assets is, however, in some cases significantly less mobile.

workers need. These effects are often referred to as 'forward' and 'backward' linkages (Hirschman 1958). These linkages can explain considerable persistence of places at which production takes place and that small initial differences between locations can lead to very different 'paths of development'. To transfer a disadvantaged region into a booming one, according to this set-up, one may need to initially subsidise firms in order to locate in a given area, before – due to linkage effects – other firms are willing to follow absent subsidies.

3.5.9. Governmental competition with externalities

An alternative approach to Government competition using State aid has been recently developed by Besley and Seabright (1999). They introduce a model in which firms choose where to locate and how much to produce. These location and production decisions create external benefits and costs to the economy in which they take place, such as environmental cost, congestion, pollution, reduction of unemployment, Marshallian labour market externalities, backward linkages, and tax revenues. More generally, these externalities include all market failures that Governments are concerned with and may try to correct. Because firms may create positive externalities to the local economy that they do not internalise, Governments have an incentive to attract them. In addition, the firms' choices may also affect the welfare of the country in which the firm does not locate (e.g. the quantity it produces may affect the welfare of consumers in all Member States). In particular, Governments in the model can offer subsidies contingent on both the firms' location and production decisions. The competition between the Governments of the Member States is modelled as a menu auction *a la* Bernheim and Whinston (1986): Each Government offers the firm a payment schedule, which specifies the subsidy that the firm will receive as a function of both its location and output choices. While the value of the firms choices are private (i.e. can differ from Member State to Member State), these values are assumed to be common knowledge (i.e. each Member State cannot only evaluate the externality the firms' choice inflict on itself but also the externalities it imposes on all other Member States).

Besley and Seabright illustrate that the intergovernmental competition can lead to an efficient resource allocation in which all externalities are internalised. To do so, they focus on so-called truthful equilibria. In such equilibria, if a firm changes its choice variable(s) from a given (equilibrium) choice to an alternative, each Government changes its payment so that the Government's payoff is unchanged. The difference in subsidies the Government hands-out as the firm changes its choice thus "truthfully" reflects the externality the firm imposes on the Government. As this is true for all Governments, the firm's payoff reflects exactly the payoff of society as a whole and hence the firm takes the efficient location and production decision. Furthermore, as Bernheim and Whinston show, no two countries can benefit from coordinating their bidding strategies if other rivals use given truthful strategies. The stark (and somewhat provocative) conclusion that Besley and Seabright derive in this benchmark model, is that State aid, including ad hoc State aid, is desirable to correct for market failure and does so even if Governments compete in handing out State aid. Furthermore, the logic not only applies to location decisions but also to any other decision firms may take. From a welfare perspective, Besley and Seabright find that subsidies overcome rather than introduce distortions in the trade between Member States.

There are at least five reasons why the results may not hold in reality:

- *Lack of commitment*: Besley and Seabright themselves qualify this finding by considering a two-period model. In each period a firm chooses to locate in one of two countries. They consider an example in which the Government payoffs are interdependent, i.e. the benefit of attracting firm one (two) depend on whether the Government manages to also attract firm two (one). The Governments compete by offering subsidies to the firms and cannot commit to their future bidding behaviour. The inability to commit to future behaviour leads to an inefficiency in the example of Besley and Seabright. When bidding in period one, a Government now looks forward to the surplus it will earn from future bidding decisions, which in turn depends on firm one's location decision. This future change in (own and the other Government's) bidding behaviour, in addition to the market failure externality from firm one's decision, will affect the subsidy a Government offers. As subsidies now reflect strategic considerations in addition to market failure considerations, intergovernmental bidding can lead to inefficient outcomes.

- *Lack of commitment and renegotiation*: Closely related to the discussion above is another type of commitment problem. Think of an example with one firm only that can locate in either of two regions. Once this firm has chosen its location, invested, and collected the local Government's subsidy, the firm has an incentive to threaten to relocate in order to demand additional subsidies as the price for staying at the chosen location. From a theoretical perspective, a good solution is for the local Government to circumvent this problem by paying the subsidy over time in such a way that at each time period the firm is paid the positive externality it creates. Such a solution, however, may sometimes be difficult to implement in practise. For example, if the subsidy is needed because the investor is credit constrained, a large up-front payment is unavoidable. Similar, it can be difficult for the (democratic) local Government to credible commit to future subsidy levels. Unless the subsidy is paid up-front, firms risk being stranded with investment cost in this case and may thus be reluctant to accept such promises. Another type of solution is to focus on subsidizing investments that are initially footloose (so that the subsidy has an impact) but later firmly fixed at a specific location. Again, in practise, such investments may be hard to find.[49]

[49] This may make another type of solution desirable: A legal commitment not to grant subsidies for the retention of existing investments, which can become credible if it is enforced by some body other than the local government.

- *Shadow costs*: It should be emphasised that even absent the intertemporal considerations, the benchmark model is based on strong assumptions. The model abstracts from any kind of Government failure. The shadow cost of Government's funds is assumed to be one. Otherwise it is easy to show that the countries as a whole may gain from restricting the subsidy competition. For simplicity, think of a situation in which the shadow costs of Government funds are 2. Let there be two countries and one firm. Suppose that the payoff of a country that does not attract the firm and does not pay a subsidy is zero. Let the value of attracting a given firm be EUR 100 to a home country and EUR 98 to a foreign country. Furthermore, suppose the firm is indifferent between locating in either of the two countries. Then the foreign country would be willing to offer EUR 49 to attract the firm while the home country would be willing to bid up to EUR 50. In this example, the home country would attract the investment at a shadow cost of EUR 98 and thus the country would realise a net benefit of EUR 2. The firms benefit would increase by EUR 50, which is the subsidy it receives. On the other hand, absent tax competition, the firm would locate in one of the two countries ensuring a benefit to society as a whole of at least EUR 98. Hence, society as whole would be better of avoiding the tax competition.

- *Non-EU ownership*: In a similar vein, Besley and Seabright implicitly think of the payment to the firm as a transfer that does not affect the overall welfare. This assumption is important. For simplicity, ignore any shadow cost of Government funding in the following. Suppose for example that the home and the foreign country belong to the EU and that non-EU citizens own the firm only. Then, from the European perspective, the competition for the firm's location decision is very costly, as the Government payments cannot be viewed as a welfare transfer.

- *Asymmetric ownership across Member States*. Implicitly, Besley and Seabright consider a situation in which there is symmetric distribution of ownerships of the recipient across Member States. Suppose the firm belongs to citizens of the foreign country only and that the Government of the foreign country maximises the welfare of its citizens, i.e. consumer surplus plus profits. Then any payment made from the foreign Government to the foreign firm is simply a wealth transfer that does not affect the foreign country's welfare. In this case, even if the foreign country has a significantly lower external benefit from attracting the firm, it is willing to pay more as the home country because the payment to the firm does not affect the foreign country's welfare (it is a transfer only) but it does affect the firm's location decision. Hence, if the Governments of the Member States care about total welfare of their citizens, then the efficiency result of Besley and Seabright depends on the assumption that each country's citizen hold an equal amount of shares in the companies considered.

- *Complete information*: The efficiency result also depends on the assumption of complete information, i.e. that all Governments can correctly and perfectly assess all externalities. In particular regarding production decisions of the firms this is a strong assumption. If each Member States Governments can asses these externalities – that is also those Governments in which the activity does not take place – then it is also natural to assume that the European Commission can assess these externalities. The case for the Member States handing them out is then based solely on political principles such as subsidiarity and the fiscal rules of the European Union. More realistically, and in contrast to Besley and Seabright and the strategic trade literature above, Governments do not have complete information regarding firms' decisions. The efficiency properties of the menu auction in such an environment are an open question and whether they dominate the costs identified above is somewhat questionable. Further research is needed to analyze these questions.

In summary, Besley and Seabright make an important theoretical innovation. Namely, they allow countries to set subsidies for all firms that depend on every decision these firms take. Intergovernmental competition through such subsidies can lead to an internalization of external effects. Their set-up thus considers those external effects that are regularly used by Member States to justify their State aid. They show that the source of failure in intergovernmental competition are not a direct consequence of externalities, but are due to failures in the policy process such as limited commitment, restrictions on bidding, Government failures, and distorted incentives due to asymmetric ownership of the firms across countries.

On the other hand, we are aware of almost no evidence that payments to firms locating in other countries occur in practise.[50] Furthermore, if each firm is fully owned by citizens of its country, intuition suggest that the country's Government should have a strong, strategic-trade type of incentive to bias its policy in favour of that firm. Hence, though theoretically somewhat unappealing, we think that the strategic trade literature may be a better description of actual intergovernmental competition – although as we pointed out above this literature needs to be adapted to specifics of State aid.

In addition to some of the limitations discussed above, one can think of the Governments in the Besley and Seabright model as in effect making all allocative decisions. Whether in reality Governments have the right incentives and information to do so is a reasonable question. But if there is political failure, citizens may benefit from restricting their Government's ability to hand out (excessive) subsidies. And if citizens in one Member State restrict their politicians' ability to hand out such discretionary subsidies – for say fear of abuse by corrupt leaders – then the efficiency benefits to the European Union as a whole can be greatly reduced.

Nevertheless, the work of Besley and Seabright (as well as extensions thereof) identifies the commitment problems by Member States (and stockholdings of EU citizens) as important considerations for evaluating the cost and benefit of State aid competition

50 Besley and Seabright, however, highlight that there may be 'aid linkages' for multinational firms. That is if the firm produces in both the foreign and the home country and decides on some action in the foreign country that negatively affects the home country's citizens, then the home country has an incentive to lower the aid it offers.

between Member States. While large cross-country externalities are not enough to justify ruling out State aid, given the many imperfections of Government competition discussed above, they may in practise still be a good starting point to select important cases. In these cases other Member States stand to suffer the most and absent a convincing theory and evidence that these externalities will be internalised, the EC may help avoiding undesirable rivalry such as the rivalry considered in the strategic trade literature. In particular, even if the State addresses valid location externalities, it seems hard to justify why it should be tailored to a specific firm. Thus, special scrutiny may be appropriate in ad-hoc cases.

3.5.10. Political failure

A last reason for why Governments may provide excessive State aid is political failure (Persson and Tabellini (2000)). As discussed above, if voters can control politicians only imperfectly, politicians may engage in activities that enable then to extract rents. In-kind contributions as rewards for State aid would be an example of such rents. In the presence of such political failure, citizens may benefit from both additional checks and balances at the European level and, indeed, from the information that a European State aid control generates.

3.5.11. Strategic responses to aid in non-EU countries

Another issue related to our discussion above is how the European Union should respond to aid in non-EU countries. In principles, the above discussion applies if we consider the EU to be a Government in competition with other non-EU governments and not a supra-national body regulating such competition between its Member states.

So, for example, according to the strategic trade literature, the EU has a strategic incentive to provide marginal cost reducing subsidies in Cournot industries while taxing Bertrand industries. (As has been extensively discussed in the strategic trade literature, it is difficult to identify Cournot from Bertrand industries.) From a theoretical point of view, in line with the results of Collie discussed above, it is often more desirable to reach a supranational agreement (through say the WTO) to limit subsidies for the same reasons that State Aid control is desirable.

One difference to our above analysis, however, is that within such negotiations the EU may be concerned with the welfare of its citizens only and not with the overall world welfare. Also, State Aid may be used for retaliatory or other strategic reasons within such negotiations. In many circumstances, however, State aid will not be the optimal retaliatory measure even if a non-EU state subsidises its firm(s). The European Commission should consider whether other measures such as tariffs on imports (which eliminate the strategic advantage at least within the EU without the need of costly public funds), reduction of development aid, threat of reduced cooperation, etc... are not more appropriate for such purposes. Furthermore, for negotiating reasons, such strategic State Aid should be under control of the European Commission.

Nevertheless, absent trade agreements and negotiations, the EU may want to engage or permit Member States to engage in State Aid to influence the terms-of-trade or implement strategic trade policies versus non-EU member states. Due to the shadow cost of

government funds and the difficulties in targeting such aid appropriately, however, it is our guess that such policies are inappropriate if only unilateral effects are considered. Such aid is most likely to be successful if it changes the market-structure in a tight oligopolistic situation. For example, Neven and Seabright (1995) argue that while the subsidies to Airbus is likely to have reduced overall world welfare, the redistribution of rents from Boeing to Airbus and the lower prices for airplanes have benefited European citizens. This is an example in which the State Aid had a dramatic effect on the industry structure. Similar, aid may be appropriate in industries with strong network effects to avoid 'market tipping' in favour of a non-EU firm. In general, however, while we acknowledge the theoretical possibility that State Aid for strategic trade reasons may increase welfare, we believe that the empirical evidence in favour of such policies is weak at best. Also, it should be emphasised that the question whether foreign firms are subsidised is of secondary importance for such strategic trade policy decisions.

3.6. EFFECT ON COMPETITION AND TRADE

Two very recent studies, Garcia and Neven (2004) and Frontier Economics (2004), have analysed the effect of subsidies on competition and trade. Contrary to the approach proposed in this report, these studies ignore the potential benefits of State aid with respect to reducing market failure or increasing equity and they interpret the effect on competition narrowly as the effect on rivals' profits.[51]

With this starting point the literature derives a number of intuitive conditions that need to be fulfilled for State aid to have an effect on rivals' profits:

- Subsidies must change the recipient firms' behaviour to have a negative effect on rivals' profits. Moreover, if aid affects firm behaviour, the higher the amount the larger the likely effect on rivals' profits. Thus, unless capital market imperfections matter, transfers are unlikely to have an effect if they are not tied to firm behaviour.

- Subsidies must be selective in their eligibility criteria or asymmetric in their effect in order to reduce rivals' profits.[52]

- The recipient firm must have a non-negligible influence on the market price (i.e. market power). Otherwise a change in the firm's price will have little effect. However, this holds true only if the subsidy does not create market power.

If all of the conditions above are given a subsidy is likely to have some effect on prices. The next question is to analyse magnitude of the effects on rivals' profits.

To address this question Garcia and Neven (2004) build a model to investigate how various State aid interventions affect rivals' profits. The model is the most comprehensive

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51 Note that there are other relevant studies that study methodologies for the measurement of the effect on competition and trade. These are discussed in Section 3.7.

52 In an international context selectivity can also arise if all firms in a specific industry receive aid in one Member State but not in another.

and formalised that explicitly addresses the impact of State aid on rivals' profits. We therefore devote some space to discussing this model in detail.

The form and amount of State aid considered is an exogenous variable in their model. In effect, this implies that Garcia and Neven also consider cases in which Member States hand out State aid that is not in their own interest – in the sense that the State aid may lower the welfare of the Member State's citizens. Contrary to Collie (2000 and 2002) and Besley and Seabright (1999), the analysis does not focus on the incentives to provide "excessive" aid.

Compared to the literature on strategic trade, Garcia and Neven build a richer model. In particular, they

- consider the impact of State aid on marginal cost, entry (or fixed avoidable) cost, and the cost of investing into product quality.

- consider the impact of concentration within Member States and allow for market segmentation across Member States.

This richness in the setup comes at some cost of analytical tractability and Garcia and Neven need to rely on simulations for some of their results, which raises robustness issues.

As we will refer to a number of findings by Garcia and Neven, we next sketch their model setup. There are two countries, referred to as home and foreign country respectively. There are *n* domestic firms producing a differentiated good and one foreign rival, which also produces a differentiated good belonging to the same industry. All domestic firms have the same (constant) level of marginal cost, which may however differ from the foreign firm's marginal cost level. The home and the foreign market are completely segmented (no arbitrage of consumers) so that each firm can set different prices in the home and in the foreign market. Together with the assumption that marginal cost is constant, this allows the authors to analyze the home and the foreign market independently from each other and they choose to focus on the home market.[53] If the foreign firm sells a unit in the home country's market, it incurs a transportation cost per unit, which in effect raises its marginal cost by *exactly this amount*. Demand in the home country is derived from a representative consumer model with a quadratic utility function, where parameters are restricted to ensure that firms produce substitutes. Furthermore, the authors impose symmetric product differentiation both within and across jurisdictions, where the latter is assumed to be stronger. That is, domestically produced goods are closer substitutes to each other than to the foreign firm's product.[54] This model then gives rise to linear (inverse) demand functions. Except when considering State aid that increases the incentive to improve product quality, the inverse demand intercept is

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53 To analyze the home and foreign market separately from each other, it is also necessary to assume that the number of firms in the industry is exogenous.

54 While perhaps often reasonable, this is by no means innocuous. For example, Fiat and Ferrarie are presumed closer substitutes than Fiat and VW.

assumed to be equal across all firms. Garcia and Neven assume that firms compete in prices and compare the equilibrium of this model with and without State aid.

State aid can affect firm behaviour through various channels. In the following we look at the impact on

- output and pricing
- entry and exit
- the quality of the goods produced
- predation and foreclosure
- incentives to innovate

3.6.1. Impact of marginal cost reductions on output and pricing

We begin by considering subsidies that lower the marginal cost of *one* of the domestic firms. Due to the strategic complementarity in the pricing decisions, such subsidies lead to a reduction of both its and its competitors' prices. Note that this approach follows the standard practice in industrial organisation theory, which largely ignores the effects of fixed cost reductions on firm behaviour. We also focus here on the effects on allocative efficiency – effects on dynamic efficiency, which may affect future output and pricing, are discussed below. The paper focuses on how the impact on rivals' profits of a given marginal cost reduction is affected by two market characteristics: the degree of product differentiation and the degree of concentration. There are also some results regarding the asymmetry of firms in the market.

Garcia and Neven report the following main results:

- An increase in *concentration* will lead to an increase in the effect of a given subsidy on rivals' profits. They claim that this effect is largely due to the fact that with higher concentration a given subsidy will affect a larger proportion of output.

- Provided that there is sufficient concentration, less product differentiation increases the effect on rivals' profits. To see why, consider the case in which substitution across products is very weak. Then the subsidised firms, as well as the others, act like a monopolist and a change in the pricing behaviour of the subsidised firm does not affect the other firms in the market place. If product differentiation is reduced, rivals will be affected by the subsidised firm's lower prices. Where concentration is low, less product differentiation may decrease the effect on foreign rivals' profits. This occurs partly because the foreign firm is assumed to be a worse substitute and if the substitution between domestic firms increases, domestic firms carry a larger share of the adjustment burden.

- Greater differences between foreign and domestic firms' products ("more *segmented markets*") obviously lower the effect on foreign firms and focus the effects on domestic firms.

- More *symmetry* across firms (more equal market shares) will lead to a more evenly distributed effect across firms. There is, however, no clear result in which way it affects the overall magnitude of the effect on rivals' profits. Note that this implies that the HHI index is not always a reliable guide to measure the impact on competitors.

It is worth emphasising that whenever rivals are worse off in this case, consumers are better off. Indeed, the larger the impact on rivals, the more the market price falls and the better for consumers. Furthermore, absent shadow cost of Government funding, a policy that reduces marginal costs, even through subsidies, would be appropriate in addressing the market failure due to the firms' market power. Moreover, to judge whether the reduction in marginal cost is desirable, we need to consider the channel through which State aid works (investment aid, output subsidy…) and which market failure it addresses. For example, if the State aid indeed addresses the market failure caused by oligopolistic market power, then one would expect that the more concentrated the market, the higher the State aid should be.

3.6.2. Impact of subsidies that lead to entry or exit

Next, we consider subsidies that affect the number of domestic firms. Harbord and Yarrow (1999) discuss how aid that affects avoidable costs may affect entry and exit decisions, where an avoidable fixed cost is a cost that does not vary with the level of output of the firm but that can be eliminated (i.e. avoided or recovered) if the firm exits the market. By definition variable costs can be avoided when production stops. Aid that affects avoidable costs can include subsidies for the rental, the leasing or the acquisition of non-specific capital equipment (i.e. capital equipment that has an alternative use). Such aid affects the calculus of the entry/exit decision and will therefore usually influence the number of firms in the market. Aid that affects unavoidable (or sunk) costs will not affect the entry/exit decision unless firms are financially constraint. Such aid, which is untied to the entry/exit decision will go straight into profits and does not affect the entry/exit decision.

The exact thought experiment that Garcia and Neven investigate is one in which the State aid induces one more domestic firm to enter that has the same marginal cost of production and product quality as all other (incumbent) domestic rivals, without inducing any of the other active firms to exit the industry. The question Garcia and Neven address is how this affects the profits of both domestic and foreign rivals.

- They find that the effect on domestic rivals' profits is inversely U-shaped in the degree of *substitution* across products produced by the domestic firms. That is, an additional firm does not matter much for domestic rivals if products are much differentiated and it therefore does not compete fiercely with the existing firms. Similar, an additional firm has a small impact on domestic rivals if the substitution among these rivals is very high and they therefore already compete very fiercely absent the additional entry. For intermediate levels of substitution, the effect on rivals' profits is greatest.

- In addition, they find support for the intuitive conclusion that the more domestic firms already produce within this industry, the lower the impact of one additional entrant. Also, the lower the *concentration*, the lower the threshold level up to which an increase in substitution between domestic firms increases the impact on rivals.

- Greater differences between foreign and domestic firms' products ("more *segmented markets*") obviously lower the effect of entry on foreign firms and focus the effects on domestic firms.

The impact on the foreign firm's profits falls as the substitution between domestic rivals increases. Because the foreign firm is assumed to be a worse substitute, increasing the substitution between domestic firms also increases the burden of the adjustment that they carry. If the foreign firm becomes a better substitute, the effect on its profits increases while the effect on the domestic rivals decreases.

In this context it is also worth pointing to a general result in industrial organisation, which studies the effect of the number of firms on welfare. Under the (crucial) assumption that there are no barriers to entry other than scale economies (i.e. there is so called "free entry"), the effect of an additional firm on welfare is negative if it leads to a reduction of output per firm.[55] If these conditions are met, subsidies that increase entry reduce welfare.

Another result that is discussed in the literature is that firms in sectors that suffer from structural problems (like overcapacity, declining demand or sustained low economic profits) may face a coordination problem: Exit often benefits all firms, but the firm that chooses to exit gets a smaller benefit, as it receives no further revenue. Thus, exit is a public good that needs to be privately provided, a fact that in many models leads to excessively late exit in terms of industry profits. In such a situation sectoral State aid is likely to delay exit. Again, the effect on welfare depends on the specific situation. It has been proposed, however, to completely ban State aid in such a situation.[56]

3.6.3. Impact of subsidies that change the product quality

Garcia and Neven proceed to consider the impact of a subsidy that increases the quality of one domestic firm relative to its rivals. The quality improvement is modelled as an increase in the firm's (inverse) demand intercept. That is the market expands and there are some consumers who are now willing to pay more for this firm's product. However, even if all firms set the same price, rivals' sales will not fall to zero. That is product differentiation is both vertical and horizontal at the same time: not all customers agree as to who produces the best product. Relying on simulations, they find the following results:

- The effect on rivals' profits is stronger when *concentration* is higher.
- They also find that the effect on domestic and foreign rivals increases with *substitution*.

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55 This result is due to Mankiw and Whinston (1986). More precisely, Mankiw and Whinston (1986) have shown that, unless compensated by other effects, entry will be excessive whenever post-entry competition is characterised by the following three conditions: first, aggregate output increases (price falls) when more firms enter; second, post-entry price is not below marginal cost and; third, entry of an additional firm causes sales of existing firms to fall (weakly). Besides Salop's circular city model with Bertrand competition, standard Cournot-games satisfy these conditions. For an application in the State aid context see Harbor and Yarrow (1999).

56 See Garcia and Neven 2004, Chapter 3 for a survey of the relevant literature and key issues.

- The more segmented the market across Member States, the lower the impact on the foreign rival and the higher the impact on the domestic rivals.

Overall their results suggest that the impact of increased quality on rivals' profits is highest when concentration and domestic degrees of substitution are high. They also find, however, that the effect on the price of rivals and their profits may differ. One of the reasons for this is that if a firm has higher quality, the overall market grows and this provides an incentive for the higher quality firm to set a higher price, which tends to benefit rivals.

3.6.4. Change in the ability to foreclose or predate

It is well known from economic theory and applied competition policy that under some circumstances "large" firms may have the ability to raise behavioural barriers to entry (to foreclose the market) or to force "smaller" firms out of the market (predation).

Benoit (1983), Bolton and Scharfstein (1990) and others showed how large firms may use their "long purse" to deter entry of small firms. Benoit (1983) countered the common argument that predation would be too costly to be a credible threat (or to occur) by showing that if strategic interaction with financial constraints is analysed in a repeated game with complete and perfect information, predation may play an important role in deterring entry – even if the expected value of future monopoly profits would justify only one period of fighting and the financially constrained firm could survive a large number of periods.

Predation due to the "long purse" is directly linked to a financial asymmetry, i.e. "large" means having less binding financial constraints than rivals. The theory of capital markets suggests that this may often (but certainly not always) be in line with other indicators of "bigness" like a larger turnover or capital employed. To the extent that State aid increases the asymmetries of financial constraints, it may facilitate predation and foreclosure by the larger firm.

More generally, if State aid leads to a lower perceived marginal cost, it may prevent entry by firms that would otherwise have entered as they expect more intensive competition post entry. Similarly, State aid may also induce exit of firms that do not receive State aid and whose true marginal cost are higher than the perceived marginal costs of the aid-receiving firms.

If aid is given to a firm that is more financially constrained than its rivals, it may have the opposite effect, reducing concerns of predation and foreclosure.

Viewed in isolation, these competition policy considerations suggest that aid to "larger" firms is more likely to be of concern than aid to "smaller" firms. Aid that does not change financial asymmetries in the market should have no effect.

Note that aid to large firms that leads to predation or foreclosure is likely to harm both consumers and rivals.

3.6.5. Impact of subsidies on the incentives to innovate

In markets where R&D activity is an important part of strategic interaction between firms, aid can influence the incentives to innovate. As discussed in Section 3.2.4 well targeted R&D aid may foster private R&D and address market failures in the innovation market.

Here, we focus on the effect of R&D aid that is selective and changes the position of a firm in its efforts to gain a patent first. In order to understand the economic effects of State aid in this situation, it is helpful to consider the process of innovation as race to first file a patent or to first launch a product. The following factors are important when assessing the impact of a subsidy that leads to entry of a firm into the innovation race (CRA 2004):

- The entry affects each firm's probability of winning in the innovation race. This has a negative effect on the incentive to invest in R&D as it decreases the expected return on investment. Thus, seen in isolation, this effect is likely to decrease innovation.

- However, if several firms pursue different routes to finding, say, a therapeutic advancement, adding an independent line of research will decrease the expected time until the discovery is made by some firm. This decreases the expected time of the research period and therefore the cost of R&D. It also means that patients have faster access to discoveries.

- An aid-induced entry may also affect the value of the "prize" in the innovation race. By adding a rival, post launch competition, e.g. with me-too products, increases and the expected return on investment decreases, which in turn has a negative effect on the incentive to innovate.

- Finally, the effect of aid-induced entry depends on the position of the entrant's research programme relative to the rival firms. If the entrant gains significant headway with respect to rival research teams, the latter may stop their research effort.

These considerations show that it is very difficult to make general statements about the effects of an aid that induces entry. A case-by-case assessment is required.

A similar result emerges when studying the effect of a subsidy to a firm that is already engaged in a "patent race". Rivalry may then be increased if as a result of the aid firms are positioned more equally in the race. Rivalry may decrease if the leading firm gains further headway as a result of the aid (Frontier Economics 2004, Annex 1).

3.6.6. Impact on the incentives of recipients and dynamic competition

Aid to firms may appear to be a suitable solution when the aid is administered, but in the long run the effect on incentives to operate efficiently may be diminished and x-inefficiencies may result (Leibenstein 1966). This may be the case especially for restructuring aid, where the amount of aid depends on the loss announced or expected prior to the aid decision. Moreover, State aid may give firms an incentive not to perform as efficiently in order to become eligible for State aid.

Generally the economic literature is quite critical regarding the benefits of rescue and restructuring aid. Indeed, the creation of soft budget constraints by State intervention has been identified as one of the key flaws in the centralised economies (Kornai 1979 and 1980; Maskin and Xu 1999). Kornai (1979) discusses the importance of financial discipline for a firm's performance and explains how the expectation of State aid can weaken the financial discipline of firms. He shows that soft budget constraints are not effective compared to hard budget constraints because the financial situation of the firm does not constrain actions. This leads to over-investment and to distorted incentives for managers.

Kornai's (1979) results are also helpful to understand the experience following the recent deregulation of the French banking sector analysed by Bertrand et al. (2004). The deregulation included the abolishment of subsidised loans and improved efficiency in the banking sector. The deregulations lead to an increase in the allocative efficiency in sectors that were most dependent on banks because banks were less willing to bail out badly performing firms. This indicates the importance of hard budget constraint for an efficient allocation of resources.

The selection of efficient firms is one of the main tasks of effective competition. By aiding failing firms, Governments may perpetuate unviable structures instead of allowing "creative destruction" and necessary adjustments. Moreover, restructuring aid is often concentrated on large firms[57] and diverting the aid to smaller firms is thought to generate higher benefits. Further, the anticipation of a Government bail out may delay difficult restructuring efforts or tempt managers to invest in excessively risky projects. Finally, the incentives of rivals are also distorted. Knowing that their profitability will not only depend on their performance but also on whether rivals receive subsidies or not, will tend to reduce their own effort to perform in the market.

Thus, rescue and restructuring aid can be assumed to be a more distortive form of State aid than any other form of State aid. Contrary to most other justifications for authorising State aid, rescue and restructuring aid covers ongoing operating expenses of a company. State intervention that keeps an enterprise afloat and active in the market almost always has a severe impact on competitors that do not benefit from State support.[58] The complexity of these cases is also highlighted by the fact that the Community courts have annulled several Commission Decisions on restructuring aid in cases in which the Commission prohibited or authorised the grant of aid.

Cases regarding rescue and restructuring aid are particularly interesting because subsidies to operating costs affect the pricing incentives of the receiving firm directly. One

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57 A recent study that reviewed 77 rescue and restructuring State aid cases found that more than half of the recipient firms had more than 1,000 employees (London Economics 2004, p. 105). However, according to the European Commission this study is not representative of the total population of the recipients.

58 See Hansen et al. (2003) for a view of legal practitioners. A study that evaluated the impact of rescue and restructuring aid cautiously argued that although the results are quite varied, "…they suggest that, perhaps, in a number of cases the recovery of a State aid receiving company appears to occur at the expense of EU competitors" (London Economics 2004, p. 106).

interesting question in these cases is the appropriate definition of the "but for" scenario, which may be particularly difficult as the firm may have failed, been sold or restructured in a more radical and efficient way.

While one discussion relates to the fact that rescue and restructuring aid may come at the expense of rivals, another area of concern is the effectiveness. A recent evaluation of companies that received rescue and restructuring aid shows that 32 percent of them went out of business nevertheless (based on 69 cases for which information was available, see London Economics 2004).

3.6.7. Summary

Few studies have analysed the effect of State aid on competition and trade. The most comprehensive and formal study is Garcia and Neven (2004). Contrary to the approach proposed in this study, the formal model developed in their study only considers the effect of subsidies on rivals' profits. Moreover, the but for world used in the analysis is a world with imperfect competition but no other market failures. Despite these limitations, the study generates a number of interesting results concerning the effect of State aid on rivals' profits.

Of particular interest are market characteristics that consistently point to a larger effect on rivals' profits (i.e. in all scenarios considered). The review shows:

- Independent of whether State aid affects marginal costs or the number of firms, the negative effect on rivals' profits is greater the greater is concentration. Unfortunately, in many of these situation the positive effect on consumers due to lower prices will also be greater the greater the concentration leaving us with an ambiguous result regarding welfare.

