European Commission

ISSN 1725-3187 (online)
ISSN 1016-8060 (print)

EUROPEAN ECONOMY

Economic Papers 530 | September 2014

The Economic Impact of Civil Justice Reforms

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Economic and Financial Affairs

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KC-AI-14-530-EN-N (online)
ISBN 978-92-79-35179-2 (online)
doi:10.2765/71090 (online)

KC-AI-14-530-EN-C (print)
ISBN 978-92-79-36145-6 (print)
doi:10.2765/80514 (print)

European Commission

Directorate-General for Economic and Financial Affairs

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Abstract

Quality, independence and efficiency are the key components of effective justice systems, a crucial condition to ensure the proper functioning of important drivers of growth in the EU. This paper focuses on judicial efficiency and investigates the impact of certain structural reforms affecting the civil justice system on selected economic outcomes, such as business dynamics and foreign direct investments (FDI). In doing so, the role of efficiency of justice systems (measured by disposition time and the ratio of pending cases to population, both referred to litigious civil and commercial disputes) is highlighted as a transmission channel linking judicial reforms to economic variables. The work draws upon a dataset based on the reports by the Council of Europe's European Commission for the Efficiency of Justice (CEPEJ). The results support the growth potential of judicial reforms rationalising the organisation of courts, fostering investment in in-court ICT and introducing incentives to reduce excessive litigation rates (for instance by enhancing the use of alternative disputes resolution methods), which are all found to positively affect the efficiency of civil justice. By increasing the efficiency of the justice system, these reforms can enhance entrepreneurial activity (as measured by firms' entry rates) and FDI.

JEL Classification: K40, K41, D02, C36.

Keywords: Civil justice, judicial efficiency, foreign direct investments, business dynamics, entry rates, disposition time, backlog, CEPEJ, structural reforms, transmission channels.

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Acknowledgments: This paper presents work carried out in the context of a broader project on the assessment of product market reforms, the main findings of which are presented in the European Commission DG ECFIN report “Market reforms at work in Italy, Spain, Portugal and Greece” (European Economy, 5/2014). Thanks are due for useful comments and advice to Anne Bucher, Isabel Grilo, Josefina Monteagudo, Dominique Simonis, Fiorenzo Bovenzi, Daria Ciriaci, Elsa Garcia Maltras, Joze Strus and the participants to the workshop "Assessing Product Market Reforms in Italy, Spain, Portugal and Greece" held in Brussels on November 25th 2013. The views expressed are the authors’ alone and do not necessarily correspond to those of the European Commission.

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I. INTRODUCTION

Effective justice systems, encompassing quality, independence and efficiency, are an important structural condition for Member States to achieve sustainable growth. Predictable, timely and enforceable justice decisions contribute to trust and stability, and thereby to a business environment conducive to entrepreneurial activity and investment. The efficiency of justice systems, indeed, is crucial to ensure the proper functioning of markets, not least through effective enforcement of contractual obligations and rights in a number of fields, like property (including intellectual one), insolvency cases, and labour law.

In the aftermath of the crisis, a number of countries (see Box I.1) have undertaken reforms meant to remove bottlenecks hindering the smooth functioning of civil justice, also in light of the European Semester exercise ([1]). This reform effort, complementing in many cases other reforms in the areas of business environment, product and service markets, mostly aimed at reducing the length of civil and commercial trials as well as the backlog of pending cases, in order to increase the efficiency of civil justice procedures alongside judicial independence and quality.

The relevance of these measures in terms of potential growth and their viability in a period of fiscal consolidation call for the development of a proper assessment framework, aimed at quantifying the potential benefits arising from reforms, while highlighting the areas of intervention that could lead to comparatively higher gains. ([2])

This paper builds on the descriptive work on justice started a few years ago by the Council of Europe (through the biennial CEPEJ reports) and, more recently, by the European Commission (through the EU Justice Scoreboard ([3]). Its aim is to analyse the link between judicial reforms and indicators of civil justice efficiency and, in turn, between the latter and selected economic outcomes. To this purpose, a number of econometric methodologies are used with the objective of providing an accurate and robust estimation of the links of interest, by controlling for potentially confounding factors and highlighting the role of judicial efficiency as an important transmission channel between judicial reforms and economic variables. With respect to previous analyses (see chapter II for a literature review), the present work has thus the advantage not only of a broader "horizontal" focus but also of more immediate policy relevance.

The findings are in line with the economic rationale: the analysis shows that reforms aimed at rationalising the organisation of courts (by increasing their average size), fostering investment in ICT and introducing incentives to reduce excessive litigation (for instance by enhancing the use of alternative disputes resolution methods) all positively affect the efficiency of civil justice, as reflected in a decrease in disposition time (our preferred measure of trial length) and in pending cases as a ratio to population, both referred to litigious civil and commercial disputes. Moreover, increased efficiency is positively reflected on entrepreneurial activity (measured by firms' entry rates) and on foreign direct investments. While not all these links show the same magnitude and statistical significance throughout the remainder of the paper, the overall picture is clearly supportive of the growth potential of civil justice reforms.

The paper is organised as follows. Chapter II provides a literature review on recent research about the effectiveness of justice systems, as well as a rationale for the transmission channels tested in the following chapters. Chapter III includes an overview of the econometric methodology (III.1), a description of the used dataset (III.2), and an outline of the results of the analysis (III.3 and III.4). Chapter IV summarises results and includes an application for the case of Italy. Chapter V concludes and proposes areas for further research.

([1]) Namely, in the context of the 2013 cycle of European Economic governance, ten MS received a recommendation in the field of judicial system (BG, ES, HU, IT, LV, MT, PL, RO, SI, SK). In particular, four (IT, LV, SI, SK) were recommended to promote mediation and alternative dispute resolution mechanisms in order to reduce litigation rates.

([2]) Beyond the economic dimension, the respect of fundamental rights, in particular the right to access to justice, and principles such as judicial independence should be at the basis of any justice reform. For example, disproportionate court fees or a general obligation to use alternative dispute resolution might be against the right to an effective remedy before a tribunal, enshrined in Article 47 of the EU Charter of Fundamental Rights. See, for instance, the rulings Alassini (2010) and Edwards and Pallikaropoulos (2013).

([3]) COM (2014) 155 final. The Scoreboard is available at: http://ec.europa.eu/justice/effective-justice/scoreboard/index_en.htm

Box I.1: **Summary of main reforms in a selection of Member States (EL, ES, IT, and PT)**

In recent years, reforms in the area of civil justice have been high in the agenda of several Member States, with the aim of enhancing the effectiveness of contract enforcing (in a reasonable time) and improving the overall business environment. The main issue several countries currently face is the excessive length of civil trials, due to, among others things, cumbersome judicial procedures, inefficient court management and accumulation of backlog (in turn depending, in some cases, on excessive litigation rates). This box provides a summary of some of the most important reforms recently undertaken by some Member States under financial assistance programme or enhanced economic surveillance (Italy, Portugal, Greece and Spain) in the field of civil justice.

In **Greece**, judicial reforms are part of the commitments taken by the government in the context of the financial assistance programmes. The key measures implemented in this area between 2010 and 2012 include the introduction of stop-gap measures to restore the structural balance between inflow of new civil and administrative cases and outflow of old ones. Mediation has been introduced in 2010: communication campaigns are ongoing to raise public awareness about it, while full opening of the mediator activity to all professions was adopted in April 2014, which should help to gradually reduce the number of cases going to court. Further developments include the improved collection of statistical data on court activity and the pilot implementation (in the district of Athens) of an e-justice plan, which will gradually extend electronic filing and other e-justice tools to all courts and will cover the whole national territory in 2016. Moreover, a draft revised Code of Civil Procedure was submitted to public consultation in March 2014 and is expected for adoption.

Italy started in 2012 a major reform of the geographical organisation of courts, aimed at merging tribunals and closing down smaller and less efficient ones, with the objective of increasing their average size, achieving scale economies and promoting professional specialisation. The reorganisation of courts has been operational as of September 2013. The judicial reform also provided for the establishment of specialised courts for businesses, as well as for measures to limit the excessive recourse to appeals (a filter for eligibility to appeal has been introduced), an increase of court fees and the re-introduction of compulsory mediation for a trial period of four years ahead of initiating a civil lawsuit before a court; compulsory mediation had already been in place from March 2011 to December 2012, when the Constitutional Court ruled it out due to irregularities in the legislative process, namely abuse of legislative delegation by the government. The potential impact of these reforms will be analysed in greater detail in chapter IV.

Portugal implemented ambitious judicial reforms in the context of the financial assistance programme. The Memorandum of Understandings included several structural reforms in the area of judicial efficiency, among which a new Code of Civil Procedure (entered into force in September 2013) facilitating the swift conduct of proceedings by judges and parties (e.g. by limiting the number of witnesses that each party can call in civil cases, and introducing measures to accelerate the closure of inactive cases). Moreover, the implementation of the Judicial Organisation Act will reduce the number of courts, enlarging the territorial jurisdiction of first instance ones and aligning them with the administrative districts, with the aim of creating court clusters to allow for greater economies of scale and professional specialisation. In order to abate the backlog of pending enforcement cases, a new regulatory framework for enforcement agents has been introduced, providing for the creation of special task forces to audit and eventually close pending cases, and the introduction of tighter

(Continued on the next page)

Box (continued)

supervision instruments. Finally, measures have been taken in the area of alternative dispute resolution (ADR) methods, for instance through the introduction of the mediation regime and of the tax arbitration regime.

In **Spain**, in addition to past measures such as the *Ley 37/2011 de medidas de agilización procesal*, recent reforms focused on the introduction of court fees (aimed at reducing the number of litigious cases and at refinancing the financial deficit in the judicial system) and on the adoption of a decree-law on mediation. Both reforms were implemented through 2012 and 2013. Court fees (whose introduction raised protests from consumer associations and legal professional associations) are due to be paid by both companies and natural persons whose family income exceeds a fixed threshold (currently, set at twice the minimum inter-professional wage). A few exceptions have been identified (for instance, some issues related to family matters, insolvency or administrative disputes in cases of administrative silence). The Royal Decree-Law 5/2012 harmonised rules on mediation on a national scale. Previously, mediation had been introduced only in some regions, with different scope (usually, only family cases were covered). The new legislation covers civil and commercial cases.

II. LITERATURE REVIEW AND DISCUSSION OF TRANSMISSION CHANNELS

In recent years, the relevance of efficient national justice systems on economic performance has been repeatedly recognized: for instance, Barkbu et al. (2012) highlighted the crucial importance of a properly functioning judicial system for the whole economy, including labour market, FDI, and innovation. OECD (2013) also discussed how judicial systems serve important purposes in determining economic performance, with lengthy civil proceedings likely to prove a drag on economic activity in several countries. It is also worth noting that the World Economic Forum (2014) includes an indicator of perceived judicial independence among its competitiveness indicators. Overall, in fact, well-functioning judiciaries could guarantee security of property rights and contractual enforcement, in turn strengthening economic agents' incentives to save and invest, as well as entrepreneurship in a broader sense, not least by dissuading opportunistic behaviour and reducing transaction costs: this is likely to promote competition, innovation, and growth.

In light of the aforementioned findings, several studies have recently aimed to assess the potential impact of the functioning of national justice systems on the economy, particularly by better investigating the channels through which effective judiciaries are able to affect economic outcomes. In particular, a recent strand of empirical research, mostly country-specific, focuses on the role of structural features of the judiciaries. For instance, it investigates – on the basis of regional/provincial variation in efficiency indicators – the relationship between the structure and governance of courts and various economic outcomes like firm entry/exit rates, firm size, and access to credit. Namely, Jappelli et al. (2005), based on a panel dataset at province level in Italy, show that improvements in judicial efficiency reduce credit rationing and increase lending, while the effect on interest rates is dependent on banking competition and the type of reform. For the case of Mexico, Laeven and Woodruf (2007) show that the quality of the legal system affects firm size by reducing the idiosyncratic risk faced by firm owners. More recently, García Posada and Mora-Sanguinetti (2013) use firm-level data to analyse the channels through which the efficacy of the Spanish judiciary (positively) affects the size of the companies at the local level. Giacomelli and Menon (2013) investigate the causal relationship between judicial efficiency and firm size across Italian municipalities, exploiting spatial discontinuities in court jurisdictions for identification: the reduction of the length of civil proceedings is estimated to exert, *ceteris paribus*, a positive effect on the average size of Italian firms.

