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Implications of EMU for Global Macroeconomic and Financial Stability

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In May 2008, it was ten years since the final decision to move to the third and final stage of Economic and Monetary Union (EMU), and the decision on which countries would be the first to introduce the euro. To mark this anniversary, the Commission is undertaking a strategic review of EMU. This paper constitutes part of the research that was either conducted or financed by the Commission as source material for the review.

This paper exists in English only and can be downloaded from the website
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Implications of EMU for Global Macroeconomic and Financial Stability

Björn Döhring* and Heliodoro Temprano-Arroyo*

Abstract

This paper assesses the implications of EMU for world macroeconomic and financial stability. After reviewing the predictions made by the literature, it looks at the evidence of the first ten years of EMU. In so doing, it distinguishes the effect of EMU from global factors at work since the 1980s, often referred to as "the Great Moderation". The paper concludes that EMU is on the whole having a stabilising effect on the world economy, particularly in neighbouring countries. By helping to stabilise interest rates, inflation and GDP growth in the euro area, EMU has contributed to greater stability of those variables in other advanced countries. There is also evidence that EMU is facilitating international risk sharing and consumption smoothing. Predictions that EMU would increase exchange rate volatility are, in general, not confirmed by the data. However, the amplitude of medium-term exchange rate swings has increased for some currency pairs. Moreover, there is little evidence so far that EMU has facilitated international policy coordination, partly reflecting the still fragmented representation of the euro area in multilateral fora.

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1.   INTRODUCTION

This paper looks at the effects of EMU on global macroeconomic and financial stability. The years before stage III of EMU saw a proliferation of predictions about the impact of the single currency on international stability, ranging from positive spillover effects of the creation of a large pole of macroeconomic stability within the euro area to possible negative implications of moving to a more symmetric international monetary system. This paper looks at the available evidence on how these channels of influence have been working so far.

Assessing the impact of EMU on world stability is an exercise confronted with two significant limitations, however. First, the euro is still a young currency and, therefore, its long-run impact may not have fully materialised yet. Second, the impact of global developments (e.g., real and financial globalisation, the spread of the "Great Moderation", financial innovation and deepening) needs to be disentangled from the impact of the euro, which is a challenging task. Since the 1980s, the world has experienced a significant reduction in macroeconomic and financial volatility, often referred to as the Great Moderation. EMU may have helped to deepen this process for euro-area countries, and may have also contributed to the observed reduction in world volatility (both through the positive spillover effects of lower euro-area volatility and through other mechanisms, i.e. by facilitating international risk sharing). At the same time, the Great Moderation at global level may have contributed to the observed stabilisation within the euro area. In examining the possible effects of EMU on world stability, this paper therefore keeps this interaction in mind.

This paper starts by reviewing the channels through which, according to the economic literature, EMU may affect world stability (Section 2). Section 3 puts EMU in context by providing an overview of the main findings of the literature on the Great Moderation. Section 4 assesses the observed volatility under EMU of some key financial (interest rates, equity prices) and macroeconomic variables (inflation and GDP growth). Section 5 discusses the contribution of EMU to international risk sharing and consumption smoothing. Section 6 looks at the impact of EMU on exchange rate volatility, distinguishing medium-term exchange rate fluctuations from short-term exchange rate volatility. Section 7 examines to what extent EMU has led to a more symmetric international system and provides an account of trends in international policy coordination since the creation of EMU. Finally, Section 8 draws the main conclusions.

2.   PREDICTIONS ABOUT THE IMPACT OF EMU ON GLOBAL STABILITY

Several channels through which EMU could affect world stability have been identified by the literature, mostly before the introduction of the euro. Some imply stabilising effects; others entail a potential increase in volatility, notably for

exchange rates. These channels largely fall under four headings: i) spillovers from changes in intra-euro area macroeconomic and financial stability; ii) effects on international risk diversification and consumption smoothing; iii) impact on exchange rate volatility; and iv) implications of the replacement of the dollar-dominated system by a more symmetric international monetary system. The theoretical arguments behind these predicted channels of transmission are discussed in what follows.

2.1   Financial and macroeconomic stability

It has been argued that the euro area's *stability-oriented macroeconomic policy framework* should increase stability in the euro area, with significant stabilising effects on the world economy given the large size of the euro area. Specifically, the focus of the European Central Bank (ECB) on price stability as its overriding objective, its statutory independence, and the discipline imposed by the Excessive Deficit Procedure and the Stability and Growth Pact on national fiscal policies, in combination with the existence of a sound financial regulatory framework, was expected to enhance macroeconomic and financial stability in the euro area. This stable and integrated area should act as a pole of stability for the world economy as a whole.

Being a large zone of stability, the euro area was expected to have particularly strong *stabilisation effects on neighbouring regions and other regions with special ties to the EU*. In particular, it could provide a useful exchange rate anchor for stabilisation in countries with strong trade and monetary links with the EU and weak institutional frameworks. Also, EU accession prospects or geographical and political proximity could confer on certain countries a sort of implicit guarantee, which could reduce the risk of financial crises. Finally, some countries could benefit from the adoption of macroeconomic rules and frameworks inspired on those of the euro area. These effects seemed especially relevant for regions such as Central and Eastern Europe, the Balkans and the African CFA franc zone.

One variant of the pole of stability argument, emphasized more recently, focuses on *the global imbalances problem*. It notes that, by having a relatively balanced current account position and a solid net international investment position[1], the euro area is helping to reduce the risk of a disorderly correction of global imbalances. A related argument is that EMU may contribute to a more balanced constellation of global current accounts in the future because the emergence of the euro as a competitor international currency will make it harder for the US to finance persistently large current account deficits.[2]

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[1]The euro area's current account has been in surplus or broad balance since 1999 and it net international debt position amounted at the end of 2007 to about 12% of GDP. This compares favourably with the US, which has shown a sizeable current account deficit over the last ten years and has moved from being the world largest creditor in the early 1970s to being its largest net debtor (see European Commission, 2008b, Chapter II.6).

[2]As stressed by Gourinchas and Rey (2007), the dollar's international role has allowed the US to accumulate large net foreign liabilities without incurring a corresponding deterioration in its net foreign income payments. This "exorbitant privilege" helps explain why the marked deterioration in

On the other hand, it has been argued that, by *increasing the co-movement of economic and financial variables within the euro area*, EMU could increase the magnitude of potentially destabilising spillovers from euro-area economic developments and policies to the rest of the world. This could reduce, rather than increase, world stability. EMU was expected to strengthen co-movement for two main reasons: first, the existence of a common monetary and exchange rate policy and the constraints imposed by the EU's fiscal surveillance framework would reduce the likelihood of country-specific macroeconomic policy shocks within it. Second, the euro would promote trade and financial integration within the euro area, which would also help to smooth out differences in economic performance among euro-area countries and reduce their exposure to asymmetric shocks. With the synchronisation of macroeconomic and financial variables across euro-area countries increasing, it was argued, their changes would be less likely to have mutually offsetting effects, which would tend to amplify their net impact on the rest of the world. This also meant that economic and policy developments in the euro area would become increasingly relevant for other countries.[3]

2.2   EMU and international risk diversification

The euro may also facilitate international risk diversification and consumption smoothing and, in so doing, may make a positive contribution to international financial and macroeconomic stability.

The argument is that the more integrated, more liquid and broader financial markets that EMU is helping to create in the euro area could increase risk diversification possibilities not only within the euro area but also in the world at large. The broadening of euro area financial markets makes them more attractive for foreign investors valuing liquidity and market depth. It also stimulates borrowing in euro by foreigners. Moreover, as EMU reduces risk spreads and increases the correlation of financial asset prices across euro area countries, euro area investors should also have a stronger incentive to diversify their portfolios into assets outside the euro area. These effects could be reinforced by a rising international role of the euro, which tends to reduce the cost of international financial transactions in euro for euro-area residents and to increase the liquidity of euro area security markets and, therefore, their appeal to foreign investors and borrowers.

In fact, there are two stabilising mechanisms at work within this transmission channel. First, the integration and development of euro area financial markets under EMU can facilitate cross-border risk sharing and consumption smoothing among euro area countries. This helps them cope with intra-euro area idiosyncratic shocks, thus increasing macroeconomic stability in the euro area, with possible spillover effects on world stability. Second, by increasing the possibilities for international

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the US net foreign liabilities during the period 1970-2004 has not been accompanied by a corresponding increase in net income payments. Similarly, Cohen (2006a) argues that the international role of the dollar has contributed to the development of global imbalances by facilitating the financing of the US current account deficit and allowing the US to avoid adjustment.

[3]For an elaboration of this point, see European Commission (1990).

risk sharing, the deepening of financial markets under EMU may facilitate consumption smoothing at world level.

2.3   Exchange rate volatility

Various (sometimes contradictory) predictions have been made on the impact of EMU on exchange rate variability. This section considers three predictions that have to do with the centralisation of exchange rate policy and the structural characteristics of the euro area. The following section examines a further reason why EMU could affect exchange rate volatility, which is related to the shift to a multipolar international monetary system.

Openness effect: Before the launching of EMU, some economists argued that, since the euro area economy would be larger and more closed than those of its individual members, policy makers would attach less importance to exchange rate stability as a target and even adopt a policy of "benign neglect" towards the exchange rate (Kenen, 1995; Cohen, 1997). This openness effect was expected to lead to "the same kind of wide and long-lasting swings as those observed for the yen, sterling or the dollar" (Wyplosz, 1999).[4] This view was underpinned by Hau (2002), who found that exchange rate volatility is negatively related to a country's trade openness.