- If State aid induces one firm to improve product quality, the effect on rivals' profits is ambiguous.

- When State aid reduces marginal costs of the recipient, the negative effect on rivals' profits will be greater the lower product differentiation. Entry inducing State aid will have the greatest effect on rivals' profits when there is an intermediate degree of rivalry. Again in both cases the effect on consumers' welfare will usually also be more pronounced and positive, leaving us with ambiguous welfare results.

- Entry inducing State aid is likely to be detrimental to welfare if there are no barriers to entry and entry reduces the output of the rival firms.

- Clearly, market segmentation along national lines lower the effect on the foreign rival, while increasing the impact on domestic rivals.

- If concentration is low and subsidies reduce marginal costs, an increase in the substitutability between domestic firms (or a cluster of firms that are highly substitutable between each other) can reduce effects on the foreign rival' profits and in this sense the exact domestic market conditions are important.

- An obvious implication of the analysis is that ceteris paribus a higher amount of State aid leads to a greater effect on rival's profits.

Overall the findings suggest that the impact of State aid to individual firms can differ from case to case. Concentration is often a good proxy indicating that rivals are hurt by the State aid. Indeed, in line with these findings, Garcia and Neven propose to use simulation models in State aid cases similar to those used in merger analyses in order to predict the impact of subsidies to an individual firm on its competitors.

Unfortunately, the lack of analysis of consumer welfare in much of the literature is significant for the conclusions. In many cases, simple economic intuition suggests that the higher the negative effect on rivals the higher the positive effect on consumers. Consider, for example, State aid that induces the recipient to lower prices. This aid will harm rivals and benefit consumers. Thus, learning about the size of the effect on rivals does not tell us anything about the net effect on welfare.

Moreover, the literature starts with a presumption that a smaller amount of State aid is less likely to change firm behaviour. If firm behaviour is not changed, competition is not distorted. This approach is seemingly intuitive but nevertheless potentially inappropriate for policy conclusions. It works well in an environment where there is no market failure and no equity concern. However, who would want to provide State aid in such an environment? Ignoring the potential benefits of State aid is misleading. The analysis considers market power but it ignores the potential beneficial allocative effect of State aid in the presence of market power: lower prices. Even if one considers State aid as the wrong tool to address the results of imperfect competition (as we are tempted to do), ignoring the benefits to consumers and ignoring the objectives of State aid makes the analysis highly incomplete.

Thus, we believe that standard static models like the one used by Garcia and Neven and similar models that are used to explain unilateral effects in merger control are of limited relevance in the context of State aid. In Section 4 we argue that the EC should focus on the dynamic effects of State aid, which may distort both the incentives of the recipient and of rivals. In addition, a competitive analysis should determine whether the State aid allows recipients to force rivals to exit the market or foreclose the market. We also discussed that:

- To the extent that aid increases asymmetries in the financial constraints faced by firms it may, if a range of other factors are conducive, make predation or foreclosure more likely.

- Ignoring the potential benefits of R&D aid, the effect of asymmetric subsidies on firms that compete for getting a patent first are ambiguous, depending on the detailed circumstances of the case.

- One of the main distortive impacts of R&R aid is likely to be the effect on the incentives of the aid recipient that result from a soft budget constraint. Rivals effort will also be reduced if their rewards to performance are distorted by subsidies to rivals.

3.7. AID INSTRUMENTS, CONDITIONS AND ALLOCATION MECHANISMS

This section describes the different aid instruments (e.g. grants or guarantees), the conditions attached to the aid (eligibility, restrictions on usage etc.), the instruments used to allocate the State aid and the amount of aid.

Distinguishing different forms of State aid is the first step towards identifying State aid that harms competition. Ideally, we would like to learn more about how to identify the circumstances in which State aid give rise to inefficiency. In fact, distinguishing between different forms of State aid has already been an important part of EU State aid policy in the past, which has relied on the distinction between generic and ad hoc aids, where the latter are treated as presumptively suspect. Generic schemes that allow all firms to access some subsidy are less suspect to rent shifting and ex-post bargaining between firms and Governments.

3.7.1. Aid instruments

Instruments of State aid are grants, loans at below market rates, guarantees by the State for which the beneficiary does not pay a fee, tax advantages such as tax base reductions, tax deferment, tax cancellation, tax rate reduction, and tax exemption, reduction of social security contributions, selling input at below market prices, buying output at above market prices, or capital injections not in conformity with the market investor principle.

As we discussed in Section 3.3, the aid instrument appears to have an influence on the effectiveness of aid. Röller et. al. (2001) who categorise aid in three types, subsidies, tax reliefs and equity generally find that subsidies are the most effective aid instrument (for R&D, SME and regional aid) with tax reliefs being equally efficient as subsidies only for regional aid.

The general theoretical literature does not focus directly on the impact of the aid instrument on the potential distortion of competition. Rather it is common to assume that certain types of aid affect either (see for example Frontier Economics 2004):

- The perceived marginal costs of the recipient firm(s)
- Reduce the fixed or variable avoidable costs
- Lower the cost of R&D investment or are otherwise linked to a specific behaviour (e.g. to invest in environmentally friendly production technologies)

The effect of subsidies that are not linked to a specific behaviour and that do not lower the perceived marginal costs of production will, according to standard static models of industrial organisation, not change firm behaviour. From this point of view, such aid only leads to a distributional effect to the benefit of the recipient firms' shareholders. Such aid is unlikely to harm consumers or rivals directly. Considering the shadow cost of funds and unwanted costs like lobbying, however, such State aid is certain to be a waste of resources.

There are two quite different reasons, however, for why State aid that simply increases the funds available to the recipients may have an effect.

- First, as discussed in Section 3.5 in some situations predatory behaviour may be encouraged if asymmetries in financial constraints increase. Thus, to the extent that aid increases or reduces asymmetries it may either increase or reduce the likelihood of predation.

- Second, if there are imperfect capital markets and some firms are financially constrained, State aid may trigger investments that would otherwise not have been undertaken.

While the first point is only relevant in very particular market constellations where predation is feasible and likely, the second point is potentially very relevant as it is often difficult to tie funds to a specific usage. Indeed, there is considerable theoretical and empirical literature that capital markets are imperfect and that subsidies may therefore change firm behaviour even if it is unconditional. Frontier Economics (2004, Annex 2) provide a survey of the key effects studied in the relevant literature. They do not reach a general conclusion but point to the need for a case-by-case approach:

> *"The implication for [the analysis of the effects of public subsidies on competition] is that one cannot necessarily ignore those subsidies that do not appear to be linked to specific firm activities as being unlikely to affect firm behaviour, and so competition. However, whether in fact they will do so, and in what way, will be dependent on the specific circumstances in question" (Frontier Economics 2004, p. 34).*

Moreover, State aid can be granted in a lump sum or relative quantity form, to a single firm or to a group of firms. The impact of these different forms is discussed in more detail in Section 4.6.

3.7.2. Conditions

Other characteristics that define the aid are the conditions attached to the aid and the definition of eligible expenditure. Sometimes Governments attach conditions to aid that directly affect the potential impact on competition. For example, the recipient may be required to open its market to other Community operators as a condition for the aid. In cases where aid takes the form of capital injection or debt write-off to compensate for past losses, it must be linked to a credible restructuring plan whose purpose is to enable the firm to avoid making losses in the future. The European Commission studies a number of conditions like these before approving the aid.

3.7.3. Allocation mechanisms

Particularly important is the method used by the State to select the beneficiaries and the eligibility criteria. Indeed, the degree of selectivity will clearly affect the impact of State aid on competition. Note that there must be some selectivity as aid that does not lead to an economic advantage to the recipient and does not affect the balance between firms does not constitute State aid.

Generally subsidies can be selective in their eligibility criteria or they can be asymmetric in effect (Frontier Economics 2004, p. 37). State aid is selective in its eligibility criteria if it is made available only to a particular firm (individual aid, ad hoc aid) or if it is only available to a subset of firms (e.g. firms that satisfy certain criteria regarding turnover, employment, ownership etc). A number of State aid schemes may appear not selective but are effectively asymmetric in their effect. State aid that aims at promoting a certain technology or provides subsidies to firms that locate in a specific region are examples. While in principle open to all firms, these schemes will only be potentially beneficial to those firms that have at the point of the launch of the scheme not yet invested in the technology or that have not yet made their location choice.

Another important distinction is between ex-ante and ex-post asymmetry. Methods for selection of beneficiaries can include tenders or beauty contests or other allocation mechanisms. Even if such a selection mechanism may be completely open and equally attractive for all firms, the firm that is awarded the aid may benefit from this award.

The impact of ex-ante asymmetry depends on the nature of the market failure that is to be addressed and on the number of firms that may provide the required services. Suppose that only one firm can provide the required service (say operating a non-commercial bus route) and the Government opts for a tendering regime to allocate the aid. Then any additional criteria that are likely to reduce the number of interested bidders are likely to raise the subsidy required or reduce the quality of the selected bidder (see the discussion of the Altmark case in Section 3.2).

The ex-post asymmetry is sometimes irrelevant. In the bus example discussed above only one firm can, by our assumption, run the service. As a result ex post asymmetry is significant. Nevertheless, to the extent that the non-commercial service does not compete with commercial services on parts of the route or in the same “corridor”, it will have no impact on competition as no firm would have been interested in providing this service.

Consider another example. State aid that leads to desirable entry in an oligopolistic market with imperfect competition. Such aid is asymmetric ex ante (only entrants can potentially benefit) and ex post (the entrant enjoys the subsidy, incumbents do not). Rather than distorting competition, however, such a subsidy reduces distortion of competition.

Thus the simple formula that more asymmetry leads to more distortion does not generally hold. Moreover, as noted before, one of the legal requirements for subsidies to be classified as State aid is their selectivity. Thus, all State aid will be to some degree selective.

Nevertheless, it is important to emphasise that one of the key problems of State aid is that the award process is often not sufficiently competitive. Returning to the bus example, one of the critical issues in the provision of bus services is the not the subsidies to non-commercial services but lack of tendering regimes and significant incumbency advantages in many Member States. These characteristics lead to X-inefficiencies and eliminate the ability of competition for the market to identify the most efficient operator.

Productive efficiency considerations therefore suggest requiring an open and transparent tendering regime – a common policy recommendation by economists.

3.7.4. The counterfactual scenario

Finally, there is a practical question whether in State aid control the situation with a given aid instrument and the chosen allocation mechanism should be compared to a world with an optimal aid instrument and an optimal allocation mechanism or whether it should be compared to a world without aid. As argued in Section 3.2.5 we propose that a given State aid measure should be compared to the better of the two worlds, without aid or with an optimal State intervention. In case practice it may not always be feasible to identify an optimal intervention mechanism. In such a case, it will be necessary to refer to a scenario "without aid" or with a reasonable alternative intervention. Whenever there are known better alternatives, however, these should form the relevant counterfactual.

3.8. MEASUREMENT TECHNIQUES AND METHODOLOGY

3.8.1. Measurement techniques: Market Definition

The analysis of the market characteristics leads to market definition and an analysis of market power, similar to the methodology used in Article 81/82 or merger cases. However, the implications of this analysis differ: In the State aid context, market definition matters with respect to identifying the competitors that are potentially harmed and consumers that may benefit. In addition, market definition serves to determine whether there are any relevant cross-border effects. Note also that in those markets where subsidies for services are tendered, the actual service may be a monopoly service (e.g. the bus service on a non commercial route) whereas competition for this service could take place in an international tendering regime, implying a much broader definition of the relevant market. Relevant to the definition of distortions of competition is to delimit the market that will be affected.

Fingleton et al. (1998 and 1999) suggest basic principles for defining the relevant market in State aid cases. The authors believe that the approach to market definition used in antitrust cases is generally relevant and useful. However,

> *"With antitrust policy, the market is delineated to see whether the market mechanism will ensure competition. With State aid control, the definition of the market is required to trace the effects of aid across markets" (Fingleton et al. 1999).*

In the following, we describe the main framework suggested in Fingleton et al. (1998) to identify the relevant markets to be considered in State aid cases. We believe that the framework may be an appropriate starting point to analyze State aid cases.

To identify the initial product market affected, the authors suggest that for each recipient of aid, all of the markets in which it sells output and purchases inputs should be identified. For each of these markets, substitutability in demand should be used to define a set of

relevant competitors.[59] In these markets, the direct effect of the aid occurs. That is in most cases, the harm to competitors and the benefit to consumers is likely to be highest in these markets. It is important to consider all of the recipient's products, not only to identify potential competitors that may be harmed but also because the intended effect of aid – even if it is activity-specific – is diminished under the effect of cross-subsidisation, which will affect the welfare trade-off.

Next, an attempt needs to be made to identify the markets into which the recipient could enter if granted aid. That is supply side substitutability from the recipient's market into other markets needs to be considered, i.e. substitutability in the opposite direction than that typically considered in antitrust cases. In general, one would expect this effect to be lower than the direct effect; it is most likely to become relevant if there are strong economies of scope. For example, if the recipient is already in financial difficulty, this effect is likely to be low.

Fingleton et al. (1998) point out that the aid may have significant effects in market for complementary products (e.g. necessary inputs) also.[60] For example, if there are stable bilateral relationships between upstream and downstream producers and it is hard to change partners, aid to a downstream producer will tend to benefit its upstream supplier. A first lesson from this example is that it may be important to take market for complementary products into account also. Who the relevant upstream producers are and how they are affected will tend to depend on upstream competition. If competition is such that it is easy to change suppliers, then as all suppliers can compete for the extra demand from the aided downstream firm, upstream suppliers in general will benefit. If the upstream competition is very fierce, the downstream firm will be able to hold on to a greater share of the benefits from the aid. To define the relevant upstream markets for this effect, substitutability should be used.

There is, however, another more indirect effect that can be important. Even if there is no substitutability between suppliers, an aid to a downstream firm can affect other suppliers. If the aid leads to a reduction of sales and profits from the recipients' downstream competitors, then these will demand fewer inputs from their suppliers. Hence, even though these suppliers are in completely separate markets, they are still negatively affected. This impact may be especially important in regional aid to firms who buy inputs predominantly from local suppliers. If aid to a given firm leads to a redirection of downstream market share from competitors in other similar disadvantaged regions, then the negative effect on their suppliers needs to be considered in the same way as the positive effect in the aided region is considered.

As Fingleton et al. point out, cross-border effects and hence the geographic market definition can be assumed to play a greater role in State aid cases than in competition

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59 In contrast to antitrust policy, supply-side substitutability of other firms can be ignored at this point. The reason is that the likely effect in antitrust cases is a price increase, which may induce firms not currently in the market place to enter. In aid cases, however, the likely effect of the policy is a price decrease, which should not lead to entry of firms for whom it is unprofitable at the current (higher) price.

60 This is of particular importance in rescue and restructuring aid cases where the loss of employment in markets that produce complementary products (e.g. inputs) is often used as an argument to justify aid.

cases because the impact of State aid could be to alter the recipient's geographic strategy.

Sleuwaegen (1999) suggests a method for delineating the relevant market in State aid cases that fall within the old multisectoral framework. He suggests the use of an 'integrated approach' that uses standard econometric techniques from antitrust cases (such as residual demand estimation, price correlation, etc.) and more qualitative information used in the business strategy literature. While he acknowledges that the differences highlighted by Fingleton et al. between State aid cases and antitrust cases regarding cross subsidization, he believes that considering all products of the firm involved is too cumbersome:

> *"However, for obvious practical reasons such analysis is too broad to handle and an efficient control of cross subsidization is not an easy task. A minimal control could consist in providing with the notification documents some verifiable statement showing the necessity of the State aid for the project…"*

He suggests asking for documentation that shows for the necessity of aid linked to the choice of location. The aim of his proposal is to avoid cross-subsidization by not overcompensating for the cost disadvantages linked to a specific location. Nevertheless, we would like to point out that from a welfare standpoint, this emphasis could lead to perverse effects. Consider a country with two firms at two locations, one being more efficient for the production of a good or service A in question and the other at producing B. For simplicity, suppose the locations are in all other aspects relevant similar and that location A can produce good A without aid and B could produce B also without aid. Furthermore, suppose that the output is sold in non-EU market and that there is a strategic trade incentive to provide aid. Then aid could only be granted to each location for the product that it has a comparative disadvantage in – a policy that reduces EU citizens' welfare. In our view, the approach suggested by Fingleton et al. is more promising.

3.8.2. Methodologies for prioritising

Besley and Seabright (1999) propose that a first step for an analytical framework consists in distinguishing between compulsory, i.e. State aid control that is binding on all members, and State aid control for which Member States can sign up for voluntarily. In the case of compulsory State aid the authors propose a set of questions to be posed, which also allocate the burden of proof. The set of question relates to whether the aid is directed towards a named firm or to a firm that meets a number of generic criteria.

1. If the actual beneficiary is not in a position to exercise significant market power in input or output markets, the aid can be declared legal.

2. If market power is presumed to exist, the next criterion examines whether the presence of market power in conjunction with State aid creates a significant net negative cross-border externality. If the answer is no, the State aid can be declared legal.

3. In the case of a negative answer, if the rationale for aid is due to an alleviation of a domestic market failure and the aid is seen to be an appropriate remedy, and

the aid is for greenfield investment or for firms receiving aid for the first time, the aid can be declared legal.

4. Conversely, if the rationale for State aid cannot be justified by the alleviation of a domestic market failure, the aid can be declared illegal unless it can be shown that there are significant benefits from permitting it that would outweigh the cross-border cost.

Fingleton et al. (1999) develop a taxonomy to handle the different criteria according to which the effect of State aid on neighbouring countries can be measured. The effect of State aid across national boundaries depends on the effect on total output, the country's share of total output, which determines the industry effect, and the country's share of total inputs and downstream products, which determines the economy-wide effect. Whether the aid is to a firm whose location is fixed or not matters only to the magnitude but not the direction of the effect.

Four possibilities exist:

1. If both output and input markets are geographically confined to national boundaries, then there can be no effect on other countries. This is often the case of non-traded services such as theatres, although care needs to be taken to not assume that services are non-traded if they are actually traded.

2. If the output market is international and input market is national, the increased share of total output imposes a negative industry effect on other countries as the recipient increases his market share. According to the authors, however, any negative effect is consolidated at the input level because any increase in domestic output must be met from domestically produced inputs.

3. If both input and output markets are international, the negative industry effect on other countries in the output market is compensated by the positive effect due to the increase in demand in the international input market.

4. If the output market is national and the input market is international, State aid may have a positive effect on other countries.

A recent report for the UK Office of Fair trading Frontier Economics (2004) looked at the effects of public subsidies on competition. They focus on the effect on rivals' profits and sometimes refer, more loosely, to "competition concerns" that seem to be related to the intensity of the rivalry in the market. Building on Garcia and Neven (2004) as well as on Harbord and Yarrow (1999) they analyse the effects on rivals considering

- Entry and exit decisions
- Pricing and output decisions
- R&D investment decisions

They find that three factors are necessary for subsidies to have an effect:

- The subsidies need to change firm behaviour. Transfers *not tied to firm behaviour* are unlikely to have an effect unless there are capital market imperfections. Whether there are capital market imperfections would depend on the circumstances of a case.

- Subsidies would have to be *selective* in the eligibility criteria or asymmetric in effect. While it is acknowledged that aid that is not selective may also have an impact, this impact is not considered as leading to significant competition concerns.

- If the recipient does not have *market power* before and after the introduction of the subsidy, the subsidy will have no effect on competition.

Moreover, they investigate different factors that affect the materiality of a potential effect on rivals':

- *Magnitude* (relative to costs) and *structure* (one off vs. spread over periods, which changes the incentives to enter or exit the market). It is argued that the larger magnitude of the subsidy relative to the costs of the subsidised activity the larger the anticipated effect on competition. With regard to the structure they find that upfront lump sum payments may increase the likelihood of entry and a subsidy spread over time may increase the likelihood of keeping the recipient in the market.

- *Market concentration and product differentiation*. Subsidies that affect pricing decisions are most likely to give concerns where the number of firms is small and goods are homogenous. In such environments, effects on pricing are strong and may lead to exit of rivals. Where the number of firms is small and goods are differentiated the effect is lower. However, if exit is nevertheless induced it would be of more significant concern than if goods are homogenous. A subsidy that leads to entry will be most effective where product differentiation is moderate.

- Degree of *asymmetry* of firm size. Subsidising large firms is likely to have negative effects on competition. Subsidising fringe firms is good for competition if it induces fringe firms to compete more effectively with large firm. It may have negative effects on competition if it leads to an exit of existing fringe firms.

- *Importance of R&D competition* in the market. R&D subsidies can influence firm behaviour by changing the quantity or focus of investment. Frontier Economics do not find a general rule whether subsidies will reduce or increase incentives for future innovation.

- Extent of *barriers to entry and exit.* Higher barriers to exit imply that firms that compete with a subsidised rival may be less likely to leave the market. However, if exit does occur, it may be more difficult for firms to re-enter.

Based on this analysis they propose a screen for subsidies that are unlikely to cause an effect that is based on magnitude of the aid and on the HHI. For those that have passed the screen the above-discussed criteria provide an indication where effects are likely to be the largest. Further recommendations refer to the subsidy design. Finally, the report suggests considering whether there is a less distortionary subsidy that could achieve the

same objectives and whether the distortionary effects of the subsidy outweigh the potential benefits. However, no methodology is developed for the final two steps.

The report provides few arguments why the suggested methodology is appropriate and it is not always clear what the objective of the Government should be (protecting rivalry or protecting rivals' profits). From the analysis in the report of Frontier Economics the two criteria (amount of aid and HHI) seem plausible candidates for a very first screen to focus State aid control efforts. However, this result depends crucially on ignoring the market failure that is to be addressed. As we will show in Section 4.4.1 taking into account market failures implies that a low amount of aid and a low aid intensity are not good screens.

When it comes to normative considerations the report is not always clear why the Government should pursue a certain proposal. The report seems to aim at minimising competition effects:

> *"For pricing, competition effects are likely to be greatest where the number of firms is small. For entry, competition effects are greatest where there are a small number of firms and product differentiation is moderate" (Frontier Economics 2004, p. 7).*

This seems to suggest a policy that does avoid lower prices when there is market power due to strategic interaction and that avoids entry when there are few incumbents. This is, of course, a direct implication of the focus on rivals' profits. We feel that the analysis would have to be complemented by an analysis of the effect on consumers.

Finally, the report does not develop a methodology for considering the benefits of subsidies. Rather it is suggested that a weighing of the costs and benefits should be conducted after the assessment of the distortion of competition. This may lead to conceptual problems. As is highlighted by the report, the assessment of the costs of a subsidy must be carried out with reference to an appropriate counterfactual. If the counterfactual is a world with significant market failure, the correct counterfactual to identify the impact of State aid on the distortion of competition would have to be one with this market failure. As we point out elsewhere, State aid that leads to the provision of a good that would not have been provided in the absence of State aid cannot distort competition.

4. FRAMEWORK FOR THE ANALYSIS OF CASES

4.1. APPROACH TO METHODOLOGY DEVELOPMENT

In order to develop a useful methodology for the analysis and assessment of the impact of State aid on competition and trade we used a number of guiding criteria. In particular, the methodology should meet the following standards. It should be

- Based on sound economic principles
- Related to the objectives of State aid control
- Lead to robust results (minimise type I and type II errors)

- Feasible and practicable (including data requirements)

- Transparent and provide a maximum of legal certainty

The weights that are put on these criteria and practical design of the methodology differs depending on whether effect of State aid on competition and trade is evaluated more generally as part of policy evaluation or whether the methodology is intended for use in specific cases, e.g. when State aid to individual undertakings or State aid schemes are notified, or whether notified State aid is to be screened without any analysis.

A methodology for case handlers needs to be more practical than a methodology for policy evaluation purposes since case handlers will have to assess cases and schemes with a limited amount of time and resources. Case handlers access to general information about the performance of other cases is relatively more limited compared to research that evaluates State aid projects on a broader basis. For each case, case handlers can only process the limited amounts of information provided by a member state's Government, whereas as part of policy evaluation, information and data from a number of past cases can be used. Screening criteria, which are used to circumvent in depth analysis of certain cases or schemes, need to be even less demanding in terms of the analysis required. When designing a methodology for the assessment of cases and schemes, the bundling of different aspects of the analysis into an evaluation step and the sequencing of the various evaluation steps will also be influenced by

- The effort and time required for different elements of the analysis, and

- The burden of proof.

Ideally, a methodology for case handlers should have natural stopping-points, which allow the case handler to decide some cases without conducting an extended analysis of all possible effects. The sequencing of the elements of analysis should then be guided by the effort and time required to gather sufficient evidence in order to take a reasonable and defendable decision without doing the full analysis. Generally, those elements of the analysis that can be pursued with limited resources should come first, leaving the "full blown" analysis only for very important and complex cases.

Many EC approaches in competition policy also allocate the burden of proof to different parties. Loosely speaking and brushing over some important subtleties, one could say that the parties need to show and underpin the benefits of their behaviour or their agreement, whereas the EC focuses on showing and underpinning the harm. The explicit responsibility of the parties to proof efficiencies under Article 81(3) (agreements) and in merger control can be seen from this perspective. There are similar elements in the risk capital communication in which the Governments need to show specific benefits if the aid intensity is above a given threshold.

Both the appropriate cut-off points and the exact thresholds for the burden of proof depend on the market failure that is addressed by the aid and the aid instruments. Thus, we do not attempt to provide general results with regards to these two elements.

The focus of this study is on preparing the ground for the development of a framework for the analysis to be pursued by case handlers. We propose that there should be a more

direct link between policy evaluation and the methodology applied by case handlers. Policy evaluation yields a number of important results that should feed into the prioritisation efforts in practice. For example, if, as suggested by our analysis, there is empirical and theoretical evidence that some aid instruments are more effective than others, this should be taken into account in the case evaluation.

Our study presents some of these general "policy evaluation" insights and makes suggestions on how these should feed into the methodology for cases. There is, however, much more data available inside the European Commission and with Member States that should feed into a more systematic process of policy evaluation. This process should be linked more formally to the methodology for case evaluations. The European Commission emphasised that evaluation practices differ tremendously across Member States and that very few countries perform a systematic evaluation of their national State aid measures. This leads to a policy recommendation, which is also directly addressed to Member States:

Recommendation: The European Commission should – in collaboration with the Member States – develop a more systematic process of past policy evaluation. There should be a more systematic process to evaluate the performance of State aid (schemes) with respect to the stated objectives of State aid. This process should lead to a regular update of the evaluation criteria used in State aid cases. Member States should have an active role in this effort. The European Commission should both collect and disseminate the experience gained in Member States (and also in its own aid schemes). To do so, it should make its knowledge regarding the effectiveness of various schemes and all collected data (where legally feasible) publicly available. In addition, the European Commission should regularly update the methodology and block exemptions used in State aid control based on the policy evaluation results. While it will require some time before the beneficial impact of these changes can be noticed, the effort should begin immediately.

4.2. OVERVIEW

In this section we propose a framework for the analysis of State aid cases that consists of five steps.

Step 1: Is the objective worth pursuing?

Step 2: Is the aid (scheme) appropriate?

Step 3: Definition of the relevant market for affected products

Step 4: Analysis of the counterfactual scenario

Step 5: Decision and remedies

As pointed out above the emphasis on different elements, potential cut-off points and screening criteria depend to a large extent on the market failure that is to be addressed and the aid instrument used. Moreover, while the five steps are ordered in a logical sequence later parts of the analysis can inform earlier parts. For example, the analysis of

the counterfactual scenario can be seen as an integral part of the analysis whether an aid (scheme) is appropriate.

The framework needs to be adapted to specific cases. For example, as shown in Section 4.5.2, the methodologies for defining innovative markets differ significantly from the methods to define product markets. In Sections 7 and 8 we discuss the framework in the context of R&D aid and R&R aid.

The following provides a more detailed break down of the methodology discussed in this Section and the questions that will be analysed within each step.

Step 1: Is the objective worth pursuing?

- *Market failure*: Is there proof of significant market failure?
- *Effectiveness*: Has past aid been shown to be effective with regard to the policy objective?

Step 2: Is the aid (scheme) appropriate?

- *Amount of aid and aid intensity:* Is the amount of aid and the aid intensity appropriate? To what extend are non-EU countries subsidising firms in that sector?
- *Aid instruments:* Which aid instruments (grants, loans, etc.) are the most appropriate for specific policy areas? Is aid the least distortive policy instrument available to achieve the objectives? What is the interaction with other policy instruments in place (are there measures for the "effective rate of assistance")?
- *Duration and frequency of aid:* What is the effect of the duration and frequency of aid on the assessment of the impact of aid?
- *Conditionality:* What is the appropriate conditionality of aid by policy area ("focus of aid")?
- *Shadow costs of funds:* What is the appropriate shadow cost for the Government funds used and does it vary by country and over time?
- *Transaction costs and lobbying:* Under which conditions is State aid likely to trigger particular transaction costs such administrative costs associated with handing out and monitoring the State aid or induced wasteful lobbying expenditure?

Step 3: Definition of the relevant market for affected products

- *Affected products:* What is the change in behaviour caused by the aid and which products of the aid recipient are affected?
- *Market definition:* What is the relevant geographic and product market for the affected products?

Step 4: Analysis of the counterfactual scenario

- *Analysis by channel:* Through which channels is competition and trade likely affected and how? Marginal cost reductions that affect output and pricing (unilateral effects), improvements in product quality, entry of the recipient firm or exit of rival firms, foreclosure and predation, changes in the incentives to innovate, changes in the incentives of the recipient and effects on dynamic competition

- *Application of counterfactual scenario techniques:* Simulation model, market characteristics approach, recipient characteristics approach, closest competitor analysis, techniques from other fields.

Step 5: Decision and remedies

- *Weighing of evidence:* How can trade-offs be resolved?

- *Burden of proof:* Who should carry the burden of proof?

- *Cut-off points:* What are appropriate points where the analysis can stop?

- *Remedies:* What are appropriate remedies and "compensating" measures?

- *Considering aid in non-EU countries*: How does aid in non-EU states affect the assessment of schemes within the EU?

4.3. STEP 1: IS THE OBJECTIVE WORTH PURSUING?

One of the key problems of the current regime of State aid control is that neither the objectives of providing State aid nor the objectives of State aid control are clearly specified. This has been a shared view throughout the interviews we conducted with DG Comp officials. Indeed, making the objectives of a particular State aid more transparent and analysing the appropriateness of State aid to achieve the objective should be one corner stone of the reform of State aid control. The Commission has already undertaken an important step in that direction. The risk capital notice explicitly requires "evidence of market failure" before the EC is prepared to authorise risk capital measures that fall outside the scope of other existing State aid rules.[61] State aid notifications without an explicit reference to the market failure that is to be addressed should be dismissed.

4.3.1. Market failure

One outcome of the literature review was that one should consider the market failure in question or the objective of State aid when assessing its impact on competition. The need to do so has been confirmed in the analysis and development of methodologies to assess the impact of State aid on competition and trade. This can be motivated by conceptual and by practical considerations.

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61 State aid and risk capital OJ C 253/3 21.8.2001; para. VI.5..