Among the few examples of horizontal works, providing cross-country evidence on the impact of efficient civil judiciaries, are Djankov et al. (2003) and Palumbo et al. (2013). In the former, an index of procedural formalism of dispute resolution is built on the basis of micro data for 109 countries, allowing to conclude that such formalism, systematically higher in civil than in common law countries, is associated with higher expected duration of judicial proceedings, less consistency and fairness in judicial decisions, and more corruption. In the latter, trial length, accessibility of justice, and predictability of decisions are compared across OECD countries, based on performance indicators and institutional characteristics: this allows investigating how the disposition time is related to structural characteristics like the shares of the justice budget devoted to computerisation, the systematic production of statistics on case-flow, the active management of the progress of cases by courts([4]), the presence of specialised commercial courts and systems of court governance assigning greater managerial responsibilities to the chief judge. These findings are in line with those in OECD (2013), where differences in trial length are more

([4]) Case-flow management broadly indicates the set of actions that a court can take to monitor the progress of cases and make sure that they are efficiently managed. E.g., it includes the monitoring and enforcement of deadlines, the screening of cases for the selection of an appropriate dispute resolution track, and the early identification of potentially problematic cases. The quoted paper measures case-flow management across countries through two indicators, obtained through PCA techniques, respectively of: i) early identification of long/problematic cases in first instance, found to be correlated with shorter trial length and higher productivity of judges (ratio of resolved civil cases across all instances to the total number of judges); ii) systematic collection of detailed statistics on case-flows (incoming, pending, resolved cases), trial length, judges' workload and other operational dimensions, which appears to be correlated with higher productivity of judges and (weakly) with shorter trial length.

related to the structure of justice spending and the structure and governance of courts than to the sheer amount of financial resources devoted to justice.

As an important *caveat*, it is worth noting, in line with Botero et al (2003), that efficiency is only one of the desirable features of national judiciaries, since quality and independence, are also essential aspects of an effective justice system.

III. ECONOMETRIC ANALYSIS

III.1. METHODOLOGY

In line with the reviewed literature, the present work investigates the economic impact of reforms enhancing the efficiency of the national judiciaries by addressing some of their structural features. The adopted approach is a two-step econometric analysis aimed to estimate the impact of judicial efficiency (e.g. measured by average trial length) not only as an objective per se but also as the channel through which actual judicial reforms undertaken by the Member States could deliver their full impact over certain economic outcomes (such as business dynamics and FDI). Following the OECD (2013) terminology, most of these reforms (see Box III.1) have targeted, on the *supply side*, the organisation of the judicial system (e.g. the geographical organisation of courts, including their number and size, the number of judges, their degree of specialisation, the in-court ICT intensity, etc.) and, on the *demand side*, the disincentives to bring a case to court (e.g. court fees, criteria for appeals, availability of alternative dispute resolution methods).

In detail, the regression analysis is based on CEPEJ data covering all Council of Europe countries, including the EU Member States, over the period 2006-2010 (see chapter III.2.1 for details). The availability of a short time series for each country allows to exploit panel data estimation methodologies, in order to rule out the confounding effect of individual country characteristics.

The first step estimates the impact of reform variables, such as average court size ([5]), on the functioning of the justice system, measured by efficiency indicators. A typical estimated model takes the following form:

$$I(efficiency)_{it} = a_1 + a_2 I(supply)_{it} + a_3 I(demand)_{it} + a_4 X_{it} + a_5 D_t + \varepsilon_{it} + \omega_i$$

Where *I(.)* respectively denotes efficiency, supply, or demand indicators; X_{it} is a vector of control variables; D_t are time dummies controlling for common cyclical shocks; ω_i is an individual effect in panel specifications to account for country-specific time-invariant factors; and ε_{it} is an idiosyncratic error term. For instance, we explain disposition time or backlog ratio (i.e. efficiency indicators) as a function of average court size (i.e. supply-side variable) and average litigation rate (i.e. demand-side variable). Control variables include structural factors, such as the legal origin of each national judicial system, as in Djankov et al. (2003). To account for possible endogeneity issues, the same estimates are also run in an instrumental variable (IV) setting.

The second step then estimates the impact of efficiency indicators on relevant economic outcomes, including business dynamics and foreign direct investments. The rationale is that the combined reading of the two steps could shed light on the impact of changes in structural features of the judiciaries on economic outcomes, passing through the transmission channel of increased efficiency. A typical estimated model in the second step would take the following form:

$$Outcome_{it} = b_1 + b_2 I(efficiency)_{it} + b_3 Y_{it} + b_4 D_t + \varepsilon_{it} + \omega_i$$

Where *I(.)* denotes judicial efficiency indicators, Y_{it} is a vector of control variables, D_t are time dummies controlling for common cyclical shocks; ω_i is an individual effect in panel specifications to account for country-specific time-invariant factors; and ε_{it} is an idiosyncratic error term. The dependent variables used in the estimations include sectoral entry and churn rates ([6]), as well as national net inflows of foreign direct investments ([7]). The underlying economic intuition is that more efficient national justice systems might incentivize entrepreneurship, and thus firms' entry, as well as foreign investors' confidence in a country, in light of better contract enforcement among economic agents. Control variables include: i) for business dynamics indicators, the average firm size and value added growth at sectoral level;

([5]) This is defined as the average number of professional judges (both working full time and occasionally) per first instance court.

([6]) The entry rate is defined as the ratio of new firms to the total number of firms in a sector. The churn rate is defined as the sum of the entry rate and the exit rate (ratio of firms' deaths to total firms in a sector). The latter can be considered as a proxy of businesses' turnover.

([7]) Net FDI inflows measure new investment inflows from foreign investors (less disinvestment) in the reporting economy in a certain year.

ii) for FDI net inflows, the openness of the economy (measured by the sum of import and export as a ratio to GDP) and GDP growth.

It is worth noting that the two steps are estimated first as separate equations (see chapters III.3 and III.4) and then simultaneously, through a 3-Stage Least Squares (3SLS) approach (see chapter 3.4). While the first approach makes it possible to focus on each individual relationship and improve the precision of the estimates by better addressing specific technical issues (e.g. individual effects, endogeneity), the second one is the most appropriate to quantify the overall impact of judicial reforms on final outcome variables (FDI and entry), through their mediated effect on judicial efficiency (transmission channel). More details are provided in chapter III.4.

III.2. DESCRIPTION OF THE DATASET

III.2.1. The CEPEJ data

The analysis exploits a dataset compiled starting from the reports published by the Council of Europe's European Commission for the Efficiency of Justice (CEPEJ), which biennially provide a detailed picture on the main aspects of judicial systems across Europe ([8]). CEPEJ reports, based on a network of country correspondents, provide crucial information to assess the quality and efficiency of justice systems, allowing the distinction between "supply-side" and "demand-side" factors, as introduced in the previous chapter. Namely, they include quantitative information about court organisation, number of judges and non-judge staff, budget yearly allocated to courts, use of ICT in courts, number of pending and resolved cases, and related efficiency indicators (e.g. disposition time and clearance rate).

Four full reports are currently available, respectively covering 2004, 2006, 2008 and 2010. However, changes in methodology and incomplete availability of information ([9]) prevented the inclusion of 2004 in the analysis, which therefore covers three non-consecutive years (2006, 2008 and 2010). The sample of countries covered by CEPEJ is not limited to the European Union, but it includes non-EU members of the Council of Europe, increasing the total number of covered countries to 46 ([10]). The choice of using the full CEPEJ dataset, instead of limiting the analysis to EU countries only, is justified by the need to run the econometric analysis on a sufficient number of observations, in order to achieve robust inference. In this respect, due to the occurrence of missing values in relevant variables, the number of countries actually included in most regressions (according to the different models estimated) oscillates between 30 and 40.

In what follows, we provide a description of the main variables from the CEPEJ dataset we used in our analyses. To start with, two indicators of efficiency have been considered, namely the *disposition time* and the *ratio of pending cases at 31st December to population* (a measure of backlog), both referred to first instance civil and commercial litigious cases ([11]).

The disposition time is an estimated indicator of average trial length, comparing the number of resolved cases during the observed period and the number of unresolved cases at its end ([12]). It is computed as:

$$disposition\ time = 365 * \frac{pending\ cases\ at\ the\ end\ of\ the\ period}{resolved\ cases}$$

([8]) The latest reference is to CEPEJ (2012), *European judicial systems - Edition 2012 (data 2010).* Strasbourg, Council of Europe Publishing.

([9]) Some indicators were not collected for 2004.

([10]) Non-EU countries in the sample include Albania, Andorra, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iceland, Macedonia (FYR), Moldova, Monaco, Montenegro, Norway, Russian Federation, San Marino, Serbia, Switzerland, Turkey and Ukraine. The results for the United Kingdom are presented separately for England and Wales, Scotland and Northern Ireland, as the three judicial systems are organized on different basis and operate independently from each other.

([11]) The choice of considering civil and commercial litigious cases (excluding administrative, non-litigious and criminal cases) appears the most appropriate, given our focus on reforms improving business environment (for which enforcement of commercial contracts matters). The analysis is only limited to first instance cases due to the high frequency of missing values in data on higher instance lawsuits.

([12]) The intuition behind the formula is as follows: the ratio of resolved cases in a period to the pending cases at its end provides information on the *case turnover ratio* (i.e. the share of resolved cases in the remaining backlog); its reciprocal, multiplied by the number of days in a year, approximates the number of days needed to solve one case on average.

Disposition time provides a measure of the average number of days necessary for a pending case to be solved in court in a certain year. It is worth noting that this proxy for trial length is alternative to the well-known "time for enforcing contracts" indicator collected by the World Bank in its Doing Business report. However, in spite of limited time coverage and less frequent updates, the disposition time indicator presents several advantages in its respect ([13]).

We also explicitly consider backlog, by measuring the number of unresolved (pending) cases at the end of the period as a ratio to population (100,000 inhabitants). We call this indicator backlog ratio, computed as:

$$backlog\ ratio = 100{,}000 * \frac{pending\ cases\ at\ the\ end\ of\ the\ period}{population}$$

This indicator measures caseload backlog at country level, scaled by country size (measured in terms of population). It provides an idea of the stock of unresolved cases, whose magnitude is inversely correlated to the capacity of a judicial system to timely and efficiently enforce obligations and rights.

We also use several independent variables in the analysis, as introduced in the previous chapter. Among them, three deserve a detailed description. The main indicator we consider for court organisation is the average size of first instance courts, which is a relevant "supply-side" variable in the current reform framework (especially in IT and PT). It is computed as the ratio of first instance professional judges ([14]) (either working full time or occasionally) to the number of first instance courts; the number of first instance judges is in turn estimated based on their share over total judges in 2010, according to CEPEJ (2012) ([15]). It is worth noting that, in some specifications, this variable is split into its two components (number of courts and number of judges as a ratio to population) in order to investigate their specific effects. Another "supply-side" indicator hereby considered, linked to the modernisation and thus potentially to the efficiency of case handling, is the ICT investment in courts, measured as a share of total public budget. The main "demand-side" variable, in turn, is the litigation rate, measured as the number of incoming first instance civil and commercial litigious cases per 100,000 inhabitants. This variable provides an idea of the request to access the justice system in order to resolve controversies.

Table 1.1 in Annex 1 shows descriptive statistics for the main CEPEJ variables used in this chapter. Moreover, Graphs 1.1 to 1.4 in Annex 1 present, separately for the EU and non-EU countries in our sample, the evolution over time of disposition time and backlog ratio, based on detailed country-level statistics (please note that figures for EU countries also include, for the sake of comparison, data for 2012 from the *EU Justice Scoreboard 2014*).

III.2.2. Use of other datasets

In order to estimate the mentioned second-step regressions, the CEPEJ dataset was combined with other relevant data sources collecting information on business dynamics and FDI flows. Information on firm dynamics (entry, exit, and churning rates) and related control variables (such as value added and average firm size) at industry level come from the Eurostat Structural Business Statistics (SBS) dataset. This covers 17 EU Member States and 11 sectors over the period 2004-2011 (obtained by reclassifying NACE Rev.1 categories for 2004-2007 into NACE Rev.2 ones, by using Eurostat conversion tables). Due to the occurrence of

([13]) The WB indicator is based on a survey among professionals, who are asked to assess the time required for the resolution of a hypothetical commercial case (in the capital city of each country). Therefore, it is only an approximation of the actual disposition time (although it correlates significantly with the disposition time calculated by CEPEJ). Moreover, it changes very slowly over time, unless major reforms are undertaken. For these reasons, we resort to CEPEJ disposition time in our analyses, in spite of data limitations.

([14]) Non-professional judges (e.g. lay judges and “judges of the peace”, dealing with small claims) are not considered due to data reliability issues.

([15]) CEPEJ reports the total number of permanent and occasional professional judges (including first, second and higher instance) as FTE (full time equivalents) in 2006, 2008 and 2010. However, the report for 2010 also provides a disaggregation of judges according to the different instances. By assuming that the respective shares have remained constant from 2006 to 2010, we estimated the number of first instance judges by multiplying their share in 2010 to their total number over 2006-2010. Although this is clearly an approximation, it relies on quite a conservative assumption (the allocation of judges across different instance courts is not likely to change significantly over a 5-years period).

missing data in the CEPEJ dataset, only 14 countries can be effectively used in the analysis, over three years ([16]) (2006, 2008, and 2010). However, the industry disaggregation allows to achieve a sufficient number of observations to perform the analysis.