Volatility transfer: Other authors argued that by removing exchange rate volatility within the euro area, EMU would lead to higher exchange rate volatility vis-à-vis the rest of the world. Proponents of this idea argued that fixing intra-euro area exchange rates would prevent them from fulfilling their buffer role. Intra-euro area shocks would thus be transferred to the exchange rate of the euro against third currencies as well as to the interest rates of the euro zone. The assumption was that there is a given (exogenous) amount of volatility in the system and that if this volatility is not absorbed by movements in intra-euro area exchange rates it will have to show elsewhere. Others economists, however, challenged the volatility-transfer view by noting that the regime change to EMU could affect the underlying amount of volatility (e.g., by reducing the likelihood of asymmetric shocks). In a related line of argument, Flood and Rose (1995) showed that locking exchange rates did not necessarily increase the volatility of other variables in the system.

Vanishing volatility: It was also pointed out that EMU could reduce total volatility in world exchange rates by eliminating exchange rate volatility within a significant part

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[4]This view did not go unchallenged. For example, Masson and Turtelboom (1997) argued that insufficient knowledge about the properties of money demand and the behaviour of key indicators for the euro area would probably lead to ECB to rely significantly, at least for an initial period, on the exchange rate as an indicator. Also, Martin (1997) argued that a *large* economy (such as the euro area) has less incentive to use the exchange rate as a means of gaining economic advantage in times of recession (so-called beggar-thy-neighbour policy) because its own impact on the world economy is greater. This could make the euro's exchange rate *more* stable than those of its predecessor currencies. Dellas (1997), for his part, argued that, by creating a larger and more diversified economy, EMU would reduce output and, therefore, exchange rate volatility compared with those experienced by its individual members. Breedon and Chui (1998) found econometric evidence that exchange rate volatility falls with openness (as predicted by the benign neglect theories) but also with the economy's size (as predicted by Martin and Dellas).

of the world economy (the euro area), as well as the instability in the world monetary system that tensions within the European Monetary System (EMS) used to generate (Mundell, 2000).

2.4   Implications of a more symmetric international monetary system

It has also been argued that a bipolar or multipolar global monetary system would intrinsically be more unstable than a dollar-dominated one. There are two variants to this argument. One is based on political economy considerations; the other one is related to the emergence of the euro as a competing international currency.

The *political economy prediction* argues that a multipolar monetary regime would lead to greater instability compared to US hegemony because the hegemon, which reaps some benefits from its dominant role, has also an interest in ensuring the stability of the system (Bergsten, 1990; Eichengreen, 1989). Several competing big players, by contrast, might be less concerned with systemic stability. This "hegemonic stability theory" was originally developed by authors such as Kindleberger (1973) and Keohane (1980). This strand of the literature often points to the instability of the interwar period as an example of the drawbacks of a multipolar world regime. Analytical models also lent some support to this view, suggesting that the absence of leadership that characterises multipolar systems could deter co-operation and generate more exchange rate instability.[5]

The *international role of the euro variant* relies on the prediction that the euro will become a significant international currency, notably as a reserve currency and as an international investment and borrowing currency. The euro is, as noted, also expected to lead to more liquid and efficient financial markets in the euro area. All this should increase the substitutability of US dollar- and euro-denominated assets and this, it is argued, could increase the scope for disruptive portfolio shifts between both currencies (Wyplosz, 1999; Eichengreen, 2005). Small changes in interest rates or risk perceptions could trigger large transatlantic capital flows, leading to greater exchange rate and interest rate volatility and, more generally, to greater financial market instability. Rising financial globalisation could magnify these effects by increasing the potential magnitude of these portfolio shifts.

In a related argument, some economists (notably Mundell, 2000) argued that the internationalisation of the euro could increase *volatility during the transition to the new, multipolar system*. The argument is that the shift towards the euro as an international reserve and private investment currency (and the associated increase in

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[5]See, for example, Giavazzi and Giovannini (1989). This type of models shows that when one economy is much larger and more closed than the rest, it will be happy to act as (Stackelberg) leader, targeting its money supply without regard for the exchange rate. A stable equilibrium can then develop in which the large economy sets its money supply target and the small economies set their macroeconomic policies so as to stabilise their exchange rates against the leader's currency. As shown by Giovannini (1988), the gold standard, the Bretton Woods system and the EMS functioned in this way, under the leadership of the UK, the US and Germany, respectively. In these models, the emergence of a second large country, in the absence of co-operation, renders the system unstable. The two large economies will tend to pursue their domestic money supply objectives without regard to the exchange rate implications, resulting in higher exchange rate instability.

the demand for euros) would not happen in a steady and smooth manner. Rather, it was likely to be erratic, leading to an increase in volatility, particularly for the exchange rate, until a new stable equilibrium was reached.

Not all economists agree, however, than the move from a hegemonic to a multipolar system should increase instability. Some argue that by increasing choice and, therefore, *diversification possibilities*, it may actually reduce instability. Section 2.2 already discussed the potential for increased international risk diversification offered by EMU and its stabilising properties. Also, economists from emerging and developing countries sometimes argue that the diversification opportunities the euro offers as an alternative reserve or international financial currency can help them reduce external vulnerability.[6] According to Knight (2008), the diversification possibilities offered by a multipolar international monetary system can make the world economy as whole more stable. Knight argues that a multipolar system can reduce the incidence of emerging market currency crises by providing countries that wish to peg their exchange rate the choice of an alternative monetary anchor that may be better suited for them. Also, the possibility to diversify financing and investment can lessen the impact of idiosyncratic shocks arising in one market. For example, in his view, the impact of the US subprime crisis on the international financial system would have been much more severe without the existence of large and sophisticated financial markets in euro.[7]

Another strand of the literature (e.g., Alogoskoufis and Portes, 1991, Bergsten, 1997, European Commission, 1990) has argued that *EMU could create a more propitious environment for international macroeconomic policy coordination,* which could have positive implications for world stability. It was argued that, in a more symmetric system, the incentives for the US to participate in international policy coordination would increase, as it would be more strongly exposed to spillovers emanating from a larger European entity with more synchronised business cycles among its member states. Moreover, by strengthening the euro area's bargaining power, EMU should allow the euro area to reap a greater share of the gains from coordination, thus increasing also the euro area's interest in coordination. Coordination was also expected to become easier and less costly because EMU would reduce the number of players (European Commission, 1990).[8] The last two points crucially depended, however, on whether the euro area would manage to speak with a single voice in international macroeconomic and financial matters, which in turn required an ambitious reform of its representation arrangements in multilateral fora such as the IMF and the G-7.

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[6]See, for example, Nogueira-Batista (2008).

[7]Campbell et al. (2007) examine the optimal currency exposure of global equity and bond investors and conclude that the euro is a good hedge (particularly for equity investors) and that its hedging properties have been strengthening relative to those of the US dollar.

[8]The literature on international macroeconomic policy coordination stresses that coordination (particularly continuous, as opposed to sporadic, coordination) is often frustrated by the existence of significant transaction costs. These costs include the cost of gathering relevant information, agreeing on the appropriate policy adjustments and monitoring compliance with the agreed policy measures. See Eichengreen and Ghironi (1998) and Frankel (1988).

In sum, the literature has identified different channels, with contradictory implications, through which EMU may affect international stability. Before assessing these predictions against actual developments under EMU, the following section discusses the changing dynamics in the global business cycle and inflation that have been detected already since the 1980s, as well as the reduction in global financial volatility observed during the mid-2000s.

3. PUTTING EMU INTO CONTEXT: THE "GREAT MODERATION(S)"

EMU has been implemented against the backdrop of a global increase in macroeconomic (output and inflation) stability that began around the 1980s, generally referred to as the "Great Moderation". A reduction in financial market volatility has also been detected since approximately 2003, although this process has been interrupted during the financial turmoil triggered by the US subprime market crisis of 2007. Some economists have referred to this stabilisation of financial market behaviour as the "second Great Moderation".

3.1 The Great Moderation of business cycles and inflation

While the moderation in the US business cycle and inflation has received most attention in the literature, similar developments occurred across the major industrial countries (Stock and Watson, 2002). The timing, speed and durability of the reduction in macroeconomic volatility differed across countries, however. Summers (2005) locates the onset of GDP stabilisation in 1971 for Germany, in 1988 for Canada and in the first half of the 1980s for the other G-7 economies. However, Stock and Watson reject the idea of a precise start date of the Great Moderation for the G-7 countries except the US: whereas, after a turning point in 1984, output volatility in the US decreased rapidly in the second half of the 1980s, progress was far more gradual in e.g. the UK and Italy, while Germany displayed a long-standing stabilisation trend. Japan is an outlier among the G-7, as output growth was stabilised during the 1970s and early 1980s, but this stabilisation was partly reversed thereafter. The timing and speed of disinflation also differed across the G-7 economies, with fast disinflation in the US and the UK in the early 1980s and a more gradual reduction of inflation in the euro area (within which the initial levels of inflation and the pace of disinflation also differed substantially; see section 4.2 below). In all the G-7 countries, the decline in inflation levels was accompanied by a marked reduction in inflation volatility.

More recently, the IMF (2007b) has documented the great moderation from a global perspective. The trend reduction in output volatility can be found in advanced economies, emerging markets and developing countries alike (even though volatility peaked at different times across the country groups). The durability of expansions has increased and the average length of recessions has declined. Simultaneously, there has been an increase in the correlation of business cycles across countries, reflecting deepening trade and financial linkages. On average, however, business cycle co-movement among advanced economies remains above the correlations

among country pairings involving emerging or developing countries, reflecting their deeper financial linkages.