In the literature review of this study, we have argued that the concept of "distortions of competition" must be linked to a welfare criterion in order to allow meaningful analysis. This is what happened in competition policy, where a negative effect on consumers and lessening of competition are used interchangeably. Market failure, however, is also a concept that is closely linked to a welfare concept as it specifies situations where the market does not lead to optimal results and in which optimality is derived from a welfare concept. In other words, if market failure is defined in relation to welfare, an appropriate remedy for the market failure is by definition pro-competitive.[62] Thus, if one could identify the exact amount of State aid required in order to address the market failure and if the market failure was properly defined, the State aid should be granted without further analysis. With the two concepts linked to welfare, a methodology that separates the analysis of market failure from the analysis of distortions of competition requires careful definition of what is analysed under which heading. It may indeed be simpler to distinguish the analysis of benefits and costs.[63] While there are situations where a separation of the two concepts seems intuitive, we found that the conceptual difficulties are quite often of practical relevance.

From a practical point of view, there are also a number of factors that underpin that market failure analysis and distortion of competition analysis are very closely linked:

- The effects on competition often depend on whether the aid is really fully used to address the market failure in question, in which case the analysis should focus on the impact of addressing this market failure, or whether there is excessive aid that can be used for other purposes.[64] This is in some sense similar to the approach taken by the European Court of Justice in the Altmark decision, which is concerned with SGEI's. The court decided that the compensation must not exceed the costs of the universal service obligation.[65] The effect of the part of aid that is required to achieve the objective (provision of a SGEI, investment in R&D, survival of a firm) is different from the analysis of the effect of "excessive" aid. The former usually involves a discrete (wanted) change in the market environment whereas the latter by definition distorts competition, because either it harms rivals more than consumers or, in the best case, it is just a simple waste of tax payers money.

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62 Clearly, a balancing approach which looks at market failure first and then at the effect on competition and trade implicitly refers to a narrow concept of market failure.

63 Similar issues arise in the context of separating the analysis of article 81(1) and 81(3) or separating the analysis of efficiencies and the impact on competition in merger cases. In some of these cases it is more helpful to think of these different elements of analysis as factors that are likely to work in favour of consumers and factors that are likely to harm consumers where both need to be analysed in an integrated model.

64 This is acknowledged by current EC practice. For example, the R&R guidelines state that the "[…] the amount of the aid or the form in which it is granted must be such as to avoid providing the company with surplus cash which could used for aggressive, market-distorting activities not linked to the restructuring process" (Community Guidelines on State Aid for the Rescuing and Restructuring Firms in Difficulty.)

65 The decision is related to what is to be defined as State aid, we are concerned with prioritising cases where State aid has been identified. There are legal implications whether the analysis is pursued in order to define aid as State aid or to prioritise. From an economic point of view, any aid identified as excessive should be assessed most sceptically.

- In order to assess the impact of the discrete change, two worlds need to be compared. A world where the stated goal of the State aid is pursued with a world where the service is not provided, the investment is not undertaken, or the firm goes bankrupt. This type of counterfactual analysis is required for the analysis of market failure and for the analysis of the distortion of competition, whatever exact definition is chosen for the two concepts.

- Our analysis shows that the unilateral effects on rivals' profits are often greater when the rivalry is more intense. By unilateral effects, we mean those effects on output and pricing that are derived in the type of models that are also used to identify unilateral effects in merger cases. When there is intense rivalry in a market, however, it either seems unlikely that there is a serious market failure or other active rivals are likely to receive State aid too. In the former case, aid should usually not be granted as there are no benefits, in the latter case, the issue is to balance the aid provided to the various recipients.

With these considerations in mind, we argue that the analysis of the effects on competition and trade must be embedded in a framework that includes a careful analysis of the objectives of the State aid in question. Indeed, forcing the Governments (and the aid recipients) to be more explicit about the two scenarios (with and without aid or with and without the aid scheme) is one important recommendation.

Recommendation: State aid control should encourage Member States to explicitly identify the significant market failure they attempt to address. In the past, notifications have rarely analyzed market failures explicitly. Governments should state specifically the market failure that they attempt to address with the aid (scheme) in question. The analysis of whether the objective is worth pursuing should become a central part of State aid control. By implementing this change, which can be done with little delay, the European Commission will encourage a clearer definition of the objectives of the aid (schemes), which should enable a more focused analysis of the benefits and costs of state aid (schemes).

One argument against such an approach may be that it is impossible to measure the market failure. Some economists are sceptical about whether one should attempt to measure the welfare impact of market failure. This is, however, inconsistent with a balancing approach. Indeed, as pointed out above, conceptually it is impossible to identify the effects on competition and trade if it is not clear how much aid is required in order to align the private incentives with the social incentives. We believe that measurement of market failure is extremely difficult in practise and the results will almost always remain incomplete estimates. Nevertheless, conceptually, balancing and measurement are inextricably linked. Even if in some cases the direct measurement of market failure can be avoided, it should be clear that *conceptually* one cannot avoid making estimates about the size of the costs and the benefits of State aid if one is to apply a "balancing approach" as suggested by Commissioner Kroes.

There are a number of techniques available for the measurement of the benefits of an investment that is triggered by State aid. Just as in the private sector, no firm would undertake an investment without a financial analysis, the financing of an SGEI or an R&D project should in many (not all) circumstances involve some estimate of the benefits.

In this report, we do not present and evaluate the different techniques that can be used to evaluate the benefits of projects. Those can be found on the websites of donors, like the EC and the World Bank. Rather, we concentrate on exploring the nature of the different market failures that are relevant in R&D and R&R aid cases.

Recommendation: Where possible quantification of benefits and costs should be attempted by Member States: Governments should be encouraged to estimate the expected benefits and costs of State aid. While this is often difficult, such cost-benefit approaches are currently used in other policy areas by some "donors" including the World Bank and, to some extent, the European Commission itself. Standard project evaluation techniques are likely to be helpful in the required estimation attempts.

In practice, there is often a simple indicator to identify whether there is strong market failure. If the same type of activity is pursued in other countries without aid than this is a strong indication that there is no significant market failure. Note that the reverse need not always be true. In Section 4.7, we discuss the impact of State aid in non-EU countries on the evaluation of a case.

4.3.2. Effectiveness

Once aid has been granted, the effectiveness of aid should be monitored. In the literature review, we reported a number of results on the effectiveness of aid schemes and of particular aid instruments (see Section 3.4). In Section 4.1 we recommended that there should be a more systematic process to evaluate the performance of State aid (schemes) with respect to the stated objectives of State aid. In light of this recommendation, the results of the empirical research on the effectiveness of aid should feed back into the methodology for cases.

4.4. STEP 2: IS THE AID (SCHEME) APPROPRIATE?

In the literature review, we have identified a number of criteria that matter when assessing the impact of State aid on competition and trade. We discussed with EC officials the extent to which these criteria can be evaluated in specific cases and the efforts put into policy evaluation. As a result of this discussion, we identified the following criteria that should be subject to an ongoing policy evaluation by the EC and by Governments of Member States and feed into the case handling methodology: Amount of aid and aid intensity, aid instruments, duration and frequency of aid, conditionality, alternative instruments, interaction with other instruments, shadow costs of funds, transaction costs and lobbying. In the following, we discuss each of these factors in turn. Conceptually, the assessment of whether a State aid measure is "appropriate" should lead to a comparison with the "optimal" intervention. While this is not always practical in the assessment of cases, there are areas, where known better instruments can be used in order to achieve the objectives. (Here comparisons with other EU or non-EU countries are likely to be helpful.) In those cases the existence of better alternatives should be taken into account. In any case Member States should be encouraged to motivate the choice of the aid scheme.

4.4.1. Amount of aid and aid intensity

The amount of State aid seems to be one of the most obvious criteria to use in order to gauge the likely effects on competition.[66] Indeed, it has been proposed as a screening criterion in a number of previous reports on the matter (see Section 3.8). This approach is based on a simple intuition: more aid means more distortion. In this Section we argue that this simple intuition is often wrong. Before doing so, we consider a number of further reasons for investigating the amount of aid.

The literature review has shown that on an aggregated level there are diminishing returns to aid intensity, i.e. the percentage of the costs incurred for the development of the activity that is financed by State aid (see Section 3.4.1). This suggests that the benefits of each unit of State aid is reduced, the higher the amount of aid relative to the total cost of a project – providing another reason to be sceptical of aid that leads to a high aid intensity.

Finally, there may also be some practical considerations why (some measure of) the amount of State aid may be a reasonable starting point for assessing State aid:

- Determining the grant element, the amount of State aid and other indicators like the aid intensity are part of the standard procedure in State aid cases. Thus, these indicators are, although not always easy to determine, available.

- Since there is a fixed cost of investigating a case in more detail, the EC may be well advised to focus on those cases where the State aid involved is significant.

- Finally, if the absolute amount of aid is small, it seems more likely that it is addressed to a local matter rather than to encourage an activity that would affect rivals or consumers in other Member States.

While all these arguments are important in some situations they can also mislead and they need to be qualified.

Take the intuition “more aid means more distortion”. While sometimes true, this conjecture can lead to wrong conclusions. If State aid effectively addresses market failures, a larger amount may not distort but benefit effective competition. If the market failure that the aid intends to remedy requires a given minimal amount of State aid, a relatively large amount of State aid may be needed for the aid to have any beneficial effect.

This first qualification need not prevent the use of the amount of aid as a criterion for evaluating State aid. It simply highlights the fact that a large amount of aid may well be

66 While there are many cases in which it is straight forward to identify the amount of aid, there are also a recognisable number of cases where the grant element is not obvious. Indeed, a number of prominent State aid cases focus on determining whether a private investor would have pursued the same investment or not and, if not, what the effective grant element is. In the following description of the methodology, we will assume that the amount of aid has been determined, potentially as part of the effort to determine whether aid is to be classified as State aid.

pro-competitive. Moreover, any aid in addition to the aid necessary to remedy the market failure leads to a distortion of effective competition. One may thus be tempted to argue that a large amount of aid may nevertheless be a necessary condition for a significant harm for competition.

There are, however, further reasons to be sceptical about regarding the amount of aid as an indicator for the effect on competition:

- Small absolute amounts can still have significant effects within a small relevant market. If only a few SMEs are active in a relevant market, preferential treatment of some of them can lead to a significant distortion of competition within that market. By effectively raising the de minimis threshold, SMEs may not be appropriately protected from distortions of effective competition. If many of these cases occur, the accumulated effect on welfare can be significant.

- In order to adjust for this, one may want to look for low aid intensities (and thresholds on aid intensities are used widely in State aid control). Low aid intensities may be taken as an indication that significant distortions of competition are unlikely. If the supported activity is undertaken with low aid intensities, however, one may question whether the activity is really additional or whether it would have been undertaken anyway. Market failure increases the more social and private gains from an activity differ. Thus, larger market failure warrants larger aid intensities. In this sense, the fact that a project is undertaken if aid intensities are low, may indeed suggest that the project would have been undertaken anyway, i.e. that there is no additionality. Such State aid, however, is always inefficient.

- If there are any fixed costs in evaluating a project, handing out low aid amounts through a project-based scheme leads to high administrative costs relative to the amount of aid handed out. Hence, such schemes should be viewed with significant scepticism.

- If, alternatively, small aid intensities (or small absolute amounts) are sufficient to trigger additional activity, this additional activity may still have significant effects on competition as in a world without aid this activity would not have been undertaken.

We believe the above criticisms to have important implications. Consider the implication of the first bullet point in the list above. If a series of SME's are affected by unmonitored aid schemes, the cumulated effect on welfare may be significant. Thus, we view a fixed cost of investigating a case argument, which suggests focussing on cases with large amounts of aid and ignoring those with low amounts, as inappropriate. (Indeed, the appropriate conclusion of the fixed cost of investigating a case argument could be to forbid all small aid.) A completely different, and somewhat more convincing reason to ignore cases that involve a small amount of aid in a small relevant market is that these markets are likely to be local markets. Thus, one may argue that these cases are best dealt with on a local level, an argument that we address in more detail in Section 6.

The second and the third bullet point emphasise that small aid intensities may lead to a waste of money especially in the context of project-based schemes. One reason is that they are less likely to induce new investments or activities that the recipient would not have undertaken in the absence of the State aid scheme. Another is that they are likely to

involve high transaction costs. As we mentioned earlier in this report, this waste of money argument can potentially be countered by a subsidiarity argument. If the only problem of an aid scheme is that it wastes taxpayers' money, this may be an issue for the national (or local) authorities to address. The discussion in Section 3.5, however, highlights that national authorities can have incentives to hand out excessive aid in such cases also, making State aid control potentially desirable.

Now suppose there is additionality. Then, as pointed out in the last bullet point above, a small amount of aid can lead to a new activity that may well have a significant effect on competition. One may be tempted to argue that the effect is unlikely to be distortive as it only required a small amount of additional aid. Nevertheless, it remains true that without the aid the activity would not have been undertaken (otherwise it would have been a waste of money, the case we dealt with above). Thus, there is still potential for a significant effect on the market allocation.

Box 1: Hoffman-La Roche 1997 – no additionality

The HLR case shows that the European Commission already investigates whether aid is additional, or, in the language of the Commission, whether there is an "incentive effect".

In 1997, Austria notified a proposed State aid measure for the development of the anti-obesity drug Orlistat, designed for the treatment of obesity. Orlistat works by blocking the absorption of dietary fat. The R&D aid was first notified as investment aid and withdrawn by Austria after it became clear that the Commission would open a procedure and probably adopt a negative decision.

The aid granted was relatively small (aid intensity including both the aid granted to environmental aid and the R&D aid was 5.3%).

The Commission decided not to authorise aid because the "incentive effect" of the aid could not be demonstrated, i.e. there was no proof of additionality. The Commission found that HLR would have had to carry out the project anyway in order to remain competitive. Anti-obesity drugs were considered to have enormous market potential. Moreover, the development of the project already began in 1986 yet the Austrian Government only notified the proposal for State aid in 1995, suggesting that the aid was not instrumental for the undertaking.

Source: Commission Decision of 21 May 1997 on the proposal of Austria to award aid to the Hoffmann-La Roche company for the development of the drug 'Orlistat', designed for the treatment of pathological obesity, L103, 3/4/1998.

These concerns already limit the value of a screening criterion based on a measure of the amount of aid. Further criticisms of such a screening approach are:

- Another criticism of choosing either the amount of aid or aid intensity as the sole criterion is that one may not want to approve aid to certain recipients. For example, in interviews it was mentioned that even small amounts of aid can be unacceptable if a dominant firm is the recipient.

- If the amount of aid is taken as a screening criterion to gauge the effect of State aid on competition, Governments may allocate aid in small tranches effectively both avoiding a proper scrutiny of the (large) cumulated amount and increasing the administrative burden associated with the state aid. To track the cumulated amount further monitoring would be required.[67]

- As shown in the literature review, the effect of a given amount of State aid depends on a number of other factors, including the market shares of the recipient and the product differentiation in the market.

- A small amount of aid per firm may be a large amount of aid for an industry. Governments may effectively promote national industry by spreading a small amount of aid to many firms, changing the terms of trade in favour of national producers.

Some of these criticisms, while valid, are potentially simpler to address than the ones raised earlier, e.g. by adding further criteria to a screening test. This has to some extent been the approach taken in the LET and LASA tests proposed by the EC (see Section 2.4).

From an ex-post perspective, a valid argument for why individual *cases* that involve a low total amount of aid should not be investigated is that such cases are likely to involve small effects and the value of reaching a correct case-based decision is insufficient to justify the use of scarce community resources on such minor cases. Besides encouraging aid in cases that are unlikely to satisfy additionality and be beneficial, however, such a rule provides incentives for governments to hand out aid in small amounts in order to avoid scrutiny. This is likely to further raise the administrative costs associated with such project-based schemes, reducing their desirability even more.

While, indeed, a careful balancing may not be justified, an alternative to allowing all cases that involve a small amount of aid is to simply forbid handing out small aid amounts on an individual case basis. Alternatively, the commission may try to use clear guidelines (such as market failure based block exemptions) and precedents to standardise and facilitate the analysis of such cases. Furthermore, given that such cases are unlikely to be beneficial from an ex-ante point of view, the Commission may require detailed justification for such selective project-based schemes from the Member State.

Another potential approach could be to limit the overall level of State aid for each Member State. The possibility of setting ceilings on e.g. the ratio of State aid to GDP has already

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67 Some practitioners questioned how important this effect is. They believe that a Government policy of handing out aid in small amounts to circumvent scrutiny by the European Commission is unlikely to occur. In their view, such a policy would lead not only to small economic benefits to the Member State but also to small political benefit to the Government. They argue that big, highly visibly aid, targeted on an important interest group or marginal constituency is more likely to yield political returns. Note, however, that aid handed out in small amounts is less likely to be scrutinised by voters and the media. If voters, however, are not well informed, there is less (political) damage to choosing inefficient policies. Furthermore, while the political benefits of a single such aid measure may be low, the cost of handing the aid out is also low. Also, such aid may well be used to target an important marginal constituency. Ultimately, whether and to what extend Governments will respond by choosing multiple small aid schemes to avoid scrutiny is an empirical question.

been discussed by the Economic Policy Committee.[68] This would imply that Member States with a greater ratio of State aid to GDP would need greater efforts to reduce the level of State aid. Setting a global limit reduces higher levels of aid, which improves the effectiveness of aid because governments would be motivated to only select the most effective aid (whether this is actually done is a different matter). Moreover, setting a global limit will be easy to implement. Still, setting a global limit may not be the appropriate. There is no global limit that would be optimal for all countries because the extent of market failures may differ among countries.

One compromise between the above two approaches would be to give each Member State a fixed budget that it can use for small project-based aid schemes, with larger aid decisions being investigated by the commission. To refine such an approach, the Commission may randomly select some small-project based case for an in-depth analysis, with the Member States maximal budget for such schemes being increased or decreased depending on the outcome of the investigation.[69]

Conclusions on the amount of aid and aid intensities

Our analysis has shown that for project-based aid that addresses a specific market failure, the amount of aid is not suitable as an indicator for the distortion of competition. Where aid intensities are low there is a significant danger that there is no additionality and there are good arguments that such programmes should not be promoted. Any scheme that encourages project-based aid with low aid intensities is likely to lead to a waste of public money.

The key criterion for assessing the amount of aid is to determine whether the aid reflects the minimum amount required in order to trigger the investment or the activity that is desired. This leads to two recommendations:

Recommendation: Amount of aid and aid intensity screens can be useful if adapted to the market failure concern and the instruments used (e.g. to shift the "burden of proof"). While generally the burden of proof is with the Member States (due to the illegality presumption of Article 87(1)), guidelines and block exemptions can (and should) be used to facilitate the approval of aid that is unlikely to harm competition. In this context, market failure and instrument specific upper bounds on the amounts of aid and aid intensity can be used to shift the burden of proof to the European Commission should it want to challenge the appropriateness of the State aid. This approach has been adopted, for instance, in the Risk Capital Communication of the European Commission and seems pragmatic. The implementation of this recommendation requires careful analysis of the additionality and effectiveness of aid as well as the potential distortive effect on competition within the specific context of a given market failure and a given proposed aid instrument. Thus, this recommendation can be implemented in ongoing

68 Proposal for a coordinated strategy to reduce State aid volumes, Brussels, ECFIN/643/99-EN

69 Alternatively, the Member State and/or the subsidised firm may be required to pay a fine in case additionality and desirability cannot be established.

efforts to develop and revise guidelines and block exemptions as, for instance, in the ongoing consultation process with regards to innovation aid.

Recommendation: The European Commission's State aid control should consider more explicitly the appropriateness of the aid instrument. The chosen aid instrument is important when evaluating an aid scheme since it has direct implications on whether the aid is properly targeted to a market failure. While this is already done in some policy areas (again the Risk Capital Communication is one example, limitations regarding the instruments in rescue and restructuring aid cases is another), there is scope for a more systematic evaluation of the aid instruments, as well as a thoughtful consideration of better alternatives. We report some relevant results on different instruments in Section 3.7 and in Section 7.2.4 on R&D aid. Unfortunately, there is very limited research on the appropriateness of aid instruments and we would encourage further efforts to explore this issue in focussed and targeted projects.

As will be discussed in the next section, there may be a case for non-selective activity-specific aid measures awarded through the tax regime. For these measures the relationship between the amount of aid and the distortion of competition is different.

4.4.2. Aid instruments

As shown in the literature review, there is evidence that some aid instruments seem more effective than others in achieving a particular policy objective. The review has also shown that these "optimal instruments" vary depending on the policy objective. Thus, as part of an effort to provide more effective aid, the choice of the aid instrument should matter and it should depend on the policy objective.

Studying specific aid instruments in the context of different policy area yields a further refinement of this result. In Sections 7.2 and 8.2 we provide a discussion of the effectiveness of different aid instruments in the context of R&D aid and R&R aid.

In this analysis, we find evidence that - at least for R&D aid - a number of aid instruments are complementary and that instruments should be adapted to the market failure that is to be addressed.

To see these points, consider the following more general debate. There are two conflicting arguments with regards to the degree of intervention by the Government. Should one promote general tax measures (where the Government does not evaluate each project) or should the aid be targeted to those areas where market failure is most extreme? There are strong arguments for each position:

- Where possible, Governments should not interfere as businesses are better placed to put money at the most efficient use.

- By the very nature of the justification of State aid, however, private incentives are not in line with public incentives. Thus, aid should be focused on limiting the freedom of the recipient as they are always inclined to use the funds for other purposes in which the private gains are higher.

The implication of this is that the market failure must be analysed carefully in order to find out whether it is systematically linked to a group of firms or a set of activities.

In the context of R&D aid we show in Section 7.2 that different aid instruments are likely to be complementary and discuss which aid instruments are best suited for which market failure. An activity-specific aid measure through the tax regime can be used to shift resources in the economy to R&D intensive activities. The key advantages of such an approach are low administrative costs, full coverage of potential recipients, minimised selectivity and reduced incentives to lobby for aid. Project-specific measures can then be targeted to remedy market failures in the product market (e.g. orphan drugs) or market failures in the R&D process (e.g. information spillovers). Those aid schemes require careful monitoring of the use of these funds. They are costly and should be limited to significant and proven market failures. Finally, there are arguments for measures that address capital market failures. These schemes require different criteria and can also be targeted to small firms, which are likely to suffer most from financial constraints.

Thus, general tax measures may be useful because, if properly designed, they are an efficient tool to promote all firms with a certain level of (R&D) activity or to promote that activity generally. Activities are, however, heterogeneous with regard to the gap between social returns and private returns. The larger the gap the more aid is required. For projects in which the gap is large, targeted aid is required and much stricter conditions must be attached to this aid.

For R&R aid, we find that one critical characteristic of the aid instruments is the monitoring possibility of donors and the ability to commit owners and creditors to participate in some of the losses.

Alternative instruments

A proper assessment of the State aid (scheme) would have to take into account not only the benefits of State aid but also whether State aid is the best (e.g. least distortive or least “costly”) measure for achieving that benefit. The same logic applies to the choice of the aid instrument.

One option to address these issues is to require the Government to state clearly the market failure and the objective to the State aid. This would allow the Commission to analyse if an alternative instrument would not be more suitable to remedy the market failure. Ultimately one could ask the Government to explain the choice of instrument.

Interaction with other instruments

State aid is not only a substitute for other measures, it also interacts with other measures of State intervention. Thus, a proper evaluation of the benefits of State aid would have to consider the complementary action, possibly in the form of a more general “effective rate of assistance” measure as discussed in Section 3.3. This would measure the amount of all the State aid granted in a particular industry, regardless of the aid instrument, compared to the value added in that industry. An indication of how much aid the industry already receives would be helpful in the assessment of schemes.

Empirical analysis of State aid has shown significant complementarities across different State aid schemes as well as between State aid schemes and EU structural funds (see Section 3.4 and 3.7).

Member States are better informed regarding the assistance that a company receives. One way to share this information with the Commission would be to oblige Member States to indicate on the standard notification form how much aid the potential beneficiary may be eligible to receive.[70]

Conclusions

The analysis of aid instruments in the context of R&D aid and R&R aid clearly shows that the choice of the aid instrument needs to be adapted to the market failure that is to be addressed. Moreover, we find that different aid instruments are likely to be complementary. These results show that the choice of aid instruments is one of the most critical elements driving the assessment of aid (schemes). This leads to the following recommendation:

Recommendation: Ideally Member States should report more explicitly on the interaction of schemes and instruments. Governments should be encouraged to explain how a given aid (scheme) specifically targets a market failure within the context of the activity or sector that it encourages. Conceptually, State aid (schemes) must be analysed in the context of other government activities to foster an activity, a firm or a sector. We would encourage further investigation as to the feasibility of such an approach.

The analysis of aid instruments is based on the interviews with DG Comp officials and the literature that we reviewed In Section 3 of this report. Theoretical and empirical research regarding the aid instruments is progressing and new financial instruments are being developed. We would therefore discourage a policy that fully deters the use of certain instruments. If parties can make a thorough argument in favour of an aid instrument that is currently not considered optimal for a given market failure, this should be considered. Moreover, a complication of choosing the preferred aid instrument may arise if aid is provided for several policy objectives at once.

The reported results are, at best, indicative and we urge more focused research on this issue before taking a final decision on preferred aid instruments. Such focused research should also take account of the costs and the ease of implementation of different aid instruments, factors not explicitly considered here.

4.4.3. Allocation procedure

Where possible, donors of aid should use allocation procedures that are open and transparent. By its very nature R&R aid is ad hoc and provided to individual companies.

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70 The standard notification form asks companies to indicate whether the aid can be cumulated with aid received from other local, regional, national or Community schemes to cover the same eligible costs and to describe the mechanisms put in place to ensure that cumulation rules are respected.

Moreover, in those cases where the company failure is due to mismanagement or inefficient production, the aid is allocated to those companies that would normally exit the market. The selectivity of R&R aid is one of the reasons why should be assessed critically.

For other aid measures open and transparent allocation procedures are possible and the European Court of Justice has recently stressed the importance of the allocation procedure in the Altmark decision.

For some purposes, very general schemes can be effective. For example, general subsidies handed out through the tax regime to R&D intensive firms are likely to be one of the least distortive measures as only those companies are treated preferentially which undertake R&D (which is what is desired).

Recommendation: The European Commission should be more lenient towards schemes with an open allocation process than towards ad hoc aid. Schemes are preferable to ad hoc aid. Schemes that are targeted at projects should be open to all firms and the award of the funds should be based on a transparent and fair allocation procedure. When possible, tendering regimes should be employed. Such a requirement maximises the effectiveness of aid, ensures that the amount of aid is not excessive, and avoids distortions of competition and effects on trade in the bidding process. This recommendation reflects the spirit of the Altmark decision and can be implemented immediately.

Note that the ex post selectivity of such allocation mechanisms can be a virtue. By picking only one firm one can choose the best proposal. Moreover, by ensuring that subsidies are not spread to a pre-defined group but handed out selectively, such scheme through creating a conflict of interest can break some of the lobbying power of the firms involved.

4.4.4. Duration and frequency of aid

The analysis of the duration and frequency of aid in the two policy areas R&D and R&R aid underpin the importance of distinguishing the evaluation of aid by policy objective. The “one-time, last-time” principle is critical in the context of R&R aid in order to minimise the distortion of the recipient’s incentives and to limit the lobbying activity of failing firms. This does not apply to R&D aid. To the contrary, there are indications from the empirical evidence reported in Section 3.3.4 that long-run support may be more effective than one-off support.

4.4.5. Conditionality

The R&D and the R&R guidelines prescribe conditions attached to the aid. Moreover, the Commission can impose

> *"any conditions and obligations it considers necessary in order to ensure that the aid does not distort competition to an extent contrary to the common interest, in the event that the Member State has not given a commitment that it will adopt such provisions."*[71]

Thus, in theory the aim of the conditions applied by the Commission is to ensure that the policy objective is met, distortions to competition trade are remedied, and beneficiaries are compensated for the benefit of aid in order to provide a disincentive to applying for State aid in the first place.

We find that in practice conditions are often used to ensure that the plans of the recipients described in the notification of aid are indeed pursued. For example, the case studies and meetings with the Commission confirmed that a lot of emphasis in rescue and restructuring cases is on whether the business plan is viable and whether it is pursued. This is clearly helpful.

During our research and during the interviews, however, we did not come across a case where compensatory measures were designed to effectively mitigate a distortionary effect on competition (note that we considered only a very small sample of cases). In particular, in the context of R&R aid conditions are often imposed as "compensatory measures" that are not linked to distortion of competition but are imposed as a means to discourage the use of aid.

We find that the instrument of "compensatory measures" is not appropriate to limit the distortionary effect of R&R aid. In order to limit the distortionary effects the key actors that are potentially responsible for the failure of the firm need to face hard budget constraints. Compensatory measures seem often inappropriate for this purpose. We expect that limiting State aid to situations where firms are already in bankruptcy proceedings will provide a better means to address these concerns.

Compensatory measures could then be turned into "remedies" that are targeted to effectively remedy a distortion to competition as prescribed by the rescue and restructuring guidelines.

There may be room for more targeted action in the case of State aid for R&D, for example by a requirement to publish or to license the results to limit the distortion to competition.

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71 Community Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty, 2004, C 244/02, 1.10.2004.

4.4.6. Shadow costs of funds

The welfare effects of aid also depend on the shadow costs of Government funds. The shadow cost of State aid includes the cost of generating the funds for State aid, for example, the deadweight loss of taxation.

In the context of the State aid literature reviewed for this project, we identified very little recent and generally accepted research on the costs of funds. This seems a major shortcoming given that those studies that we have reviewed indicate that shadow costs can be significant. For example, estimates of the welfare costs of taxation are in the range of 25-50% of tax revenue for intermediate parameter values according to Browning (1987). Collie (2002), based on a review of Snow and Warren (1996), uses a shadow price of 1.2 as a plausible value, which implies that raising funds for 1 Euro of State aid imposes a deadweight loss of 20 cents. An indication of the cost of State funds is important because it indicates the minimum benefit which the State aid should achieve.

As it is incorrect to assume that the level of market failure is similar across countries, it is incorrect to assume that shadow costs of Government funding do not vary over time and across countries. In light of these findings we derive the following recommendation:

Recommendation: Member States and the European Commission should evaluate shadow costs of funds. Governments should undertake efforts to measure the shadow costs of using funds for State aid and require a level of benefits of State aid that is in line with the identified costs. While this recommendation sounds extremely remote from current State aid practice it should not be so. For many State aid cases, shadow costs of funds are required for justifying State aid control. The current scientific and practical knowledge about the level of shadow costs in Member States is very scarce although attempts to measure shadow costs exist (not least for European Commission aid schemes). The approach to measure shadow costs can be informed by the literature on project evaluation. This recommendation will require some discussion and coordination and potentially further research until a generally agreed methodology to measure shadow costs can be used in State aid cases.

4.4.7. Transaction costs and lobbying

State aid may lead to additional transaction costs as it creates an incentive to lobby for aid. Lobbying by firms can be successful if the Government is vulnerable to such lobbying activity, for example if the recipients constitute an important electoral group or if the recipients can organise themselves to lobby. The costs of State aid such as the deadweight loss of taxation and the funding itself are usually widespread, while the benefits in the form of subsidies are concentrated and can often be more easily communicated to the public. As a result State aid decisions are likely to undervalue the consequences on tax payers, who face problems to organise. This is likely to lead to a waste of resources.

Moreover, companies can try to convince the Government to subsidise them by passing on wrong or incomplete information. Rational Governments should be aware of this but may nevertheless have to make decisions based on little reliable information. In practise,

this problem is alleviated to some extent through hiring of so-called industry experts.[72] The transaction costs of State aid may vary with the specific aid characteristics. For example, the method of distributing the aid as well as strict conditions controlling the granting of aid may lower the extent that firms engage in excessive lobbying. Also, aid to large firms is more often thought to be influenced by lobbying and this may make such aid costlier than other aid. Furthermore, general tax breaks have lower administrative costs than schemes that require an evaluation of each project.