In order to check the relationship between FDI inflows and judicial performance variables, selected variables from the World Bank Development Indicators (WDI) dataset have also been added. The use of World Bank rather than of Eurostat data is justified by the need to cover also extra-EU countries. WDI indicators are in fact available for all CEPEJ countries ([17]), over a wide time span ([18]) (for our purposes, we considered the 2006-2011 period, in order to allow for some lags in the inclusion of independent variables). The main variable used from this dataset is net FDI inflows as a share of GDP ([19]). Other relevant variables from the WDI dataset include GDP growth, and total trade (sum of exports and imports of goods and services) measured as a share of GDP.

([16]) As CEPEJ does not record information for 2007 and 2009, in order to avoid losing information from the SBS dataset, it is possible to interpolate missing observations on relevant judicial variables, by making the assumption that changes between two non-consecutive years (i.e. between 2006 and 2008 and between 2008 and 2010) occur linearly. In chapter III.4 results are presented both using raw data and interpolated data.

([17]) Evidently, a single yearly observation is available for the UK, which in the CEPEJ dataset is split into three different areas '(England and Wales, Scotland and Northern Ireland). However, this discrepancy does not represent an issue, as relevant judicial performance variables are missing for the UK.

([18]) Also in this case, it is possible to interpolate CEPEJ data for 2007 and 2009 in order to maximize the number of usable observations. Results will be presented both using raw data and imputed ones.

([19]) According to the WB definition, "foreign direct investments are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments". Net inflows measure new investment inflows from foreign investors (less disinvestment) in the reporting economy. Sources: IMF (International Financial Statistics and Balance of Payments databases) and World Bank (International Debt Statistics).

III.3. FIRST STEP – FROM REFORM VARIABLES TO JUDICIAL EFFICIENCY

III.3.1. Baseline specifications

This chapter describes the main results of first step regressions of efficiency variables (disposition time and backlog ratio, both referred to first instance litigious civil and commercial cases) on civil justice *supply* and *demand-side* variables, potentially affected by reforms in Member States. Table III.1 – Table III.4 below present results of both pooled OLS regressions (which ignore the time structure of the dataset) and panel regressions using random (RE) and fixed (FE) effects estimators ([20]).

To start with, we study reforms affecting the organisation of courts, considering average court size (first instance professional judges divided by the number of courts ([21]) as main explanatory variable. In particular, we test the hypothesis that larger courts, by allowing the exploitation of scale economies (through better case-flow management and enhanced specialisation of judges) positively affect judicial efficiency, by reducing disposition time and the backlog ratio. The chosen specification controls for an important demand-side variable, the litigation rate, measured as the number of incoming cases as a ratio to population. Indeed, this variable is of direct interest to our analysis, insofar as on-going reforms, in some cases, aim at reducing the amount of incoming cases (while complying with the requirement of adequate access to justice), for instance by

([20]) The FE estimator has desirable consistency properties. However, in short panel samples (with few observations per unit) and in the presence of sluggish regressors (with more *between* than *within* variance), as in our case, the RE estimator tends to outperform the FE one (e.g. Clark and Linzer, 2012). Therefore in the present work we are agnostic about the ex-ante choice of the most appropriate model, which is thus based on the standard Hausman test statistic (discussed in the rest of the paper). Still, since this test might not be the most efficient to discriminate between the two models, we also ran an additional test on the correlation (assumed in FE models) between the regressors and the individual error components (as in Wooldridge, 2002). This test, run through the Stata command *xtoverid*, always confirms the results of the Hausman test and, therefore, is not presented in the rest of the paper.

([21]) Please note that the reported number of judges per court includes both non-criminal and criminal ones, due to data limitations. If one assumes that the structure of non-criminal and criminal courts is not significantly different, however, the approximation can be deemed reasonable.

fostering the recourse to alternative dispute resolution procedures (such as mediation or arbitration), by increasing court fees or by introducing limitations to appeal (to safeguard procedural discipline). Accordingly, while reforms affecting the litigation rate cannot be directly assessed in our framework (due to data availability issues – for instance, no detailed data on the diffusion of ADR is available cross-country), one expects this variable to be negatively correlated with efficiency measures and, thus, to impact positively on disposition time and backlog ratio.

Further controls include time dummies and legal origin dummies. The former allow to control for cyclical shocks that might jointly affect all countries in the sample (the crisis is the most straightforward example). The latter, instead, allow to control for traditional and procedural aspects which might affect the structure and functioning of judicial system. Five categories are defined in this respect, as in Djankov et al. (2003), namely: common law; French; Scandinavian; German; and former socialist systems. Due to the time invariant nature of these dummies, they are not included in FE estimations (as their impact is captured by country fixed effects). Robust standard errors are always reported. In all cases, a log-log specification has been estimated, in order to allow the interpretations of coefficients as elasticities. A parsimonious approach in terms of number of independent variables has been adopted, to avoid multicollinearity issues, also in view of the small overall number of observations.

We present results separately for disposition time and backlog ratio. As observable in Columns 1-3 of Table III.1, results for disposition time are in line with the economic rationale. The coefficient for court size is negative and statistically significant in both OLS and RE regressions.

As already explained in chapter III.2.1, an alternative specification is also provided, which splits court size into two components, i.e. the court to population ratio and the judge to population ratio. The interest of this approach lies in the fact that recent reforms undertaken by some Member States have addressed only the first component, typically by reducing the number of courts without affecting the overall number of judges. Results show that, while controlling for the number of judges, reducing the number of courts per inhabitant is indeed associated with increased judicial efficiency ([22]).

Besides, the coefficient for litigation rate is positive and significant in all specifications (increasing in magnitude when switching from OLS to panel models). The Hausman test statistic leads to accept the null hypothesis of no statistical difference between the coefficients of RE and FE models. Accordingly, the RE estimator is preferred, due to its higher efficiency (this evidence in favour of RE models is common to all the estimates presented in this chapter).

([22]) Please note that, in all cases where different supply-side or demand-side reform variables are tested, only the "synthetic" form of the court size is used, in order to have a more parsimonious specification.

Table III.1: **Determinants of (log) disposition time – effect of court size**

	OLS	RE	FE	OLS	RE	FE
(Log) court size	-0.332***	-0.329**	-0.344			
	(0.119)	(0.143)	(0.213)			
(Log) courts to population ratio				0.316***	0.335**	0.294
				(0.119)	(0.138)	(0.225)
(Log) judges to population ratio				-0.062	-0.251	-0.482*
				(0.238)	(0.251)	(0.284)
(Log) litigation rate	0.195*	0.328***	0.341***	0.200*	0.326***	0.345***
	(0.111)	(0.045)	(0.045)	(0.116)	(0.046)	(0.047)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No	Yes	Yes	No
Observations	87	87	87	87	87	87
Hausman (p-value)	-	0.64 (0.959)		-	1.91 (0.861)	
R-squared	0.411	0.397	0.482	0.432	0.409	0.485

(1) Note: robust standard errors in parentheses. Constant term included.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ data

Table III.2: **Determinants of (log) backlog ratio – effect of court size**

	OLS	RE	FE	OLS	RE	FE
(Log) court size	-0.307**	-0.342**	-0.514*			
	(0.117)	(0.155)	(0.298)			
(Log) courts to population ratio				0.289**	0.330**	0.567
				(0.117)	(0.150)	(0.390)
(Log) judges to population ratio				0.023	-0.084	-0.369
				(0.240)	(0.284)	(0.300)
(Log) litigation rate	1.149***	1.097***	1.082***	1.155***	1.095***	1.078***
	(0.109)	(0.044)	(0.039)	(0.114)	(0.045)	(0.040)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No	Yes	Yes	No
Observations	88	88	88	88	88	88
Hausman (p-value)	-	0.49 (0.975)		-	0.94 (0.967)	
R-squared	0.793	0.792	0.680	0.802	0.800	0.680

(1) Note: robust standard errors in parentheses. Constant term included.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ data

Table III.2 shows results using backlog ratio as dependent variable. The results are almost fully comparable with those obtained in the specification with disposition time. Namely, the coefficients on both court size and courts to population ratio present the expected sign, and are always statistically significant in RE models (which are preferred, according to the Hausman test). Interestingly enough, the coefficient of litigation rate has a higher magnitude in this case, generally higher than unity. This suggests that an increase in litigation rate is correlated to a more than proportional rise in backlog ratio ([23]).

([23]) As also verified through regressions using the absolute number of incoming and pending cases (not reported, but available on request), evidence suggests that each additional incoming case translates, on average, into more than one pending case at the end of the period. A possible interpretation is that additional cases increase congestion in courts, slowing down the resolution of the stock of pending cases as well.

Table III.3: **Effect of ICT investment on (log) disposition time**

	OLS	RE	FE
(Log) court size	-0.297**	-0.260*	-0.280
	(0.128)	(0.147)	(0.208)
(Log) litigation rate	0.214*	0.380***	0.406***
	(0.116)	(0.052)	(0.052)
(Log) share of public budget for courts ICT	0.0203	-0.050**	-0.056***
	(0.044)	(0.021)	(0.019)
Year dummies	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No
Observations	79	79	79
Hausman (p-value)	-	1.76 (0.881)	
R-squared	0.341	0.313	0.567

(1) Note: robust standard errors in parentheses. Constant term included.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ data

Table III.4: **Effect of ICT investment on (log) backlog ratio**

	OLS	RE	FE
(Log) court size	-0.293**	-0.253*	-0.273
	(0.126)	(0.146)	(0.211)
(Log) litigation rate	1.146***	1.135***	1.138***
	(0.107)	(0.0376)	(0.0475)
(Log) share of public budget for courts ICT	-0.0073	-0.051**	-0.052**
	(0.0419)	(0.024)	(0.024)
Year dummies	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No
Observations	79	79	79
Hausman (p-value)	-	0.58 (0.989)	
R-squared	0.806	0.803	0.916

(1) Note: robust standard errors in parentheses. Constant term included.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ data

Another important area frequently targeted by civil justice reforms is ICT. Investment in ICT in courts can increase their efficiency, for instance through improved case handling, reduced staff workload and streamlined procedures. CEPEJ reports provide an accurate disaggregation of yearly expenditures in the justice system, including the overall investment in ICT (annual public budget allocated to computerisation in courts, including equipment and maintenance). In order to take into account country size (and different patterns of public expenditure), we consider ICT investment as a share of total public budget. Tables III.3 and III.4 report regression results including this

explanatory variable ([24]). It comes out that, in panel specifications (the RE model being again the preferred one), ICT investment displays a negative correlation with both disposition time and backlog ratio. While statistically significant, the effect is small in magnitude: increasing by 10% the share of public budget devoted to in-court ICT is associated with a decrease of both dependent variables by around 0.5%. Coefficients on the other explanatory variables are in line with those previously obtained.

III.3.2. Instrumental variables approach

As widely acknowledged by the econometric literature, in estimating an economic model it is crucial to take due account of endogeneity issues, i.e. the possibility that the theoretical relationship linking the dependent and the explanatory variable(s) does not fit in a framework in which one can assume the former to be determined by, but not to jointly determine, the latter.

From a conceptual viewpoint, endogeneity issues cannot be ignored, particularly when assessing the impact of reform variables, due to a likely loop of causality (reverse causality issue) between the independent and dependent variable(s) of the model. Although drawing exhaustive conclusions in terms of causal inference is often a challenge, adequate treatment of endogenous regressors is crucial in our context to correctly estimate the impact of reform-related judicial changes on civil justice efficiency, in the presence of clear hints of reverse causality. Indeed, one could argue that the reform variables whose impact is being investigated (e.g. court size or ICT investments) fail to be exogenous with respect to the outcome indicators of civil justice efficiency. In fact, changes in these explanatory variables could be in turn induced by observed efficiency trends: for instance, an increase in backlog could prompt the implementation of reforms to tackle the identified flaws.

From a statistical viewpoint, in order to correctly identify the parameters of interest, endogeneity has to be taken into account by choosing the appropriate estimation method: indeed, OLS (as well as baseline RE and FE models) is incapable of delivering consistent parameter estimates in case of endogenous regressors. Accordingly, an instrumental variable (IV) estimator should be resorted to, finding appropriate "instruments" for the variables of interest.

This subsection aims to present how endogeneity issues have been taken into account in the context of the first step regressions presented in chapter III.3.1, namely by re-estimating each of the above models in an instrumental variable (IV) setting. The same specifications as in chapter III.3.1 are used, but emphasis is put on the choice of adequate instruments, being significantly correlated with each reform variable of interest and, at the same time, reasonably uncorrelated with the employed metrics of civil justice efficiency (disposition time and backlog ratio).