The reduction in world output volatility is mostly attributable to the decline in volatility observed in advanced economies, although, as noted, emerging market economies (notably China) and developing countries have also contributed to it. It has taken place despite the fact that emerging market and developing countries, which tend to be more volatile than advanced economies, have been gaining weight in the world economy (accounting already for about 40% of the world GDP and for about two thirds of global growth in 2006, using purchasing power parities).

The fact that the Great Moderation is very widespread suggests that some common (though not synchronised) factors have been at work. However, there is little agreement in the literature on what the most relevant factors are. The most prominent candidates are briefly discussed in what follows.

Improvements in the conduct of monetary policy: Monetary policy during the "Great Inflation" of the 1970s was suboptimal. Bernanke (2004) makes this case for the US, but the same seems true for most other economies. Monetary policy suffered from both "output optimism" and "inflation pessimism". "Output optimism" refers to policy-makers' belief that they could use the trade-off between inflation and unemployment suggested by the Phillips curve to achieve durably lower unemployment. In so doing, they overestimated their ability to fine-tune the business cycle. "Inflation pessimism" refers to the perception that the high inflation of the 1970s was mainly the result of non-monetary shocks, and that monetary policy could do little about these. There was thus considerable leeway for efficiency gains in monetary policy. The move towards more orthodox monetary policies started by US Federal Reserve Chairman Paul Volcker in the early 1980s and the subsequent spread of the practice of committing to a nominal anchor successfully reduced inflation and inflation expectations, as well as the volatility of inflation and output (IMF, 2007b; Giannone et al, 2008). However, while the literature generally ascribes a role for the reduction of inflation and inflation volatility to improved monetary policy, there is no consensus on monetary policy's relative role (see European Commission 2008a; Leduc and Sill, 2007).[9]

Improvements in the conduct of fiscal policy and the general macroeconomic policy framework: Like monetary policy, fiscal policy in the 1970s also suffered from exaggerated optimism as to the capacity to fine-tune the cycle. In fact, fiscal activism often turned out to be pro-cyclical, and "stop-go policies" resulting from occasional attempts to rein in the deficit aggravated the destabilising impact of fiscal policy further (see European Commission, 2007a). For a broader set of countries, the

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[9]Trade *globalisation*, and in particular the rapid growth in the supply of tradable goods produced by the emerging market economies, has also been pointed out as a factor contributing to the reduction in inflation levels in the 1990s and 2000s. However, as the more recent experience shows, the rise of new market economies has also increased global demand, notably for energy and foodstuffs, contributing to push up international commodity prices and global inflation. While the first effect tended to dominate in an initial phase, the second one has become increasingly important in recent years. On the net effect of globalisation on inflation, see Pain et al. (2006).

analysis by the IMF (2007b) highlights the role of improved institutional quality as well as quality of macroeconomic policies in the decrease in output volatility.

Structural changes: Among the potential structural underpinnings of the decrease in output volatility, advances in inventory management have received particular attention. Better communication and data processing technology have allowed better information on final demand and a reduction of inventory cycles (McConnell and Perez-Quiros, 2000, Kahn et al., 2002).[10] Arias et al. (2006) attribute the decrease in US business cycle fluctuations mainly to smaller shocks in total factor productivity. The shift in the sectoral composition of output from manufacturing to the (less volatile) services sector may have played a role in the reduction of output volatility, but most studies for the US suggest that this role was modest (Blanchard and Simon, 2001; Stock and Watson, 2003). Financial market development and integration may have also contributed to the decrease in output volatility by creating additional possibilities for smoothing consumption (Dynan *et al.*, 2005; Kose *et al.*, 2003; Gerlach and Hoffmann, 2008). This is supported by the fact that the moderation in output volatility is mostly attributable to the reduction in the volatility of consumption rather than investment (IMF, 2007b).

"*Good luck"*: This view argues that the exogenous shocks that contributed to the "Great Inflation" of the 1970s were exceptional and that the number and size of adverse shocks has decreased since then. Stock and Watson (2002) and Gordon (2005) attribute much of the moderation of output volatility to the reduced size of common international shocks in the 1980s and 1990s. However, Giannone *et al.* (2008) suggest that the role of good luck is overstated in simple models. Other authors (e.g., Hamilton, 2003; Panetta et al., 2006) have also argued that the shocks experienced by the word economy since the early 2000s (including rising oil prices) have been significant, further weakening the "good luck" argument.

3.2   The recent decline in global financial market volatility

Concerning global financial market volatility, there is evidence that the volatility of a number of financial asset prices, including short- and long-term interest rates, stocks, corporate spreads and exchange rates fell significantly in the years 2003-06 (see Panetta et al. 2006), although this process has been interrupted during the financial turmoil that followed the US subprime crisis. This "second Great Moderation", which coincides with part of the EMU period, was evident in both industrial and emerging market economies. However, while volatility levels fell compared to the previous decade, they were not particularly low in a longer-term historical perspective (with the exception of short-term interest rate volatility, which reached in the mid-2000s its lowest level in 20 years).[11] The impact of the decline in

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[10]These studies focus on the impact of inventory management techniques on *quarterly* output volatility, however. The role of inventories in explaining the reduction in output volatility in the US is greatly diminished if one uses annual data (IMF, 2007c).

[11]Using very long historical series, some reaching as far back as to the second half of the 19th century, Gerlach et al. (2006) find that financial market volatility in the industrial countries increased on average between the early 1970s and the early 2000s. Despite the reduction of stock and bond market volatilities seen since the early 2000s, they remain above their long-run averages.

volatility at individual asset level on the volatility of the returns obtained by global portfolio investors, however, has been mitigated by the increased co-movement of domestic bond and stock market prices (Panetta et al., 2006).

Several possible explanations have been suggested for the reduction in financial market volatility observed during the 2003-06 period, some of which had already been highlighted by the literature on the Great Moderation. While some of these factors are transitory, others reflect structural changes and are therefore expected to have lasting effects on volatility:

Macroeconomic factors: since financial volatility tends to show a counter-cyclical behaviour (Hamilton and Lin, 1996; Campbell et al., 2001), its recent reduction may reflect the sustained expansion shown by the world economy between 2002 and 2007. It may also reflect a more recent deepening of the Great Moderation of business cycles and inflation volatility, as there is evidence that global output and, especially, inflation volatility have further declined over the last 10 years (see IMF, 2007b; Panetta et al., 2006). The improvements in the conduct of monetary policy referred to above may have also helped to reduce financial market volatility. In particular, increased gradualism in monetary policy action, greater transparency about policy intentions and improvements in the operational framework have translated into more stable money market rates (see Bernanke, 2004, Poole, 2005; and Swanson, 2006).

Financial factors: Structural changes in financial markets, and in particular the development of risk transfer instruments and the rising role of institutional investors[12] have tended to increase market liquidity and reduce volatility. And the accumulation of a large pool of investable foreign exchange reserves in Asian and oil exporting countries running large current account surpluses has contributed to increase financial market liquidity (Blundell-Wignall, 2007). The recent decline in financial volatility may also be related to the observed improvement in the balance-sheet conditions of listed companies. Indeed, there is some evidence suggesting that the volatility of stock market returns is negatively related to profitability and positively related to uncertainty over future profits (Wei and Zhang, 2006).

In sum, EMU was preceded by a substantial moderation in global macroeconomic volatility and has been accompanied by a deepening of this process and by a simultaneous reduction in global financial market volatility. While these two "moderations" largely reflect a combination of global factors discussed by the literature, EMU may have contributed to intensification in the trend towards lower global macroeconomic volatility observed over the last 10 years and may have also contributed to the decline in financial market volatility seen during much of the present decade. The remainder of this paper attempts to shed light on the interaction between EMU and global macroeconomic and financial stability.

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[12]Hedge funds, for example, tend to trade more frequently, improving market liquidity and facilitating price discovery, both of which tend to reduce volatility. However, Rajan (2006) argues that some institutional investor practices may also increase market volatility.

4.   FINANCIAL AND MACROECONOMIC STABILITY

This section looks at developments in euro area financial and macroeconomic stability and compares them with global developments, distinguishing the period before 1999 from developments after the introduction of the euro. The focus is put on trying to assess to what extent developments in the euro area are a reflection of global trends and to what extent EMU may have contributed to the reduction in global volatility observed since the 1980s. To this end, developments in the euro area are compared with developments in a control group of advanced countries. Unless otherwise indicated, this group consists of the G-7 countries outside the euro area (the US, the UK, Canada and Japan) and Switzerland. Financial stability is discussed in terms of short- and long-term interest rates and stock prices, while macroeconomic stability is assessed in terms of inflation and GDP growth.

4.1   Financial stability

The run-up to EMU in the 1990s produced rapid and sustained convergence in *interest rate levels* among euro-area Member States (Graphs 4.1 and 4.2). Not only did this convergence occur towards the lowest interest rate prevailing in the euro area (mostly the rates prevailing in Germany, Austria and the Netherlands); there was also a downward shift in the benchmark level of short-term rates from 1992 onwards and a downward shift in the benchmark long-term rate after 1995.