4.5. STEP 3: DEFINITION OF RELEVANT MARKETS FOR AFFECTED PRODUCTS

4.5.1. Affected products

In the Multisectoral framework for large investment project, the Commission introduced a concept of the "product concerned" in the context of State aid. The definition presented by the Commission is as follows:

> *"'Product concerned' means the product envisaged by the investment project and, where appropriate, its substitutes considered to be such, either by the consumer (by reason of the product's characteristics, prices and intended use) or by the producer (through flexibility of the production installations). When the project concerns an intermediate product and a significant part of the output is not sold on the market, the product concerned will be deemed to include the downstream product."*[73]

In the following, we present a characterisation, based on Fingleton et al. (1999) as discussed in the literature review that is intended to help identify the products concerned:

- If State aid is activity-specific, i.e. if it is granted on the condition that firms carry out a specific activity, the affected products are those produced with this activity. For example, environmental aid may be linked to introducing new technologies that reduce energy consumption. The products affected are those produced with this technology. Moreover, in R&D, where aid is often tied to a specific R&D project, it may be helpful to study the competitive interaction of the R&D activities of rival firms. We will discuss the concept of innovation markets below.

- In some cases, aid is firm-specific and not related to a specific activity. Examples include SME aid and R&R aid. In these cases potentially all products produced by the aid receiving firms may be affected. Indeed, this may lead to a large number of potential product markets that require analysis. There has therefore been a debate in the literature as to whether one should really look at all relevant markets.

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72 According to DG COMP, industry experts are used in more than 90% of the R&D State aid cases. Meeting with DG COMP, 31 May 2005.

73 Paragraph 52, Multisectoral Framework on regional aid for large investment projects, OJ C 70/8, 19.3.2002

- Sometimes aid is granted to all firms operating in a certain sector. The affected products are those produced within the sector and the market definition can focus on the geographic market delineation, unless there are likely spillovers to other sectors due to affected complementary products, including input markets.

- Regional aid schemes can potentially subsidise any firm operating in a certain region. Here it is particularly difficult to anticipate the effects of aid until the specific recipient firms are identified.

- If aid leads to significant changes in input demand or output by a firm or by an industry, it may also lead to sizeable effects on markets for complementary products. See especially our discussion in Section 3.8.1 on the role that supply relationships and other factors play in determining the impact of state aid on upstream (and downstream) markets in which the recipient or its competitors are active.

4.5.2. Market definition

Market definition can be a helpful step in order to determine which rivals and which consumers are affected by a State aid measure. Indeed the alternative methodology for individual cases developed in Section 6 relies on market definition as a screening criterion for those markets where the geographic definition of the relevant markets is obviously local or national. Here we explore what is to be considered in those cases where market definition is not "obvious" and the differences compared to market definition in the context of other areas of competition policy.

Comparison to market definition in other areas of competition policy

Market definition in standard competition cases is well defined and a useful starting point for market definition in State aid cases. There are, however, some important differences between market definition for the purpose of competition policy and market definition in the context of State aid.

The aim of market definition in competition cases is to determine the market power of the undertakings that are involved in a merger, in an agreement, or that are alleged to behave anti-competitively. Hence, market definition for competition purposes aims to identify the set of products which imposes a competitive constraint on the products produced by the investigated undertakings. In the past, the European Commission has rarely explicitly defined relevant markets in State aid cases (see Box 2).

Box 2: Market definition in State aid cases

Although more recent cases examined such as the ST Microelectronics case (2001) and the Bull case (2002), contain a more detailed description of the market in which the beneficiary is active than earlier Commission cases (e.g. Hoffman-LaRoche (1998) and Banco di Napoli (1998)), these decisions do not define the relevant market. It is not necessary for the Commission to produce a full-fledged analysis of the relevant product and geographic market along the lines of the analysis required under Article 81 and Article 82 of the EC Treaty. The lack of market definition, however, is surprising because the small market share of the State aid beneficiary was often cited as a reason for the likely small effect on competition (ST Microelectronics (2001) and Bull (2002)). This shows that the Commission already considers some characteristics of the beneficiary, such as its size, in its assessment of the competitive effects of the aid. It is difficult, however, to meaningfully interpret market shares without defining the relevant market.

Source: Commission Decision of 13 November 2002 concerning the cash advance granted by France to Bull, 2003/599/EC and Draft Letter to the Ministry of Foreign Affairs of Italy (2000).

The approach followed by most competition authorities is the "hypothetical monopolist test", also called the "SSNIP test" (Small but Significant and Non-transitory Increase in Price). This test goes through the logic of a hypothetical monopolist to determine whether or not pricing on a particular candidate market is constrained by substitute products. The relevant market is the smallest collection of products (regions) such that the hypothetical profit-maximising monopolist would, if he were serving the market on its own, impose a small but significant non-transitory increase in price (often five to ten percent), assuming the terms of sale of the other products are held constant.

The focus in State aid cases is different, as stated in the Commission Notice on the definition of the relevant market in the context of competition policy:

> *"The focus of assessment in State aid cases is the aid recipient and the industry/sector concerned rather than identification of the competitive constraints faced by the aid recipient."*[74]

Existing proposals for market definition, which have been discussed in the literature review, take the differences into account by proposing amendments to the SSNIP test when applied to State aid cases. Four points stand out:

- There is no need to look at the extent to which productive assets outside the control of the hypothetical monopolist can be rapidly re-directed for the production of directly competing products. In other words, **supply side substitution** into the market should not be taken into account as it would potentially lead to a too wide market-definition.

- The SSNIP tests studies the effects if prices go up. Here prices go down. In some cases the relevant price elasticities may depend on the **direction of the price change**.

- The **price change** resulting from State aid may be significantly **larger** than five to ten percent. Pursuing a test on the level of a small price change may therefore lead to a market definition that is too narrow as firms producing more "distant" products are harmed if the price change is that drastic.

In the following each of these points is discussed in more detail.

Supply-side substitution

Market definition in the context of State aid should focus only on demand side substitutability. This is in contrast to the standard competition policy approach where both supply and demand substitutability are considered. In standard competition policy cases, the focus is on the competitive constraints that make prices increases unprofitable. For this question, it is important to include those potential competitors that render a price increase unprofitable because they have an incentive to start producing substitute products once the price is raised. In State aid cases, the relevant question is to trace the effects of a price decrease or an output expansion of the aid recipient's products. Thus,

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74 Commission notice on the definition of the relevant market for the purposes of Community competition law, OJ C 372, 9.12.1997. http://europa.eu.int/comm/competition/antitrust/relevma_en.html

market definition should focus on how other existing producers are affected and on the potential effects on producers in markets that the aid recipient intends to enter. In practice, a SSNIP-type test that ignores the responses of potential competitors that become active after a price increase can still be applied.

Direction of price change

In standard competition policy cases the question is what constrains the firm(s) investigated, i.e. will the firms lose significant sales when they raise prices. In State aid cases, the focus is on the sales won from other firms when the prices are lowered. In some cases, the cross-price elasticities may vary depending on the direction of the price change.

Magnitude of price change

The SSNIP-test is concerned with small changes in price. As discussed in Section 4.5, the SSNIP test should be adjusted to reflect the fact that the aid recipient may lower the price by significantly more than five to ten percent. Thus, even firms that do not operate in the relevant market identified with the standard procedure may suffer significant harm if the price cut is large.

Apart from these differences, there is another reason to consider an amendment of the methodology. In most State aid cases, the objective of the aid is to achieve a **discrete change in market structure** compared to the situation without aid. The effect is rarely a marginal change in pricing behaviour. This can be illustrated as follows:

- Regional aid intends to attract firms which would otherwise not have located in that region.
- R&D aid intends to generate R&D programmes which would otherwise not have occurred.
- R&R aid intends to keep a company alive that would have gone bankrupt otherwise.
- SGEI aid intends to ensure services that would otherwise not be provided.

Thus, for each area the identification of the competitive effects should start from this discrete change, which may not be related to a price change. In many cases, it may therefore be more appropriate to skip the market definition exercise and to focus on the definition of the counterfactual.

Use of market definition techniques

As shown in the previous section, the use of standard market definition techniques for the purpose of analysing the effects of State aid has some limitations.

In a number of cases, however, using the standard techniques of market definition can still be useful:

- The market definition can be used “assuming” that the activity is already under way.

- In cases in which the activity already exists and State aid the continuation of the activity, standard market definition techniques may be useful. This is often true in R&R cases but it may also be true for a renewed subsidy for SGEI and other areas of State aid. In these cases, it can be helpful to employ the standard techniques of market definition, not least because the use of small price changes will allow employing some techniques to identify the relevant competitors. Most market definition techniques greatly rely on estimates of demand elasticities and cross-price elasticities, and the necessary data is only available for the current industry outcome. Nevertheless, these techniques can be seen as part of the counterfactual analysis. When using the SSNIP test in this context, one should always consider the market structure with State aid (i.e. assuming the bankrupt firm will remain in the market, the R&D project will be launched etc.).

- When appropriately defined, market definition can be helpful in order to identify whether there is a market failure in the first place. In those markets where, first, there is active competition in the market and, second, rivals do not receive State aid, market failures are unlikely to exist.

- Moreover, in many cases geographical market definition is relatively obvious and it can be used for screening purposes. As we will discuss in Section 5, this may be particularly helpful if the EC would put strong emphasis on subsidiarity and little emphasis on commitment effects of State aid control.

There are a number of tests that can be performed as part of the market definition exercise. As these tests are well described in standard textbooks on the economics of competition policy, we do not elaborate them here.

Finally, we emphasise again that in State aid cases sometimes special care needs to be taken to trace the effect on complementary products also (see Section 3.8.1).

The analysis of market definition in State aid cases yields the following recommendation: Standard market definition techniques developed in the context of competition policy need to be adapted to account for the different direction of the price change and the potentially large price change. Moreover, in many cases State aid intends a discrete change in market structure. In those cases, it may often be best to move directly to the analysis of the counterfactual scenario.

Market definition in the context of innovative markets

In R&D cases State aid is granted for the development of products which do not yet exist. Thus, standard techniques of product market definition cannot always be employed. This is especially important for State aid granted to basic research, as it is more difficult to determine the future product market.

For these situations, it is sometimes suggested to use the concept of “innovation markets”. According to the Antitrust Guidelines for the Licensing of Intellectual Property issued by the Department of Justice and the Federal Trade Commission in 1995,

> *“An innovation market consists of the research and development directed to particular new or improved goods or processes, and the close substitutes for that research and*

development. The close substitutes are research and development efforts, technologies and goods that significantly constrain the exercise of market power with respect to the relevant research and development, for example by limiting the ability and incentive of a hypothetical monopolist to retard the pace of research and development."[75]

The guidelines further state that the agencies will only delineate an innovation market when the capabilities to engage in the relevant research and development can be associated with specialised assets or characteristics of specific firms.

Distortions of competition could flow from the distortion of the innovation market to the future product market. It is likely that more R&D improves the chances of success of the recipient. This may in turn impact competition in the future product market. Think for example of a case in which the beneficiary becomes the first to win the race to patent the invention.

A first step to defining innovation market is to list the R&D programmes of competitors. The higher the similarity of these projects, the higher the probability that State aid will have a negative impact on competitors as State aid reduces the R&D costs of the beneficiary, leading to an increase in R&D. One should also consider the potential use of the innovation. For example, in the pharmaceutical industry R&D efforts are sometimes usefully distinguished by the therapeutic value that they aim at finding. Two research programmes based on different new active substances may lead to similar effects on the product market and therefore belong to the same innovation market.

Even if in those cases where it is possible to properly identify an innovation market, it is not straightforward to assess the implications of the addition of another R&D programme (see Section 3.6.5).

4.6. STEP 4: ANALYSIS OF THE COUNTERFACTUAL SCENARIO

In this section, we discuss a range of techniques that can be used to identify the appropriate counterfactual scenario to be used when analysing the effect of State aid on competition and trade.

The first step is to identify the channels through which the aid may affect competition and trade. In the literature review we discussed various channels that matter. In particular, we looked at the impact of State aid that leads to

- marginal cost reductions that affect output, pricing or product quality
- entry of the recipient firm or exit of rival firms
- predation and foreclosure
- changes in the incentives to innovate
- incentives of the recipient and dynamic effects

75 Antitrust Guidelines on the Licensing of Intellectual Property, 1995

As the nature of the concerns and the methodology depend on the "channel" it is important to identify the potential effects at an early stage.

Another dimension of the "channels" is to identify which products are affected by the aid such that the effects of the aid can be "traced" to the rivals.

As the literature review has shown, the academic or semi-academic work on the effects of State aid on competition provide only limited guidance on the "tracing" of aid. To assess the impact of State aid on competition, however, it is necessary to understand how the subsidy affects behaviour. The natural starting points for such an analysis are the conditions attached to the aid. Indeed, economic theory suggests that aid that is provided without conditions attached will not change behaviour unless it relieves a binding financial constraint due to capital market imperfections.

4.6.1. Analysis by channel

(Marginal) cost reductions which affect output and pricing (unilateral effects)

One of the finding of our case studies and interviews is that State aid that lowers marginal (or variable) cost directly is rare, if not non-existent. Yet, as seen in the literature review most of the models that analyse the effect of subsidies on competition and trade assume a reduction in marginal costs. Indeed, there is a gap in the academic literature with regards to the analysis how different forms of aid may translate into marginal cost reductions.

The most obvious form is a subsidy that is granted per unit of variable costs. However, to our knowledge subsidies are (almost) never granted in this form. There may, however, be indirect ways how other forms of subsidies may lead to marginal cost reductions:

- Suppose a subsidy triggers an investment into new capital equipment that would not have been undertaken in the absence of aid. If such capital equipment leads to lower marginal costs it will affect future pricing. Note that there is not necessarily a continuous link between the amount of aid and the effect on marginal costs. The amount of aid may either trigger the investment or it may not. If it triggers the investment, the marginal cost reduction depends on the production function given the new capital equipment.

- A similar argument can be made regarding State aid that leads to training or allows firms to attract more qualified staff. Again this may lead to more efficient production with lower marginal costs.

- Finally, it is often presumed in competition policy practise that in the long-run also reduction in (quasi-) fixed costs may translate into lower prices. Economic theory, however, provides much less clear guidance on the degree to which such fixed cost reductions will be passed on to consumers (and rivals) in form of price changes. Thus, as exemplified in the EC Merger Guidelines, competition authorities tend to put a lower weight on fixed cost changes than on variable cost changes.

Indirect changes in variable costs are most likely in those cases where the aid not just offsets additional costs. For example, subsidies that just compensate for the costs of

providing a SGEI will not affect variable costs. Subsidies that trigger an investment in an environmental filter within existing machinery will not affect variable costs.

Figure 1: The impact on rivals' profits in a Cournot industry is significant if

A given amount of state aid leads to …	Plus market share of recipients is …		Plus concentration is …	
	Low	High	Low	High
1) A given reduction in marginal cost, independant of firm size	-	-		√
2) An internal subsidy in order to lower prices	√			√
3) Is determined by an aid intensity level	√			√

Source: CRA International

In Figure 1, we illustrate unilateral effects of State aid on rivals' profits. By unilateral effect, we mean the impact of State aid on firms' profits under the assumption that the nature of firms' conduct is not affected through the State aid. We also, for a moment, ignore the effect of State aid on industry structure, i.e. on the entry and exit decision of firms. Under these assumptions, the table analyses the impact of firm-specific State aid, by which we mean aid that is handed out for a specific project undertaken by a given firm. It should be emphasised that we do not consider subsidy competition between governments but the impact of a single subsidy to a given firm on its rivals' profits.

Given these assumptions we find that, independent of the exact nature of the subsidy, the impact on rivals' profits is bigger in more concentrated environments (see Appendix A4). This finding is in line with the result of Garcia and Neven's price-competition model with differentiated goods that we discuss in the literature review.

While this result is in line with standard intuitions derived in competition policy, the Cournot model, however, also leads to a "reverse result" compared to standard competition policy. In standard competition policy an acquisition by a large firm is, other things equal, thought to more likely harm consumers than an acquisition by a small firm. In State aid the focus is on the effect on rivals' profits. The Cournot model suggests that that the effect on rivals' profits is larger if aid is given to a small firm than to a large firm if it leads to a greater reduction in marginal costs:

- **If aid leads to the same marginal cost reductions for all potential recipient firms, the effect on rivals' aggregate profits is independent of the market share of the recipient**: Suppose a given amount of aid leads to investments, which in turn lead to a given reduction in marginal costs, independent of firm size. Then the effect on rivals' aggregate profits is independent of the market share of the recipient.

- **If aid leads to a larger marginal cost reduction for a small firm compared to a large firm, the impact on rivals' profits will be larger if aid is handed to a small firm.** This can arise in three plausible scenarios:

    - If as in the last scenario a given absolute amount of aid leads to a given (marginal) cost reduction, the crucial question is whether a large or a small firm will receive a higher absolute amount of aid. In practise, the higher (marginal) costs of small firms, tends to increase the amount of aid they receive, while on the other hand the larger quantity produced by large firms (seemingly) justifies higher amounts of aid to large firms. Who ever receives a higher amount of aid will have a larger reduction in marginal cost in this scenario and thereby lead to a lower market price and a bigger impact on rivals' profits.[76]

    - Suppose a given amount of aid is handed out to a firm per unit of production (i.e. used to lower the firm's perceived marginal cost). Then the smaller the firm, the higher the reduction in perceived marginal cost. The greater the decrease in perceived marginal cost, the greater the incentive to increase production and the more the market price will fall. Under this scenario, a given amount of State aid will, in models that underlie the unilateral effects theory in merger control, lead to a larger effect on the aggregated rivals' profits if it is given to a small firm. If the firm was small because it was inefficient, welfare may be harmed.[77]

    - Suppose that not the amount of aid is held fixed but the aid intensity. If the aid intensity is defined as the share of aid relative to the production cost, then for each additional unit produced by the recipient firm, the higher the firm's marginal cost, the greater the absolute reduction in its marginal cost. A firm with higher marginal cost will thus get a higher subsidy on the margin. If smaller firms have higher cost, they receive a higher amount of subsidy when they choose to increase production by one unit (more generally, under such aid intensity schemes, the most inefficient firm receives the highest subsidy on the margin). Again, we find that the effect on rivals' profits is larger if the aid is handed to a small firm.

Garcia and Neven also analyse product differentiation in their model of price competition. They find that the effect on rivals' profits is most pronounced if product differentiation is in the intermediate range.

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76 Similar, suppose the firm is offered aid for an investment that leads to lower marginal costs. Then, the effect on rivals' profits depends on whether it is more profitable for the smaller firm with higher marginal cost or for the larger firm that produces more units although at lower marginal cost to accept to implement the investment.

77 The homogenous good Cournot model predicts that smaller firms have higher marginal costs and this prediction can also be derived from other standard models of industrial organization. Some practitioners also adopt this view. For example, industry representatives in Italy argue that the average firm size of Italian manufacturers must increase for the firms to become competitive with the on average larger firms in other countries. There are, of course, other reasons for the existence of small firms which are perfectly in line with them being more efficient then large firms. The point here is that one reason for firms being small is that they are less effective competitors than their larger rivals. If they are indeed relatively inefficient on the margin, then a subsidy to small firms will tend to harm welfare even absent distortionary taxation.

In our review of past cases, we have not found discussions on how State aid may translate into marginal costs reductions. There seems, however, to be general presumption that more intensive rivalry should lead to a more favourable assessment of the case (see Box 3).

Box 3: St Microelectronics 2001 – intensive rivalry and market failure

The ST Microelectronics R&D project addressed the production of next generation flash memories. Flash memories (or flash memory circuits) are used for easy and fast information storage in devices such as digital cameras, cellular phones, camcorders, hand held assistants or smart cards. The beneficiary, ST Microelectronics, was a large Franco-Italian enterprise which ranked among the 10 main world producers of semiconductors. ST Microelectronics was the only European company acting in the field of mass standard flash memory production in 1999.

The State aid allowed ST Microelectronics to develop increasingly smaller flash memory generations. The necessity of State aid was confirmed by the industry expert appointed by the Commission: "In view of the strong competition of the major contenders (Intel, AMD, Fujitsu, Sharp, Atmel) and the huge complexity and the cost of the sub-130 nm development, this goal does not seem to be realistic without such State support." It is not clear, however, why strong competition necessitates State aid. According to a Commission expert, these competitors were also receiving State aid and this was one of the reasons for approving State aid to St Microelectronics. Thus, the "strong competition" resulted because these competitors received State aid. State aid that leads to a subsidy race is not beneficial from an overall perspective as described in our literature review – although it may have been optimal from a European perspective to subsidise its firm if mark-ups were high and business stealing possible. Other reasons for granting State aid included the huge complexity and costs of the project. The incentive effect was assumed because the aid proposal was submitted before the research project had started. However, given the size of ST Microelectronics and the fact that sub-130nm developments may be expected in the future, it is not clear why ST Microelectronics would not have undertaken the project without State aid.

The impact on competition was considered to be negligible because of ST Microelectronics' small market share (less than 5% of the world-wide market). Given that ST Microelectronics was the only European company acting in the field of mass standard flash production in 1999, however, its market share may be very high if the market is assumed to be European.

Source: Draft Letter to the Ministry of Foreign Affairs of Italy (2000). We received the document from the Commission.

The Microelectronics case discussed in Box 3 highlights the following dilemma. Intense rivalry that may stem from the fact that there are many firms in the relevant market and that product differentiation is not too large, suggests that the effects on rivals' profits are not too pronounced. On the other hand we have:

- The lower the effect on rivals' profits (due to price reductions) the smaller the beneficial effect for consumers.
- The more intense the rivalry the less likely it is that there is a market failure, unless rivals receive subsidies too.
- If rivals in the same relevant market receive subsidies, the true issue is the coordination of aid levels across countries.

Thus, unilateral effects are unlikely to be a key element of the analysis of the competition effects. Nevertheless, unilateral effects analysis can be informative in two ways. First, it can be informative for the analysis of whether there is a market failure: If there is intense rivalry and rivals do not receive aid, this is – for a number of potential market failures – evidence that there is no market failure. Second, unilateral effects analysis can be helpful to determine which countries gain and which lose. It is thus informative to determine whether Governments have an incentive to provide excessive aid.

As discussed in the Section 3.5, however, the analysis of the distribution of the gains and losses across countries requires further knowledge of the net export/import shares since this determines the net welfare effect of a change in the terms of trade in many standard cases.

This leads to the following recommendations:

Recommendation: The European Commission should not use short-run price effects ("Unilateral effects") as the first screen for the effect on competition. In most cases, we expect the main concern of State aid to arise due to their negative dynamic incentive effects or their artificial market structure effects. If seen in isolation, short-run price effects that do not change the number of firms in the market ("unilateral effects") are unlikely to harm welfare even if they do have a negative effect on rivals' profits. In this context, we find that when rivals' profits are hurt most, consumers benefit most (which underpins the importance of the choice of the welfare standard for evaluating these effects). If dynamic incentive effects and artificial market structure effects are unlikely, however, tracing the unilateral effects can be helpful as a step to determine whether the existence of market failures is likely and to investigate the distribution of the burden and the gains of State aid across Member States (see the "alternative methodology" developed in Chapter 6).

Recommendation: A complete analysis of the incentives to provide excessive aid must take into account effects on, inter alia, foreign consumers. When assessing the incentive of Governments to provide excessive aid, one needs to consider not only the burden on foreign rivals and the gain to local consumers (and the recipient firm) but also the potential losses of national rivals and gains to foreign consumers (see the "alternative methodology" developed in Chapter 6).

Improvements in product quality

Improvements in product quality can be analysed along the same lines as the potential effect of State aid on marginal costs (see Section 3.6.3 for a discussion of the analysis in the model of Garcia and Neven). Note, however, that an increase in product quality may lead to higher prices as market demand expands and could even benefit both consumers and rival firms.

Entry of the recipient firm or exit of rival firms

In this section, we discuss channels that lead to the entry or exit of firms. Closely related, and perhaps more common, we these channels can also lead to the launch of a new activity by the recipient firm or the closure of existing activities by rival firms.

Subsidies may encourage entry or the launch of a new activity and they may prevent the exit of failing firms. While these effects usually trigger (at least short-term) benefits from the point of view of consumers, they affect rivals' profits in a negative way.

As shown in the literature review, aid that affects avoidable costs can shape entry and exit decisions. In particular, aid is often conditional on an investment programme, which may imply that firms enter new markets. Thus, in many cases the implied change in the number of firms active in a market will be straightforward. In cases where the exit of firms

may be induced through the kinds of output, pricing, and quality effects discussed in the previous sections, however, it will be much more difficult to determine this number.

Foreclosure and predation

The number of firms in a relevant market may also be affected if the recipient firm engages in foreclosure or predation. As discussed in Section 3.6.4, both effects are more likely if the recipient firm is large and if the aid leads to or intensifies financial asymmetries in the market. By the same argument, aid that reduces financial asymmetries may reduce the risk of foreclosure and predation. To analyse the risk of foreclosure and predation, tools that have been developed in the competition policy context are available and can be applied to State aid cases.

Contrary to the unilateral effects discussed above, an increase in the risk of foreclosure and predation is likely to harm rivals and consumers. Thus, there is a clear case to forbid State aid (schemes) that may increase the ability to profitably predate and foreclose. One route to do so is to ensure that amount of State aid provided is the minimum amount necessary to alleviate the market failure.

Rivals may also be hurt if State aid allows the recipient to strategically increase input prices by (artificially) increasing his input demand and thereby putting rivals in a weaker position. Such raising rivals' cost strategies can be profitable and at the same time harmful to rivals and consumers.[78]

Recommendation: In the analysis of the competition effects, the European Commission should analyse artificial market structure and dynamic incentive effects first. Aid to large firms requires particular scrutiny regarding the potential effects on foreclosure and predation. Aid that soften the budget constraints of firms or distorts dynamic incentives in other ways should be analysed with a negative presumption. A more systematic investigation of these competition effects can be implemented immediately.

Changes in the incentives to innovate

Finally, R&D aid is usually directly linked to specific R&D activity. It thus directly affects the incentives to innovate of the recipient firm. By adding a new research and development activity, such aid affects rivals that pursue similar activities or activities that may lead to similar applications. In Section 3.6.5, we reviewed the impact of subsidies on the incentives to innovate. Often the introduction of an additional R&D programme reduces the expected profits of the existing R&D programmes. The reason is that they reduce the probability of the existing programmes to yield a patent first or be first to market. Moreover, if several firms can come up with similar products (me-too products), the expected future profit decreases. On the other hand, foster R&D activity can reduce the expected costs of R&D for all firms as it is likely that discoveries are made faster. Moreover, if one research programme has gained significant headway support to a laggard can revive rivalry and increase the incentive to invest in the programme. Finally,

78 They do, however, benefit input suppliers.

while the effect on the rivals' incentives to innovate may well be negative in many cases, allocative efficiency after the products are brought to the market may increase as a result of more choice to consumers.

The bottom line is that it is difficult to derive general statements on the effect of aid that induces new R&D activity. The importance of the different factors discussed above will have to be assessed on a case-by-case basis.

Changes in the incentives of the recipient and dynamic effects

In all situations where firms can expect a specific activity to be fully funded by aid, the effort of these firms to gain private sector funding is reduced. For R&R aid, the creation of a soft budget constraint leads to further misallocation of resources and reduction of effort to reduce costs. We refer to Section 3.6.6 for a more extensive discussion of the effects on the incentives of the aid recipient. Box 4 shows the value of the "one-time, last-time principle", which will presumably be more effectively enforced in the future.

Box 4: Bull (1994, 2002) – 'One time, last time'?

The series of Bull cases is interesting because it shows the risk of State aid becoming permanent if it is granted more than once. The capital injections granted in 1994 were conditional on several factors, for example that the restructuring plan would be followed, privatisation would take place and that no further aid is paid to Bull except in conformity with Community law. However, in 2001 the Commission learned that France was planning to grant another EUR 350 million to Bull. During this time Bull was not under French bankruptcy proceedings. The aid was approved because the Commission was not able to refute France's claim that the aid granted was not used for restructuring aid. For example, France provided data which confirmed that the restructuring costs had been financed from the sale of assets and not from the aid notified in 2002.

According to the 2002 decision, France had provided sufficient information for the Commission to conclude that the aid had no negative spillover effect because Bull had only a small market share and in addition, it was selling most of its businesses outside France, which limited the adverse effects of aid in other Member States.

As a result of this case, the 2004 rescue and restructuring guidelines clearly apply the 'one-time, last-time' principle to rescue aid. The 2002 Bull case is also evidence of the influence of politics in State aid decisions. The French Government granted aid to Bull shortly before the 2002 general election, after it had denied aid to Electrolux.

Source: Commission Decision of 12 October 1994 concerning the grant of State aid by France to the Bull group in the form of a non-notified capital increase, OJ L 386, 31/12/1994 and Commission Decision of 13 November 2002 concerning the cash advance granted by France to Bull, 2003/599/EC

While it is obvious that a soft budget constraint distorts the incentives of the aid recipient, it is potentially less obvious how this affects rivals. To the extent that rivals' profits are harmed when aid is granted to a failing firm, this expectation reduces the relationship between own performance and the expected profits of the rivals. As a result, general intuition from incentive theories would suggest that rivals effort is reduced leading to further distortions of effective competition.

4.6.2. Application of counterfactual scenario techniques

Simulation approach

In cases where good information about market characteristics and the strategic interaction in the relevant markets is available and where simpler techniques do not yield sufficiently clear evidence on the expected effect of State aid on effective competition, a simulation approach may be appropriate. Such an approach allows for the inclusion of the

demand and supply interrelationships between firms and may therefore lead to a better estimate of the impact of aid. Due to their complexity, however, we do not expect simulations to be applied often. Nevertheless, we would like to point out that simulations are already used in the context of the market economy investor test and in other fields of competition policy and litigation (merger simulation, damages simulations etc.).

Using market characteristics to assess the effect

A simpler approach is to use market characteristics in order to assess the likely effect on competition. As shown in the discussion of the various channels through which State aid may affect competition, a simple characteristics approach is not always easily applied. In the following, we comment on the likely impact of different characteristics on the effect of aid that is used to lower the cost of the recipient.

Concentration of industry. The examples of the "unilateral effects" theories that we reviewed suggest that the effect of aid to a single firm on rivals' profits is likely to be larger in concentrated industries than in less concentrated industries. Based on the welfare effect derived in unilateral effects models, however, the stronger effects on rivals should be of little concern. They imply that prices are reduced significantly – to the benefit of consumers. Hence, in this context of pure short-run price and output effects we do not suggest to put too much weight on the degree of concentration in an industry. This changes if there is evidence indicating that the markets are subject to predation and foreclosure concerns, which affect market structure.

If relevant markets cross borders, knowledge about industry concentration can be helpful to estimate the likely distribution of the welfare effects across Member states (see Chapter 6).

General national aid schemes for firms in a particular sector can distort the terms of trade and harm foreign rivals. The welfare effects will then depend on many more parameters than just the concentration of the industry.

When a market is concentrated, exit of firms due to predation is likely to be of particular concern. If a market is concentrated and in addition there are significant barriers to entry other than scale economies, entry is likely to be particularly beneficial for effective competition. Note, however, that there may also be excessive entry in some industries, because entrants do not consider the business stealing effect (a negative externality) on the rivals in the market.

Product differentiation. Product differentiation tends to reduce the rivalry between firms and makes the impact of aid more local. A high degree of differentiation therefore limits the negative effects on rivals but also the positive effects on consumers. With product differentiation, consumers may benefit from the additional good available in the market, even if prices do not fall (significantly) as a result of market entry. A subsidy that leads to entry will be most effective where product differentiation is not to small and, accordingly, subsidies that lead to exit (e.g. due to predation by the recipient) are likely to harm effective competition in such situations.