Tables III.5 to III.8 present, separately for disposition time and backlog ratio, the results of this estimation approach both in a simple pooled cross-section setting (ignoring the time structure of the dataset), and in a panel setting using random and fixed effects estimators. The IV random effects estimator is the maximum likelihood one computed on the basis of Baltagi and Li (1992). The corresponding robust standard errors are attached to each estimate.

In line with the previous chapter, we first consider reforms affecting the court size, including as explanatory variable the ratio of courts to the population, while controlling for the ratio of professional judges to the population. The chosen instruments for the (log) courts to population ratio are the lagged variations in the (log) proportion of population living in predominantly rural areas and in the (log) population density, drawn from WDI and Eurostat, respectively. Actually, these indicators can safely be considered uncorrelated with respect to the judicial efficiency indicators under scrutiny, and at the same time correlated with the number of courts, given the assumption (confirmed by the data) that courts are likely to be more diffused, and thus smaller, in the presence of sparser population (also due to relatively more significant proportion of rural dwellings).

Litigation rate is used as a control variable in all specifications. As a consistent estimation of its

([24]) This set of regressions is presented separately as the inclusion of the ICT variables reduces the number of observations, which suggests choosing a parsimonious specification.

coefficient is relevant in order to quantify the impact of reforms in this area, an IV specification is also presented for this explanatory variable. In fact, litigation rate is also passible of being correlated with the efficiency metrics, in so far as less efficient systems (e.g. long disposition time) could provide disincentives to bring cases to courts, thereby reducing average incoming cases. In this context, the chosen instrument is represented by the average court fees per incoming case, expressed as a percentage of GDP per capita ([25]). In fact, this variable can safely be considered unrelated to the efficiency of the justice system, while directly affecting its accessibility by likely reducing litigation as the average court fee increases.

The IV regressions results for (log) disposition time are reported in Table III.5 below, namely instrumenting only the average court size in columns 1-3, and instrumenting both average court size and litigation rate in columns 4-6. The reported values of the Kleibergen-Paap LM test (on under-identification of parameters) and the Hansen J test (on over-identifying restrictions) all hint at the goodness of the chosen instruments and the identification of the estimated IV models.

All the results appear in line with the economic rationale, as well as consistent with the findings of chapter III.3.1, where larger courts appear to positively affect efficiency, by allowing the exploitation of scale economies. In particular, the coefficients on average number of courts per 100,000 inhabitants are always negative and statistically significant: while the magnitude of the coefficient is significantly larger in the case of fixed effects regression, the reported Hausman test statistics indicate a preference for RE across all specifications. It is also worth noting that: i) the coefficients on the litigation rate tend to be positive and statistically significant in all specifications, in line with the economic rationale that more litigation negatively affect an efficient response by civil courts; ii) the coefficients on the ratio of judges to population are always negative, although not always statistically significant, as expected by the fact that more judges should allow quicker resolution of incoming cases and reduction of pending ones.

Overall, results from the preferred IV-RE model, respectively with and without instrumenting the litigation rate, indicate that a 1% reduction in the courts to population ratio would decrease disposition time by 0.55% to 0.58%, slightly higher than found in chapter III.3.1.

Table III.6 shows the findings obtained from another set of IV-regressions, using (log) backlog ratio as dependent variable. The results and conclusion that can be drawn are substantially in line with those for the disposition time. The coefficients on (instrumented) court to population ratio presents the expected positive sign and are always statistically significant in the preferred IV-RE models. Interestingly enough, the coefficients of litigation rate (instrumented or not) are always positive, significant, and higher than unity, as discussed in the previous chapter. Instead, the coefficients on the judges to population ratio are always negative, as expected, but never significant. Overall, results from the preferred IV-RE model, respectively with and without instrumenting the litigation rate, indicate that a 1% reduction of the courts to population ratio is associated with a decrease in backlog ratio by 0.38% to 0.53%, slightly higher than found in chapter III.3.1.

([25]) This is computed as the total amount of collected court fees divided by incoming litigious civil and commercial first instance cases, in turn expressed as a percentage of GDP per capita. This is a proxy for actual court fees (as only first instance cases are used in the computation), reasonably usable in an IV setting.

Table III.5: **Determinants of (log) disposition time, instrumental variables specifications**

	IV-POOLED	IV-RE	IV-FE	IV-POOLED	IV-RE	IV-FE
	Instruments for court to population ratio			Instruments for court to pop. ratio and lit. rate		
(Log) courts to population ratio	0.511**	0.584***	2.132**	0.677*	0.548**	1.435**
	(0.215)	(0.218)	(0.934)	(0.380)	(0.252)	(0.720)
(Log) judges to population ratio	-0.256	-0.420*	-0.938**	-0.434	-0.425	-0.725*
	(0.299)	(0.247)	(0.452)	(0.446)	(0.296)	(0.415)
(Log) litigation rate	0.194*	0.298***	0.288***	0.234	0.437***	0.444***
	(0.116)	(0.072)	(0.051)	(0.253)	(0.101)	(0.105)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No	Yes	Yes	No
Observations	85	85	84	75	75	72
Hansen J test (p-value)	0.307 (0.580)	11.921 (0.218)	0.000 (0.999)	0.765 (0.382)	9.581 (0.296)	1.035 (0.309)
Kleibergen-Paap LM test (p-value)	19.451 (0.000)	18.288 (0.050)	4.151 (0.126)	6.652 (0.036)	17.350 (0.044)	5.687 (0.058)
Hausman (p-value)	-	2.50 (0.777)		-	1.88 (0.865)	

(1) Note: robust standard errors in parentheses. Constant term included. Random effects models are estimated according to Baltagi and Li (1992).
Instruments: lagged difference in (log) share of rural population over total population and (log) population density; (log) average fees per case (as a share of GDP per capita)
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ data

Table III.6: **Determinants of (log) backlog ratio, instrumental variables specifications**

	IV-POOLED	IV-RE	IV-FE	IV-POOLED	IV-RE	IV-FE
	Instruments for court to population ratio			Instruments for court to pop. ratio and lit. rate		
(Log) courts to population ratio	0.528**	0.534***	1.688**	0.684*	0.384*	0.989
	(0.220)	(0.203)	(0.728)	(0.384)	(0.232)	(0.667)
(Log) judges to population ratio	-0.14	-0.219	-0.628	-0.32	-0.103	-0.352
	(0.308)	(0.299)	(0.424)	(0.459)	(0.371)	(0.467)
(Log) litigation rate	1.145***	1.093***	1.044***	1.100***	1.191***	1.185***
	(0.114)	(0.0689)	(0.0513)	(0.267)	(0.1234)	(0.144)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No	Yes	Yes	No
Observations	86	86	85	76	73	76
Hansen J test (p-value)	0.594 (0.441)	6.508 (0.591)	1.035 (0.309)	1.174 (0.279)	8.352 (0.400)	0.011 (0.916)
Kleibergen-Paap LM test (p-value)	19.438 (0.000)	18.624 (0.029)	5.687 (0.058)	6.563 (0.0376)	17.871 (0.0367)	5.792 (0.0552)
Hausman (p-value)	-	0.88 (0.972)		-	0.75 (0.980)	

(1) Note: robust standard errors in parentheses. Constant term included. Random effects models are estimated according to Baltagi and Li (1992).
Instruments: lagged difference in (log) share of rural population over total population and (log) population density; (log) average fees per case (as a share of GDP per capita)
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ data

In the second place, we consider the previously estimated regression models relating ICT investments in courts to the efficiency of the civil justice system. In this case, in order to control for the possible endogeneity of the relevant explanatory variable ([26]), the chosen instruments are represented by rather structural ICT-related indicators, such as the national fixed broadband penetration rate ([27]) and the number of Internet users per 100 inhabitants, both drawn from WDI. Again, in fact, these indicators can be considered exogenous with respect to our judicial efficiency measures, and at the same time correlated with the employed metrics of ICT investments in courts, given the assumption that more ICT-mature countries will either have to allocate smaller budgets to bridge the digitalization gap (as ICT investments may have already been made), or on the contrary have a structurally higher propensity to invest in digital technologies ([28]). It is worth noting that neither court size nor litigation rate have been instrumented in this set of regressions, in order to keep a parsimonious specification (in view of the small sample size, and given our focus, in this case, on ICT investment). Again, the

([26]) Consistently with what already indicated for the case of court size, it may well be the case that ICT reforms are in turn spurred by the observation of lack of efficiency of the national civil justice system, not least in terms of outstanding backlog or disposition time.

([27]) Measured by the fixed broadband Internet subscribers (per 100 persons).

([28]) Indeed, in most specifications, internet users are negatively correlated with in-court ICT investment, while broadband penetration is positively (although not always significantly) correlated with it. First stage results are available upon request.

Table III.7: **Determinants of (log) disposition time, instrumental variables specifications**

	IV-POOLED	IV-RE	IV-FE
	Instruments for share of public budget for ICT		
(Log) share of public budget for courts ICT	1.316	-0.0994**	-0.102***
	(1.367)	(0.0440)	(0.0345)
(Log) court size	-0.162	-0.234	-0.219
	(0.459)	(0.142)	(0.175)
(Log) litigation rate	0.61	0.367***	0.396***
	(0.515)	(0.0910)	(0.135)
Year dummies	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No
Observations	78	75	78
Hansen J test (p-value)	0.028 (0.866)	3.907 (0.865)	0.000 (0.993)
Kleibergen-Paap LM test (p-value)	1.257 (0.533)	18.604 (0.029)	4.387 (0.111)
Hausman (p-value)	-	0.20 (0.999)	

Source: Own calculations based on CEPEJ data

Table III.8: **Determinants of (log) backlog ratio, instrumental variables specifications**

	IV-POOLED	IV-RE	IV-FE
	Instruments for share of public budget for ICT		
(Log) share of public budget for courts ICT	1.208	-0.117***	-0.117**
	(1.284)	(0.0441)	(0.0480)
(Log) court size	-0.169	-0.2	-0.177
	(0.428)	(0.142)	(0.177)
(Log) litigation rate	1.543***	1.145***	1.155***
	(0.482)	(0.0911)	(0.0941)
Year dummies	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	No
Observations	78	75	78
Hansen J test (p-value)	0.013 (0.910)	4.531 (0.806)	1.258 (0.262)
Kleibergen-Paap LM test (p-value)	1.257 (0.533)	18.640 (0.028)	4.387 (0.112)
Hausman (p-value)	-	0.06 (1.000)	

Source: Own calculations based on CEPEJ data

reported values of the Kleibergen-Paap LM test and the Hansen J test corroborate the choice of instruments and the identification of the IV-estimated models.

Table III.7 and III.8 report the IV regressions results for (log) disposition time and (log) backlog ratio, respectively. It comes out that, in all panel specifications (the RE model being again the preferred one, on the basis of the Hausman test statistic), ICT investments have a statistically significant negative impact on the chosen metrics of efficiency, and markedly bigger than found outside the instrumental variable setting in the chapter III.3.1. Namely, increasing by 10% the share of public budget devoted to in-court ICT is associated with a decrease in disposition time by around 1% and in backlog ratio by around 1.1%. Results for the other variables are in line with those presented in the previous chapter.

III.4. SECOND STEP – FROM JUDICIAL EFFICIENCY TO ECONOMIC OUTCOMES

Results from chapter III.3 provide a clear picture about the need and possible directions of reforms aiming at improving the efficiency of civil justice systems, by reducing average trial length and the backlog of pending cases. The second step of our analysis aims at linking these potential efficiency gains to economic outcomes in two areas: business dynamics and foreign direct investments. As introduced in chapter III.1, following the relevant

literature, one can indeed hypothesize that more efficient civil justice would positively affect entrepreneurship (thus enhancing firms' entry), make firms' exit smoother (then favouring reallocation dynamics, that we measure through the business' churn rate) and increase the attractiveness of a country for foreign investors, typically concerned about proper contract enforcement. The following chapters deal separately with those two areas.

III.4.1. Business dynamics

As explained in chapter III.2.1, this chapter relies on data on firms' entry and churn rates (the latter being a measure of business turnover, computed as the sum of entry and exit rates) from the Eurostat Structural Business Statistics (SBS) dataset. The dataset covers the period 2004-2011, including 17 countries and 11 sectors. Since CEPEJ data are only available biennially (for 2006, 2008 and 2010), the loss of information can be minimized, with beneficial effects on the variance of coefficients, by imputing judicial indicators in 2007 and 2009 through linear interpolation (results without interpolation are presented in Annex 2, for sake of completeness). In this regard, it is worth remarking that 2007 and 2009 observations are unavailable due to the scheduling of CEPEJ reports, carried out every two years, rather than to missing answers by respondents. Accordingly, by performing a linear interpolation, we are not implementing a missing values imputation procedure, but considering hypothetical values of relevant judicial variables, under the assumption that they are evolving linearly between two known data points over time.