Graph 4.1: Three-month interbank rates – euro area (quarterly data, 1990-2007)
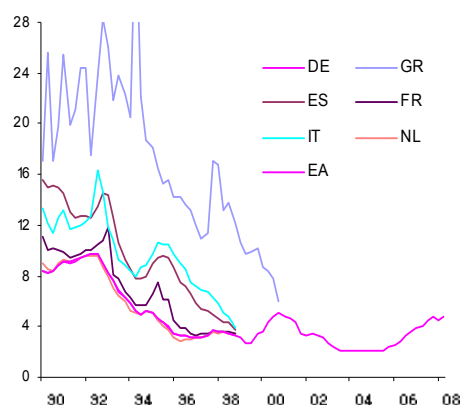
Graph 4.2: Long-term interest rates – euro area (quarterly data, 1990-2007)
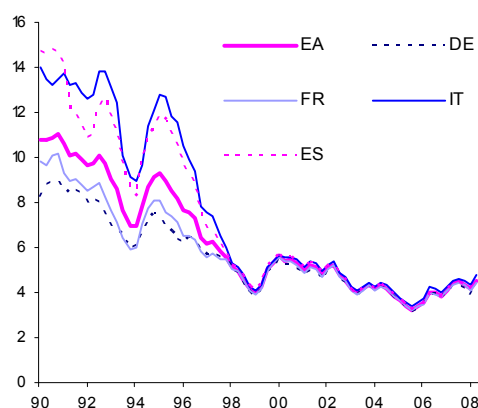
Source: Eurostat

Source: Eurostat, EcoWin

While the convergence of interest rates observed during the 1990s was much more marked in the euro area than among G-7 countries, reflecting the expected and actual introduction of a single currency, non-euro area G-7 countries also experienced significant declines in the level interest rates during this period (see Graphs 4.3 and 4.4). These declines were particularly pronounced in the case of Japan and the UK. There was also a significant convergence of interest rate levels

among G-7 countries, although Japan, with its zero-interest-rate policy during much of the past decade, has remained an outlier. These developments therefore suggest that common factors, notably the "Great Moderations", were at work. After the turn of the century, short-term interest rates decreased further, to very low levels, in the aftermath of the dotcom bubble.[13]

Graph 4.3: Three-month interbank rates – Comparator countries (quarterly data, 1990-2007)
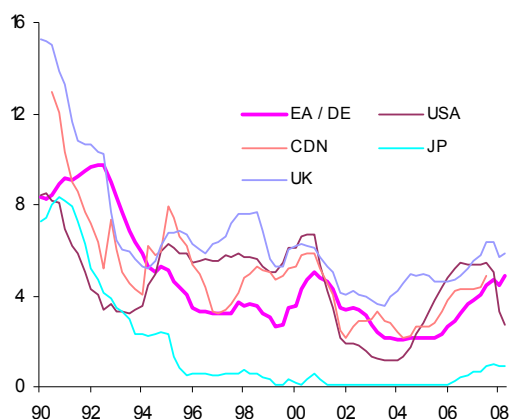
Source: Eurostat
Euro area is the unweighted average of euro area (12) member states

Graph 4.4: Long-term interest rates – Comparator countries (quarterly data, 1990-2007)
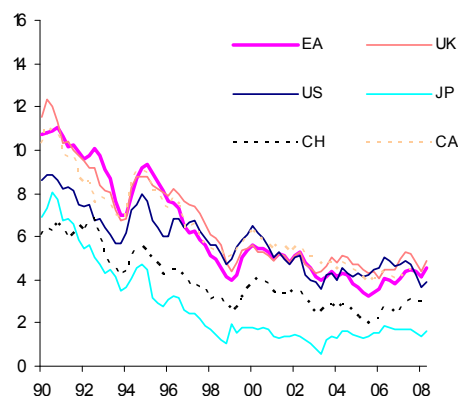
Source: Eurostat, EcoWin
Euro area is the unweighted average of euro area (12) member states

Turning from levels to the *volatility of interest rates*, all observed countries but the US experienced a decrease in the quarterly volatility of short-term interest rates after 1999, and all saw a decrease in the volatility of long-term interest rates, with volatility being measured by the standard deviations of absolute interest rate changes (see Table 4.1). Again, this suggests that the decline in volatility was part of a global phenomenon. The data in Table 4.1 are, in this respect, consistent with the findings of the literature on the second Great Moderation, which, as noted, detect a clear reduction in interest rate volatility in industrialised countries during the 2000s (see, in particular, Panetta et al., 2006). However, Table 4.1 shows that the average reduction in interest rate volatility was more important in the euro area countries than in the control group, with volatility decreasing most in those Member States where its initial level had been highest. There has been, therefore, a convergence in interest rate volatility within the euro area, in addition to the convergence in interest rate levels. And in both cases an EMU effect seems to be at work since the downward convergence is more acute within the euro area countries than within the control group.

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[13]However, as Graph 4.3 indicates, the amplitude of the cycle of short-term interest rates has been significantly larger in the US than in the other G-7 economies and the euro area after 1999.

Table 4.1: Quarterly interest rate volatility (standard deviation)

	3 month interbank rates		10-year government bond yields	
	1990-98	1999-07	1990-98	1999-07
Euro area				
BE	0.54	0.32	1.62	0.72
DE	0.33	0.32	1.30	0.63
ES	0.68	0.32	2.96	0.72
FR	0.83	0.32	1.65	0.66
IE	1.90	0.32	1.59	0.73
IT	1.05	0.32	2.99	0.67
LU	0.54	0.32	-	-
NL	0.36	0.32	1.40	0.68
AT	0.36	0.32	1.30	0.72
PT	0.77	0.32	3.50	0.72
FI	1.18	0.32	2.80	0.72
GR	5.15	0.52	5.57	0.96
Unweighted average	**1.14**	**0.34**	**2.43**	**0.72**
Euribor	-	0.32	-	-
Benchmark bond	-	-	1.30	0.63
Control group				
UK	0.64	0.36	1.74	0.39
US	0.43	0.50	1.06	0.72
JP	0.36	0.12	1.91	0.30
CA	0.92	0.41	1.15	0.56
CH	0.49	0.32	1.62	0.67
Unweighted average	**0.57**	**0.34**	**1.50**	**0.53**

Source: Eurostat (CA and CH: EcoWin)

In the case of *stock prices*, no durable trend can be detected in either the euro area or the G-7 countries during the EMU period (see Graph 4.5). Mainly due to the build-up and burst of the dotcom bubble, the major stock exchanges experienced an increase in volatility from early 1998 to late 2003. From 2004 to 2006, stock index volatility fell to back to the levels seen in the mid-1990s (Gerlach et al., 2006; Panetta et al., 2006), but it increased again with the onset of the financial crisis in mid-2007 (although less than in 1998-2003). On average, after 1999, the volatility of stock price indices in the G-7, with the exception of the Nikkei, has been somewhat higher than in the 1990-98 period.

Graph 4.5: Volatility of stock indices
(Standard deviation in %, 100-day rolling)
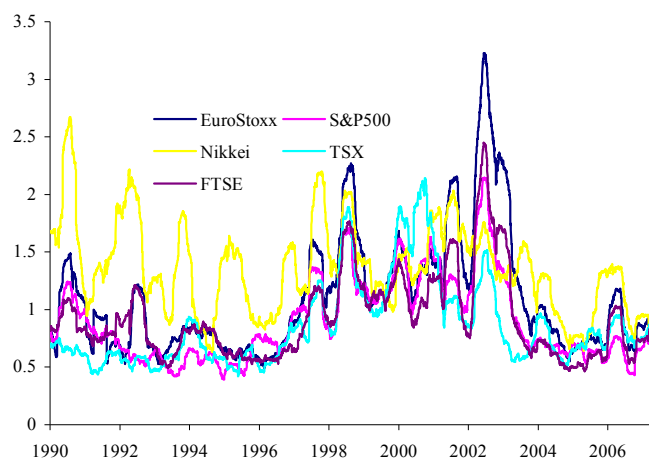
Source : EcoWin

4.2   Macroeconomic stability

4.2.1 Inflation

The *G-7* economies experienced strong *disinflation* in the first half of the 1980s (Graph 4.6), a turning point from the inflation-prone 1970s. Inflation had more than doubled in the 1970s compared to the 1960s, reflecting the two oil price shocks and the policy responses to them. Following a temporary price spurt in the late 1980s and early 1990s (coinciding with the increase in oil prices that followed Iraq's 1990 invasion of Kuwait), G-7 inflation fell further and remained at low levels throughout the remainder of the 1990s and the 2000s, reaching in the last decade the lowest average levels seen in 50 years. In the case of Japan, the economy has struggled to durably overcome deflation ever since 1995. Since 2007, the rise in international food and energy prices has produced a moderate increase in headline inflation in all G-7 economies, although core inflation has remained subdued in most of them.

In the future *euro-area countries*, inflation levels also fell considerably during the 1980s and 1990s (with a transitory interruption around the 1991 Gulf war) and there was also a substantial convergence of inflation rates among them (see European Commission, 2008b). EMU has been accompanied by a further reduction in inflation in the euro area (which averaged 2% in the period 1999-2007, compared to 2.8% in the previous 10 years), even though the level and cross-country differentials have increased from the very low values observed immediately before the introduction of the euro. Since 1999, average inflation has also been about half a percentage point lower in the euro area than in the US (see Table 4.2).