Trends in demand and supply and capacity utilisation. Sectors suffering from structural problems often receive larger amounts of State aid. In sectors in which demand is

declining, however, effects on rivals' profits are more likely as rivalry is more intense if there is overcapacity. The effect on consumers may still be beneficial. Demand-side growth limits the effect on competition because the market is expanding. Whether the effect is beneficial or not depends on the specific situation. The effects of entry and exit are also ambiguous.

Nature of competition and the role of technology and innovation (e.g. Cournot, Bertrand, Stackelberg, the importance of innovation). In general, the effect of State aid on competition will depend on the type of competition in the market. In innovative markets, the effect of aid cannot be measured by looking at the size of the firm. Small firms that focus on a particular field may have a similar likelihood to innovate than larger rivals in that particular field. What may matter more is the position of a firm in the "race" to patent the innovation. In dynamic markets, a head start for one rival can lead to significant disadvantages for the follower. Some research and development (e.g. fundamental research or development of orphan drugs), however, may also not have occurred absent the aid, which makes the effect of the State aid beneficial for consumers. Furthermore, with significant spillovers both rivals and consumers may indirectly benefit from State aid.

Entry and trade barriers: The effects of barriers to entry and trade very much depend on the specific situation. For example, if State aid is available for all firms and barriers to trade do not exist, then the incentive to distort competition through subsidies would lead to inflow of foreign firms, mitigating any strategic trade policy efforts that are target to help national firms at the expense of foreign rivals. The greater the level of exit and entry barriers, the greater is the value of waiting to exit a given market.

Decreasing marginal cost: If the recipients' competitors have decreasing marginal cost in output, than aid that increases the output of the recipient at the cost of its competitors has an additional strategic benefit. Here, aid induces rivals to be less efficient on the margin. In such industries, State aid, through making rivals smaller and thereby increasing their marginal cost, may tip the market and lead to exit of (more or less) efficient rivals. This may sometimes be desirable since industries with overall decreasing marginal costs are natural monopolies (i.e. the (short-run) cost of producing a given amount of output are minimised if the entire output is produced by one firm).[79] Problems arise if an inefficient firm is selected or if, due to the benefits of competition, the monopoly market structure is not optimal even though firms have declining marginal costs.

Supply and demand relationship(s): Aid may have significant effects in market for complementary products (e.g. necessary inputs) also. For example, if there are stable bilateral relationships between upstream and downstream producers and it is hard to change partners, aid to a downstream producer will tend to benefit its upstream supplier.

Recommendation: The European Commission can use market characteristics to assess how competition effects spread. Market characteristics like measures of industry concentration can be helpful to gauge the expected effects. For example, for a given price reduction due to State aid higher concentration suggests larger negative

79 Note that in some industries it is necessary to also consider a time dimension when assessing the relationship between output and costs. Examples are infant industries and industries with learning by doing.

effects on rivals' and larger positive effects on consumers (assuming no artificial market structure and no dynamic incentive effects).

Using the characteristics of the aid recipient to assess the effect

Size of the recipient receiving aid: While pointing out that larger firms may be large because they are more efficient or innovative than smaller firms, the literature identifies a number of reasons why aid for small firms is likely to harm competition less than aid for large firms. By granting aid to small firms, competition in the market may be strengthened. Increased competition would drive down prices for consumers. Larger firms may also be in a better position to capture the Government or regulators through lobbying[80] and they are likely to be in a better position to predate rivals or foreclose markets. Finally, some market failures are likely to affect small firms more than large firms.

It should be noted, however, that the effects on rivals' profits may well be larger when aid is handed to smaller firms. This has been shown in the analysis of the unilateral effects. If aid to smaller firms lead to larger reductions in marginal costs, effect on rivals' profits will be larger and, at the same time, consumers benefit more.

Mobility of the recipient firm. If firms are completely mobile and if they can negotiate with Governments, the effect of State aid may be beneficial because Governments will engage in a bidding contest to attract the investment of multinational firms undertaking greenfield investment and the Government with the highest willingness to pay can attract the firm. Observe, as discussed in our literature review, that in reality intergovernmental competition may work rather imperfectly.

Positioning of recipient of R&D aid. Some effort to innovate can be viewed as a race to get a patent. The impact of selective R&D aid may therefore depend on the positioning of the recipient in that race. Note that the likelihood of innovation in a certain area does not have to be correlated with the size of the firm.

Age of the recipient. For some market failures, the distinction between start-up enterprises and established firms may be relevant. For example, newer enterprises are more likely to be affected by capital market imperfections.

Efficiency of recipient. In oligopolies, equilibrium conditions do not lead to an equalization of marginal costs across firms. In other words, firms that are more efficient may coexist with less efficient rivals. In principle, keeping other factors constant, State aid is more desirable if it extends the market share of more efficient firms and lowers that of relatively inefficient firms. As discussed above, firms may have a larger market share in equilibrium because they are more efficient at producing another incremental unit. In practise, however, the size of firms is also determined by other aspects and we do not draw the conclusion that larger firms are always more efficient at producing another incremental unit. Typically, we believe that it will be difficult to judge whether the recipient is more efficient than rivals. For R&R aid, however, the fact that the firm applies for aid is

80 In some industries, such as agriculture, small firms seem to be rather effective at lobbying also.

indicative of a lack of efficiency, which should be taken into account when deciding on whether to permit such aid.[81] For other State aid schemes, this is less clear. On the one hand, it is sometimes argued that Governments come under more pressure to grant (ad-hoc) aid when the domestic firm is having difficulty competing with foreign rivals and, thus, an aid receiving firm is less likely to be efficient. But on the other hand, Governments have an incentive to run successful programmes. Why, for example, would a Government prefer to give R&D aid to a firm that is less likely to actually make a successful innovation? Or why should a government attempt to attract an inefficient firm? Given a lack of empirical evidence, we do not propose a presumption that independent of the market failure to be considered, an (ad-hoc) aid recipient is always less efficient than his rivals.

Nature of firm's projects linked to aid. Capital market imperfections are particularly pronounced if there is considerable uncertainty related to the projects undertaken by the recipient firms. The nature of the firm's projects should therefore be part of the market failure analysis.

First time recipient. Repeated rescue and restructuring aid to firms is likely to be least beneficial, as it reduces incentives to effectively restructure. More generally, repeated aid may soften the recipient's budget constraint and lead to inefficiencies.

Recommendation: The European Commission can use the characteristics of the recipient to assess the likely effect on competition. Characteristics of the aid recipient can be used as one element in the assessment of the likely effects on effective competition. There are, however, no general results and the characteristics will have to be evaluated in the context of each case.

Closest competitor analysis

Another technique that can be employed in the context of State aid cases is a form of the closest competitor analysis. Standard techniques that are used in merger control can be used to identify the closest competitor of the aid recipient in the relevant market of the affected product. Given that aid may potentially affect many different firms, concentrating on the rival that is likely to be affected most can be a helpful starting point for the analysis. In particular, the effect on the closest competitor can be used in order to determine a lower bound of the effect of State aid on rivals' profits. Moreover, if the number of firms in the relevant market is known, multiplying this effect by the number of firms can yield an upper bound as well. At the same time, learning about the likely effects on the closest competitor's prices, initial conclusions can be drawn on the likely effect on consumers.

Techniques from other fields

In this review, we attempt to sketch a range of different techniques that can be helpful in the analysis of State aid cases. We do not claim that we have covered all potentially

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81 Even in an R&R case, however, the firm could have low marginal cost if it has excessively high fixed cost or is in difficulty for reasons that are unrelated to production capabilities.

useful techniques, which will also differ by policy area, aid instrument, market failure and channel of competitive distortion. Project evaluation units within the EC and within other donor organisations (like the World Bank) are likely to be in a position to provide helpful insights into further techniques that can be used order to analyse the effect of State aid. Moreover, techniques from the analysis of unfair pricing practices and trade in goods can, if amended appropriately, be potentially of use in some State aid cases.

4.6.3. Summary

In past decisions, the EC rarely analysed through which channels aid may affect rivals and consumers explicitly. This reflects the low priority that was put on the analysis of competition and trade in these markets. Based on the existing literature that we discussed in the literature review, we identify various channels that should be considered in the analysis of the distortions of competition and trade. There are two main dimensions. First, we distinguish channels according to the way aid affects competition. Here a distinction is helpful because it allows a more focused analysis of the impact of State aid on competition. Second, tracing aid involves identifying the products that are potentially affected and that therefore provide the starting point for the next step, the market definition.

Recommendation: Governments should be encouraged to provide the two scenarios "with aid" and "without aid". If Member States can make a plausible claim that in a "without aid" scenario the good would not be provided, competition effects are much less likely to exist. But even in these cases it needs to be investigated whether there are instruments that are (obviously) better suited to address the market failure in question, in which case the relevant alternative scenario becomes one "with another aid instrument".

4.7. STEP 5: DECISION AND REMEDIES

4.7.1. Weighing of evidence

The decision whether or not to allow a State aid (scheme) depends on the balancing of the evidence from the different parts of the analysis. If the aid is properly targeted to address a significant market failure, which is likely to justify the general costs of raising the funds, then the aid is unlikely to generate significant and harmful unilateral effects that overcompensate the benefits. One reason is that in the short run such aid typically benefits consumers through lower prices.

In cases, however, where State aid induces exit of more efficient rivals, prevents entry, distorts either the incentives of the recipient to exert effort or distorts the recipients' dynamic incentives, the potential costs of State aid can be significant. In such case, the potential benefits of remedying the market failure and the potential costs due to the distortions of competition need to be compared.

We will discuss simple criteria to screen the likely assessment of cases below. However, one result can already be noted. The screening criteria will have to depend on the market failure in question and the aid instruments used.

4.7.2. Burden of proof

A refined methodology may want to shift the burden to prove the benefit of the aid to the donor Governments whenever they wish to use aid intensities, aid instruments, or other elements of State aid schemes that seem inappropriate for the market failure in question. Those schemes that are assessed as generally appropriate can be treated preferentially.

4.7.3. Cut-off points

There are several potential cut-off points for the analysis. However, we find that those cut-off points depend on the market failure that is targeted and the aid instruments used.

4.7.4. Remedies

In cases where there are clearly identifiable remedies to the competition concerns, one may want to consider the use of "remedies". The analysis of past practice in R&R aid shows, however, that "compensatory measures" have been used to provide a disincentive to provide State aid rather than as a remedy to competition concerns. Based on our initial review, it is not clear whether the tool of remedies is effective in the context of State aid.

5. SCREENING METHODOLOGY AND POLICY EVALUATION

Screening criteria can be used in order to allow cases that are extremely unlikely to have an appreciable effect on competition and trade. Screening criteria can also be used to identify those cases that should not be allowed on a per se basis.

The key requirements for screening criteria are that they must be easy to measure and evaluate, and screening criteria should not permit aid that is likely to distort competition and trade or reject aid that may have a positive effect.

The value of candidate criteria for screening purposes critically depends on the objective function. If the EC puts little emphasis on the commitment effect of State aid control but believes that there may be excessive State aid due to Government competition, one could justify a subsidiarity approach that would focus attention to those cases where there is a strong negative effect on foreign rivals' profits.[82] If so, small amounts and local markets provide easy screening criteria. If the commitment effect is taken into account, screening will need to be adapted to the market failure that is to be addressed by the State aid.

In order to evaluate the criteria for screening purposes, we develop what may be called the swimming pool test: The screening criteria should filter out cases like the Dorsten swimming pool case, where it is seen as "obvious" that they do not harm competition and trade. The Dorsten swimming pool case is characterised by a number of elements:

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82 This is a simpler screen than one which looks at the net welfare effect on other Member states, which include the impact of the aid on their consumers. This will have to be considered whenever the screening test fails.

- Swimming pools are seen as a merit good, a SGEI which is underprovided if not subsidised by local authorities. Those countries with public support of swimming pools have a significantly larger supply of these pools than those which do not support swimming pools.

- The effect of the aid is purely local and limited to the constituency of Dorsten, as users of (ordinary) swimming pool do not travel large distances.

- While the aid intensity may be high, the overall project size is small, limiting the potential effects on input markets or other parts of the economy.

- There is no other privately run swimming pool in Dorsten, which is harmed by the subsidies granted to the swimming pool under consideration.

In sum, these characteristics lead to the general agreement that one should not look at "swimming pool cases". For the purpose of this study, it is helpful to disentangle the four elements mentioned: the objective is not unreasonable, the effects are local (why should the EC look at this?), the project and the amount of aid involved are small, and there is no rival harmed.

Changing any of these four elements may change the assessment of the case. Indeed, the discussion in this Section shows that it is difficult to come up with simple general thresholds to screen cases that should be allowed. The main reason for this is that small amounts of aid may have significant harmful effects and large amounts may well be pro-competitive. Indeed, it is easier to propose a simple screen for what should not be allowed: any aid that does not clearly serve a community objective.

In the following, we discuss how elements introduced in the analysis in Section 4 can be used to screen cases.

5.1. COMMUNITY OBJECTIVE AND AID INSTRUMENTS

State aid (schemes) that are not in line with a community objective should be forbidden without any further analysis. In order to test whether a State aid (scheme) is in line with community objectives, Governments should be specific about the market failures that are to be addressed by the aid (scheme). For example, as suggested in Section 7.1, the European Commission may want to consider whether aid to failing firms that are not in national bankruptcy proceeding is in line with community objectives.

Moreover, we propose that the European Commission investigates the aid instruments that are the most appropriate in order to address the specified market failure (see Section 7.2 for examples in the context of R&D aid). For example, activity-specific aid measures that do not monitor the use of funds are less likely to channel aid to areas where the difference between private and social gains is particularly large. Project-based aid schemes may be more appropriate.

Once lists of "preferred" instruments are identified, it will be relatively easy to screen cases on this basis. In those cases where Governments choose other aid instruments, the burden of showing their effectiveness should be on them.

Recommendation: The European Commission should tailor the screening to the market failure and the aid instruments. The European Commission should request more detailed specifications of the market failures that are to be addressed and develop an understanding of appropriate aid instruments for these market failures. Based on this understanding, screening can be adapted to the market failure and the aid instruments used.

5.2. AMOUNT OF AID AND AID INTENSITY

As discussed in detail in Section 4.4.1, a low amount of aid and a low aid intensity do not constitute good screening devices as this may channel aid into programmes where State aid is at best a waste of money. Project-based and activity-based aid should be targeted to areas where market failures are significant. High amounts of aid and high aid intensities may therefore be required. The amount of aid and the aid intensities can nevertheless be used as screening criteria if it is possible to identify "typical" appropriate amounts of aid levels and aid intensities for specific market failures and aid instruments.

While the usage of typically appropriate amounts of aid and aid intensities should lead to a favourable treatment of certain State aid (schemes), Governments should be allowed to argue for different approaches. In those cases, however, the burden of proof should rest with the Government.

This leads to the following recommendation:

Recommendation: Low amounts/intensities are not suited. Contrary to previous approaches and suggestions, we do not propose to use a low amount of aid or a low aid intensity as a general screening criterion. Rather we propose to develop screening methodologies tailored to the market failure and the aid instruments used.

5.3. MARKET POSITION AND FINANCIAL CONSTRAINTS OF THE RECIPIENT

Another candidate criterion for screening purposes is the market position of the aid recipient. We find that the most harmful competition effects are the creation of an artificial market structure and the distortion of dynamic incentives. Both effects are typically more likely if the aid recipient is a large firm.

Our findings, however, do not suggest that the size of the recipient firm is a sufficient criterion to provide a blanket approval of aid (schemes) to small firms. But as long as the aid (scheme) is properly targeted to address a market failure and it is directed towards small firms, a distortion of competition is very unlikely.

Note that "small" and "large" would have to be defined in the context of the relative financial constraints of the recipient and its position in the market. Thus, there may be intermediate cases where more detailed analysis is required to categorise the aid recipient as small or large.

Recommendation: Financial and market position of recipient firm. If aid is targeted to address a significant market failure, the European Commission should focus on

scrutinising aid to firms that are relatively less financially constrained and that have a paramount market position.

5.4. ALTERNATIVE MEASURES TO PRIORITISE STATE AID CONTROL

Our analysis provides a number of arguments in favour of schemes that allocate aid in an open, transparent, and objective manner. Moreover, we identified arguments for a coordination of schemes in order to ensure that market failures are appropriately targeted and measures used complementary. The application of these principles may indeed reduce the burden of the European Commission as it shifts the activity of the Commission to an assessment of schemes rather than to the assessment of individual aid. Further analysis may find that within some countries, the number of schemes can be rationalised significantly if Governments adopt a more integrated approach. Complaints by aid recipients also indicate that reducing the number of schemes in order to avoid a "jungle of aid measures" would significantly lower administrative cost (of the firms involved).

The European Commission and the Member States should work together to develop a coherent framework that selects only significant market failures and determines optimal and complementary aid instruments to address these market failures. In some Member States, the same arguments apply with respect to the national, the regional, and local Governments.

Recommendation: Use of schemes. Member States and the European Commission should be encouraged to move further to the use of schemes, to rationalise the number of schemes, and to explicitly position schemes in an overall framework of State aid.

5.5. SUMMARY

Overall our analysis provides strong support for a screening approach that is targeted to specific market failures and aid instruments. This provides support for the announced approach of the European Commission to put more emphasis on block exemptions.

Note that our results depart from a number of previous approaches and suggestions. In particular, we dismiss a low amount of aid and a low aid intensity as a suitable screening candidate. Moreover, we do not suggest industry concentration as a sole screening criterion.

6. AN ALTERNATIVE APPROACH FOR INDIVIDUAL CASES: LIMITED HARM TO FOREIGN RIVALS AND CONSUMERS

Among the various rationales for State aid control, one that is often emphasised or even singled out is that Member States have an incentive to provide excessive aid whenever a significant part of the burden of the aid is carried by other countries, while the benefits are mainly local. One underlying premise for focusing only on the distribution of cost and benefits across countries is the following: Member States have the correct incentives to choose the most desirable policy – unless this policy imposes a cost on other countries that Member States do not internalise. Since Member States have the correct incentives to manage their own affairs, it is not the job of the European Commission to interfere in

those cases in which the policy effects are local. From this perspective, the sole role of State Aid control is to avoid policy coordination failures between Members States. [83]

In this Chapter, we develop a methodology for individual cases based on the above premise that the European Commission should only interfere if there is a suspicion of policy coordination failure between Member States (which could, for example, arise due to the strategic trade motives discussed above). Nevertheless, once it is established that a particular State Aid case has a negative impact on other Member States, the State Aid decision inevitably involves a trade-off between the (presumed) welfare benefits to the State Aid giving country and the impact of the policy on other Member States. Following our early analysis, we suggest that this trade-off should be resolved on the basis of a welfare standard. Hence, once the likelihood of a (net) negative welfare effect on other Member State is identified, a full welfare analysis that weighs the net benefit to the giving Member State and the negative impact on (all) other Member States is needed. Thus, once such a likely negative effect on others is identified, we suggest following the steps outlined in Section 4 and 5.

To be precise, the analysis in this section *assumes* that the State Aid policy of each Member States maximises the benefits of its citizen and, hence, there can be no role for improving this policy unless it has a negative externality on other Member States. By doing so, the analysis ignores other incentives and reasons for providing aid that distorts effective competition. In particular, we abstract from political failure that stems from lobbying, commitment problems, and other causes discussed in Section 3.5.

There are several (political) advantages to such an approach:

- First, whenever the European Commission engages in State Aid control, it overrides political decisions of a Member State. Such violations of "subsidiarity" are easier to justify politically if the local policy imposes a burden on other Member States. Political economy arguments that point to welfare improvements due to control activities by the European Commission are politically far more controversial. In addition, they raise the question whether such political failures are more severe on a Member States level or within the European Commission.

- Second, Member States may have the local knowledge and expertise that is often important in reaching correct decisions at relatively low costs.

- Third, as we show below, such an approach offers a screening criterion that filters out many of those cases, which are generally perceived as "not important enough for the European Commission to look at".

We wish to emphasise, however, that despite these potential advantages, the methodology developed in this section rests on the strong assumption that Governments perfectly target their State aid spending on significant market failures but for those situations where the distribution of burdens (mainly to foreigners) and benefits (mainly to

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83 Previous authors suggested that obligatory State aid control should be limited to cases where the European Commission can establish a significant negative effect on foreign countries and that non-obligatory State aid control can be introduced to allow Member States to circumvent commitment problems.

nationals) leads to an incentive to provide excessive aid. It is also worth noting again that the methodology needs to be seen in the context of the compatibility test of Article 87(3). Case law has made it very clear that the legal hurdle for an effect on trade in the context of Article 87(1) is very low. The European Commission has all the powers to assess many cases that only have a very limited effect on trade.

Under the maintained assumption throughout this Section that the European Commission should only interfere if there is political coordination failure between Member States, a limited effect on foreign rivals and consumers can be sufficient criterion to filter out cases that should not be studied in detail.

Based on the analysis in Section 3.5, we developed a two-step filter:

- Step 1: Is the relevant geographic market clearly local or national?

- Step 2: Is the distribution of positive and negative externalities such that an incentive to provide excessive aid is likely?

We also carefully considered whether a low amount or intensity of aid should be proposed as a uniform screening criterion for the methodology developed here. Instead, we propose that aid measures, which are not filtered out by the two steps identified above, should enter the default methodology developed in Section 4. In the context of this methodology, the amount of aid and the aid intensity are criteria that need to be considered within the context of the market failure that is to be addressed. We prefer this approach to a blanket screening across the board based on the aid amount and intensity for mainly the following reasons (see Section 6.3 below for a more detailed discussion):

- On balance, the second screening criterion chosen by us provides a more effective mechanism to filter out those cases where the incentives of a national Government are distorted.

- Low amounts of aid and low aid intensities can have a significant effect on foreign communities if the relevant market is small and, hence, “local” effects on foreigners are significant or if aid is provided to many firms where it may, for example, change the terms of trade in a significant way to the disadvantage of other Member States.

- Choosing low aid amounts and intensities as an across the board screening criterion can lead to unwanted strategic responses by Governments. By channelling aid into those projects where aid intensity is low, it may - depending on the aid instruments used - increase the number of projects in which additionality is questionable. As shown in Section 4, however, projects without additionality distort effective competition.

We therefore propose to use the amount of aid and the aid intensity as a criterion only in the context of the market failure in question, i.e. in the context of the methodology as developed in Section 4.4.

6.1. STEP 1: IS THE RELEVANT GEOGRAPHIC MARKET CLEARLY LOCAL OR NATIONAL?

Many of those cases that have lead to concern about "excessive" control of State aid have been in markets that are clearly local or national – e.g. local transport, local services (like dentists), regional airports, or swimming pools. While it is well known from other areas of competition policy that market definition can be a difficult exercise, these are examples of many cases where a screening based on the definition of the relevant geographic market for the provision of the services can be easily done unless the local market is very close to a border.[84]

Moreover, there are also many other markets where clear precedents have been set by competition authorities and regulatory bodies. For example, market definitions for various telecommunication services have been mainly national. (One exception is "international calls". therein this market, however, foreign consumers benefit and foreign rivals are not hurt.) Thus, unless the methodology developed in Section 4.5 shows that State aid is used to finance entry and expansion in other markets (in other Member States), these cases can also, under the approach discussed in this Section, be dismissed quickly.

When applying this screen, however, care must be taken with regards to whether the definition of the relevant market for selling the products or services is sufficient or whether related markets, bidding markets or markets for complementary goods, need to be considered.

6.1.1. Bidding markets

Note that such an approach could be seen as contrary to the *spirit* of the Altmark decision of the European Court of Justice and other jurisprudence.[85] One way to read the decision is to conclude that the European Commission should be concerned about distortions of competition even if the effects are purely local and the "only" harm to foreign rivals is the loss of an opportunity to participate in national bidding schemes (as the bus services in question where local). Thus, bidding markets could potentially qualify as an exception to the above established approach, which concentrates on the definition of the relevant market for the provision of the services. Here, however, it is worth distinguishing the relevant geographic market of the services that are provided and the relevant geographic market for the competition in the tendering process. This competition is (often: has to be) international. As will be shown in more detail in the next section, in those cases where the relevant geographic market of the service provided is local or national and the bidding for the market is Community-wide, there is almost always a negative net externality on another Member State because, first, there is no consumer in the other Member States that benefits and, second, rivals are very likely to suffer at least a reduction in expected revenues.

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84 Note that this comment refers to the provision of the service, i.e. to "competition in the market". If there is a bidding process for the service, i.e. "competition for the market" a wider geographic market definition may be appropriate – this issue is discussed in more detail later in this chapter.

85 The discussion here is in the context of compatibility. We therefore do not refer to the legal implications of the Altmark decision in the context of Article 87(1), which is very clear. We are addressing the wider implications of the approach chosen.

Thus, the relevant question in this context is whether the negative effects on other Member States due to aid in such bidding markets are significant. We offer two different perspectives on the matter:

- On the one hand, preferring national bidders in international competitions can be seen as a prime example for situations where Governments score points to the disadvantage of foreign firms. Moreover, such aid often halts efforts to liberalise markets (as rivals do not get a chance to enter) and restructure local (often state or municipality owned) firms. Additionally, cases like the Altmark example show that the effect can easily multiply. While the case refers to local bus services in the Altmark, many German municipalities were watching the cases carefully in order to assess the need to restructure and prepare for more intense competition (for the market).

- On the other hand, the harm to foreigners may be seen as temporal and small, as once the aid is abolished, the barriers to entry in the bus industry are low and one would expect the competitive procurement of local bus services to eliminate significant profits. The negative effects of less efficient services are borne in the country and can be seen as the choice of the local authorities to the benefit of local employees and, often, state owned companies.

We favour the first view offered above, which suggests that international bidding markets should be subject to State aid control. In such markets, aid must be offered to all bidders participating in the tendering in order to be subject to the filter offered in this chapter.

6.1.2. Complementary (input) markets

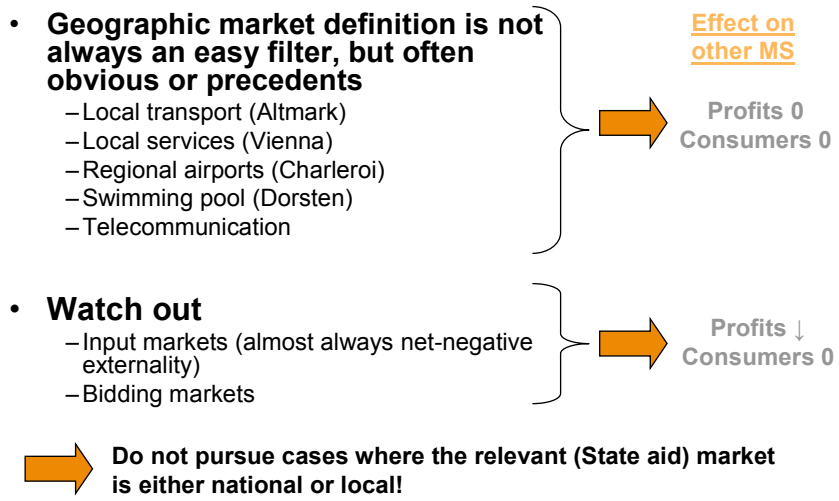
Another factor for careful consideration is whether there are complementary goods that are affected by the aid (see also Section 3.8.1 on market definition). This may affect a number of markets where distribution or branding leads to national (or local) relevant markets whereas the goods distributed and branded are produced internationally. Another example stems from rescue and restructuring aid cases where the loss of employment in markets that supply to the aid receiving company is often used as an argument to justify aid.

In this context, it is necessary to also define the relevant markets for the complementary goods and services in order to trace the effects of the aid to other markets. In doing so it is generally helpful to investigate the nature of the relationships with the complementary goods market. If there are, for example, local rivals that are negatively affected by the aid and have stable relationships with suppliers in other countries, there maybe a negative effect on other Member States. If in addition the aid receiving firm sources mainly nationally, other Member States are indeed harmed although the recipient operates in a clearly national output market.

6.1.3. Summary of Step 1

Figure 2 below summarises the proposed step 1 filter.

Figure 2: Alternative method, Step 1: Geographic market definition



Source: CRA International

Where the screening of Step 1 either leads to a clear finding that markets are international or leaves doubt as to the exact geographic market definition, we propose a second screening device that looks more carefully at the distribution of positive and negative externalities.

Recommendation: If political coordination failure across Member States is seen as the main rational for State aid control, national definitions of the relevant markets are a sufficient criterion for finding aid to be compatible with the common market.

Ideally such aid measures should still be subject to control by a national authority. Currently, only few Member States have a dedicated institution that analyse national aid measures from a State aid perspective. One example is Denmark where the national competition authority is tasked to survey national aid and where cooperation with the European Commission is attempted.

6.2. STEP 2: IS THE DISTRIBUTION OF POSITIVE AND NEGATIVE EXTERNALITIES SUCH THAT AN INCENTIVE TO PROVIDE EXCESSIVE AID IS LIKELY?

In those cases where foreign firms or consumers may be hurt, a second filter would look more carefully at the distribution of the potential positive and negative externalities. In particular, we offer some simple screens that are designed to quickly gauge the likelihood of an incentive for excessive aid due to political coordination failures across Member States.

For a Member State who hands out aid, there are two potential benefits:

- The State aid addresses a market failure and thereby raises the welfare of its citizens.

- The State aid steels profitable business from producers in other Member States or changes the terms-of-trade favourably, and thereby increases the rents of its citizens.

Member States often face a free-rider problem regarding the first effect. Think, for example, of a policy that reduces pollution or the oligopolistic distortion in a market (i.e. lowers the market price). If the citizens of other Member States suffer from the pollution or the high market price, then a Member State that maximises the welfare of its citizens will have an incentive to provide too little aid because it neglects the benefits to non-nationals in its calculations. This provides an incentive to give insufficient aid. On the other hand, as discussed 3.5, the second effect will give the Member State an incentive to provide excessive aid. Thus, sometimes there is a trade off between

- Stealing business from other Member States; and

- Benefits to consumers in other Member States.

The following screening test is based on comparing the two effects.

6.2.1. Aid that may lead to an artificial market structure requires further analysis

As discussed in Section 3.6.4, State aid that induces an artificial market structure through enabling the beneficiary to engage in foreclosure or predatory practises harms rivals and consumers. In those cases that have not been screened out in Step 1, such aid typically has not only a negative net-welfare effect on other Member States but also leads to a reduction of effective competition.[86] Thus in cases where foreclosure or predation are likely, this screen does not apply and a full analysis according to the steps laid out in Chapter 4 is required.

6.2.2. Aid that leads to short-run price effects only

In the following, suppose that a State Aid scheme has only a short-run effect on price or a "unilateral effect" (i.e. it doesn't change the industry structure or conduct). Then, the incentive to provide excessive aid[87] tends to be lower if the share of *consumption* in the

- Member State that gives aid is low;

- Other Member States that benefit from the positive externality is high; and

---

86 Similarly, State aid that keeps an inefficient firm alive while forcing more efficient competitors to exit, can lead to harmful effects on foreign rivals and consumers. In this case, however, foreign consumers are only hurt if the induced production inefficiency's impact on pricing is larger than that of the subsidy.

87 The incentive to provide excessive aid requires two elements: First, there must be an incentive for the Government to provide aid and, second, this aid must have a negative welfare effect in the European Union.

- Countries outside the European Union that benefit from the positive externality is low.