Following Ciriaci (2014) we estimate firm entry and churn rate equations, controlling for sectoral value added growth and average sectoral firm size (measured by total employment divided by the number of firms). While the first variable would account for the business cycle, the second one would capture different entry or reallocation patterns due to the average size of incumbent firms (more intense business dynamics being expected where smaller firms are more widespread, due to lower entry and exit barriers). Judicial efficiency variables have been included also with a time lag, in order to check for the occurrence of delayed effects on outcome variables (coefficients in contemporaneous specifications are usually found not to be statistically significant). All specifications include time dummies, so as to control for common cyclical shocks. Moreover, we also include sector and country dummies (except in FE models) in order to control for structural patterns of entry and churn rates at industry or country level.

As first-order autocorrelation of residuals (according to the Wooldridge, 2002 test statistic) has been found in baseline RE and FE panel data regressions, the same models with AR(1) disturbance terms have been estimated, along with pooled OLS regressions. As highlighted in Ciriaci (2014), this choice allows to control for the entry rate correlation structure across groups and for the potential downward bias of coefficients (Bertrand et al, 2004) due to the fact that individual-specific response variables (i.e. sectoral entry rates) are regressed against aggregate explanatory variables (the judicial efficiency indicators, measured at country level), as shown by Moulton (1990). Standard errors reported in AR(1) models are robust to this bias.

Tables III.9 and III.10 present results for entry rates equations, testing alternatively for disposition time and the backlog ratio as explanatory variables ([29]). When included with a time lag, the coefficient for disposition time is negative and statistically significant in all specifications (the Hausman test statistic provides evidence in favour of the FE model). Instead, when considered contemporaneously, the coefficient is statistically significant only in the FE model. In any case, the inclusion of the variable with a lag has robust theoretical grounds, as firms' start-up decisions are likely not to react immediately to changes in civil justice efficiency. When considering the preferred FE estimates, results point out that a decrease in disposition time by 10% is associated with an increase in firms' entry rates by 0.75 to 0.93 percentage points (it is worth reminding that the average sectoral entry rate in the sample amounts to about 9%, which means an increase by around 10%).

([29]) A level-log specification has been estimated in this case, as the use of logarithms is not the most appropriate when dealing with rates (due to the zero lower bound). The coefficients are interpretable as semi-elasticities.

Table III.9: **Determinants of firms' entry rate**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) disposition time	-0.0284		-0.0294		-0.0750***	
	(0.0238)		(0.0221)		(0.0266)	
(Log) disposition time (t-1)		-0.0566**		-0.0560***		-0.0934***
		(0.0227)		(0.0162)		(0.0186)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	658	653	658	653	518	513

(1) Note: standard errors in parentheses. Constant term included. A linear interpolation for disposition time is used in 2007 and 2009.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

Table III.10: **Determinants of firms' entry rate (cont'd)**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) backlog ratio	-0.0340		-0.0415**		-0.0220	
	(0.0217)		(0.0193)		(0.0235)	
(Log) backlog ratio (t-1)		-0.0284		-0.0278*		-0.0079
		(0.0186)		(0.0145)		(0.0171)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	658	653	658	653	518	513

(1) Note: standard errors in parentheses. Constant term included. A linear interpolation for backlog ratio is used in 2007 and 2009.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

Table III.11: **Determinants of firms' churn rate**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) disposition time	-0.0235		-0.0211		-0.0347	
	(0.0312)		(0.0252)		(0.0341)	
(Log) disposition time (t-1)		-0.0537*		-0.0526**		-0.105***
		(0.0300)		(0.0210)		(0.0299)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	605	601	605	601	465	464

(1) Note: standard errors in parentheses. Constant term included. A linear interpolation for disposition time is used in 2007 and 2009.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

Turning to the backlog ratio as dependent variable (Table III.10), coefficients are statistically significant only in RE specifications, both with and without a time lag. However, as in the case above, the Hausman test suggests that the RE model is not providing consistent estimates. In any case, in both RE and FE specifications the sign of the coefficient is the expected one.

The results for churn rates (a measure of sectoral dynamism), reported in Tables III.11 and III.12, closely mimic those for entry rates. Disposition time is negatively correlated with churn rate in all specifications, when included with a time lag. Again, the Hausman test provides evidence in favour of the FE model, pointing at an increase of firms' churn rate by 1.05 percentage points in

Table III.12: **Determinants of firms' churn rate (cont'd)**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) backlog ratio	-0.0551**		-0.0536***		-0.0307	
	(0.0266)		(0.0207)		(0.0268)	
(Log) backlog ratio (t-1)		-0.0416*		-0.0407**		-0.0431*
		(0.0240)		(0.0177)		(0.0246)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	605	601	605	601	465	464

(1) Note: standard errors in parentheses. Constant term included. A linear interpolation for backlog ratio is used in 2007 and 2009.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

relation to a decrease of lagged disposition time by 10%. The coefficients are in line with those estimated in the entry rate specification, suggesting that the impact of disposition time on churn rates is mostly mediated by entry rates, while the impact on exit is relatively small. Results also show a statistically significant negative effect of the backlog ratio on churn rates, with similar magnitude across specifications, when the variable is included with a time lag. Decreasing the backlog ratio by 10% would increase the churn rate by around 0.4 percentage points (lagged effect).

For sake of completeness, Annex 2 reports regression results obtained without implementing the linear interpolation of judicial efficiency variables. Estimated coefficients are generally in line with those presented in this chapter, although sometimes smaller in magnitude and with larger standard errors, presumably due to the smaller sample size.

However, business dynamics is likely to be determined by a broader array of variables than those considered so far. In particular, how national justice systems are perceived by the citizens might play an equally important role as more objective measures of its efficiency. Indeed, Box III.1 below provides evidence that more citizens' trust in national justice systems is associated with higher firms' entry rates across the EU.

So far, second step regressions have been presented as a stand-alone piece of analysis. Indeed, a separate reading of the first and the second step has the advantage of allowing a focus on individual relationships and the possibility to better address specific issues (e.g. occurrence of individual effects and endogeneity) as well as to use in each case the broadest number of observations, in order to improve the robustness of the estimates.

However, when the objective of the analysis is to directly link judicial reforms to final outcome variables (in this case business dynamics), the most appropriate approach is simultaneous equations modelling, combining the first and the second step in a single estimation framework. This allows to consistently estimate the final effect of a variation in reform variables (e.g. courts to population ratio, litigation rates and ICT investment) on entry and churn rates, through the transmission channel of efficiency indicators. In what follows a simultaneous equations model is estimated, using the same sample as in the first part of this chapter. The chosen approach is the 3-Stage Least Squares (3SLS) method, aiming to take into account the endogeneity of some variables in the second stage (i.e. the judicial efficiency indicators), while correcting for the correlation of disturbances across equations (through SURE modelling).

In this exercise, we focus on firms' entry rate as dependent variable, considering the effect of disposition time as relevant explanatory variable. We estimate a three-equation model, based on evidence provided in chapter III.3 as concerns the first step, linking judicial efficiency indicators to reform variables.

Box III.1: The impact of trust in the judicial system on business dynamics

There is a broad literature on the economic relevance of State institutions, and in particular of the public confidence in their proper functioning. For instance, Stevenson and Wolfers (2011) recently investigated the relationship between citizens' trust in US public institutions, including the judicial system, and the economic cycle.

This Box presents a preliminary investigation of the link between public confidence in the national judiciaries in the EU, and economic outcomes such as business dynamics. This is possible by exploiting the data collected by the Standard Eurobarometer reports "Public Opinion in the European Union" (see http://ec.europa.eu/public_opinion/archives/eb_arch_en.htm), published twice a year on the basis of approximately 1000 face-to-face interviews per country. Indeed, over the period 2006-2010, survey data are available for all EU Member States on the share of people who "tend to trust" their national justice/legal system, as opposed to those who "tend not to trust" it. A recent update has been issued in the November 2013 Flash Eurobarometer 385 "Justice in the EU" (not used in the regression analysis).

The data on business dynamics feature, in particular, the entry rates drawn from SBS for the period 2004-2011 in 17 MS and 11 sectors, as explained in chapter III.2.1. The model is the same specified in chapter III.4.1, controlling for sectoral value added growth and average sectoral firm size (measured by total employment divided by the number of firms), and accounting for first-order autocorrelation of residuals through AR(1) disturbance terms in panel specifications.

Table B1 below summarises the regression results for entry rates equations, testing for the share of population trusting the national judiciary as explanatory variable, with a time lag. The inclusion of the lagged variable has robust theoretical grounds, not only since people's opinions are likely formed over a certain period of time but also as firms' start-up decisions are unlikely to react immediately to them. Moreover, this attenuates the risk of biases due to reverse causality.

The coefficient on (log) trust in the judicial system is, as expected, positive and statistically significant in all specifications (the Hausman test statistic provides evidence in favour of the RE model). When considering the preferred RE estimates, our findings indicate that a 10% increase in the share of population trusting national judiciaries is associated with an increase in firms' entry rates by some 0.38 percentage points (the average sectoral entry rate in the sample amounts to about 9%).

These results, in line with the previous literature on confidence in State institutions as well as with economic intuition, point to the importance of securing a trustworthy judicial system in order to contribute to the creation of a business environment conducive to entrepreneurship and assumption of risk by the economic agents.

Table B1. Determinants of firms' entry rates

	OLS	RE-AR(1)	FE-AR(1)
(Log) trust in the judicial system (t-1)	0.0344**	0.0382***	0.0336**
	-0.0136	-0.0134	-0.0139
Controls for VA growth and average firm size	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	No
Observations	838	838	655
Hausman (p-value)	-	0.267	

(Continued on the next page)

Box (continued)

Note: standard errors in parentheses. Constant term included.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table III.13: **Determinants of firms' entry rate – Simultaneous equations model (3SLS)**

	Equation 1 Entry rate	Equation 2 (Log) disposition time	Equation 3 (Log) courts to population ratio
(Log) disposition time	-0.2810**		
	(0.1207)		
Value added growth	-0.0420		
	(0.0330)		
(Log) average firm size	-0.0011		
	(0.0043)		
(Log) courts to population ratio		0.1807**	
		(0.0860)	
(Log) judges to population ratio		0.0844	
		(0.0536)	
(Log) litigation rate		0.2061***	
		(0.0398)	
(Log) population density			0.3235
			(0.6501)
(Log) share of rural population over total population			1.7774***
			(0.2346)
Year dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	370	370	370

(1) standard errors in parentheses. Constant term included.
* significant at 10%, ** significant at 5%, *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

In detail, the first equation explains entry rate as a function of (log) disposition time and standard controls (value added growth and average firm size). Disposition time, which mediates the impact of judicial reforms on business dynamics (acting as a transmission channel) is hereby treated as endogenous. Accordingly, in line with the estimations presented in chapter III.3.1, it is explained in Equation 2 as a function of courts to population ratio, judges to population ratio and litigation rate. However, as court to population ratio (our reform variable of interest), following chapter III.3.2, cannot be considered exogenous with respect to disposition time, we use Equation 3 to instrument it with exogenous variables (as done previously, we include population density and the share of rural population over total population as instrumental variables, although, in this case, without lags).

Table III.13 provides an overview of the results concerning the three equations, which are estimated simultaneously through 3SLS, correcting for the correlation of residuals across equations. Coefficients attached to relevant variables present the expected sign and are statistically significant. In particular, disposition time is negatively correlated to entry rate and the coefficient is larger coefficient than found in a single equation framework. A decrease in disposition time by 10%, based on these findings, is associated with an increase in entry rate by 2.81 percentage points.

Looking at Equation 2, it comes out that, in turn, a 1% decrease in the number of courts as a ratio to population would reduce disposition time by 0.18% (keeping the number of judges constant). It is easy to combine these results, using the coefficients from the simultaneous equations model, to estimate the overall effect of a reform affecting the number of courts per inhabitant on firms' entry rate. By multiplying the coefficients, a 1% decrease in the courts to population ratio is found to be associated with an increase in entry rate by 0.18*0.281=0.051 percentage points.

III.4.2. Foreign Direct Investments

As explained in chapter III.2.2, this analysis relies on data on net FDI inflows as a share of GDP from the World Bank Development Indicators (WDI) dataset. This covers all countries in the CEPEJ dataset over the years 2006-2011. Since, as already explained, judicial data are only available biennially from 2006 to 2010, all presented regressions are run both using the raw CEPEJ data and by imputing judicial data in 2007 and 2009 through linear interpolation, in order to minimise information loss. Also, in light of the very high volatility observed in net FDI inflows data, both cross-country and over time, all the regression analyses presented below exclude statistical outliers lying beyond two standard deviations from the sample mean ([30]).