Graph 4.6: Inflation in the G-7

(monthly data, 1990-2007)
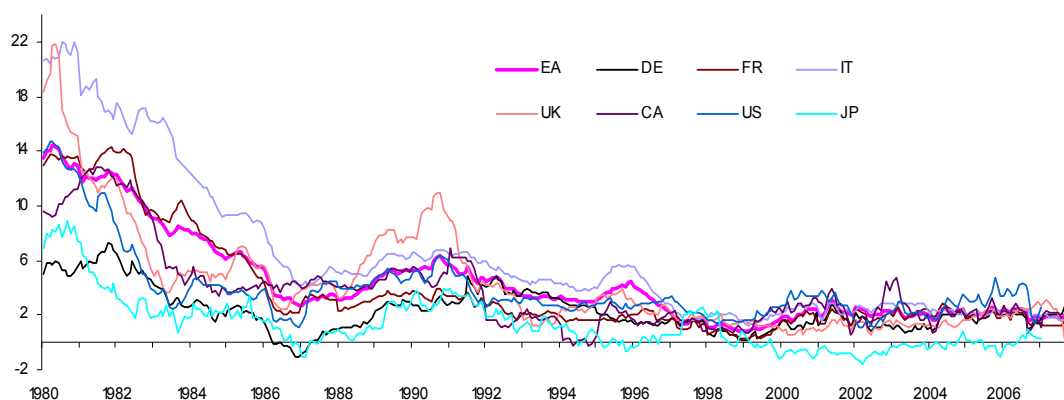
Source: Eurostat

Table 4.2 Inflation performance by decade: euro area and US

	Euro area		United States	
	Average	Maximum	Average	Maximum
1960s	3.7	5.1	2.4	5.4
1970s	9.3	13.6	7.1	11.3
1980s	7.5	12.8	5.5	13.5
1990s	2.8	5.0	3.1	5.4
2000s*	2.0	2.4	2.6	3.4

Source : European Commission

* Corresponds to EMU period. For the last two years, Commission
   forecasts are used.

Table 4.3: Inflation volatility
(standard deviation of monthly annualised inflation rate)

	1980-89	1990-98	1999-07
Euro area	3.6	1.4	0.4
BE	2.8	0.9	0.7
DE	2.1	1.2	0.6
GR	4.2	5.6	0.7
ES	3.8	1.7	0.6
FR	4.3	0.9	0.6
IE	-	0.9	1.2
IT	5.7	1.6	0.4
LU	3.4	1.0	1.1
NL	2.6	0.8	1.3
AT	2.0	1.1	0.6
PT	7.1	3.9	0.9
FI	2.1	1.8	0.9
Unweighted average	**3.7**	**1.8**	**0.8**
Control group			
UK	4.4	2.6	0.6
SE	3.1	3.5	0.8
CH	1.8	2.1	0.5
US	3.5	1.1	0.8
JP	2.3	1.2	0.5
CA	3.2	1.7	0.8
Unweighted average	**3.1**	**2.0**	**0.7**

Sources : Eurostat (except CH and CA:EcoWin); own calculations

Turning to volatilities (Table 4.3), a strong decrease in the *volatility of the inflation rate* is visible both from the 1980s to the 1990s and further since 1999 both in the euro-area and in the control group. Since the introduction of the euro, average inflation volatility in the euro area has been lower than in other period of comparable duration in post-war history, and it has been lower than in any of the comparator countries. The fact that the comparator countries also experienced a decline in inflation volatility suggests that there were common global forces at work. These may include, in particular, improvements in the conduct of monetary policy, a discussed in Section 3. The strong positive correlation observed between the level and the volatility of inflation during the past five decades in both the euro area and the control group lends some support to this view (see Graph 4.7). It suggests that

the pursuit of more rigorous, credible and predictable monetary policies has helped to reduce both inflation levels and inflation volatility. Another contributing global factor seems to be the reduction in the inflationary impulses from the external side. Indeed, the volatility of import prices in industrial has declined markedly over the last three decades and there is also evidence that the degree of pass-through of import price changes to domestic prices has diminished in those countries (see European Commission, 2007c). But the fact that the reduction in inflation volatility has been more marked among euro area countries points towards the existence of EMU-specific factors as well (see Section 4.3).

Graph 4.7: Inflation: level and volatility
(Euro area, US, UK and SE)

Source: European Commission.
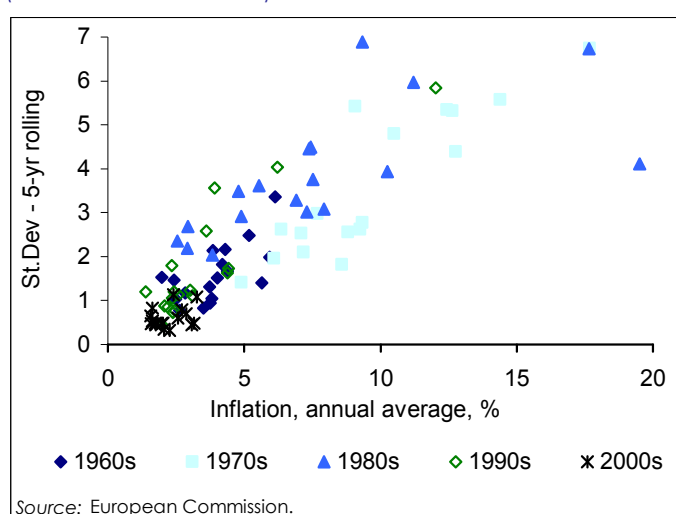
4.2.2 GDP growth

As shown by the literature on the Great Moderation, the *volatility of GDP growth* in the advanced economies has been declining since the 1980s, while the synchronisation of their business cycles has been rising. Table 4.4 displays the average volatility of real GDP growth for the euro area countries and a number of key advanced economies for each decade since the 1970s. Graph 4.8, for its part, compares the evolution of GDP growth volatility in the euro area and in the US since 1975. Volatility is measured using standard deviations of year-on-year GDP growth computed for rolling windows of 5 years using quarterly data. After jumping in 1970s and early 1980s, GDP growth volatility declined significantly during the 1980s and the 1990s and decreased further during the EMU period. This is true for the non-euro area economies, for the euro area aggregate and for each of the euro area countries (although in the case of Austria and the Netherlands, output growth volatility, which was already relatively low, did not decrease further during the EMU years). As Graph 4.8 illustrates, although the drop of growth volatility observed since the 1970s has been less marked in the euro area than in the US, the decline in volatility in the US has taken place from higher levels and both economies exhibit now a similar degree of volatility.

Table 4.4:   Volatility of GDP growth in euro area and selected OECD countries
(Standard deviations of y-o-y growth, in %)

	1971Q1-1980Q4	1981Q1-1990Q4	1991Q1-2000Q4	1997Q1-2007Q4	Difference between 1971Q1-1980Q4 and 1997Q4-2007Q3
AT	2.64	1.51	1.10	1.11	-1.53
BE	2.48	1.56	1.54	1.20	-1.28
DE	2.14	1.83	1.71	1.37	-0.77
EL	5.34	3.31	2.34	0.82	-4.42
ES	2.87	1.99	1.75	0.77	-2.10
FI	3.06	1.94	3.61	1.60	-1.46
FR	1.78	1.25	1.35	1.08	-0.70
IT	3.14	1.47	1.45	1.26	-1.88
NL	2.53	2.16	1.53	1.56	-0.97
PT	4.45	3.00	2.01	1.83	-2.62
EA	**1.94**	**1.34**	**1.33**	**1.07**	**-0.87**
DK	2.67	2.24	1.71	1.30	-1.37
SE	2.22	1.64	2.26	1.20	-1.02
UK	2.91	2.03	1.50	0.66	-2.25
AU	1.93	2.67	1.78	1.17	-0.76
CA	1.78	2.74	2.12	1.36	-0.42
CH	3.56	1.86	1.52	1.46	-2.10
JP	n.a.	1.70	1.75	1.70	0
NZ	6.99	3.52	2.37	1.57	-5.42
US	2.76	2.43	1.51	1.26	-1.50

Source :   González Cabanillas and Ruscher (2008)

(1) IE and LU are not included due to lack of quarterly data.

Graph 4.8 Volatility of GDP growth: euro area and US
(standard deviation of y-o-y growth in %; 5-year windows)
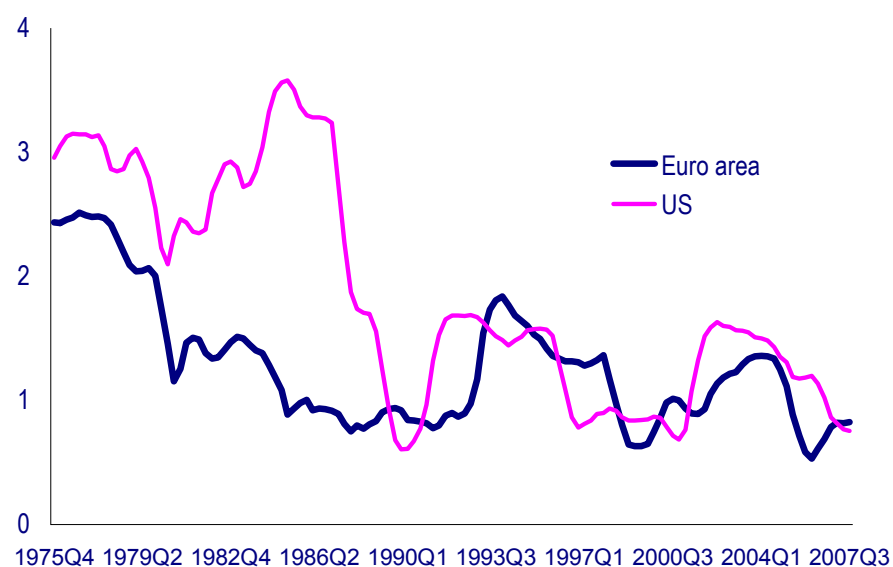
Sources : European Commission services and ECB

The decline in euro area volatility conceals significant heterogeneity among individual euro area countries (see European Commission, 2007a and González Cabanillas and Ruscher, 2008). While volatility fell in all of them between the 1970s and the EMU period, the magnitudes and timings of this reduction differ considerably. Perhaps the most significant observation is that output volatility fell more markedly in the euro countries that had posted the highest volatility in the 1970s. As with inflation and interest rates levels and volatilities, therefore, there has been a *convergence in output volatility levels across euro area countries*, and this process continued during the EMU period.