Similarly, the incentive to provide excessive aid tends to be lower if the share of *production* in the

- Member State that gives aid is high;
- Other Member State that suffer from the negative externality is low; and
- Countries outside the European Union that suffer from the negative externality is high.

Thus, the incentive to provide excessive aid depends on the distribution of the benefits and costs across the aid giving Member State, the other Member States and the countries outside the EU. Note that these trade flows need to be identified in all relevant markets as identified in the previous step, e.g. relevant trade flows may be identified in the relevant market of goods that are complementary to the goods produced by the aid recipient.

The countries outside the EU matter for the assessment because their share of total consumption and production affects, ceteris paribus, the distribution of the benefits and costs. If for a given total consumption a higher share of consumption in the relevant market is outside the European Union, the benefits to consumers within the European Union are lowered and a negative welfare effect within the European Union is more likely. Similarly, if for a given total production in the relevant market the share of that production that is based outside the European Union is larger, the negative externality on other Member States is lower.

Using some results developed in Section 3.5, we can advance the intuition further by considering some examples:

- **Suppose that each Member State consumes (roughly) as much as it produces**. Then State aid that lowers the market price benefits foreign consumers but hurts foreign rivals. In this case, however, as we discussed extensively in Section 3.5, the benefit to foreign consumers will overcompensate the harm to foreign producers, i.e. the state aid scheme will have a *positive net welfare externality* on other countries. This tendency is reinforced if the Member State produces more than it consumes, and exports mainly to other Member States.
- **Suppose the other Member States are net exporters and the aid giving Member State is a net importer.** To see what happens in this case consider the extreme case of an aid giving Member State that has one of a few producers but all consumers in a relevant market. This country will perfectly internalise the benefit to consumers of a lower price, and due to the business stealing effect, has an incentive to provide excessive aid. Clearly, as there are no consumers in other Member States, there will be a negative net welfare externality.

- **Suppose the other Member States are net-exporters and the aid giving country is a net exporter.** Contrary to the previous case, we now always have a relevant market that is larger than the European Union as countries outside the European Union are now net importers. While in this scenario it is less likely that there is an incentive to provide excessive aid because the aid giving country is a net exporter, the aid will clearly have a negative effect on other Member States. The aid will redirect business from other Member States and mainly benefit non- European-Union consumers, and thus have a net-negative welfare externality on other Member States.

In search for a simple if rough screening test we thus propose the following for unilateral effects:

- If the other Member States jointly are not significant net-exporters, then the short-run price effects can be presumed to be positive.

As discussed in Section 3.5, the distribution of the impact of State aid depends not only on the location of rivals and consumers but also on a number of other market characteristics. Nevertheless, though imperfect, we believe that the simplicity of a market share based test justifies using it as screening criterion for unilateral-effects-based welfare externalities.

Recommendation: If there is no indication of anticompetitive behaviour by the recipient (e.g. the recipient or competitors have not been found guilty of predatory behaviour or foreclosure in the past) and the other Member States jointly are not significant net-exporters, then the aid can be presumed to be compatible with the common market.

6.3. FURTHER STEPS AND THE ROLE OF THE AMOUNT AND INTENSITY OF AID

For those cases that are not screened out by the two filters discussed above, we propose to apply the methodology as developed in Section 4. As pointed above, we also explored arguments to use a general low amount threshold and/or a general aid intensity threshold as a screening criterion if coordination failure across Member States is seen as the main rationale for State aid control. In this section, we discuss the reasons for why we believe that addressing the amount and intensity of aid in the context of section 4 is likely to be more fruitful than using a general across the board threshold.

One potential reason for choosing low aid intensities or amounts is to infer that effects of small measures are likely to be local. However, Step 1 provides a more direct measure of whether effects are local or not. Moreover, Step 2 is designed to identify whether there is potentially an incentive to provide excessive aid. This calculation screens the potential distortion of the incentives of national Governments more effectively than studying the amount or intensity of aid.

Moreover, low amounts of aid and low aid intensities can have a significant effect on foreign communities if the relevant market is small and, hence, “local” effects on foreigners are significant. A case in point is where a local market is governed by two jurisdictions. Here, the local effects can be significant even if the amount of aid is small.

Also, if aid is provided to many firms, it may have collectively a significant negative effect on other Member States. It may, for example, change the terms of trade in a significant way to the disadvantage of trading partners. If the criteria discussed in Step 2 are met, there could be a significant incentive to provide excessive aid by supporting a large number of national players.

Choosing low aid amounts and intensities as an across the board screening criterion may lead to unwanted strategic responses by Governments, which leads to more money being put in low aid (intensity) measures. This effect has been discussed extensively in Section 4. Projects with low aid intensities are particularly likely to be ineffective – unless it is a general scheme designed to promote an activity with very limited selectivity. While one may be tempted to argue that a waste of local money should not concern the European Commission, it should also be noted that aid that does is not targeted or address significant market failures is much more likely to have negative effects on (effective) competition than aid that is targeted.

We therefore propose to use the amount of aid and the aid intensity as a criterion only in the context of the market failure in question, i.e. in the context of the methodology as developed in Section 4.4.

7. FIRST STEPS TOWARDS A METHODOLOGY FOR R&D AID

State aid for research and development is clearly seen as an objective worth pursuing in principle. The Barcelona European Council set the target of *increasing* overall spending on R&D in the European Union up to 3% of GDP by 2010 (with two-thirds of the funds coming from the private sector).[88]

In the literature review we identified both, theoretical arguments acknowledging relevant market failures and empirical evidence that State aid can encourage private investments in R&D. There is much less past empirical and theoretical work, however, on the appropriateness of alternative aid instruments. While identifying a set of optimal instruments to foster innovation through R&D aid is beyond the scope of this report, we apply the methodology developed Chapter 4 and use the findings presented in Chapter 3 in order to provide some high level recommendations that should be helpful in developing and implementing a reform of European Commission policy with respect to R&D aid.

Our analysis provides support for our approach to be explicit about the market failure that is to be addressed by the aid (scheme). Moreover, different instruments have different positive and negative characteristics and we argue that several aid instruments are complementary. Indeed, one should adopt a wider and integrated approach and consider not only state aid instruments but the general entrepreneurial environment in place to foster innovation.

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88 "Progress report concerning the reduction and reorientation of State aid", Communication from the Commission to the Council, 16th October 2002.

Having said this we need to acknowledge that our attempt below is limited in that we focus on R&D aid and do not consider in detail other measures to foster innovation (including the public consultation on measures to improve state aid for innovation, which was launched after this chapter was drafted).

7.1. STEP 1: IS THE OBJECTIVE WORTH PURSUING?

7.1.1. Market failures related to R&D and innovation

In the literature review we identified a number of market failures that potentially lead to underinvestment in R&D. In particular, we identified the following elements:

- Knowledge and ideas spread easily and the spillover to rival firms drives a wedge between the social and the private gains which leads to private underinvestment in R&D.
- Once knowledge is produced it is socially optimal to spread the ideas throughout the economy.
- R&D activity is associated with high uncertainty making it particularly vulnerable to capital market failures.
- There are a number of matching problems. Empirical research has shown that clusters often work well.
- In some areas innovations can be of great value to society but there is no market for it. Here underinvestment also stems from the anticipated lack of revenues generated from the innovation.

Moreover, as reported in the literature review, there is ample evidence that in general R&D aid does have a positive effect on private research expenditure. This is an indication that State aid is additional to private research and that it may address some of the problems identified above. Thus, there is a theoretical and an empirical basis for State aid that aims at fostering R&D. Here, we focus on how this is best undertaken.

7.1.2. Elements of current approach

Some aid measures designed to foster R&D may not be classified as State aid. Public financing of R&D activities by public non-profit-making higher education or research is normally not covered by Art. 87(1) if the results of the research are made available to the Community industry on a non-discriminatory basis.[89] For such aid schemes, there are no limits regarding the aid intensity or the amount of aid.

R&D aid that is classified as State aid can be authorised under Art. 87(3)c on the basis of the Community Framework for State Aid for Research and Development ("R&D

89 Paragraph 2.4 Community framework for State aid for research and development, OJ C45 17/02/1996.

framework").[90] The framework allows State aid for companies that undertake R&D projects that they would not have undertaken without State support, subject to certain conditions.

The R&D framework acknowledges that the closer R&D aid is to the market, the less likely are market failures and the more significant may be the distortive effect of State aid. The R&D framework distinguishes between the following types of aid:

- *Fundamental research* includes activities "designed to broaden scientific and technical knowledge not linked to industrial or commercial objectives."[91]

- *Industrial research* encompasses "planned research or critical investigations aimed at the acquisition of new knowledge, the objective being that such knowledge may be useful in developing new products, processes or services."[92]

- *Precompetitive development activity* includes "the shaping of the results of industrial research into a plan, arrangement or design for new, altered or improved products, processes or services, whether they are intended to be sold or used, including the creation of an initial prototype which could not be used commercially."[93]

The closer a scheme to the market the less likely it is approved. Further, the allowable aid intensities are higher for R&D the more distant it is from the market.

The allowable aid intensity, however, is determined by the Commission on a case-by-case basis and Member States must facilitate the calculation of the grant equivalent of aid.[94] The aid intensity is calculated as a percentage of the total costs eligible for support.[95]

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90 Community Framework for State Aid for Research and Development (96/C 45/06). The current R&D framework will expire on 31 December 2005 and the Commission has stated in its State aid action plan that it intends to modify the R&D framework.

91 Annex 1, Community framework for State aid for research and development, OJ C45 17/02/1996.

92 Annex 1, Community framework for State aid for research and development, OJ C45 17/02/1996.

93 Fiche III , Vademecum Community Rules on State Aid for Innovation.

94 The gross grant equivalent is the nominal value of the aid granted expressed as percentage of the total eligible project costs. Due to different company taxation within Member States, the net grant equivalents are often calculated for better comparability.

95 Eligible costs include: Personnel costs (researchers, technicians and other supporting staff employed solely on the research activity); costs of instruments, equipment, land and premises used solely for the research activity; Costs of consultancy or similar services used exclusively for the research activity (including research or patents bought from outside sources); additional overheads incurred directly as a result of the research activity; and other operating expenses (costs of materials) incurred directly for the research activity.

Table 5 sets out the general rules regarding maximum limits for permissible aid intensities (column 1) and allowed increases in the limit for State aid projects which take place in regions benefiting from regional aid as well as State aid projects which involve cross-border cooperation.

Table 5: Permissible aid intensities as percentage of the eligible costs of the project

Forms of R&D	General rules	Rules for SMEs	Rules for Art. 87(3)a regions ("Regional bonus")	Rules for Art. 87(3)c region ("Regional bonus")	Framework programme for R&D	Upper bound for all bonuses
Fundamental Research	100%					
Industrial Research	50%	+10 percentage points	+10 percentage points	+5 percentage points	+15 percentage points (+25 if cross-border co-operation)	75%
Pre-competitive Development Activity	25%					50%
Feasibility study preparatory to Industrial Research	75% of study costs					
Studies preparatory to pre-competitive development activity	50% of study costs					

Source: Community Framework for State Aid for Research and Development. Annex I of the Framework contains definitions for the different stages of R&D and Annex II contains a description of the eligible R&D costs for the purpose of calculating aid intensity. In cases of R&D activity spanning industrial research and precompetitive development, the permissible aid intensity may not exceed more than the weighted average of the permissible aid intensities applicable to the two types of research. Aid in support of patent applications and renewals by SMEs may be granted up to the same level as that for the research activities which first led to the patents concerned. The Commission considers that to satisfy the definition of a medium-sized enterprise, the enterprise must have fewer than 250 employees and an annual turnover not exceeding €40 million (€50 million as of 1 January 2005). A small enterprise is an enterprise that has fewer than 50 employees and an annual turnover not exceeding €5 million (€10 million as of 1 January 2005).

As stated in the R&D framework, the additional 10 percentage points allowed for Art.87(3)a and Art.87(3)b regions (the so-called "regional bonuses" shown in Table 5) take into account the ceilings applicable to regional investment aid and the need to stimulate intangible investment in conformity with Commission policy. Aid intensities allowed under general rules may be increased by 15 percentage points if the project is in accordance with the objectives of a specific programme for R&D ("RTD programme"). As the Commission also takes a special view on projects involving cross-border cooperation, the maximum allowable aid intensity will increase by 25 percentage points where a project involves effective cross-border cooperation between firms or public research bodies, or between at least two independent partners in two Member States and where its

results are widely disseminated and published, whilst observing intellectual property rights. However, the combination of increases for the regional bonuses as well as for projects that are part of the Community's current framework programme for R&D are subject to an upper bound of maximum gross aid intensity of 75% for industrial research and 50% for pre-competitive development activity.[96]

If the research project is not in accordance with the objectives of a specific project or a programme undertaken as part of the RTD programme, the Commission allows increases up to 10 percentage points if at least one of the following conditions is satisfied:

- The project involves cross-border cooperation between at least two independent partners in two Member States, especially in the context of coordinating national RTD policies;

- The project involves effective cooperation between firms and public research bodies, especially in the context of coordinating national RTD policies;

- The project's results are widely disseminated and published, patent licenses are granted or other appropriate steps are taken.

Maximum intensities allowed under the WTO's Agreement on Subsidies and Countervailing measures for non-actionable subsidies may be authorised if similar projects or programmes of competitors located outside of the EU have received (in the last three years) or are going to receive aid of an equivalent intensity for industrial research and pre-competitive development activities.[97] According to a Commission expert, however, proving that competitors have received aid of an equivalent intensity requires a great deal of information which is not easily available, especially because it typically requires competitors to provide this information. Thus, this possibility is rarely exploited explicitly (the ST Microelectronics case, however, is an example in which this possibility was exploited implicitly).

The general rules regarding gross aid intensity apply to all forms of State aid, with the exception of advances that only need to be repaid in the event of a successful outcome of research activity. If the research concerned fails, the Commission (in line with past practice) may allow a higher level of aid intensity because, as stated in the R&D framework, the project's failure reduces the risk of competition and trade being distorted.[98]

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96 Paragraph 5.10 Community framework for State aid for research and development, OJ C45 17/02/1996. The Commission Communication amending the Community framework for State aid for research and development (98/ C 48/02) states that "it is not advisable for R&D aid in the agricultural sector to be subject to the maximum limit of 75% applicable in all instances (except for fundamental research)", subject to conditions such as that the R&D carried out is in the general interest to the particular sector or the results of the work are made widely available.

97 Paragraph 5.13 Community framework for State aid for research and development, OJ C45 17/02/1996.

98 Paragraph 5.6 Community framework for State aid for research and development, OJ C45 17/02/1996.

The R&D framework stipulates that aid should serve as an incentive for firms to undertake R&D activities in addition to their normal day to day operations. In order to verify whether research has been undertaken that companies would not have pursued in the absence of the aid, the Commission takes account of quantifiable measures such as changes in the number of people assigned to R&D activities.

7.1.3. Identifying market failures: Some recommendations

Market failures are likely to be more pronounced when the results of R&D efforts are difficult to appropriate. Thus, required aid intensities are often higher when it is more difficult to appropriate the returns from the R&D efforts. Results from fundament research are difficult to patent. In addition, information spillovers are likely to be significant in the case of fundamental research. Thus, it is unlikely that a firm can fully appropriate the returns from fundamental research. In contrast, it is far more likely that a firm can appropriate most of the results from pre-competitive research. Thus, there is support for the approach of the Commission to distinguish between State aid to fundamental, industrial or pre-competitive research for the purpose of State aid control. The three categories developed seem a plausible proxy in order capture the degree of this positive externality from the research activity.

While supporting this general approach of simplifying the analysis and distinguishing different types of R&D, we would also encourage the European Commission and the Member States to analyse the underlying market failures more directly. For example, in highly specialised fields, firms may be able to internalise the benefits of fundamental research and the need for subsidies may be reduced. In other areas, social benefits can be maximised and the appropriate use of funds can be better ensured if information spillovers are forced, e.g. by requiring publication of results. This leads to the following recommendation:

Recommendation: Beyond the characterisation as fundamental research, industrial research or as pre-competitive development activity, the **European Commission should attempt to identify market failures more directly**: In many R&D State aid cases, the European Commission already employs industry experts to assess whether the aided activity is to be categorised as fundamental research, industrial research or as a pre-competitive development activity. As industry experts, these advisors should be instructed more clearly with regards to the market failures to identify. In a number of cases, the European Commission has also studied whether such activity is undertaken in other countries without Government intervention. Such benchmarking should be conducted on a more systematic basis in order to assess the severity of the claimed market failure.

R&D activity that is close to the market is less likely to require aid based on R&D market failures at all. Rather, our case studies suggest that the request for aid and the desire to hand out aid for pre-competitive research and development seems often driven by a desire to attract companies to a region or to support national firms in competition with rivals that receive subsidies (see Box 1). There may be a case for international coordination in order to eliminate aid for pre-competitive R&D.

Indeed, taking the example of innovation in the pharmaceutical industry, one issue for innovation in the European Union is an ongoing and pronounced trend to transfer R&D

activity to the United States that is reflected in the growing share of global R&D spending that is located in the United States. Clearly, State aid is only one of many measures influencing such decisions to re-locate R&D activity. Careful analysis of the entrepreneurial environment for innovative firms is required.

Recommendation: The right balance between university and industry research requires more attention. Fundamental research is undertaken to a large extent by universities. It is a priori not clear why industry needs to engage in fundamental research, in particular since it has an interest to channel the aid into areas where the private (and not necessarily the social) gains are the highest. One counterargument is that if research is too basic, it may not lead to marketable products and therefore it may not lead to a benefit to society. At some point, the input of industry is required as they can best identify those projects that have market potential and will therefore generally be beneficial to society. State aid practitioners are aware of this tension but there is very little systematic research into the optimal balance between university and industry research and the success of past State aid schemes. Further research in this area would be fruitful.

Recommendation: The European Commission should put R&D aid to "large" firms under particular scrutiny. Large firms have the potential to provide internal financing of R&D projects in order to overcome capital market failures. Indeed large R&D firms are to a large extent assessed by their ability to provide a steady cash-flow to finance R&D. Moreover, information can be more effectively kept within large firms. Large firms can optimise the information flow between more basic research programmes and managers with detailed knowledge about the market potential of various research activities. Thus, there is less need to support large firms' R&D activities compared to supporting those of small firms. Moreover, there are a number of disadvantages associated with State aid for large firms. Large firms are more likely to generate some of the competitive distortions discussed in Section 3.6.4. Industry experts regularly claim that some scientists do not work well in the context of large organisations and that radically different ideas may have a better chance of getting pursued in small spin-offs from universities rather than large established organisations. Thus, on the one hand, there are arguments to provide more support to small firms. Especially the existence of capital market failures suggests such an approach. On the other hand, becoming large can be an efficient response by the firm to a number of market failures. Thus, State aid schemes should not provide a disincentive for firms to grow. Moreover, one cannot argue that a priori large firms can overcome all market failures associated with R&D activities and hence should not be eligible for any State aid. Rather, State aid to large firms requires more careful scrutiny.

Recommendation: Some product market failures may be best addressed through measures in the product market itself. All market failures discussed above relate to problems associated with R&D activity for products that ultimately yield a proper return on the product market. Another potential reason to support R&D is that market failures in the product market lead to private gains that are smaller than the social gains. Examples may include orphan drugs, products for environmental protection, products that can in turn be used for further research (like space missions). Clearly, this issue can be tackled by either directly addressing the market failure through creating higher private returns in the product market or by R&D aid for such research areas. Under some circumstances, it may be preferable to subsidise demand rather than to subsidise production as this may make the subsidy levels more transparent and as it may lead to better allocative

incentives. Identifying the precise conditions for decisions like these seems a valuable area for further research.

7.2. STEP 2: IS THE AID (SCHEME) APPROPRIATE

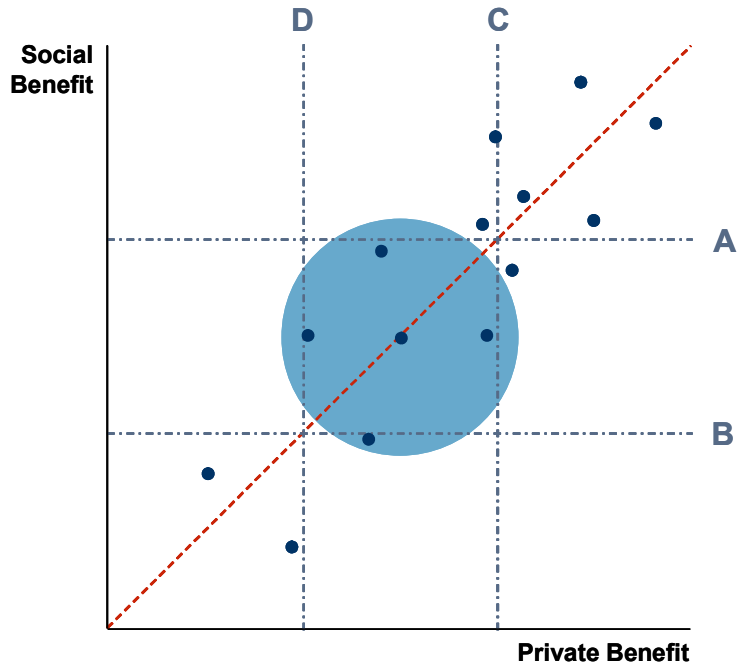
In this section we discuss some results regarding the amount of aid and the aid intensities. Criteria that have been important in past practice of State aid control. We then move on to analyse the characteristics of different aid instruments and argue in favour of distinguishing State aid control policy by aid instrument.

7.2.1. Amount of aid and aid intensity

R&D projects and activities should be supported if the project or activity would not have been undertaken in the absence of aid and there is a large gap between private and social benefits for this project or activity. We therefore encourage the direct evaluation of the social and the private benefits in order to determine the appropriate amount of aid.

If private and social benefits are positively correlated, there can be a tension between this approach and the intuition to choose 'good' projects that are also likely have to relatively high private gains.

Figure 3: Social and private benefits of selected R&D projects



Source: CRA International

Figure 2 shows a scatter plot of R&D projects (represented by the blue points in the graph) in a private and social benefit space. There is a positive correlation between the social and the private benefit of projects, which can be seen by the clustering of projects around the 45 degree line. Thus, projects which yield high private benefits are also likely

to produce high social benefits. If in such a world, if Governments can only observe the private gains they should target aid to “mediocre” projects:

- A socially benevolent dictator would want to choose projects that have a high social benefit. Projects with a high social benefit, however, are also likely to be privately profitable. Thus, it is likely that these projects will be undertaken anyway (at a given level of private costs) and should therefore not be subsidised (in the figure projects to the right of line C).

- At the same time, if private and social gains are correlated a socially benevolent dictator should not choose projects with a very low private benefit (projects to the left of line D) as these seem unlikely to yield sufficient social gains to justify the intervention.

We do not suggest this approach. Rather we encourage efforts to directly identify those projects and activities where the difference in private and social gains is significant. As discussed above, this can be based on theoretical and on empirical considerations. Our suggestion is consistent with the current practice of the European Commission.

The amount of aid should raise private returns to a level that is just sufficiently high for the R&D project to be undertaken. The risk capital communication provides a wording that acknowledges this need in the context of risk capital instruments:

> *“Where it is recognised that there is a market failure, the Commission will examine whether any State aid measure is proportionate to the presumed market failure it is devised to meet, and will seek to ensure that any distortion is minimised. It believes that this can best be achieved by measures which are just sufficient to ensure that market investors provide capital and which result in investment decisions being taken on a commercial basis and on terms as close as possible to those which would prevail in the normal economy.* [99]

Given some uncertainty about the optimal amount of aid and the optimal aid intensity, one would expect that some research projects are not undertaken or abandoned when the EC takes a decision not to allow aid while others proceed. In order to assess whether the right amount of aid and level of aid intensity is chosen, it may therefore be helpful to study the behaviour of firms that do not receive aid.

7.2.2. Aid instruments

Current State aid control practice of the EC does not discriminate between different R&D aid instruments. The exception is the risk capital communication, which contains a list of instruments that will be assessed more favourably. We begin by discussing the example of the risk capital communication and then discuss aid instruments in the context of R&D aid more generally.

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99 State aid and risk capital OJ C 253/3 21.8.2001, para. VI.6.

The Commission communication on State aid and risk capital recognises a role for limiting public funding of risk capital measures to cases in which market failures are addressed.[100] Risk capital is defined as equity financing to companies in their start-up and development phases.

State aid in the form of risk capital may be authorised if it addresses either of two "market failures": imperfect or asymmetric information and transaction costs, both of which affect access to capital by SMEs. The Commission requires evidence of market failure unless the risk capital provided to firms is small. The reason for this exception is that for small transactions the argument that market failures exists through high transaction costs is more persuasive (see para VI.5 of the Communication).

Due to the difficulty in defining rigid criteria for the assessment of risk capital measures, the Commission only lists factors, which may affect its decision positively or negatively. Factors which contribute towards a positive assessment include (see para. VIII of the Communication):

- Focus on small or even micro-enterprises
- Focus on medium-sized enterprises in their start-up or other early stages or in assisted areas
- Proof of additionality
- Profit-driven investment decisions, e.g. by market economy investors
- Measures which ensure that the level of distortion of competition between investors and between investment funds is minimised, for example by a call for tender for the establishment of any preferential terms given to investors
- Sectoral focus where it has a commercial and public policy logic
- Investment on the basis of a business plan
- Avoidance of cumulation of aid measures to a single enterprise

Furthermore, the risk capital communication lists a number of instruments that are suited to encourage the provision of risk capital to the 'target enterprise' on a commercial basis. These measures include

- the establishments of investment funds in which the State participates (potentially on less advantageous terms than other investors)
- grants to venture capital funds to cover part of their administrative and management costs

100 State aid and risk capital OJ C 253/3 21.8.2001.

- guarantees to risk capital investors or to venture capital funds against a proportion of investment losses

- fiscal incentives to investors

The basic premise behind this approach seems of more general value. State aid control should make use of general insights about the effectiveness of different aid instruments in addressing the market failure identified.

There is a practical debate about the optimal aid instruments to foster R&D. There are several elements in that debate. Aid instruments differ in their characteristics with regard to how targeted they are to specific projects, how high the administrative costs to the governments are, how easy firms can get access to them, how selective they are and how high the administrative costs to the recipient firms are. It follows from our analysis below that a complementary approach is useful.

General, non-selective but activity-specific measures through the tax regime

There are arguments to provide general, i.e. non-selective, activity-specific aid to R&D intensive industries which shift resources in the society to these activities. For such activity-specific aid, it will be very difficult to provide direct proof of additionality other than proof of the activity as such. Rather the effects are likely to be indirect: by supporting R&D intensive industries generally, more factors of production will be allocated to these industries and output will (hopefully) increase in the long-run. One approach to provide stronger targeted incentives is to grant aid (usually tax breaks) for incremental R&D programmes undertaken by firms. Given that there is no direct proof of additionality, this kind of aid should be symmetric in its effect on the recipient firms, it should have very low administrative cost and it should be easily accessible to firms. Small firms may not have access to grants because they do not have the relevant information departments but may, nevertheless, benefit from more general schemes. Indeed, recipients of aid often complain about the "jungle of different aid schemes". Subsidies provided through the tax system that are nevertheless independent of the profitability of the recipient are likely to be good instruments for this kind of aid.[101] Subsidies provided through the tax regime also allow companies to estimate with some certainty how much aid they will receive and when they will receive it. Despite these potential advantages and despite the fact that general activity-specific aid schemes are less selective than other schemes, they may still affect the terms of trade between Member States and may therefore distort effective competition. Some coordination of such activities across Member States should therefore be welcome.

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101 Representatives of pharmaceutical firms have expressed concerns that tax relieves are not helpful for small (start-up) firms that focus entirely on innovation. These firms typically do not earn profits for a number of years, when funding is critical. In the UK the authorities addressed this problem by adding a provision to the small firm's tax credit so that an SME not making any taxable profit can claim a cash payment at a rate of 24% for every £1 million spent on R&D (Harrison 2004).

Project-based subsidies

There are arguments to channel aid to those projects where the wedge between private and social gains is particularly large. Here criteria like “proximity to market” seem very sensible first indicators, although market failures should also be assessed directly. By definition, large aid intensities can be required for these projects to be carried out and direct subsidies for certain promising projects may be the best instrument. For such aid, there must be, first, proof of additionality and, second, monitoring that the aid is not re-directed by the recipient into privately more profitable projects. Such aid (schemes) must therefore involve more Government activities in the sense that nature of the research must be screened and the use of the funds monitored. Given these costly activities by the Government and the danger that substantial resources of industry may be devoted to attracting such funds, there must be careful evaluation of the division of labour between universities and industry. Indeed, the alternative approach is to facilitate the interaction between (fully) publicly funded research and industry.

So far the assessment is solely based on the nature of the research activity and whether the benefits of the knowledge generated can be internalised. In some cases there may be a need to assess the value of the ultimate product that may come out of the R&D efforts. Our analysis suggests that such a need may arise if there is no product market. In these cases, however, alternative instruments, like longer patent periods or higher re-imbursement by Governments, should be carefully evaluated.

Governments may wish to coordinate market activity to generate “clusters”. There is empirical evidence that such clusters can lead to positive development as many different players work together in organisational forms between markets and hierarchies. However, detailed requirements by Governments are criticised by business as they usually lead to much higher administrative costs on both sides.

Risk capital

Market failures that result from capital market failures can best be addressed by promoting financing opportunities for firms that engage in uncertain activities. Market failures in this area are particularly pronounced for small firms. Such projects should therefore be particularly focused on smaller firms. The risk capital communication seems a valuable step in that direction.

Alternative instruments

In the R&D context, it has been suggested that cooperative R&D agreements or joint ventures can help to share the costs and risks associated with R&D. Other possibilities to foster R&D include improving the education and the higher education system, rewards for individuals or setting up research institutes. The patent system is an important system to provide companies with an incentive to innovate. In general, investment in R&D and innovation depends on broader issues such as investment in skills, investment in infrastructure, universities and improved networks for the diffusion of new technologies from universities to firms.

Ideally Member State Governments should develop a framework to promote R&D that ensures consistency across the different aid measures.

Interaction with other instruments

Ultimately, the aim of R&D aid is to foster innovation. One of the findings of our literature review was that R&D aid, SME aid, public R&D and public investment are all mutually complementary in terms of stimulating private R&D and are therefore all likely to increase innovation. This implies that higher levels of SME aid, more public R&D and investment raise the level of effectiveness of R&D aid. The interaction between the policy instruments indicates that an integrated approach to innovation policy fan be helpful.

Conclusion

There are a number of interesting implications of the discussion above.

Recommendation: Member States should use aid instruments as complements and the European Commission should take this into account in State aid control. There are arguments for using a number of different instruments, which implies that there should be coordination between the different schemes. For example, capital market failures linked to firm size are best addressed through measures that relate to capital market initiatives, while others may be better addressed by direct support to R&D activities. State aid schemes with very detailed requirements lead to high (administrative) costs for recipients and donors. It follows that such schemes should be rare and targeted only to those areas in which the wedge between social and private gains is large. These schemes are therefore likely to require significant aid intensities. Low aid intensities are likely to make sense only if they are provided in very general measures accessible by a very broad class of firms.

Note, however, that on an aggregate level quantitative empirical evidence suggests that R&D State aid granted in the form of subsidies (which include grants, interest rate subsidies, soft loans and guarantees) has been found to be more effective than R&D aid granted through tax relief or equity (see Röller et al. 2001). Further research is required to reach reliable and robust conclusions on the complementary use of different aid instruments.