While there is a rather vast and heterogeneous literature on the determinants of foreign direct investments, as summarised, for instance, in Blonigen (2005), only few works, such as Staats and Biglaiser (2012), reflect on the role of structural features of national judicial systems, which are considered. Following a significant strand of literature ([31]) which shows the interconnectedness of FDI behaviour with trade flows, in our partial equilibrium estimations we estimate FDI inflows controlling for the openness of the economy, measured by the magnitude of national total trade flows expressed as a percentage of GDP, and for the growth rate of GDP, to control for the business cycle ([32]). All specifications include time dummies, so as to control for common cyclical shocks. Differently to chapter III.4.1, we do not include country dummies, as the panel identifier is hereby defined at country level.

Tables III.14 and III.15 present results for FDI equations, testing alternatively for disposition time and backlog ratio as explanatory variables, as said, both with and without linear interpolation for the missing years 2007 and 2009. All the estimated coefficients on disposition time and backlog ratio have the expected negative sign, although those on disposition time are not statistically significant at the 90% confidence level in any of the reported specifications. Instead, the coefficients on backlog ratio are statistically significant in both the RE and the FE panel specifications (the Hausman test statistic provides evidence in favour of the RE and the FE model, respectively with raw and interpolated data): this is in line with the economic rationale that increased efficiency of the national judiciaries, measured by lower amounts of pending cases, represents an attractive condition for foreign direct investors in their choice among alternative destinations, for instance due to the expectation of faster contract enforcement. The higher relevance of backlog ratio as a determinant of investment decisions, with respect to disposition time, could be explained by the fact that the number of pending cases is a more "objective" and straightforward structural feature of national judiciaries to be observed by foreign direct investors than disposition time, which is rather the result of an artificial computation leading to an estimated time of case resolution.

When considering the preferred model estimates, results point out that, on average, a decrease in backlog ratio by 100 cases per 100,000 inhabitants is associated with an increase by 0.025 to 0.033 percentage points (depending on whether

([30]) This is a standard trimming procedure that can be found in similar contexts, for instance, in Krzepkowski (2013) and in Varga (2006). In practice, this procedure leads to excluding at most 6 observations out of a sample of 142, namely positive FDI net inflows above 24.24% of GDP and negative ones larger in absolute terms than 11.45% of GDP (the sample distribution of FDI net inflows is skewed to the right).

([31]) See for instance Baltagi et al. (2007).

([32]) Additional controls have been tested, such as GDP per capita (in PPP) and a number of further structural and context variables taken from the WDI dataset (e.g. road density, broadband penetration, etc.). These are not significant except in a few cases (e.g. GDP per capita, unsurprisingly negatively related to FDI inflows). However, the inclusion of these controls does not affect either the significance or the magnitude of the coefficients of interest. Therefore, a parsimonious specification is used.

Table III.14: **Determinants of foreign direct investments (FDI net inflow in GDP %)**

	OLS		RE		FE	
Disposition time	0.000734		-0.000531		-0.00349	
	(0.00197)		(0.00263)		(0.00984)	
Disposition time (interpolated)		0.000606		-0.000347		-0.00389
		(0.00153)		(0.0023)		(0.00867)
Controls for GDP growth and openness	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	91	153	91	153	91	153

(1) Note: standard errors in parentheses. Constant term included. A linear interpolation for disposition time is used in 2007 and 2009.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and WDI data

Table III.15: **Determinants of foreign direct investments (FDI net inflow in GDP %) (cont'd)**

	OLS		RE		FE	
Backlog ratio	-0.0000549		-0.000249***		-0.000314***	
	(0.0000984)		(0.0000411)		(0.0000379)	
Backlog ratio (interpolated)		-0.0000543		-0.000182**		-0.000325***
		(0.0000888)		(0.0000717)		(0.0000424)
Controls for GDP growth and openness	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	92	152	92	152	92	152

(1) Note: standard errors in parentheses. Constant term included. A linear interpolation for backlog ratio is used in 2007 and 2009.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and WDI data

interpolation is undertaken) ([33]). Considering that the average FDI net inflow is 6.4% of GDP in the sample, this impact may appear small. It is worth bearing in mind that the overall effect on FDI of reforms affecting structural features of the national judiciaries, such as the average size of courts, will depend in the first place on the magnitude of their impact on the backlog ratio, as estimated in the first step analysis.

As explained in chapter III.4.1, in order to capture the overall impact of judicial reforms on FDI net inflows, the two steps of the analysis, so far presented as stand-alone pieces, are linked in a simultaneous equations framework. This allows to directly relate judicial reforms (as assessed in the first step) to foreign direct investments, through the channel of judicial efficiency. Also in this case, such model is estimated using a 3-Stage Least Squares (3SLS) method: this allows focussing on foreign direct investments as dependent variable, while taking into account the endogeneity of some variables in the second stage (i.e. the judicial efficiency indicators) and correcting for the correlation of disturbances across equations (through SURE modelling).

Focussing on FDI net inflows as dependent variable, and considering the effect of backlog ratio as relevant explanatory variable, we estimate a three-equation model, based on evidence provided in chapter III.3 as concerns the first step, linking judicial efficiency indicators to reform variables. In detail, Equation 1 explains FDI net inflows as a function of backlog ratio and the already used standard controls for GDP growth and trade openness. Backlog ratio, which mediates the impact of judicial reforms on FDI inflows (acting as a transmission channel) is treated as

([33]) It is worth noting that these findings remain substantially unchanged when also 2012 data on judicial performance, exclusively for some EU Member States, are drawn from the EU Justice Scoreboard 2014. However, since this availability is limited to a subset of all the countries in considered sample and to a few time series, this update is not systematically presented. More could be done once the new edition of the CEPEJ report becomes available.

endogenous: accordingly, in line with the estimations in chapter III.3.1, it is explained in Equation 2 as a function of courts to population ratio, judges to population ratio and litigation rate. However, as court to population ratio (our reform variable of interest) has been shown in chapter III.3.2 not to be exogenous with respect to backlog ratio, it is instrumented in Equation 3 with the previously identified exogenous variables, namely population density and share of rural population over total population, in this case without lags ([34]). All equations include, in line with previous specifications, time dummies and legal origin dummies.

Table III.16 provides an overview of results concerning the three equations, simultaneously estimated through 3SLS, correcting for the correlation of residuals across equations. All coefficients of relevant variables present the expected signs and are statistically significant. In particular, (log) backlog ratio is negatively correlated with FDI net inflows: in this case, where a level-log model allows for an easier interpretation of the results, a decrease in backlog ratio by 10% is associated with an increase in FDI net inflows by some 0.1 percentage points, a larger impact than estimated outside the 3SLS modelling approach ([35]).

Looking at Equation 2, it comes out that, in turn, a 10% decrease in the number of courts as a ratio to population would reduce backlog ratio by 4.6% (keeping the number of judges constant). One can thus easily combine these results, building on the simultaneous equations setting, to estimate the overall effect of a reform affecting the number of courts on foreign direct investments. By multiplying the coefficients, it can be concluded that a 10% decrease in the courts to population ratio is associated with an increase in FDI net inflows as a ratio to GDP by 4.6*0.01063=0.05 percentage points.

([34]) Please note that the 3SLS specification has been estimated also excluding Equation 3, and this provides comparable coefficients.

([35]) In fact, a decrease in backlog ratio by 10% corresponds, at the sample average, to an absolute reduction by slightly more than 200 cases per 100,000 inhabitants, which would correspond to an increase in FDI net inflows by up to 0.066 p.p. according to the previous baseline panel estimations (Table 15).

Table III.16: **Determinants of foreign direct investments (FDI net inflow in GDP %) – Simultaneous equations model (3SLS)**

	Equation 1 FDI net inflow	Equation 2 (Log) backlog ratio	Equation 3 (Log) courts to population ratio
(Log) backlog ratio	-0.010634*		
	(0.00555)		
GDP growth	0.00158**		
	(0.00068)		
Trade openness	0.000075		
	(0.00015)		
(Log) courts to population ratio		0.4630**	
		(0.2136)	
(Log) judges to population ratio		-0.0205	
		(0.1965)	
(Log) litigation rate		1.2008***	
		(0.1076)	
(Log) population density			-0.1261
			(0.0885)
(Log) share of rural population over total population			-0.2304
			(0.1895)
Year dummies	Yes	Yes	Yes
Legal origin dummies	Yes	Yes	Yes
Observations	137	137	137

(1) Note: standard errors in parentheses. Constant term included. A linear interpolation for backlog ratio, courts to population ratio, judges to population ratio and litigation rate is used in 2007 and 2009.
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and WDI data

IV. OVERVIEW OF RESULTS AND SIMULATION SCENARIOS

In order to summarise the vast evidence collected throughout the paper, this chapter provides an overview of the main results of the econometric analysis, expressed in terms of elasticities (or semi-elasticities) in order to facilitate their utilisation for simulation purposes. Only results passing statistical tests at the standard significance levels are presented. To start with, Table IV.1 summarises first step results, concerning the effect of judicial reform variables on the two judicial efficiency indicators used in the analysis (disposition time and backlog ratio). The reported results refer to RE models, with an instrumental variables specification. Details can be found in chapter III.3.

Table IV.1: **Summary of first step results (IV specifications)**

Reform variable	Dependent variable	
	Disposition time	Backlog ratio
Average number of judges per court	-0.5	-0.5
Courts to population ratio	0.6	0.5
Litigation rate (incoming cases per 1000 inhabitants)	0.4	1.2
Share of public budget for courts ICT	-0.1	-0.1

Source: Own calculations based on CEPEJ data

Table IV.2 below focuses instead on second step regressions, estimated as stand-alone equations. In particular, it summarizes the effects of changes in judicial efficiency indicators on business dynamics (firms' entry and churn rates) and on net FDI inflows, measured as a share of GDP (for details, see chapter III.4). Results from the preferred FE models, using lagged explanatory variables, are presented in the case of firms' entry and churn rates; results refer to the FE model also in the case of backlog ratio.

Table IV.2: **Summary of second step results**

Explanatory variable	Effect on dependent variable		
	Entry rate[1] (t+1)	Churn rate[1] (t+1)	Net FDI inflows as a ratio to GDP[2]
Disposition time	+0.93 p.p.	+1.05 p.p.	Not significant
Backlog ratio	Not significant	+0.4 p.p.	+0.03 p.p.

(1) Simulated shock: 10% decrease in disposition time/backlog ratio
(2) Simulated shock: decrease in backlog ratio by 100 cases per 100,000 inhabitants
Source: Own calculations based on CEPEJ, SBS, and WDI data

In order to simulate the impact of judicial reform variables (first step) on final outcome variables (second step), a further set of elasticities is then presented in Table IV.3, summarizing results of the simultaneous equations models (3SLS) estimated in chapter III.4. A 10% shock to two reform variables, the courts to population ratio and the litigation rate, is quantified, and the table presents its indirect (final) impact on the entry rate and on net FDI inflows as a share of GDP. It is worth remembering that models concerning entry rate and FDI inflows as final variables are run on distinct samples, which in turn are different from those used in first-step stand-alone equations. As a consequence, first step coefficients are not comparable with those presented in Table IV.1 (in particular as regards the entry rate model, due to the significantly different sample size).

Table IV.3: **Summary of simultaneous equations models (3SLS) results**

Reform variable	Final impact on selected outcome variables	
	Entry rate	Net FDI inflows (% GDP)
Courts to population ratio	0.51 p.p.	0.05 p.p.
Litigation rate	0.58 p.p.	0.13 p.p

(1) Simulated shock: 10% decrease in reform variable
Source: Own calculations based on CEPEJ, SBS, and WDI data

Box IV.1: **Simulation of the impact of judicial reforms for the case of Italy**

As indicated in Box I.1, Italy is among the Member States that have undertaken ambitious structural reforms effort in the field of civil justice. This box aims at providing a first-hand simulation scenario of the impact of the main aspects of such reform, based on the results of the previous chapters.

According to the adopted framework, some quantifiable aspects of the Italian reforms, based on available data, concern: i) on the supply side, the re-organisation of judicial geography (i.e. the merge or suppression of a number of courts, based on efficiency criteria); ii) on the demand side, incentives to reduce excessive litigation, e.g. by fostering out-of-court dispute settlement (not least through the introduction, for a trial period of four years, of compulsory mediation for specific types of lawsuits). Other aspects of the reforms, such as the digitalisation of case handling and the increase in court fees, are not taken into account because of difficulties in the quantification of reform-related shocks, due to lack of precise information. However, in the presence of sufficient data, our analysis would be able to account also for these reforms, for instance through the share of national budget devoted to ICT in courts.