The convergence of output volatility across euro-area countries has been accompanied by an increase in the degree of *synchronisation of their business cycles*. As noted in Section 3, this phenomenon has also been observed in other advanced and developing economies as part of the Great Moderation process.[14] But there is some evidence that the euro, in combination with the EU's Single Market programme of trade and financial integration, may have contributed to intensify this process (see Gayer, 2007; European Commission, 2008b, Chapter I.3; Mélitz, 2004; and Kalemli-Ozcan et al., 2004). This increased business cycle synchronisation among euro area countries lends some support to the proponents of the endogenous optimum currency area theory, notably Frankel and Rose (1998), who predict that currency unions, by promoting trade integration, can increase business cycle co-movement among its participants. The convergence of macroeconomic policies under the Maastricht Treaty and the Stability and Growth Pact may have had a similar effect by reducing policy-driven asymmetric shocks. For example, Darvas, Rose and Szapáry (2005) find that countries with similar budget positions tend to have more correlated business cycles. The predictions of those who argued that EMU would reduce business cycle synchronisation by promoting higher productive specialisation among participants, thereby increasing their exposure to asymmetric shocks (e.g. Krugman, 1993), have so far not be been corroborated by the evidence.

There is evidence that business cycle correlations are higher and have been rising faster with the countries neighbouring the euro area, a process sometimes referred to as the *"Europeisation" of business cycles*.[15] As Table 4.5 shows, the degree of business cycle synchronisation between the euro area and advanced neighbouring economies is approximately as high as that shown among euro area countries and has increased significantly since the introduction of the euro. Strong (and, in most cases, growing) trade and financial linkages with the euro area help to explain this. While cyclical correlations with the euro area have also increased in the case of the US and Japan, they remain much lower.[16] Similarly, the advanced neighbouring countries tend to show higher interest rate correlations with the euro area (Table

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[14]Artis (2005) finds evidence of an emerging "world business cycle". On the co-movement of world business cycles, see also IMF (2007c).

[15]See European Commission (2008b), Chapter I.3.

[16]This is in contradiction with earlier analysis by Stock and Watson (2002), who found evidence suggesting the emergence of two synchronisation clubs among the G-7, the first centring on the euro area and the second comprising the English-speaking members of the G-7 (the UK, the US and Canada).

4.5). The business cycles of most of the new EU countries of Central and Eastern Europe also exhibit a relatively high degree of correlation with the euro area cycle (Lithuania, which trades significantly with Russia, is the main exception) and, in most cases, the correlations have been increasing (see Darvas and Szapary, 2004 and 2008, and Fidrmuc and Korhonen, 2006). In some countries (Poland, and Slovenia[17] and, until recently, Hungary), the correlations are even higher than those shown by some core euro area countries, partly reflecting their strong trade orientation towards the euro area (Darvas and Szapáry, 2008).

Table 4.5: Euro-Area Business Cycle and Interest Rate Correlations with Outside Countries

	EA-DK	EA-NOR	EA-SE	EA-CH	EA-UK	EA-US	EA-JAP	Intra-EA
Business cyles *								
1989-1998	0.41	0.12	0.51	0.56	0.07	-0.21	0.50	0.56
1999-2008	0.82	0.53	0.75	0.95	0.64	0.42	0.57	0.60
Long-term interest rates								
1999-2007	0.99	0.93	0.94	0.97	0.85	0.72	0.19	

Source : European Commission services

* Calculated using a 2-sided Hodrik-Prescott (HP) filter that extracts business cycles of a periodicity of between 1.5 and 8 years.

4.3   EMU-specific stability effects and spillovers

The evidence discussed in the previous section shows that the euro area has participated in the moderation of inflation and business cycles observed at global level since at least the 1980s, as well as in the more recent reduction of financial volatility. Now, to what extent is this simply a reflection of global factors and to what extent have developments in the euro area contributed to the Great Moderations at global level? This section tries to shed some light on this issue by surveying the empirical evidence on the matter.

As noted in Section 2, one channel through which EMU is most likely to have had a stabilising impact on the euro area over and above that of the Great Moderation is the improvement of the euro area's macroeconomic framework and policies. Such improvement has arguably been more important in the euro area than in the US and other countries. This view is underpinned by the observation that the reduction in inflation levels and in the volatility of inflation, interest rate and output was strongest in euro-area countries such as Italy, Spain and Greece, where the conduct of macroeconomic policy in the 1970s and 1980s had been relatively less efficient. Recent econometric estimates by the staff of the European Commission further support to this hypothesis. Using a sample of 20 countries (14 euro area countries plus Australia, Canada, Japan, Switzerland and the US) and data for the period 1973-2007, González Cabanillas and Ruscher (2008) regress output volatility on a series of explanatory variables including both structural and economic policy indicators. They find that improvements in monetary and, to a lesser extent, fiscal policy are the main explanatory factors for the reduction in volatility experienced by the countries in the sample. More importantly, these factors are relatively more

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[17]Slovenia joined the euro area in 2007.

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important for euro area countries than for the other countries. The estimated contribution of the monetary policy variable, which captures much of the regime change associated with EMU, is particularly large for those euro area countries (notably Greece, Finland, Italy, Portugal and Spain) where monetary management was comparatively weaker in the 1970s and 1980s. In these countries, monetary policy accounts for between 25% and 40% of the decline in output volatility, whereas its contribution in the case of the US and Germany is small. The contribution of fiscal policy, while less important, is also found to be larger in some Southern euro area countries.[18]

Other empirical studies have also detected a favourable effect of EMU on euro area macroeconomic volatility. Thus, econometric estimates by Barrel et al. (2008) indicate that EMU has contributed to reduce output growth volatility. Gerlach and Hoffmann (2008), using a sample of 25 OECD countries (including the 12 first euro-area Member States) and a number of control variables in their regressions, find an EMU-specific effect in the reduction of the volatility of inflation, interest rates and, to a lesser extent, output growth in the euro area. The EMU effect on interest rates is stronger in the 1990s than after 1999, which is consistent with pre-EMU convergence. The EMU-specific effect on euro area inflation happens entirely in the run-up to EMU, but disappears after 1999, which seems explained, again, by the fact that much of the convergence in inflation took place as countries prepared for EMU entry.

The fact that, among the advanced countries examined, the euro area has shown since 1999 the lowest inflation volatility and one of the lowest volatilities of short-term interest rates and output growth also suggests that an EMU-specific effect may be at work.

Regarding business cycle synchronisation, there is, as noted, some evidence of a euro-area specific process on top of the global phenomenon, although the fact that much of the increase in intra-euro area synchronisation took place between the late eighties and the late nineties and the fact that EU-wide developments differ little from euro-area developments suggest that the impact of the Single Market may have been more important than the effect of the euro itself (European Commission, 2008b, pp. 49-51). Graph 4.9 displays the mean of rolling correlations between the GDP of the euro area, on the one hand, and several key economic partners (the US, the UK and Japan), on the other (euro area-world line), as well as intra-euro-area correlations (intra-euro area line). Since the late 1980s, the intra-euro area correlation curve, which used to be below the euro area-world correlation curve, has been most of the time significantly above it.[19] This provides evidence that the increasing cyclical synchronisation among euro area countries is not simply a side-product of global trends.

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[18]However, this largely reflects the contribution of government expenditure size and automatic stabilisers, rather than an improvement in discretionary fiscal policy.

[19]This was the case in particular during the whole EMU period. In the first four years of EMU, intra-euro area correlations continued to increase even as euro area-world correlations fell. During 2003-04, correlations temporarily declined both within the euro area and between the euro area and the rest of the world, but fell much less in the euro area. After 2005, both curves recovered.

Graph 4.9: Rolling Business Cycle Correlations
(GDP, 6-year rolling window)
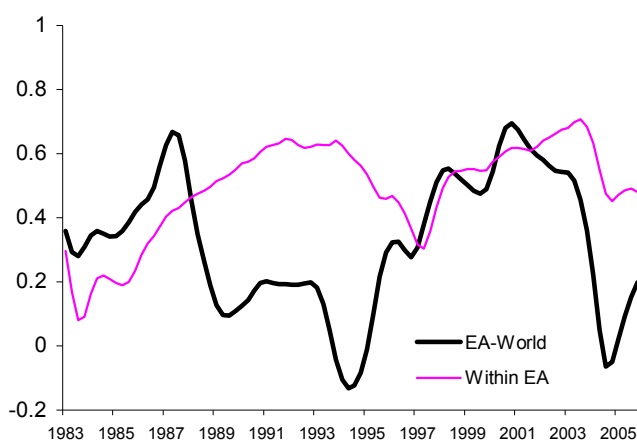
¹EA-world is based on correlations with the US, UK and Japan

Source : European Commission (2008b)

All the above suggests that there has been indeed an EMU-specific effect reinforcing the reduction of macroeconomic and financial volatility in the euro area over and above the influence of the global Great Moderations. The other key issue to examine is whether this has contributed to intensify the global Great Moderation. As discussed in Section 2, by helping to reduce volatility within the euro area, EMU can produce stability-spillovers without a policy change in third countries.