Recommendation: Member States should rationalise and focus aid (schemes). One conclusion of our interviews with State aid practitioners is that some countries employ a wide range of different schemes – some recipients even referred to aid measures as a "jungle". There seems to be a clear case to encourage Member States to rationalise and focus aid schemes. This would allow the European Commission to focus their resources on the evaluation of general schemes in order to promote measures that are best suited to enhance effective competition.

Governments are not used to evaluate the administrative costs of interventions. For example, the regulatory burden of market regulation is almost never measured (a notable exception is the Netherlands). In the context of State aid, such a cost-benefit approach is essential. It is likely to lead to much less detailed interventions and more detailed monitoring of those activities in which specific requirements are formulated.

Given that different market failures may require different instruments, a general point system may not be appropriate. In fact, the large number of different requirements, the high administrative costs and the complexity of schemes ("Förderdschungel") are

criticised by aid recipients. It may well be more sensible to provide measures that are more targeted to specific market failures that hamper R&D efforts. Useful instruments can be:

- A) Benefits allocated through the tax regime in order to foster R&D intensive industries relative to other industries. These schemes have low administrative cost.

- B) Specific schemes targeted to remedy capital market imperfections. These schemes should be linked to firm size, to the asymmetry of information, and to the uncertainty of the projects undertaken. General schemes that foster the development of markets for risk capital also fall into this category.

- C) Specific schemes targeted to research areas in which the diffusion of knowledge is likely to be large. For such schemes there must be proof that the diffusion of knowledge is likely, that there is additionality (no similar projects are provided unfunded elsewhere), and that there is appropriate monitoring that the funds are used for the purposes specified. Institutions that are concerned with the spread of knowledge and that bridge the gap between academic and industrial research should also fall into this category. Aid can also be made conditional on efforts to diffuse knowledge, e.g. requiring full publication of research results.

- D) Schemes that promote the R&D of a specific product seem only appropriate if there is a significant market failure in the product market. (Where possible, it is better to address the market failure in the product market directly.)

How do these schemes interact? When assessing the required amount of aid to trigger additional investment in schemes C and D the availability of funds through B should be taken into account. Higher cumulated aid intensities for projects that have access to different aid channels can be justified by the addition of market failures.

The importance of various market failures leading to private underinvestment in innovation differ from sector to sector in the economy and among the main modes of innovation. There have therefore been proposals to develop aid schemes per sector.[102] Clearly, for B, C and D, some industry knowledge may be required to appropriately target the aid.

7.2.3. Allocation procedure

Subsidies that are allocated by general tax measures and that do not depend on the profitability of the recipient firm do not discriminate within the group of firms that receive aid. Given that additionality is not checked, the generality of the scheme should be a necessary requirement. For project based measures, schemes should, ex ante, be open to all firms that fulfil the criteria. The aid recipient should then be selected on the bases of an open and transparent tendering procedure.

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102 Notably by Martin and Scott (1999).

Recommendation: R&D aid should be awarded through open and transparent allocation mechanisms. If aid is granted based exclusively on market failures associated with the innovation market, we see no reason for Governments to provide ad hoc aid to individual firms. We would encourage the move to (a few) coordinated schemes that are open and transparent and designed to properly target the market failures identified.

7.2.4. Duration and frequency of aid

One important finding from our literature review is that direct funding and tax incentives may be more effective when they are stable over time, presumably because firms do not invest in additional R&D if they are uncertain of the durability of the Government support. Market failures such as capital market imperfections may well be permanent, implying that for some cases of aid, a long duration of aid or repeated access to aid may be necessary. Repeated subsidies, however, to the same recipients may not be possible when the characteristics of the recipient firms change (not a start-up any more, not a small firm any more, insufficient R&D activity, etc). Contrary to our finding in R&R context, a general one-time, last-time principle by firm is inappropriate in the R&D context.

7.2.5. Conditionality and compensatory measures

The R&D framework states that the Commission must take particular account of quantifiable factors such as changes in R&D spending to ensure that the aim of State aid for R&D (namely to serve as an incentive for firms to undertake R&D activities in addition to their normal day-to-day operations) is met. Furthermore, annual reports on implementation are required. The Commission usually limits itself to checking whether the conditions tied to State aid were fulfilled (mainly by approving the annual report of the aid project). There is an obligation to check on means but not for results. [103]

Again our findings suggest that the conditionality should vary by aid instrument. Activity-specific aid provided through the tax regime should be linked only to a limited number of conditions (like the share of R&D, or the amount of incremental R&D spending). Project-based aid schemes should carefully monitor the use of the aid as we propose that such aid should be limited to areas where social returns are higher than private returns. Thus, there is always an incentive for the recipient to switch to investments with a higher expected private return.

7.3. STEP 3: DEFINITION OF RELEVANT MARKETS FOR AFFECTED PRODUCTS

For the evaluation of project-based State aid, it may be helpful to define relevant markets. It can also be useful to define markets if aid schemes focus on a narrow technological field. The definition of the relevant market for R&D activity is described in detail in Section 4.5.2. The analysis of the innovation market is relevant from two perspectives. First, if there are a number of rival research programmes ongoing, this would suggest that either it is unlikely that there is a significant market failure or other firms also receive State aid,

103 Meeting with DG COMP, 10.06.2005.

in which case the balancing of State aid across countries is critical. Second, the identification of rival research programmes is important for assessing the effect of State aid on competition and trade as discussed in the next section.

In the cases that we reviewed, we find that rival research programmes are discussed and European Commission officials and the industry experts employed in cases analyse whether similar research programmes have been undertaken without public support. Both activities would benefit from a definition of an innovation market, a concept already used in other fields of competition policy.

7.4. STEP 4: ANALYSIS OF THE COUNTERFACTUAL SCENARIO

One result of the case studies and the interviews with European Commission officials is that there is only limited explicit exploration of the counterfactual scenario provided by the Member States. We argue that it would be helpful for the assessment of the market failure, the aid instruments used and the likely effects on competition to request a more detailed description of the two scenarios: "with aid" and "without aid" (or "with other measures", if obvious better alternative measures exist). For the analysis of the counterfactual scenario it is helpful to distinguish the different aid instruments that can be employed to foster R&D.

General aid measures awarded through the tax regime

In a hypothetical closed economy, general measures awarded through the tax regime are selective only to the extent that those firms that pursue less R&D than required by the award criteria of the regime are the only group that may suffer relative to those that do R&D. Often these firms engage in different activities as they are less active in R&D. This limits the potential harm. There are, however, potentially a number of complicating factors:

- Recipient firms may be multi-product firms that can shift resources from one area to another. Given that one key element of the tax-based regime is to avoid administrative costs and to provide maximum accessibility monitoring of the use of the funds is impossible. If the amount of aid is linked to the share of R&D expenditure in total costs, multi-product firms may receive relatively less aid than firms that focus on R&D intensive activities. This aspect can be partially addressed by providing R&D aid proportional to the R&D spending. Generally, the European Commission focuses on aid proportional to R&D spending and not on the share of R&D relative to a firm's cost.

- Firms may attempt to falsely categorise activities as R&D.

- In an open economy, competitive distortions may arise if levels of R&D aid differ significantly by country.

The main idea of general measures provided through the tax regime is to

- Shift resources in the economy to R&D intensive activities

- Minimise administrative costs for donors and recipients

- Minimise the need for governments picking winners
- Provide aid to all firms, including those that do not employ aid specialists
- Minimise potential distortions by avoiding asymmetric effects

Efforts in the design of such regimes should focus on these objectives. In order to avoid competitive distortions relative to other countries, the European Commission may want to consider developing maximum aid intensities, jointly with Member States. Subsidy competition between Member States would be desired to the extent that it leads to an overall aid intensity that is in line with the objective to promote R&D.

Project-specific aid schemes

In contrast to activity-specific aid that is awarded through a general measure, project-specific aid schemes should be assessed differently. Here the relevant analysis is to carefully study additionality. In order to do so, it is helpful to identify the rival firms within the innovation market and to investigate the level of aid that they receive. In those cases where there is intense competition and rivals do not receive project specific aid, the programme should not be approved.

In those cases where there is competition and the rivals do also receive aid, the question turns again to the appropriate level of aid and a potential need to coordinate aid programmes across the Member States in order to reduce incentives to provide excessive aid.

In those cases where there is limited competition, a significant market failure is more likely. That is, in the absence of aid such a programme would not have been undertaken by a commercial firm. If so, a serious impact on competition is unlikely as other firms will not be interested in engaging in such an activity. Other firms may only be affected indirectly if:

- The promoted R&D programme leads to an increase in demand for input factors that are also required for other R&D programmes. On a general level, some increase in factor costs may be desired in order to encourage factors to be used in R&D intensive industries. Thus, one would want to focus on significant changes in factor costs which would require a careful analysis of why factors are particularly scarce. If there is significant crowding out of alternative activities, the programme should not be approved.

- Even in those areas where there is limited competition commercial programmes could be launched in the future. In particular, the expectation that there could be aid for certain R&D programmes may prevent commercial R&D from being started. In such an environment, State aid to R&D may deter entry. In order to avoid such effects, it is essential to proof the market failure at hand. That is, either the market failure in the product market or the expected diffusion of knowledge.

- The promoted R&D programme may lead to some results that affect commercial programmes. For example, research for innovations to facilitate the application of medicine to children may require support if the expected private value is lower but the expected social value of such an innovation higher than the costs of undertaking the R&D. However, once developed, such a product may also be used for adults and crowd out older applications. Where such side effects can be foreseen, they should be taken into account in the evaluation of the market failure (as they will increase the private gain).

- Aid for specific R&D may provide knowledge for the recipient firm, which could turn into a competitive advantage if put to other fields. One way to maximise benefits is to make the information dissemination a requirement for the aid and to monitor appropriate publication of results. While this may in fact reduce the incentive to provide private funds, it is efficient from a social point of view.

- The funds provided exceed the minimum required amount to trigger the investment and if they are not appropriately tied to the investment, there may be spillover effects to other (commercial) R&D programmes and/or the product markets in which the recipient firm is active. As the exact tracing of such aid is difficult, the key requirement is to ensure that the aid is indeed targeted and tied to the specific research identified.

Aid to alleviate capital market failures

The assessment of the counterfactual for schemes that are designed to alleviate market failures depends on how well targeted the programme is. In those cases where aid schemes are general for companies investing in uncertain projects, the same arguments apply as for the general tax regimes. Aid schemes, however, that intend to address capital market failures may be directed towards private sector institutions that show particular characteristics in the way that investment projects are selected. The capital market communication provides a number of potential criteria that can be used to assess different schemes in this area.

7.5. STEP 5: DECISION AND REMEDIES

We expect that in many R&D cases the focus of the assessment will be on the first two steps of the proposed methodology. R&D aid is unlikely to lead to significant distortions of effective competition if it is well targeted to address a properly defined market failure.

Some conditions can be used in order to ensure that the funds are indeed used appropriately and that social gains are maximised. Examples include the cooperation with universities or the obligation to publish results.

If private returns are likely to provide sufficient incentives to engage in an R&D activity, this activity should not be promoted by project-specific or activity-specific aid. Such schemes may have to be reconsidered, taking into account also the subsidies provided by other jurisdictions and incentives provided by other more general aid measures.

8. FIRST STEPS TOWARDS A METHODOLOGY FOR R&R AID

8.1. STEP 1: IS THE OBJECTIVE WORTH PURSUING?

The rescue and restructuring guidelines justify aid by the

> *"…social or regional policy considerations, by the need to take into account the beneficial role played by small and medium-sized enterprises in the economy, or, exceptionally, by the desirability of maintaining a competitive market structure when the demise of firms could lead to a monopoly or to a tight oligopolistic situation."*[104]

Indeed, contrary to R&D State aid the economic case for R&R State aid is much less clear. The arguments are based on externality on workers, customers, and other stakeholders of a firm closing down that are not taken into account by shareholders. Such externalities exist, however, for all bankruptcies and the demise of inefficient firms is an essential element of dynamic competition that fosters technological progress and efficiency. This is generally acknowledged and the European Commission approaches R&R State aid with a much more sceptical attitude than other policy areas. Indeed, the theoretical arguments in favour of R&R aid are relatively weak and to the best of our knowledge there is little empirical support that shows that R&R aid helped to efficiently alleviate market failures. On the other hand, strong empirical and theoretical evidence exists, which indicates that R&R State aid is harmful for dynamic competition in general and the incentives of the recipient firm in particular.

- The strongest and potentially most convincing empirical evidence on the effects of a soft-budget constraint caused by State aid stems from socialist economic systems. As shown by Kornai and other economists, soft budget constraints similar to the ones that are introduced through R&R State aid, lead to overinvestment and reduced effort by the recipient as well as more generally to a misallocation of resources.

- The negative impact of soft-budget constraints is also one likely explanation for the bad performance of public utilities in the 1970s and 1980s, which led to the efforts to focus the attention of these firms on commercial objectives, through privatisation and other means.

- A recent study on the French banking sector has shown the beneficial effects of eliminating Government interferences in bank lending decision. The study finds without Government interference, firms' face "harder" budget constraint and banks provide more targeted funding. This lead to an increase in the allocative efficiency in those sectors that were most dependent on financing through banks because banks were less willing to bail out badly performing firms.

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104 Community Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty, 2004, C 244/02, 1.10.2004. On the other hand, in her recent speech on State aid, Commissioner Kroes did not mention R&R aid as a policy area worth pursuing.

- Firms that may potentially benefit from R&R aid have an incentive to engage in wasteful lobbying activity.

- Many recipients of R&R aid do not survive despite the aid. A recent evaluation of companies that received rescue and restructuring aid shows that 32 percent of them went out of business nevertheless (based on 69 cases for which information was available, see London Economics 2004).

Thus, in general we believe that R&R aid should be viewed with significant scepticism. Furthermore, we argue below that those market failures that *may* justify R&R aid, do so only on a temporary basis. This justifies the use of a "one-time, last-time" principle similar to the one advocated by the EC.

- If failing firms consist of multifunctional units that are inefficiently bundled together, there can be no proper competition for the parts of the company until the parts are unbundled and clearly defined. In these cases, it may be helpful to provide State aid for a limited period to prepare the failing firm for a sell-off. Such aid should only be provided after a firm has entered bankruptcy proceedings as this task is best pursued by a liquidator: Among other reasons, the fact that the firm is failing cast doubt on the effectiveness of its current management and a liquidator has the ability to restructure not only the firm's assets but can also change the management where appropriate. As long as managers get benefits from holding their current job, it also provides a disincentive to strategically ask for State aid.

- Another market failure relates to the negative social externalities of firm bankruptcy. For example, the area in which the company is located may not be able to absorb a large number of unemployed workers. Nevertheless, maintaining failing firms in order to provide employment in regions where economic activity is scarce seems only appropriate as a temporary remedy. As some business leaders put it at a recent conference on State aid, it is "investment in the past".[105] A more viable solution should identify measures to attract profitable industry to the area.

- In case market failure relates to negative social externalities, State aid to support individual employees may be helpful. The rescue and restructuring guidelines state that general social security schemes under which redundancy benefits and early retirement pensions are paid and general social support schemes that are not selective do not fall under State aid.[106] To prevent that companies demand State aid in order to save jobs, State aid can be granted directly to employees or to the regions suffering from the shock in the labour market.

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105 EC State Aid Control: The Case for Reform. Conference by Universiteit Leiden and Wilmer Cutler Pickering Hale and Dorr LLP, Brussels 14 June 2005

106 Community Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty, 2004, C 244/02, 1.10.2004.

- Another concern that is mentioned in the R&R guidelines is that the exit of a firm may increase market power of the remaining firms. While often true in the short-run, there is a clear trade-off between allocative and dynamic efficiencies. The negative dynamic effects of R&R aid include the following: They provide a disincentive to enter the market (as firms would have to compete against subsidised rivals), which is especially problematic in markets with high firm turnover. Furthermore, if firms make losses consistently, a restructuring that allows for further exploitation of scale economies may be necessary. If the firm only faces a liquidity crisis, debtors should have an incentive to keep the firm alive even absent the State aid. The aid recipient will also have less of an incentive to appropriately plan his business and to make necessary (and potentially unpopular) adjustments himself. In summary, addressing market power concerns through R&R State aid does not seem to be an attractive option.

Altogether, there are many good reasons to allocate the screening process as to which firm activities are viable to banks, which often effectively monitor the selection process of dynamic competition by deciding whether to provide further credit or not. This is underpinned by the results of the empirical study of the French banking industry discussed in Section 3.6.6.

Justifications for Government intervention can only be made for temporary aid and when the private and social objectives are incongruent. In those cases, however, for the above mentioned reasons, we think it is appropriate for the firm to enter bankruptcy proceedings.

Recommendation: The European Commission should seriously consider linking R&R aid to bankruptcy proceedings or alternative procedures that minimise the distortion of dynamic incentives. Firms that enter bankruptcy proceedings are often said to suffer from losing customers. Due to this induced loss, the firm's survival chances are significantly impeded. Because State aid increases the chance that a firm will survive, a company receiving State aid loses fewer customers. While true, this is not a strong argument for providing State aid outside bankruptcy proceedings. Firms enter bankruptcy proceedings because they failed. The elimination of failing firms is one key element of dynamic competition. Creditors, workers, and owners of the company have the appropriate interests to invest in the company if they see a viable business plan for rescuing and restructuring the firm. If they let the firm slip into bankruptcy proceedings, it is a strong indication that there is no better alternative (although it could sometimes also be due to a coordination failure between stakeholders). Indeed, as it was pointed out in several interviews, providing R&R aid to failing firms is mainly aid to creditors and the firm's current management. Thus, R&R aid seriously distorts the dynamic incentives provided by a hard budget constraint. To avoid this State aid should be linked to measures that put the critical decision makers at risk. Linking aid to bankruptcy proceedings seems a simple and practical approach.

It should be noted, however, that bankruptcy proceedings vary significantly across Member States. It is beyond the scope of this report to study the implications of each national procedure for the effect of an approach that links State aid to bankruptcy procedures. Thus, more detailed research that considers the variety of national

procedures may be valuable to test our intuition that linking R&R State aid to bankruptcy proceedings is a simple and practical general approach.

Independent of the details of the approach chosen, the key elements should be to provide a strong disincentive for all stakeholders to rely on the Government to bail them out when in difficulty.

Saving large firms can be politically attractive. Politicians face significant pressure from the electorate to save jobs "at home". While affected individuals in failing firms can organise to lobby for State aid, tax payers are less well organised to prevent inefficient use of their funds. Thus, there are a number of arguments to provide Governments with a commitment device that helps them to constrain State aid to failing firms. A very strict R&R State aid control would fit into such an environment.

8.2. STEP 2: IS THE AID (SCHEME) APPROPRIATE?

8.2.1. Amount of aid and aid intensity

The current Community Guidelines applying Articles 87 and 88 of the Treaty of Rome to the granting of rescuing and restructuring aid to firms in difficulty were published in July 2004 and replace the 1999 version of the guidelines.[107] These guidelines will remain in force for another 5 years, unless stipulated otherwise in a decision.[108] The guidelines apply to firms in all sectors, except those operating in the steel sector, the coal sector, the shipbuilding sector, and the aviation sector.

There are two major differences between the 1999 and the 2004 guidelines. First, the 1999 guidelines did not address the issue how substantial a company's own contribution to restructuring efforts should be. The new guidelines set forth a minimum percentage threshold of the restructuring cost that the aid beneficiary has to bear on its own, dependent on the size of the undertaking in difficulty. Second, the new guidelines introduce a standstill period of ten years during which no new aid in whatever forms is envisaged.[109]

The guidelines state that the primary objective of rescue aid is to permit a failing firm to stay afloat for the time needed to work out a restructuring plan and to allow time to analyse the circumstances that gave rise to the difficulties. Rescue aid includes measures which need to be implemented immediately to stem losses. These measures may include structural measures such as immediate withdrawal from a loss-making field of activity.

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107 Community Guidelines on State aid for rescuing and restructuring firms in difficulty, OJ C 244/2, 1.10.2004.

108 The new concept of urgency aid replaces the previous concept of "rescue" aid and allows the beneficiary to undertake urgent measures which are may also be of a structural nature. This section continues to refer to rescue aid instead of urgency aid.

109 Press Release, New guidelines set forth Commission approach to saving firms in difficulty, 7 July 2004.

Definition of a firm in difficulty

To qualify for State aid, a firm needs to be in difficulty. According to the guidelines, "a firm is, in principle and irrespective of it size, regarded as being in difficulty for the purposes of these Guidelines in the following circumstances:

- "In the case of a limited liability company, where more than half of its registered capital has disappeared and more than one quarter of that capital has been lost over the preceding 12 months;

- In the case of a company where at least some members have unlimited liability for the debt of the company, where more than half of its capital as shown in the company accounts has disappeared and more than one quarter of that capital has been lost over the preceding 12 months;

- Whatever the type of company concerned, where it fulfils the criteria under its domestic law for being the subject of collective insolvency proceedings."[110]

Even if none of these circumstances are present, a firm may be considered to be in difficulties if there are signs of increasing losses, diminishing turnover, growing stock inventories, excess capacity, declining cash flow, mounting debt etc. Also, a newly created firm (i.e. one that has not been operating for longer than three years) is not eligible for rescue and restructuring aid even if its initial financial position is insecure. In addition, a firm is not eligible if it belongs to a larger business group, except where it can be demonstrated that the firm's difficulties are intrinsic to its own operations. The guidelines add that a firm in difficulty is eligible only if it cannot recover through its own resources or with the funds it obtains from its owners/shareholders or from market sources.

Definition of rescue and restructuring aid

All aid granted after a restructuring plan has been established and is being implemented is considered to be restructuring aid. According to the guidelines, restructuring aid usually involves elements such as reorganisation and rationalisation of the firms' activities, restructuring of activities that can be made competitive again, and diversification in the direction of new and viable activities. These restructuring measures are often accompanied by financial restructuring such as capital injections, debt reduction, loans, relief from taxes or social security contributions, or loan guarantees. The guidelines stipulate that restructuring operations cannot be limited to financial aid designed to make good past losses without tackling the reasons for those losses.

In determining whether injections of new capital by public authorities into companies involves elements of aid, the criterion applied is the market economy investor principle ("MEIP") and the "market creditor test", where the MEIP must be applied to the facts of the case at the time when the state decided to commit the funds.

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110 Community Guidelines on State aid for rescuing and restructuring firms in difficulty, OJ C 244/2, 1.10.2004.

Aid to cover the social costs of restructuring

Regarding aid to cover the social costs of restructuring, the guidelines state that the Commission does not consider as aid the following measures.

- General social security schemes that are part of a Member State's labour legislation, which includes i.e. redundancy benefits or early retirement pensions.

- Benefits that the company in distress grants to redundant workers, which go beyond its contractual obligations as long as these benefits are available without sectoral limitations to any worker.

- Aid which is provided for training, counselling and practical help.

The guidelines, however, state that the obligations a company itself bears under employment legislation or collective agreements with trade unions to provide redundancy benefits are part of the normal costs of business, which the firm should pay from its own resources.

Clearly, firms that cannot produce a business plan that can potentially turn the company into a viable firm should not receive any support from Governments. On the other hand, strong business plans should not receive Government support either as it suggests no additionality: If the buisness plan is strong, creditors and owners are likely to support such a turnaround effort even without Government support. Indeed, in an uncertain environment it is advisable to screen out those cases where there is no additionality by focusing on those restructuring efforts where substantial Government input is required. Thus, R&R aid should rarely be "cheap".

In practice, the determination of the right amount is often not only the result of careful analysis of the required financial resources but also outcome of negotiations between the Government, the worker's representatives, the owners and creditors of the recipient firms and (indirectly) EC officials. The art in this process is to identify the amount that will just turn owners and creditors into donors willing to sustain the company at a loss. During the process of these negotiations, owners and creditors of the failing firms have no incentive to reveal their true cut-off point but have a strong incentive to apply for the maximum aid level.

8.2.2. Aid instruments

The rescue and restructuring guidelines limit the aid instruments allowed for *rescue aid*. The aid must be provided as liquidity support in the form of loan guarantee or loans. Limiting the form of financial support for rescue aid to loans is seen as necessary because the aid should be reversible and temporary.

The guidelines do not prescribe the aid instrument to be used for *restructuring aid*. As discussed in the literature review, a rational private investor would tend to favour those forms of aid that give the firm less discretion than others. There are the following ways to provide extra cash flow to a firm that is in financial difficulties:

- Additional equity capital: The equity capital route leaves managers with more freedom as to how the incremental cash flows (if they will result) should be used.

- Additional debt write-off: Similar to equity capital, a debt write-off provides extra resources to management without an increase in future obligations to the investor. Additionally, a debt write-off provides the firm with additional cash flows over an extended time period – the firm benefits in the initial time period only to the extent that the interest it needs to pay is reduced, which may not correspond with the cash-flow profile necessary for the restructuring program.

- Loans: A loan provides cash today with an obligation for the firm to pay back pre-determined amounts of cash in the future. If loan terms can be enforced, management will have less discretion with respect of the uses of the future incremental cash flows generated.[111] The disadvantage to the firm of receiving aid through loans is that, compared to equity, the loan may leave the firm with less funds for restructuring at a later point in time – because the firm will need to pay interest and service the loan. If the repayment occurs before the company has recovered, this reduces funds available for (future) restructuring. Nevertheless, if the firm faces a liquidity crisis only, such loans may be attractive.

- Staggerd loans: The aid may be provided through a series of loans over time.[112] This would give the aid granting authority an opportunity to monitor the compliance with the restructuring plan before granting more aid. As the monitoring may be costly and difficult, it is not clear whether it is desirable to put the aid granting authority in a position where it has to constantly monitor the implementation of the restructuring plan and go through the administrative details of approving another loan.

Governments should determine their objectives in the process (e.g. survival of the firm for at least two years or a soft transition to a much smaller company) and make their aid contingent on achieving these objectives.

Alternative instruments

In the absence of State aid, bankrupt firms are subject to national bankruptcy laws. Bankruptcy laws play an important role in the US in restoring the health of failing firms. More research is needed to learn which factors drive the success of Chapter 11 proceedings. This is especially so because creditors are among the main beneficiaries from both State aid and bankruptcy laws, which explicitly aim to ensure that creditors are

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111 This is provided the loan terms are enforced. According to Harbord and Yarrow (1999), enforcement often involves policy credibility problems when lending is by the State. The incentive effects may not be so strong if the firm believes that it will be able to default without managers facing substantial negative effects.

112 This principle is similar to the principle of conditionality imposed by financial institutions. For example, the IMF uses phased disbursements to verify that a country adheres to its commitments. The monitoring relies on tools such as prior action (measures that a country agrees to take before a fund is approved), performance criteria (quantitative criteria such as maximum level of government borrowing), indicative targets (targets set up for the later months of a program, which are then turned into performance criteria as the economic situation improves) or structural benchmarks.

compensated for their investment. Hence, there is significant overlap between the two policy areas. Moreover, if Member States have effective bankruptcy laws, companies (and creditors) may be less prone to ask for State aid.

Interaction with other instruments

Rescue and restructuring aid is a potential substitute for but also complementary to bankruptcy proceedings as discussed to above.

8.2.3. Allocation procedure

R&R State aid is by nature selective as it is open only to (the) failing firm(s) in the relevant market.

8.2.4. Duration and frequency of aid

As pointed out above, the potential market failures that are to be addressed by R&R aid are temporary and the aid that should address these should also be temporary. Rescue and restructuring aid will have an especially distortive effect if it is provided over a long period of time.

Generally, repeated aid is more likely to create X-inefficiencies than one-off aid that is restricted in time because the probability that aid keeps firms artificially alive is higher and repeated granting of aid may increase the company's expectation that it will receive aid in the future.

Duration: The rescue and restructuring guidelines limit the duration of aid because rescue and restructuring aid is thought to have a distortive effect if provided over a long period of time.

- In the case of rescue aid, the guidelines state that loans or guarantees must be terminated no later than six months after the measure has been authorised. Alternatively, if the Member State has submitted a restructuring plan, the loan or the end of the guarantee is extended until the Commission has reached a decision on the restructuring plan.

- For restructuring aid, the guidelines state that where restructuring operations cover several years and involve substantial amounts of aid, the Commission may require payment of the restructuring aid in instalments. The payment of each instalment is then made subject to the confirmation of the satisfactory implementation of each stage in the restructuring plan.[113]

Frequency: It has always been the intention of the EC to avoid repeated granting of R&R aid and, for example, restructuring aid could not be granted again for a ten year period.

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113 Community Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty, C 244/2, 1.10.2004.

Partly due to the experience with Bull, the 2004 rescue and restructuring guidelines have clearly extended the "one-time, last-time" principle to rescue aid (see Box 4).[114]

8.2.5. Conditionality

The R&R guidelines list a number of conditions attached to the granting of aid.

In order to be approved by the Commission, *rescue aid* must consist of liquidity support, be warranted on the grounds of serious social difficulties, be accompanied by a restructuring plan, be restricted to the minimum amounted needed to keep the firm in business and respect the one-time, last-time principle.

In the case of *restructuring aid*, the aid is conditional on carrying out the restructuring plan to restore the firm's long-term viability. To ensure that the adverse effects on trading conditions are minimised, compensatory measures must be taken such as divestment of assets, reductions in capacity or market presence and reduction of entry barriers in the markets concerned. For example, in the Alstom case, the French Government had to open up the market for rolling stock.[115] Furthermore, aid must be limited to the minimum amount necessary to enable restructuring to take place. In addition to the compensatory measures, the Commission may impose any conditions and obligations it considers necessary in order to ensure that the aid does not distort competition to an extent contrary to the common interest. To allow the Commission to verify whether the conditions have been met, the Member State concerned must communicate regular detailed reports to the Commission regarding the implementation of the restructuring plan.

Recommendation: The European Commission should not use compensatory measures as a "punishment scheme". Compensatory measures should only be adopted if they can effectively mitigate a clearly specified competition concern.

The problem with current compensatory measures is that these measures are often not tailored to the distortion of competition.[116] Without a careful assessment of the distortions of competition, it is difficult to ensure that compensatory measures are properly targeted to address the distortion of competition. In the 2004 MobilCom case, the distortion to competition was identified – the aid allowed MobilCom to focus on its high-end customers, like its rivals. It is not clear, however, how the compensatory measure (not allowing online sales for 1 month) mitigates this distortion. Furthermore, one concern mentioned in the interviews was that the measures are not always appropriate from a

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114 Exceptions to this principle include when rescue aid has been granted and new rescue and restructuring aid becomes necessary after at least five years due to unforeseeable circumstances for which the company is not responsible (Anestis et al. 2005).

115 Commission Decision of 7 July 2004 on the aid measures implemented by France for Alstom, Brussels C (2004) 2532 final.

116 Compensatory measures may lack credibility because they may be contradictory to one of the aims of rescue and restructuring aid, which is to create a viable company.

business point of view. Instead, they are often the outcome of bargaining between the Member State and the potential beneficiary.

Another aim of current compensatory measures is to provide companies with a disincentive to ask for State aid in the first place, or a sort of punishment for having accepted State aid. Allowing State aid in order to support the rescue and restructuring efforts and then harming the firm by a punishment mechanism seems contradictory and difficult to justify. Disincentives to ask for State aid in the first place should be targeted at the relevant decision makers, in particular but not only, the management without making the rescue and restructuring efforts more difficult.

8.2.6. Transaction costs and lobbying

In view of the costs of R&R aid such as the distortion to competition, the shadow costs of funds, the long-term costs of aid due to a softening of the budget constraint and the consequential loss in productive efficiency, one could argue from a social welfare point of view that cases in which the benefit of State aid outweighs the costs are likely to be very rare. Hence, the presence of these costs may be a sufficient argument to forbid R&R aid.