In the first place, we consider the impact of the reduction in courts to population ratio, as a result of the 2012 judicial geography reform (d.lgs. 156/2012). Table B2 below summarises the effects of this reform on the total number of first instance courts, that is, the CEPEJ indicator used in the regression analysis. The table takes into account the most recent legislative developments (Ministerial Decree of March 7th 2014), reducing the number of suppressed small claims courts ("Uffici del Giudice di Pace"), following local administrations' instances to maintain some of them open at their own expenses.

Table B2. Effects of the judicial geography reform on the number of courts in Italy

	Pre-reform	Post-reform (April 2014)
First instance general jurisdiction tribunals	385	135
- of which, local offices	*220*	*0*
Small claims courts ("Uffici del Giudice di Pace")	846	464
- of which, local offices	*4*	*0*
Other first instance courts	87	87
Total first instance courts	1318	686

Source: own computation based on data by the Italian Ministry of Justice

Overall, the number of first instance courts has decreased by 48% as a result of the reform. Based on the estimated elasticities, this reform shock would result, in terms of judicial efficiency, in a decrease in disposition time by some 28% (to provide a reference, disposition time amounted to 590 days in 2012, according to the 2014 EU Justice Scoreboard) and a reduction in backlog ratio by 25.6% (to provide a reference, backlog ratio amounted to 5544 cases per 100,000 inhabitants in 2012). By using 3SLS estimates reported in Table IV.3, the expected economic outcome, through the estimated transmission channels of increased efficiency, would be a rise in firms' entry rate by 2.45 percentage points (average entry rate across sectors in our sample amounting to 7.5% in 2011) and 0.24 percentage points

(Continued on the next page)

Box (continued)

additional FDI net inflows as share of GDP (average value over 2000-2012 being around 1%). Table B4 summarises the results. Please note that, given the large magnitude of the shocks, these estimates should be considered as an approximation (elasticities are consistently estimated for small changes).

In the second place, we consider the impact of the reintroduction of compulsory mediation for some matters by the Italian government since 2013Q4, after this had been in place from March 2011 to December 2012, and then ruled out by the Constitutional Court due to irregularities in the legislative process. To this aim, we first estimate (based on national data from the Italian Minister of Justice) the actual number of cases successfully resolved through mediation, obtained as the number of incoming mediation cases multiplied by their rate of success, during 2012 and 2013. We then compare the number of successful cases during the first three quarters of 2012, when mediation was compulsory, with those of the corresponding quarters of 2013, when it was voluntary[1]. This allows to quantify the observed differential in the number of cases subtracted to the court system (thus reducing litigation rate) under a compulsory mediation regime with respect to the baseline scenario of voluntary access to this ADR procedure. These results are reported in Table B3.

The difference estimated over the Q1-Q3 period (45,327 cases) is then rescaled on a yearly basis, in order to account for the quarter of 2013 when mediation was again compulsory. The yearly value is 60,436 cases subtracted to the court system, which corresponds to a reduction in incoming first instance court cases (and thus in litigation rates) by 2.9%, based on 2012 figures[2]. Please note that this estimate is approximate, as some matters have been excluded from compulsory mediation after its reintroduction (e.g. circulation of vehicles and vessels) while new others have been included (e.g. healthcare liability). Moreover, it is only based on three quarters, thus failing to account for a potentially higher take up of the reform in the long run.

Table B3. Comparison in incoming and successful mediations, 2012-2013

Quarter	2012			2013			Difference in successful mediation, 2013-2012
	incoming mediations	success rate	successful mediations	incoming mediations	success rate	successful mediations	
Q1	30880	0.441	13618	4785	0.442	2115	11503
Q2	51634	0.429	22151	4485	0.631	2830	19321
Q3	45040	0.405	18241	6369	0.587	3739	14503
Q4	27325	0.38	10384	25965	0.329	8542	1841
Total	154879	0.414	64394	41604	0.497	17226	47168
Total Q1-Q3	127554	0.425	54010	15639	0.553	8684	45327

Source: own computation based on data by the Italian Ministry of Justice

[1] Unsurprisingly, when the mediation was voluntary, its recourse was lower, and its success rate higher.

[2] The number of 1st instance litigious civil and commercial cases incoming in 2012 has been estimated on the basis of national statistics by the Ministry of Justice, consistently with CEPEJ methodology, as reported in the 2012 report (excluding non-litigious, enforcement and insolvency cases from total incoming civil and commercial cases). Small claims cases are included in the computation, consistently with 2010 figures. The estimated number of incoming cases is around 2.1 million in 2012.

(Continued on the next page)

Box (continued)

Table B4 reports the potential effects of the estimated shock to the litigation rate on judicial efficiency (1.27% decrease in disposition time[1] and 3.45% reduction in backlog ratio) and on economic outcomes (increase in firms' entry rate by 0.17 percentage points and increase in FDI net inflows as a share of GDP by 0.04 percentage points).

Table B4. Summary of simulation results

Reform shock	Affected variable	Estimated impact
Reduction in the total number of first instance courts by 48% (effect of geographical reorganisation of courts)	Disposition time	-28.01%
	Backlog ratio	-25.60%
	Entry rate	+2.45 p.p.
	FDI net inflows as a share of GDP	+0.24 p.p.
Reduction in litigation rate by 2.9% (effect of reform in mediation)	Disposition time	-1.27%
	Backlog ratio	-3.45%
	Entry rate	+0.17 p.p.
	FDI net inflows as a share of GDP	+0.04 p.p.

[1] Please note that the simulation takes into account only the time to resolve a case within the court system, and ignores the risk that having mediation as an obligatory step before litigants can reach the court system could at times even increase the overall length of them having their dispute resolved, whenever the mediation attempts are unsuccessful.

V. CONCLUDING REMARKS

The improvement of the quality, independence and efficiency of national justice systems is often highlighted to have a direct economic significance ([36]). The present analysis aims to investigate the economic impact of selected structural reforms affecting civil justice, focusing on the efficiency component, which is important for a business environment conducive to entrepreneurial activity and to investment choices.

To this purpose, a number of econometric methodologies have been applied in order to obtain accurate and robust estimations of the impact of civil justice reforms on selected economic outcomes, such as business dynamics and foreign direct investments. The paper highlights the important role of the efficiency of justice systems (measured by disposition time in resolving litigious civil and commercial cases and the ratio of pending litigious civil and commercial cases to population) as a crucial transmission channel linking judicial reforms to economic variables. This approach is rather innovative with respect to previous literature on the same subject.

Drawing upon a dataset based on the descriptive work on justice systems by CEPEJ, this work has the advantage, with respect to previous analyses, of a broader "horizontal" focus encompassing not only EU Member States but also non-EU members of the Council of Europe. Also, in terms of policy relevance, the proposed assessment framework allows to shed light on the potential economic benefits of some civil justice reforms actually undertaken by a number of countries after the crisis, also in light of the European Semester exercise.

Our findings are in line with the economic rationale and support the growth potential of reforms rationalising the organisation of courts (by increasing their average size), fostering investment in in-court ICT and introducing incentives to reduce excessive litigation rates (for instance by enhancing the use of alternative disputes resolution methods), which are all found to positively affect the efficiency of civil justice. In turn, through increased efficiency, these reforms can potentially enhance entrepreneurial activity (as measured by firms' entry rates) and foreign direct investments. However, when reading the results, one should be aware of the limitations of our analysis, including the need to resort to proxies in order to measure reform efforts, the small available samples and the occurrence of missing values for some countries, the difficulties in obtaining robust causal inference, and the unaccounted risk of parameters heterogeneity across countries. Still, this work provides an original contribution in terms of horizontal analysis of the economic impact of judicial reforms across Europe.

Further research could be usefully undertaken as new data become available, also exploring the use of alternative data sources. Moreover, one could investigate the possibility to include in the analysis further structural features of national judiciaries typically targeted by reforms but currently not covered due to data availability issues, such as the actual use of alternative dispute resolution methods or quality indicators related, for instance, to the case management in courts. The impact of reforms on other components of an effective justice system, i.e. quality and independence, could also be more specifically examined. Finally, the experience gathered through the analysis of justice reforms in Member States, carried out in the context of the European Semester and of the economic adjustment programmes, could also contribute to the development of economic research in this area.

([36]) See COM(2014) 400 final "2014 European Semester: Country-specific recommendations Building Growth"

ANNEX 1
Descriptive statistics

Table Annex1.1: **Summary statistics based on the CEPEJ dataset**

variable	year	number of obs.	mean	st. dev.	p10	median	p90
disposition time of civil litigious cases (1st instance)	2006	31	284.3	208.6	42	216	547
	2008	33	282	218.3	80	206	663
	2010	39	286.9	225.8	55	200	743
	Total	103	284.6	216.2	55	209	663
backlog ratio (number of 1st instance civil litigious cases per 100,000 inhabitants)	2006	30	1697.4	1811.8	126.4	1012.9	4392.9
	2008	34	2283.9	3500.9	144.8	1344.7	5120.1
	2010	39	1946.7	1927.2	159.5	1578.3	4473.1
	Total	103	1985.4	2517.3	150.6	1336.7	4473.1
1st instance courts size (ratio of professional judges to courts)	2006	37	11.9	17.5	2.9	9.2	18.3
	2008	37	12.2	18.2	3	9.5	21.6
	2010	34	13.7	20.8	3.5	10	19.3
	Total	108	12.6	18.7	3	9.5	19.3
1st instance courts (ratio to 100,000 inhabitants)	2006	47	3.6	10.4	0.6	1.5	5.3
	2008	47	3.8	11.1	0.5	1.5	4.9
	2010	42	3.8	10.2	0.5	1.7	6
	Total	136	3.7	10.5	0.5	1.6	5.3
1st instance professional judges (ratio to 100,000 inhabitants)	2006	37	15	9.2	4.3	13	29.8
	2008	37	15.2	10.1	5.1	13.1	30.6
	2010	38	15.8	11.3	5.1	13.5	30.8
	Total	112	15.3	10.2	5.1	13.2	29.8
ICT investment in courts (share of total public budget, %)	2006	33	0.026	0.033	0.004	0.013	0.059
	2008	42	0.102	0.415	0.004	0.014	0.042
	2010	43	0.024	0.044	0.003	0.012	0.042
	Total	118	0.052	0.25	0.003	0.014	0.053
litigation rate (incoming 1st instance civil litigious cases per 100,000 inhabitants)	2006	36	2238.1	1350.9	356.8	2156.4	3960.6
	2008	38	2288.9	1660.2	548.8	2087.2	4768
	2010	41	2738.3	1961.6	527.1	2319.8	5009.8
	Total	115	2433.2	1690.4	497.8	2215.8	4809.3

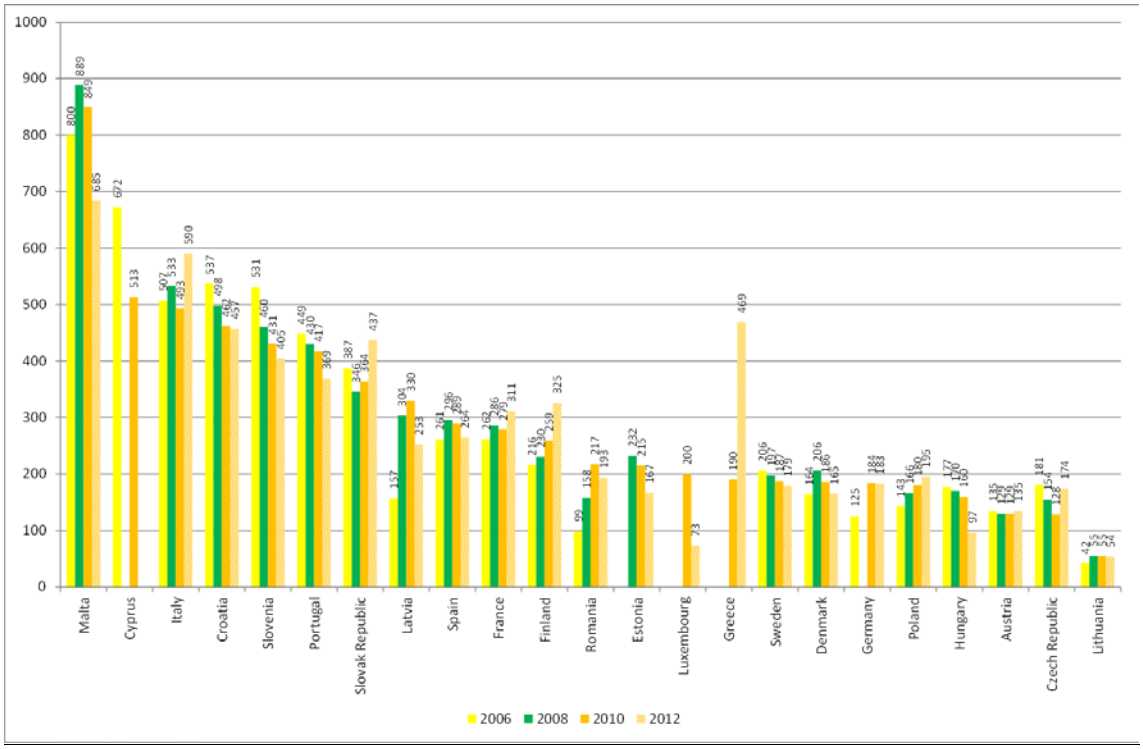
Source: Own calculations based on CEPEJ data