The above-mentioned study by Gerlach and Hoffman provides evidence that this is happening. After controlling for global factors, the authors find that the EMU-related reduction in the volatility of euro area interest rates, inflation and, to a lesser extent, output growth has had positive spillover effects on other OECD economies. Such spillovers are found to be larger for the 1990s, when pre-EMU convergence within the euro area was strongest. Gerlach and Hoffmann conclude that "there is an important international dimension of the euro in the sense that the euro area has become a pole of stability in the global economy" (op. cit., p. 2).

As noted in Section 2, some observers had predicted destabilising international spillovers from increased business-cycle synchronisation in the euro area. This could offset part of the positive spillovers from lower euro area GDP volatility. In its recent study of trends in global business cycles since the 1960, the IMF (2007b) finds that output volatility at the country level has indeed decreased more strongly than the volatility of world growth. This is explained by the increased co-movement (covariance) of business cycles, which implies that variations in country growth are offsetting each other to a lesser extent than before (see Graph 4.10). The increase in intra euro-area business cycle synchronisation has contributed to this. As Graph 4.10 illustrates, however, the positive effect from the reduction in the variance of euro-area output volatility is quantitatively more important than the effect from the increased co-variance of global business cycles (for which the euro area is only partly responsible). On a net basis, therefore, the euro area macroeconomic performance seems to be having a positive effect on world stability.

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Graph 4.10: Decomposition of changes in world output volatility by region
(Variance of real GDP growth; change from 1974-82 to 1996-2006)[1]
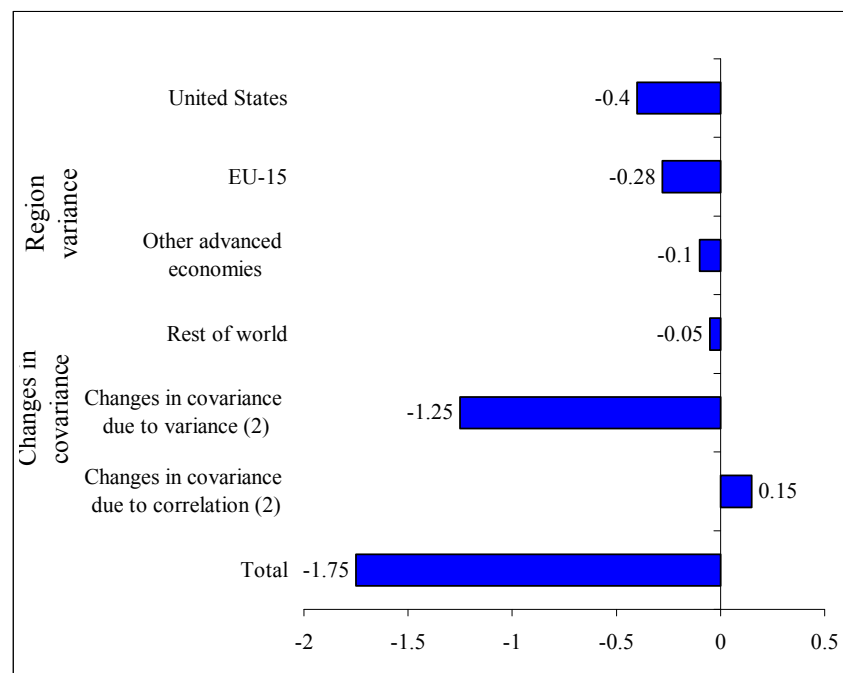
Source : IMF (2007b)

(1) Volatility is measured as the variance of real purchasing-power-parity-weighted GDP growth over a period. (2) Contributions of covariance to the changes in output volatility were decomposed into contributions due to changes in the variance of regions and changes in the correlation among them.

4.4 Regional stabilising effects of EMU

EMU seems to be having particularly strong stabilisation effects on certain neighbouring countries, which go beyond those discussed above. First, since these countries exhibit, as noted, relatively high and rising business cycle and interest rate correlations with the euro area and tend to have strong trade and financial links with it, they are likely to benefit more significantly from any spillovers stemming from a reduction in the volatility of growth, inflation and interest rates in the euro area. As discussed below (Section 5), the relatively high co-movement of business cycles and interest rates between the euro area and the UK and Switzerland may also help explain why the volatility of the euro's exchange rate vis-à-vis the Bristish pound and the Swiss franc is relatively low.

The fact that many neighbouring countries, as well as certain other regions with close economic and institutional ties with the EU, peg their currencies to the euro or try to maintain a relatively stable exchange rate against it may have also contributed to intensify the positive spillover effects from the euro area. In particular, these countries are more likely to reflect in their inflation and interest behaviour the stabilisation of these variables achieved by the ECB. In this respect, Di Giovanni and Shambaugh (2007) have demonstrated the importance of the exchange rate regime for the transmission of interest-rate shocks from the core (the country that provides the exchange rate anchor) to the periphery (the pegging country).

As documented in Section 7.2, over 40 countries and territories, most of them in the European neighbourhood and in Africa, have exchange rate regimes linked to the euro. Recent empirical evidence (see Galati and Wooldridge, 2006; Cobham, 2007, and Bénassy-Quéré et al, 2007), based on actual co-movements between currencies, suggests that the gravitational pull of the euro in its European neighbourhood and Africa is important and is increasing. This has led some authors (e.g. Pisani-Ferry et al, 2008) to talk about the existence of a de facto euro zone including a large part of Central and Eastern Europe, the Mediterranean and Africa.

For the relatively less advanced countries located in the euro area's neighbourhood (including the new EU Member States) or in other regions with strong economic, political and institutional ties with the EU, EMU may have additional stabilising effects. First, some countries with weak institutions and a poor inflation record have been able to increase the credibility of their monetary policies by using a strong currency like the euro as anchor. This is the case of many Western Balkan countries, which after the political conflict, high inflation and high degrees of currency substitution experienced during the 1990s, adopted euro-based regimes (including a currency board in the case of Bosnia-Herzegovina and unilateral euroisation in the case of Kosovo and Montenegro). It is also the case of the countries of the monetary unions that make up the African CFA franc zone, both of which peg their currency (the CFA franc) to the euro. There is evidence that the use of the euro as exchange rate anchor or reference has contributed to reducing inflation and providing stability in these regions (see European Commission, 2008c, for the Western Balkans, and Hallet, 2008, for the CFA franc zone).

The stabilisation advantages from pegging to or shadowing the euro should not be exaggerated, however. For example, some of the new EU Member States have performed very well, both in terms of inflation and interest rate stability, while maintaining a floating exchange rate on their road to EU and ERM II accession. Moreover, in some cases, the policy of pegging to the euro may have contributed to the emergence of macroeconomic disequilibria.[20]

Another factor that is contributing to strengthen macroeconomic stability in the euro area's neighbourhood and certain other regions is the adoption of EU rules and frameworks in the monetary and fiscal policy areas. The new EU Member States and countries negotiating EU accession treaties must adopt the EU's institutional and legal provisions in the area of EMU, including, inter alia, the granting of full independence to their central banks, the elimination of central bank and other privileged financing of the government and the participation in the EU's fiscal and macroeconomic surveillance system.[21] Other countries with EU accession prospects

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[20]In particular, it has been argued that in some new EU Member States experiencing credit booms, current account imbalances, strong capital inflows and upward pressure on prices and the exchange rate, exchange rate rigidity have exacerbated capital inflows, pushed down real interest rates and complicated inflation control. For this reason, and because of the need for the real exchange rate to appreciate to accommodate Samuelson-Balassa effects, some authors (e.g. Darvas and Szapáry, 2008) have recommended the adoption during the catching up process of more flexible exchange rate regimes together with inflation targeting.

[21]For a description of the "aquis communataire" in the area of EMU and its implications for countries with EU accession prospects, see Temprano-Arroyo and Feldman (1999).

have also been adopting some of these rules, as they prepare for future membership of the EU. In the case of the Western Balkans, for example, a pre-accession fiscal surveillance procedure, inspired by that applied to EU countries, is being jointly conducted by the European Commission and the Western Balkan countries. It includes the adoption of EU fiscal accounting rules and the regular submission of medium-term fiscal programmes (see European Commission, 2008c). The CFA franc zone provides another relevant example. In the context of the devaluation of the CFA franc in 1994, the CFA zone countries adopted regional macroeconomic surveillance procedures and targets modelled on those of the EU's Maastricht Treaty and Stability and Growth Pact (see Hallet, 2008).

5. INTERNATIONAL RISK DIVERSIFICATION AND CONSUMPTION SMOOTHING

Over the past three decades, international financial markets have become increasingly integrated. After growing gradually since the mid-1970s, the accumulation of cross-border financial assets accelerated sharply in the 1990s (European Commission, 2005). According to Lane and Milessi-Ferreti (2006), the ratio of industrialised countries' foreign assets and liabilities to GDP has tripled since 1990. Holdings of foreign assets have increased faster than holdings of domestic assets, leading to a decrease in measures of "home bias" in investment (Baele et al., 2007). Growing international financial integration increases the opportunities for cross-border diversification of risk and, therefore, economic agents' ability to insure against country-specific events (cf. Kalemli-Ozcan et al, 2004). This can generate welfare gains by weakening the link between national income and consumption and reducing the volatility of domestic consumption.