This leads to the question why national Governments are still inclined to hand out rescue and restructuring aid. One of the reasons why national governments have not eliminated this kind of aid may be due to the lobbying pressure of companies and their employees.

Forbidding State aid for R&R purposes can provide a commitment device for Governments that are unable to withstand the lobbying pressure from companies (and for the Commission towards the demands of national Member States). By forbidding R&R aid in all Member States, the risk that one Member State will renege and grant rescue and restructuring aid will also be minimised. Market failures linked to bankruptcies such as shocks to the labour market or to a region can be dealt with using other remedies, which are more targeted on the market failure – for example employment aid or regional aid.

8.3. STEP 3: DEFINITION OF RELEVANT MARKETS FOR AFFECTED PRODUCTS

In R&R cases the relevant issues concerning market definition depend on the activities of the aid recipient. In most cases, the restructuring plan can be taken as starting point. Given that most R&R aid is firm-specific rather than activity-specific, market definition for a multi-product firm will involve many different markets.

8.4. STEP 4: ANALYSIS OF THE COUNTERFACTUAL SCENARIO

If R&R State aid is provided before bankruptcy proceedings are opened, the counterfactual scenario most likely involves an understanding of the anticipated outcome of the bankruptcy proceedings (see Box 6).

Box 6: Banco di Napoli (1998) – bankruptcy and State aid

In the Banco di Napoli case the Commission approved a capital injection, tax concessions and the use of advances granted by the Banca d'Italia. The measures were intended to reorganise, restructure and privatise the bank.

According to the decision, the bank would have been wound up without the aid in question. In that event, its assets could have been acquired by one or several foreign competitors wishing to enter the Italian market. Thus, aid aimed at enabling even local banks to survive is considered to be liable to distort competition. Apart from these statements, the decision does not contain a description of the effect of State aid on the competitors. There is also no description of the market.

According to a Commission expert, the counterfactual situation (i.e. if State aid were not granted) can be described by considering what happened to Sicil Cassa, which was in a similar situation to Banco di Napoli. Sicil Cassa followed a normal bankruptcy procedure and the State stepped in via the deposit guarantee fund. A major aim of bankruptcy proceedings is to protect creditors in the case of bankruptcy. In State aid cases too, Commission experts confirmed that the main beneficiaries from State aid are often creditors. This example shows that considering alternatives to State aid, such as bankruptcy proceedings, is important.

Source: Commission Decision of 29 July 1998 giving conditional approval to the aid granted by Italy to Banco di Napoli L 116/36.

Moreover, the counterfactual scenario would have to consider the distortions to dynamic competition as discussed in Section 3.6.6. For the analysis of the unilateral effects and the market structure effects, the standard methodology as developed in Section 4.6 can be applied.

8.5. STEP 5: DECISION AND REMEDIES

The analysis of R&R aid provides support for a strict control of such aid measures. In light of the potentially large distortions of effective competition, a reconsideration of the current policy may be advisable. One solution could be to only allow State aid for cases where firms are already in bankruptcy proceedings.

This would be a more effective means of providing the right incentives to the management, owners, and creditors of the failing firm than the current use of compensatory measures. Our case studies do not suggest that compensatory measures designed to provide a disincentive for obtaining R&R aid are an effective means to limit the distortions of the recipient's incentives.

Compensatory measures may have a role if they are understood as "remedies". Effectively, such remedies would often involve the spin off of parts of the firm. But spin offs can also be done within the bankruptcy process. Other compensatory measures include allowing access of rivals to essential facilities or other measures to address competition concerns. We find that such interventions should be based on normal tools of competition policy and should not be part of a bargaining procedure between the European Commission, the donor Government and the recipient firm.

APPENDIX A: LITERATURE

A.1 GENERAL LITERATURE

Aghion, P., Bloom, N., Blundell, R., Griffith, R., and Howitt, P., "Competition and Innovation: An Inverted U Relationship", Institute for Fiscal Studies, IFS Working Paper, W02/04, 2003

Almus, M. and Czarnitzki, D., "The Effects of Public R&D Subsidies on Firms' Innovation Activities: The Case of Eastern Germany", Journal of Business and Economic Statistics 21 (2), 2003

Anderson, J.E. and Martin, W., "Evaluating Expenditures when Governments Must Rely on Distortionary Taxation", 1998

Anestis, P., Mavroghenis, S. and Drakakis, S., "Recent Developments in EC State Aid Policy", The European Antitrust Review, 2005

Arrow, K., "The Rate and Direction of Inventive Activity", Economic Welfare and the Allocation of Resources for Invention, in Nelson, R. (ed.), Princeton University Press, 1962

Australian Industry Commission, "State, Territory and Local Government Assistance to Industry", Australian Government Publishing Service Canberra, Report No. 55, 1996

Becker, G. S., "Human Capital", Chicago, 1964

Berger, P.G., "Explicit and Implicit Tax Effects of the R&D Tax Credit", Journal of Accounting Research 31, pp. 131-171, 1993

Berglof, E. and Bolton, P., "The Great Divide and Beyond: Financial Architecture in Transition", William Davidson Working Paper 414, 2001

Bergström, F., "Capital Subsidies and the Performance of Firms", SSE/EFI Working Paper Series in Economics and Finance (Stockholm), 1998

Bertrand, M.; Schoar, A. and Thesmar, D., "Banking Deregulation and Industry Structure: Evidence from the French Banking Reforms of 1985" mimeo, University of Chicago, 2004

Besanko, D. and Spulber, D., "Contested Mergers and Equilibrium Antitrust Policy", Journal of Law, Economics, and Oganization, 9(1), pp. 1-29, 1993

Besley, T. and Seabright, P., "The Effects and Policy Implications of State Aids to Industry: an Economic Analysis", Economic Policy, 1999

Bishop, S. and Walker, M., "The Economics of EC Competition Law", London Sweet and Maxwell, 2002

Bloom, N., Griffith, R., and van Reenen, J., “Do R&D Tax Credits Work? Evidence from a Panel of Countries 1979-97”, Journal of Public Economics, 38, 2003

Bolton, P. and Scharfstein D.S., “A Theory of Predation Based on Agency Problems in Financial Contracting”, in: American Economic Review, Volume 80, pp. 93-106, 1990

Bond, S. and Samuelson, L., “Tax Holidays as Signals”, American Economic Review, 76, pp. 713-740, 1986

Bowman, E.H., Singh, H., Useem, M. and Bhadury, R., “When Does Restructuring Improve Economic Performance”, California Management Review 41, 1999

Brander, J. and Spencer, G., “Export Subsidies and International Market Share Rivalry”, Journal of International Economics, 1985

Browning, E.K., “On the Marginal Welfare Costs of Taxation”, American Economic Review Volume 77 Issue 1, 1987

Cabral, L.M.B., “Introduction to Industrial Organization”, MIT Press Cambridge, Massachusetts, 2000

Cacciato, G., “Subsidies, Competition Laws and Politics: A Comparison of the E.U. and the U.S.A”, European Policy Paper Series, DG Competition, 1996

Cappelen, A., Castellacci, F., Fagerberg, J. and Verspagen, B., “The Impact of Regional Support on Growth and Convergence in the European Union”, ECIS Working Paper (Eindhoven), 2001

Capron, H. and van Pottelsberghe, B., “Public Support to Business R&D: A Survey and Some New Quantitative Evidence”, in OECD, ed.: Policy Evaluation in Innovation and Technology, 1997

Cassidy, M. and Strobl, E., “Subsidising Industry: An Empirical Analysis of Irish Manufacturing”, Journal of Industry, Competition and Trade, 2004

CISED, “Review of the Economic and Industrial Consistency of the Labour Related Criteria of the Currant Multisectoral Framework on Regional Aid for Large Projects”, for the European Commission, 2001

Clarysse, B. and Muldur, U., “Regional Cohesion in Europe? An Analysis of How EU Public RTD Support Influences the Technoeconomic Regional Landscape”, Research Policy 30, pp. 275-96, 2001

Collie, D., “Prohibiting State Aid in an Integrated Market: Cournot and Bertrand Oligopolies with Differentiated Products”, Journal of Industry, Competition and Trade, Vol. 2, no. 3, 2002

Collie, D., “State Aid in the European Union: The Prohibition of Subsidies in Integrated Markets”, International Journal of Industrial Organisation, vol. 18, pp. 867-884, 2000

Cowell, F. A. and Gardiner, K. “Welfare Weights”, 1999

CRA, “Innovation in the Pharmaceutical Sector” study undertaken for the European Commission by Charles River Associates, 2004

Danish Competition Authority, “Public Subsidies and Productivity Growth in Denmark in OECD/ Directorate for Financial Fiscal and Enterprise Affairs/ Committee on Competition Law and Policy”, ed.: Competition Policy in Subsidies and State Aid, 2001

David, P.A., Hall, B. and Toole, A., “Is Public R&D a Complement or Substitute for Private R&D? A Review of the Econometric Evidence”, Research Policy 29, pp. 497-529, 2000

Devarajan, S., Squire, L. and Suthiwart-Narmeput, S., “Beyond Rate of Return: Reorienting Project Appraisal”, in: The World Bank Research Observer, Vol 12, no 1, pp. 35-46, 1997

Diewert, W.E. and Lawrence, D.A., “The Deadweight Cost of Taxation in New Zealand”, Canadian Journal of Economics, 1996

Dixit, A. and Kyle, A., “The Use of Protection and Subsidies for Entry Promotion and Deterrence”, American Economic Review 75, pp. 139-152, 1985

Dixit, A., and Pindyck, R., “Investment Under Uncertainty”, Princeton University Press, 1994

DTI, “Taking Account of State Aid Issues in Policy Making: A Risk-based Approach”, July 2004. Available at http://www.dti.gov.uk/ccp/stateaid/documents.htm#reports

Eaton, J. and Grossman, G., “Optimal Trade and Industrial Policy Under Oligopoly”, Quarterly Journal of Economics, Vol. 101, pp. 383-406, 1986

Europe Economics, “The Development of Analytical Tools for Assessing Market Dynamics in the Knowledge”, for the European Commission, 2003

European Commission, “Community Framework for State Aid in the form of Public Service Compensation”, 2004

European Commission, “Community Guidelines Applying Articles 87 and 88 of the Treaty to the Granting of Urgency and/or Restructuring Aid to Firms in Difficulty”, 2004

European Commission, “Reinforcing Concentration and Mutual Consistency”, Communication to the Commission Member States on the Links Between Regional and Competition Policy, Official Journal of the European Communities, 1998

European Commission, DG Competition, “Community Rules on State Aid for Innovation”, Commission Staff working document, Vade Mecum, 2004

European Commission,, DG Competition, “European Competition Policy: A brief overview – State Aid Control”

European Commission, DG Competition, “State Aid Scoreboard”, 2004 and 2005 Spring Update

European Commission, DG EcFin, Proposals for a Coordinated Strategy to Reduce State Aids Volumes (Note for the Economic Policy Committee), Brussels, ECFIN/643/99-EN, available at http://www.ks.dk/publikationer/statsstoette/2000/workshop/janhschmidtepcpaper1.doc/

European Commission, DG EcFin, "State Aid and the Single Market", European Economy Reports and Studies Number 3, Directorate-Generale for Economic and Financial Affairs, 1999

European Commission: "Guide to Cost-Benefit Analysis of Investment Projects" Structural Funds – ERDF, Cohesion Fund and ISPA, 2002

European Commission Decision of 21 May 1997 on the proposal of Austria to award aid to Hoffman-LaRoche company for the development of the drug 'Orlistat' designed for the treatment of pathological obesity, OJ L 103, 03/03/1998, 1998

Europe Economics, "The Development of Analytical Tools for Assessing Market Dynamics in the Knowledge Based Economy", 2003

European Union, "Guidelines on the Assessment of Horizontal Mergers Under the Council Regulation on the Control of Concentrations Between Undertakings", Official Journal of the European Union, 2004

Fingleton, J., Ruane, F., and Ryan, V., "Market Definition and State Aid Control", in European Economy Reports and Studies Number 3, Directorate-Generale for Economic and Financial Affairs, 1999

Fingleton, J., Ruane, F., and Ryan, V., "A Study in Market Definition in Practice in State Aid Cases in the EU", for the European Commission, 1998

Florio, M. and Vignetti, S., "Cost-benefit Analysis of Infrastructure Projects in an Enlarged European Union: an Incentive-Oriented Approach.", 2003

Florio, M., "An International Comparison of the Financial and Economic Rate of Return of Development Projects", Working paper n.99.06, 1999

Form 20 f for St Microelectronics, available at http://www.st.com/stonline/company/investor/cob/20f2004.pdf, 2004

Foray, D., Rutsaert, P. and Soete, L., "The Coherence of EU Trade, Competition, and Industry Policies in the High Tech Sector: The Case of the Telecommunications Services Sector", Paper prepared for the International Conference on EC Policies on Competition, Industry and Trade, Louvain-la-Neuve, 1994

Frontier Economics, "The Effects of Public Subsidies on Competition", 2004

Fundación de Economía Analitíca, "State Aid and Convergence in the European Union", June 1998, Final Report. We received the document from the European Commission on 6 June 2005.

Galal, A., Jones, L., Tandon, P. and Vogelsang, I., “Welfare Consequences of Selling Public Enterprises”, Oxford University Press, 1994

Garcia, J.A. and Neven, D., “Identification of Sensitive Sectors in which State Aids may have distorting effects”, Final Report to HM Treasury, 2004

Guellec, D. and van Pottelsberghe, B., “The Impact of Public R&D Expenditure on Business R&D”, Econ. Innov. New Techn., Vol. 12(3), pp. 225-243, 2003

Hall, B. and Van Reenen, J., “How Effective Are Fiscal Incentives for R&D? A Review of the Evidence”, Research Policy 29, pp. 449-69, 2000

Hancher, L., Ottervanger, T. and Slot, J.P., “EC State Aids”, Sweet & Maxwell, London, 1999

Hansen, M., van Ysendeck, A. and Zühlke, S., “The Coming of Age of EC State Aid Law”, paper presented at the IBC Advanced EC Competition Law Conference, 2003

Harbord, D. and Yarrow, G., “State Aids, Restructuring and Privatisation”, DG EcFin, “State Aid and the Single Market”, European Economy Reports and Studies Number 3, Directorate-Generale for Economic and Financial Affairs, 1999

Hardy, D., “Soft Budget Constraints, Firm Commitments, and the Social Safety Net”, International Monetary Fund Staff Papers, Vol. 39, Iss.2, 1992

Harris, M., and Raviv, R., “The Theory of Capital Structure”, The Journal of Finance, Vol.46, No.1, pp. 297-355, 1991

Harrison, R., “Productivity and Government Policy Towards R&D”, Institute for Fiscal Studies, 2005. Available at http://www.ifs.org.uk/publications.php?publication_id=3314.

Hayek, F., “The Use of Knowledge in Society”, 1945

Helpman, E. and Krugman, P., “Trade Policy and Market Structure”, MIT Press, Cambridge, 1989

Hicks, J.R., “The Theory of Monopoly”, Econometrica, Vol 3, pp. 1-20, 1935

Hubbard, G., “Capital-Market Imperfections and Investment”, Journal of Economic Literature, Vol. 36, No.1, pp. 193 – 225, 1998

Ilzkovitz, F., Meiklejohn, R, and Schmidt, J.H., “The Control of State Aids: A Proposal for a Co-ordinated Approach”, 1999, available at http://www.ks.dk/publikationer/statsstoette/2000/workshop/janhschmidt_paper1-a.doc/

Jensen, M., and Meckling, W., “Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure”, Journal of Financial Economics, V.3, No.4, pp. 305 – 360, 1976

Jordi, G., “State Aid and Convergence in the European Union”, Barcelona, 1998

Keen, M. and Delipalla, S., “The Comparison Between Ad Valorem and Specific Taxation Under Imperfect Competition”, Journal of Public Economics 49, pp. 351-367, 1992

Keen, M., “The Balance Between Specific and Ad Valorem Taxation”, Fiscal Studies Vol. 19, no.1, pp. 1-37, 1998

Klemperer, P., “Auction Theory: A Guide to the Literature”, Journal of Economic Surveys, 13 (3), pp. 227-286, 1999

Klette, T.J., Moen, J. and Griliches, Z., “Do Subsidies to Commercial R&D Reduce Market Failures?”, Microeconometric Evaluation Studies, Research Policy 29, pp. 471-95, 2000

Kleven, H.J. and C.T. Kreiner, “The Marginal Cost of Public Funds in OECD Countries: Hours of Work versus Labor Force Participation”, CESifo Working Paper no 935, April 2003

Kleymenova, A., Lind R.C., Muysert P, “Multiparty Licencing”, study undertaken for the European Commission by Charles River Associates, 2003

Kornai, J., “Economics of Shortage”, Amsterdam, North Holland, 1980

Kornai, J., “Resource-constrained versus demand-constrained systems”, Econometrica, Vol. 47, pp. 801-819, 1979

Krugman, P., “Geography and Trade”, MIT Press, 1991

Leahy, D. and Neary, P., “International R&D Rivalry and Industrial Strategy without Government Commitment”, Review of International Economics, 4, pp. 322-338, 1996

Lichtenberg, F.R., “The Effect of Government Funding on Private Industrial Research and Development: A Re-Assessment”, Journal of Industrial Economics 36, pp. 97-104, 1987

London Economics, “Ex-post Evaluation of the Impact of Rescue and Restructuring Aid on the International Competitiveness of the Sector(s) Affected by such Aid”, for the European Commission, 2004

Mankiw G. and Whinston M., “Free Entry and Social Inefficiency”, Rand Journal of Economics, Vol. 17, No. 1, pp. 48-58, 1986

Martin, S. and Evans, A. “Socially Acceptable Distortion of Competition: EC Policy on State Aid”, paper provided by the European University Institute, 1990

Martin, S. and Valbonesi, P., “State Aid in Context”, in Giampaolo Galli and Jacques Pelkmans (editors): “Regulatory Reform and Competitiveness in Europe”, Cheltenham, UK: Edward Elgar, Vol 1, pp. 176-201, 2000

Martin, S. and Scott, J.T., “The Nature of Innovation Market Failure and the Design of Public Support for Private Innovation”, 1999

Meiklejohn, R., “The Economics of State Aid”, in European Economy, Number 3, Directorate-Generale for Economic and Financial Affairs, 1999

Messerlin, P. A., “External Aspects of State Aids”, in European Economy, Number 3, Directorate-Generale for Economic and Financial Affairs, 1999

Midelfart-Knarvik, K.H. and Overman, H.G., “Delocation and European Integration. Is Structural Spending Justified?”, Economic Policy 35, pp. 323-359, 2002

Motta, M., “Competition Policy”, Cambridge Press, 2004

Myers, S. and Majluf, N., “Corporate Financing and Investment Decisions when Firms have Information the Investors do not have”, Working Paper No. 1396, National Bureau of Economic Research, 1984

Myers, S., “The Capital Structure Puzzle”, The Journal of Finance, Vol.39, No.3, Papers and Proceedings, Forty Second Annual Meeting, American Finance Association, San Francisco, CA, December 28-30, pp. 575-592, 1983

Neven, D. and Röller, L.-H., “Consumer Surplus vs Welfare Standard in a Political Economy Model of Merger Control”, CEPR Discussion Paper No. 2620, 2000

Neven, D. and Röller, L.-H. (eds.), “The Political Economy of Industrial Policy in Europe and the Member States”, Edition Sigma, Berlin, 2000

Neven, D. and Seabright, P., “European Industrial Policy: the Airbus Case”, Economic Policy, 1995

Neven, D., “State Aid and Distortions of Competition”, Prepared for IBC State Aid Conference, 2005

Nicolaides, P. and Kekelekis, M., “An Economic Analysis of EC Guidelines on State Aid for Rescue and Restructuring of Companies in Difficulty”, Intereconomics 39, 2004

OECD, “Competition Policy in Subsidies and State Aid”, DAFFE/CLP (2001) 24, 2001

OECD, “Competition Policy in Subsidies and State Aid”, DAFFE/CLP(2001)24, 2001

OFT, “Assessing the Impact of Public Sector Procurement on Competition”, Research Paper 2, 2004

OFT, “Barriers to Entry and Exit in UK Competition Policy”, research paper 2, 1994

OFT, “Competition Act”, 1998

OFT, “Guidelines on Market Definition”, 2000

OFT, “Market Investigation References Guidelines”, 2003

OFT, “Mergers: Substantive Assessment Guidelines”, 2003

OXERA, “The Effects of State Aid on Competition”, Competing Ideas, 2005

Persson, T. and Tabellini, G., “Political Economics: Explaining Economic Policy”, MIT Press, Cambridge, MA, and London, England, 2000

Pindyck, R., “Irreversibility, Uncertainty and Investment”, Journal of Economic Literature, Vol.29, No.3, pp.1110-1148, 1991

Ritzen, J. and Stern, D., “Introduction and Overview”, in: Ritzen, J. and Stern, D. (ed.): “Market Failure in Training? New Economic Analysis and Evidence on Training of Adult Employees”, Berlin: Springer Verlag, 1991

Robson, M., “Federal Funding and the Level of Private Expenditure on Basic Research”, Southern Economic Journal 60 (1), 1993

Röller, L.-H., Friederiszick, H.W., and Neven, D., “Final Report: Evaluation of the Effectiveness of State Aid as a Policy Instrument”, OJ S 144-28/7/2001-144/098945, 2001

Ross, T.W. and Winter, R.A., “The Efficiency Defense in Merger Law : Economic Foundations and Recent Canadian Developments”, Antitrust Law Journal, Vol. 72, No. 2, 2004

Schumpeter, “Theory of Economic Development”, 1911

Seinen, T. and Crome, S. “Application of the Multisectoral Framework to State Aid in the Semiconductor Industry”, Competition Policy Newsletter June 2002

Simon, S., “Recent Developments in State Aid Policy”, in European Economy, Number 3, Directorate-Generale for Economic and Financial Affairs, 1999

Sleuwaegen, L. and Pennings, E., “Avoiding Distortion of Competition from Regional Aid for Large Investment Projects - Theory and Application in the Multisectoral Framework”, for the European Commission, 2001

Sleuwaegen, L. and Pennings, E., “New Empirical Evidence on the International Relocation of Production”, 2001

Sleuwaegen, Leo, “Competitive Distortions and State Aid to Firms. How to Define the Relevant Market”, for the European Commission, 1999

Soltwede, R. et al., “Subventionssysteme und Wettbewerbsbedingungen in der EG”, Institut für Weltwirtschaft Kiel, 1998

Spiros, B., Goerg, H. and Strobl, E., "Is R&D financially constrained? Theory and evidence from Irish Manufacturing", Review of Industrial Organisation 22, 2003

State Aid Scoreboard – Autumn 2004 update. 16.11.2004, available at http://europa.eu.int/comm/competition/state_aid/scoreboard/2004/autumn_en.pdf.

Stiglitz, J. and Weiss, A., “Credit Rationing in Markets with Imperfect Information”, The American Economic Review, Vol.71, No.3, pp. 393-410, 1981

Tiebout, W., “A Pure Theory of Local Expenditures”, Journal of Political Economy, 6, pp. 416-424, 1956

Townsend, R., “Optimal Contracts and Competitive Markets with Costly State Verification”, Staff Report No.45, Carnegie-Mellon University and Federal Reserve Bank of Minneapolis, 1979

Treasury, “Green Book – Appraisal and Evaluation in Central Government”, London Treasury, 2003

U.S. Department of Justice and the Federal Trade Commission, “Antitrust Guidelines for the Licensing of Intellectual Property”, issued by the, April 6th 1995, available at http://www.usdoj.gov/atr/public/guidelines/ipguide.htm#t323 ,1995

Verouden, V., “Economic Principles of State Aid Control”, Prepared for IBC State Aid Conference, 2005

Vickers, J., “Competition and Regulation: The UK Experience”, Industrial Economics Lectures on Regulation, 1995

Wallsten, S. J., “The Effects of Government-Industry R&D Programs on Private R&D: the Case of the Small Business Research Program.”, Rand Journal of Economics 31, pp. 82-100, 2000

Williamson, O.E., “The Theory of the Firm as Governance Structure; From Choice to Contract”, 2002

A.2 CASE STUDIES

Draft letter to the Minister of Foreign Affairs of Italy, Aid to “ST Microelectronics” for the development of non-volatile flash memories – Italy. State Aid N 32/2000

Form 20F for ST Microelectronics, filed with the Securities and Exchange Commission 23 March 2005. Available at
http://www.st.com/stonline/company/investor/cob/20f2004.pdf

Commission Decision of 12 October 1994 concerning the grant of State aid by France to the Bull group in the form of a non-notified capital increase (Text with EEA relevance), OJ L 386 31/12/1994

The Commission gives go-head for restructuring aid to Bull, available under http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/04/1424&format=HTML&aged=0&language=EN&guiLanguage=en.

Crome, S. and Sölter, A., “Conditional decisions and EC State aid law: the MobilCom case”, Competition Policy Newsletter Number 3 Autumn 2004

A.3 LEGISLATION

Community Guidelines on State aid for rescuing and restructuring firms in difficulty, OJ C 244/2, 1.10.2004, available at http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/c_244/c_24420041001en00020017.pdf

APPENDIX B: UNILATERAL EFFECTS OF STATE AID ON RIVALS' PROFITS

To understand the logic behind Figure 1, consider a homogenous Cournot model with *n* firms, which for simplicity are assumed to have constant marginal cost. Let c_i be firm *i*'s marginal cost, and q_i firm i's quantity, and π firm *i*'s profit. Denote the market demand function by Q(*p)* and observe that *Q(p)*= $\sum_{j=1}^{n} q_j$.

The first row considers the impact of State aid that leads to reduction in marginal cost by a given amount – independent of the receiving firm's size. We first observe that within this model, the impact of State aid does not depend on the market share of the receiving firm. This result allows us also to draw some conclusions about how both an internal subsidy (or a subsidy per unit of output) affects rivals and how a given level of aid intensity affects rivals.

The reasoning proceeds in two steps. First, in the above Cournot model, the equilibrium quantity produced by all firms depends only on the sum of the marginal costs of all active firms in the industry and not on the distribution of marginal cost. Second, a firm's production only depends on its own marginal cost and the average marginal cost in the industry. More formally, the argument is as follows:

In a homogenous Cournot market with *n* firms, firm *i*'s maximisation problem is:

$$\frac{\max}{q_i} q_i\left(P(Q)-c_i\right)-F.$$

Hence, for any active firm *i*, the first order condition is:

$$\left[P(Q)-c_i\right]+P^{'}(Q)q_i=0.$$

Summing over the first order condition of all firms, yields

$$nP(Q)-\sum_{j=1}^{n} c_j + P'(Q)\sum_{j=1}^{n} q_j = 0 .$$

Denote the average marginal cost by $\bar{c}$, .i.e.

$$\bar{c}=\frac{\sum_{j=1}^{n} c_j}{n}$$

Dividing the above expression by *n*, one has

$$P(Q)-\bar{c}+P'(Q)q_i=0,$$

which implies that the equilibrium quantity *Q* depends only on the average marginal cost of all active firms (the so-called Bergstrom-Varian result).

We are left to show that a firm's choice of production depends only on its own marginal cost and the average marginal cost in the industry. Rewriting firm *i*'s first-order condition yields

$$q_i = \frac{P(Q) - c_i}{-P'(Q)}.$$[117]

Thus, firm *i*'s quantity depends on its own marginal cost level and – through *Q* – on the average marginal cost in the industry.

Now, suppose the Government sets a targeted amount of State aid, which is handed out linearly per unit of production. Then the smaller the rival, the higher the reduction in his marginal cost and, therefore, in the industry's average marginal cost level. Hence the overall industry production increases and the market price falls more if a given total amount of State aid is handed out to a firm with a low market share. Furthermore, the greater the reduction in a rival's marginal cost, the less a given firm produces. Hence rivals' profits decrease more if a given amount of State aid is handed out (per unit) to a firm with a low market share.

Similarly, suppose that the Government chooses a level of aid intensity (i.e. the State aid is a given percentage, say *x*%, of operating cost). Because an increase in production by one unit increases a firm's cost by c_i, the effective marginal subsidy a firm receives in this case is *x*% · c_i, and is greater for firms with high marginal cost and, therefore, for firms with a smaller market share. Hence rivals' profits decrease more if a given aid intensity is provided to a firm with a low market share.

To investigate how concentration effects the impact of State aid on rivals profit, consider the following linear Cournot example in which the market demand is given by $Q(P) = 1 - P$ and all rivals have the same marginal cost level c_j. In this case, firm i's maximisation problem becomes:

$$\max_{q_i} q_i(1 - \sum_{i=1}^{n} q_i - c_i) - F.$$

Hence, the first-order condition of an active firm is

$$1 - 2q_i - \sum_{j \neq i} q_j - c_i = 0.$$

Using the assumed symmetry across rivals,

$$q_i = \frac{1 - c_i}{2} - \frac{1}{2}(n-1)q_j^{rivals}.$$

and similarly

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117 Note that since P'(Q) is the slope of the demand function and is negative in the case of a normal demand function, - P'(Q) is positive.

$$q_j^{rivals} = \frac{1-c_j}{2} - \frac{1}{2}(n-2)q_j^{rivals} - \frac{1}{2}q_i .$$

Solving the above system of equations for the rival firms' quantity choice gives

$$q_j^{rivals} = \frac{1-2c+c_i}{n+1} .$$

Note that

$$Q = q_i + (n-1)q_j^{rivals}$$

Hence, the profits of a typical rival are given by

$$\prod_j^{rivals} = q_j^{rivals}\left[1-(n-1)q_j^{rivals} - q_i - c_j\right]$$

$$= q_j^{rivals}\left[(1-c_j) - \left(\frac{1-c_i}{2}\right) - \frac{1}{2}(n-1)q_j^{rivals}\right]$$

$$= q_j^{rivals}\left[\frac{1-2c_j+c_i}{2} - \left(\frac{(n-1)}{2}\right)q_j^{rivals}\right]$$

$$= \left(\frac{1-2c_j+c_i}{n+1}\right)\left[\frac{1-2c_j+c_i}{2} - \frac{(n-1)}{2(n+1)}\left(1-2c_j+c_i\right)\right]$$

$$= \frac{\left[1-2c_j+c_i\right]^2}{(n+1)}\left[\frac{1}{2} - \frac{(n-1)}{2(n+1)}\right]$$

$$= \frac{\left[1-2c_j+c_i\right]^2}{(n+1)^2}$$

Thus, the sum of all rival profits is

$$n \bullet \Pi_j = \left[\frac{n}{(n+1)^2}\right]\left(1-2c_j+c_i\right)^2 .$$

Therefore a small change in firm *i*'s marginal costs has the following impact on its rivals:

$$(i)\ \frac{\partial(n\cdot\Pi_j)}{\partial c_i} = \left[\frac{n}{(n+1)^2}\right]2\left(1-2c_j+c_i\right) > 0$$

This marginal impact becomes bigger the more concentrated the industry (i.e. the smaller the number of firms) since (ii):

$$(ii)\frac{\partial^2(n\cdot\Pi_j)}{\partial c_i\,\partial\ n}=\frac{(n+1)^2-2n(n+1)}{(n+1)^4}\bullet 2(1-2c_j+c_i).$$

$$=\frac{1-n}{(n+1)^3}\bullet 2(1-2c_j+c_i)<0$$

From (i) we know that rivals' profits are increasing in firm *i*'s marginal costs. From (ii) we know that the increase in rivals' profit is less when there are more firms (n increases). Thus, a subsidy which leads to a reduction in marginal costs has a bigger impact if concentration is higher (there are less firms).