Table Annex1.2: **Summary statistics on business dynamics and FDI net inflows**

variable	year	number of obs.	mean	st. dev.	p10	median	p90
Entry rate	2006	151	0.084	0.05	0.029	0.084	0.134
	2007	151	0.087	0.046	0.032	0.086	0.14
	2008	134	0.099	0.06	0.043	0.088	0.155
	2009	145	0.099	0.05	0.049	0.089	0.159
	2010	145	0.096	0.042	0.048	0.09	0.139
	2011	143	0.095	0.038	0.049	0.093	0.136
	Total	1164	0.09	0.047	0.04	0.087	0.139
Churn rate	2006	141	0.165	0.065	0.091	0.158	0.254
	2007	130	0.164	0.067	0.092	0.152	0.253
	2008	123	0.184	0.088	0.099	0.167	0.294
	2009	145	0.194	0.079	0.103	0.193	0.293
	2010	123	0.191	0.071	0.097	0.183	0.28
	2011	134	0.182	0.073	0.095	0.177	0.269
	Total	1079	0.175	0.072	0.095	0.167	0.263
FDI net inflows as a share of GDP	2006	29	0.075	0.064	0.018	0.063	0.17
	2007	30	0.098	0.096	0.03	0.075	0.183
	2008	29	0.073	0.092	0.006	0.049	0.124
	2009	33	0.045	0.07	-0.002	0.025	0.096
	2010	33	0.031	0.057	-0.003	0.028	0.092
	2011	36	0.05	0.064	0.01	0.036	0.084
	Total	161	0.058	0.079	0.006	0.039	0.118

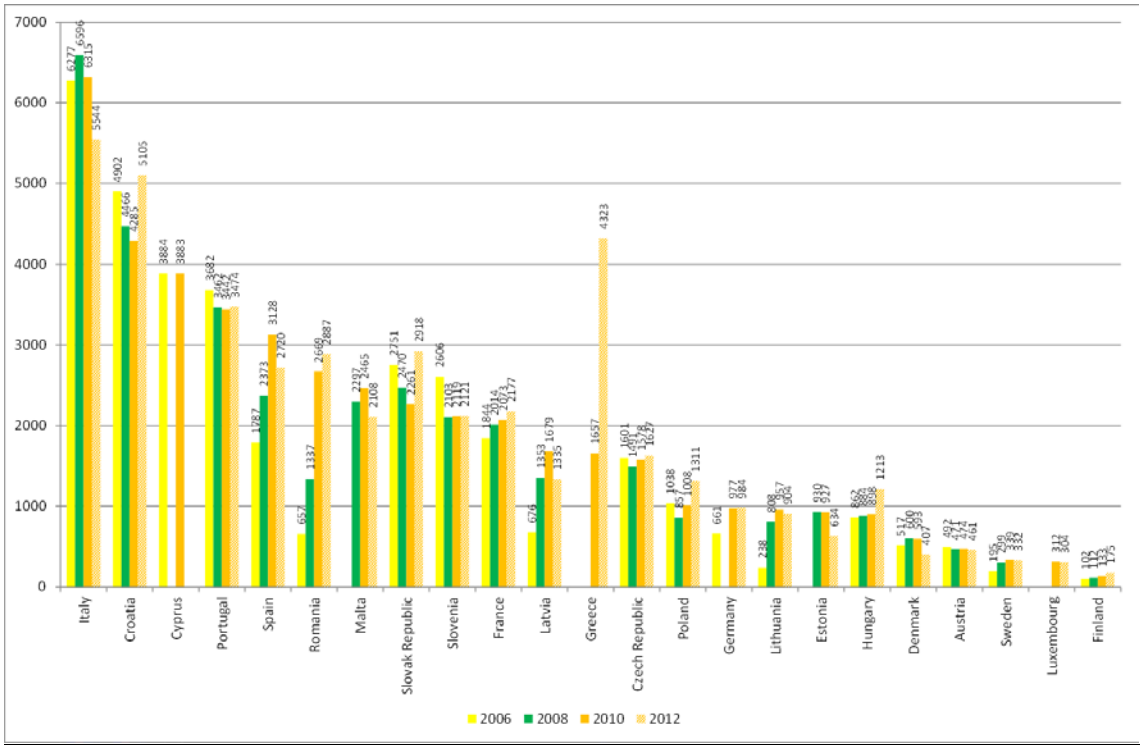
(1) Note: mean entry and churn rates are computed as simple averages across sectors
Source: Own calculations based on CEPEJ, SBS, and WDI data

Graph Annex1.1: **Disposition time for litigious civil and commercial cases (EU countries)**



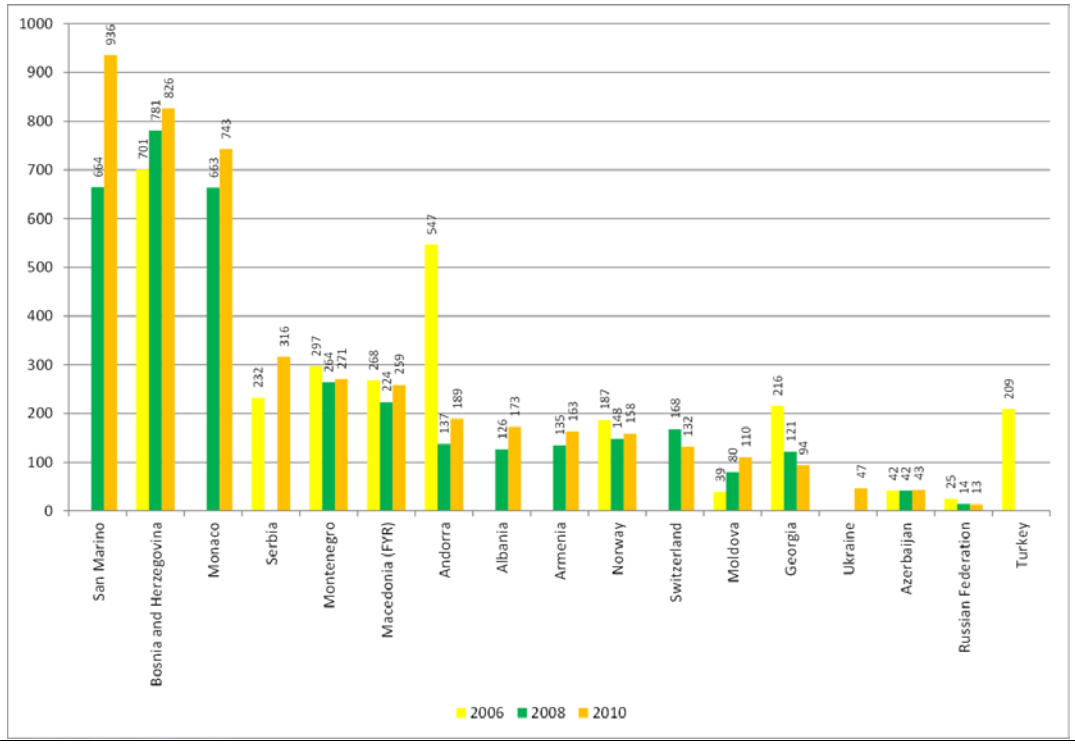
Source: Own calculations based on CEPEJ data and EU Justice Scoreboard 2014 (for 2012)

Graph Annex1.2: **Backlog ratio for litigious civil and commercial cases (EU countries)**



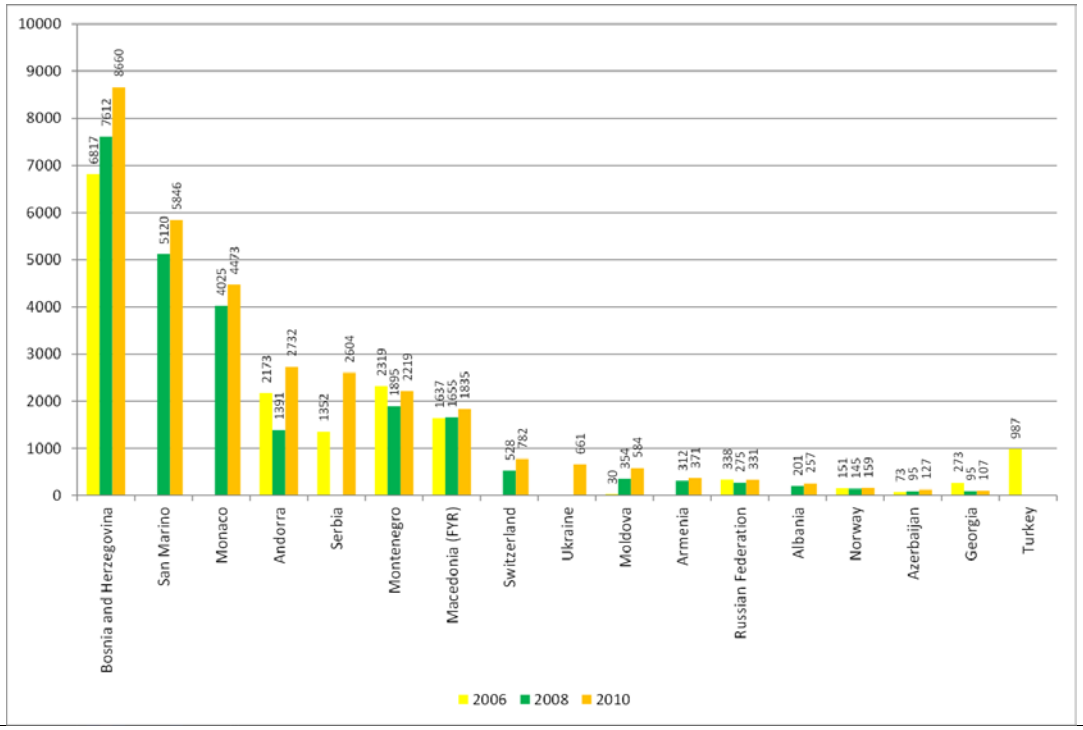
Source: Own calculations based on CEPEJ data and EU Justice Scoreboard 2014 (for 2012)

Graph Annex1.3: **Disposition time for litigious civil and commercial cases (non-EU countries)**



Source: Own calculations based on CEPEJ data

Graph Annex1.4: **Backlog ratio for litigious civil and commercial cases (non-EU countries)**



Source: Own calculations based on CEPEJ data

ANNEX 2

Regression results on business dynamics without linear interpolation

Table Annex2.1: **Determinants of firms' entry rate (no interpolation)**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) disposition time	-0.0184		-0.0156		-0.2968***	
	(0.0288)		(0.0272)		(0.0554)	
(Log) disposition time (t-1)		-0.0365		-0.0418**		- 0.119**
		(0.0250)		(0.0213)		(0.0584)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	381	390	381	390	241	250

(1) Note: standard errors in parentheses. Constant term included. * significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

Table Annex2.2: **Determinants of firms' entry rate (no interpolation) (cont'd)**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) backlog ratio	-0.0288		-0.0178		0.0495	
	(0.0263)		(0.0238)		(0. 0520)	
(Log) backlog ratio (t-1)		-0.02630		-0.0258		0.0568
		(0.0210)		(0.0192)		(0.0531)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	381	390	381	390	241	250

(1) Note: standard errors in parentheses. Constant term included. * significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

Table Annex2.3: **Determinants of firms' churn rate (no interpolation)**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) disposition time	0.0040		-0.0012		- 0.1261**	
	(0.0400)		(0.0348)		(0.0584)	
(Log) disposition time (t-1)		-0.0432		-0.0383		0.0154
		(0.0323)		(0.0273)		(0.0853)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	349	371	349	371	209	244

(1) Note: standard errors in parentheses. Constant term included. * significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

Table Annex2.4: **Determinants of firms' churn rate (no interpolation) (cont'd)**

	OLS		RE-AR(1)		FE-AR(1)	
(Log) backlog ratio	-0.0462		-0.0355		0.0486	
	(0.0316)		(0.0270)		(0.0493)	
(Log) backlog ratio (t-1)		-0.0345		-0.0338		0.0785
		(0.0267)		(0.0234)		(0.0935)
Controls for VA growth and average firm size	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country and industry dummies	Yes	Yes	Yes	Yes	No	No
Observations	349	371	349	371	209	234

(1) Note: standard errors in parentheses. Constant term included. * significant at 10%; ** significant at 5%; *** significant at 1%
Source: Own calculations based on CEPEJ and SBS data

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