The empirical literature generally finds the degree of international risk sharing to be still quite limited, especially for developing countries (e.g. Obstfeld, 1994 and 1995; Kose et al., 2007). However, some recent studies (e.g Artis and Hoffmann, 2007 and Sørensen et al., 2007) suggest that growing financial globalisation and a falling home bias is improving international consumption smoothing among industrial countries. For emerging market countries, by contrast, there is no evidence of an increase in international risk sharing, despite the fact that many have participated in the phenomenal increase in international financial flows seen over the past two decades (Kose et al., 2003 and 2007).[22]

Although financial integration is a global phenomenon, it has been boosted in the EU and the euro area by several specific factors related to the single market and the single currency.[23] Obviously, the euro has eliminated exchange rate risk in cross-

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[22]This apparent "puzzle" may be related to the existence of "threshold effects": international financial integration may foster international risk sharing and consumption smoothing only beyond certain threshold level. This could explain why the effects are detectable in industrialised countries but not yet in emerging market countries. See Kose et al. (2007).

[23]For evidence on the positive effect of the euro on euro area financial integration, see Pagano and von Thadden (2004), Capiello et al. (2006), Lane (2006) and Lane and Wälti (2006).

border holdings of euro assets within the euro area. In addition, the EU's programme of financial integration, including measures aimed at harmonising market infrastructures, is helping to reduce the cost of cross-border transactions and enhance competition. As documented in European Commission (2007b, 2008b), financial integration within the euro area, notably in the unsecured money market and in the debt security and derivative markets, has made impressive progress over the last 15 years.

Despite this deepening regional financial integration, most empirical studies suggest that consumption smoothing in the EU and in the euro area remains relatively low. Thus, the European Commission (2007b) applies the methodology developed by Asdrubali et al. (1996)[24] to the euro area and finds that risk-sharing through the capital market in the euro zone remains much lower than available estimates for the US, although significantly above the OECD average. Moreover, the size of the estimates is very sensitive to the inclusion of smaller euro area countries with relatively large financial systems and cross-border financial assets. When Ireland, Luxembourg and Portugal are removed from the regressions, euro area smoothening through the capital markets falls even below the OECD average. The study also suggests that credit market smoothening in the euro area is much lower than the OECD average. Sorensen et al. (2007) also find that consumption smoothing in the EU is lower than in other OECD countries.

On the other hand, most available studies indicate that, as expected, financial integration and the euro are helping to increase risk sharing and consumption smoothing in the EU, and in particular, in the euro area. Thus, the study by the European Commission (2007b) finds that the capital market smoothening channel has increased after the introduction of the euro and has done so more significantly than in other OECD countries. It also finds a higher degree of smoothing through the capital market and credit channels in the euro area than in the EU, suggesting that the euro is encouraging international risk sharing at least across euro-area countries. Demyanyk et al. (2008) also find that EMU is facilitating risk sharing among EU countries, although the level of risk sharing remains below the level found among US states. Giannone and Reichlin (2006) and Kalemli-Ozcan et al. (2004), for their part, detect an increase in risk sharing and consumption smoothing among EU countries since the early 1990s. Kalemli-Ozcan et al. (2004) speculate that the process is likely to continue in the future, driven by rising cross-ownership of assets among euro area countries.

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[24]In their seminal paper, Asdrubali et al. (1996) developed a methodology to measure the extent of risk sharing achieved through different channels. They found that, during the period 1964-90, nearly 40% of the shocks to US GDP were insured by the *capital markets* (due to the ownership of productive assets across states), 23% through the *credit markets* (basically through borrowing and lending) and 13% through the *federal tax-transfer system*. This paper highlighted the important potential role financial markets and financial integration can play in insuring against asymmetric output shocks. Updated estimates produced by Kalemli-Ozcan et al. (2004) for the period 1991-1998 increased to 55% the share of US GDP shocks smoothed through the capital markets.

Table 5.1: Volatility of consumption
(Standard deviation of quarterly annualised growth rates; in %)

	1981-89	1990-98	1999-07
Euro area*	-	1.1	0.9
BE	1.4	1.2	1.3
DE	-	1.2	1.4
EL	-	-	1.0
ES	2.6	2.2	1.2
FR	1.4	1.4	0.8
IE	-	-	3.0
IT	1.7	2.0	1.0
LU	-	-	2.1
NL	2.3	1.6	1.9
AT	0.4	1.8	1.4
PT	-	-	1.7
FI	1.7	3.6	1.2
Control group			
UK	2.6	1.8	1.1
CH	1.3	1.0	0.9
US	1.7	1.4	0.9
JP	1.3	2.0	0.7
CA	-	2.0	0.9

Sources : Eurostat (except CH: EcoWin, CA: IMF); own calculations
* Covers 96% of the euro area.

Even in the absence of risk sharing, consumption volatility in the euro area should be expected to decline as the macroeconomic discipline imposed by EMU has stabilised growth, inflation and interest rates. In particular, the abolition of exchange rates within the euro area has eliminated the previous occasional speculative attacks on ERM currencies, with their destabilising impact on exchange rates and interest rates. The fact that EMU has increased the possibilities for consumption smoothing provides an additional reason to expect a reduction in the volatility of consumption in the euro area. Table 5.1 indicates that the volatility of consumption growth decreased indeed in most countries after the introduction of the euro (the exception being Germany and the Netherlands). Although, as reported in Table 4.4, the volatility of euro area GDP has also declined since 1999, the volatility of euro area consumption in the period 1999-07 was on average lower than that of GDP, indicating a certain degree of consumption smoothing.

In a recent paper, Gerlach and Hoffmann (2008) find that, by helping to deepen euro area financial markets, EMU is not only facilitating risk sharing among euro area countries but is also fostering international risk sharing worldwide. First, they find that euro area countries share significantly more risk with each other than does the average non-euro area country. This has increased the resilience of euro area consumption to variations in output. Second, they detect an important international dimension in the positive effect of EMU on risk sharing. In fact, they estimate that much of the increase in euro-area international risk sharing observed since 1999 has been vis-à-vis non-euro area countries. Similarly, their study indicates that while there has been some decline since 1999 in the amount of risk non-euro countries share among themselves, this has been more than compensated by the increase in the risk sharing they conduct with euro area countries. Therefore, according to this

study, risk sharing between euro area and non-euro area countries seems to account for most of the increase in risk sharing among OECD countries observed since 1999.

In sum, financial market integration in the euro area is not only helping to increase cross-border risk sharing among euro area countries but may also be favouring a greater intensity of financial interaction with other industrial countries. As noted in Section 2, these effects could be reinforced by a rising international role of the euro, which increases the advantages for both euro area residents and foreigners of conducting international financial transactions in euros.

The positive effect of EMU on international risk sharing and consumption smoothing is particularly relevant because of the direct connection between consumption and welfare. It has two main implications for world stability and welfare. First, it can render the world economy more stable by facilitating international risk sharing. Second, by increasing the euro area's capacity to withstand asymmetric shocks, it should improve the functioning of EMU and the stability of the euro area economy.[25] This could have additional stabilising effects on the world economy.

6.   THE EURO AND EXCHANGE RATE STABILITY

In this section, pre-EMU predictions concerning the impact of the euro on exchange rate stability are assessed against actual developments since 1999. Adequately measuring exchange rate variability is not trivial.[26] In this section, two phenomena are distinguished. First, the post-Bretton Woods era has been characterised by wide swings in nominal exchange rates, at times involving protracted misalignments and overshooting. This motivates an examination of the development over time in the amplitude of medium-term exchange rate fluctuations. Second, developments in short-term exchange rate volatility, measured by the standard deviation of daily and quarterly movements in effective and selected bilateral exchange rates, are analysed.

The impact on the real economy of medium-term exchange rate fluctuations and short-term volatility differs. Large *medium-term fluctuations* may lead to resource reallocation, in particular between the tradables and non-tradables sector of the economy. Where this reallocation is not frictionless, it leads to welfare losses.[27] Exposure to longer-term exchange rate fluctuations is hard to manage for export and import businesses, as derivative hedging instruments with long maturities are

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[25]In the absence of an independent monetary and exchange rate policy, and with national fiscal policies constrained by the rules of the EU's Stability and Growth Pact, financial integration is essential to facilitate the adjustment to asymmetric disturbances within the euro area. From the point of view of the euro area, the importance of the findings reported in this section is that they suggest that financial integration is increasing the euro area's resilience to asymmetric shocks not only by facilitating intra-regional risk sharing but also risk-sharing with the rest of the world.

[26]Already Kenen and Voivodas (1972) discussed this issue; Bryant (1997) underlines the importance of distinguishing short-term volatility from long-term swings.

[27]See Williamson (1985) and Dixit (1989).

typically not easily available or quite expensive.[28] By contrast, *short-term exchange rate volatility* was long considered to have little or no impact on real variables. However, more recent empirical work points to significant negative effects of exchange rate volatility on trade.[29] This view has been corroborated by a recent strand of empirical literature that finds that currency unions boost trade.[30] Exchange rate volatility also increases the risks involved in cross-border portfolio investment and thus contributes to home bias[31] and imperfect cross-border risk sharing.

6.1   The amplitude of medium-term exchange rate fluctuations

Graph 6.1 documents developments in the nominal and real effective exchange rate (NEER and REER) of the euro, as well as in the euro-dollar exchange rate since 1994, using before 1 January 1999 the exchange rate of a trade-weighted average of the euro's predecessor currencies, known as the synthetic euro. Graph 6.2, for its part, displays the bilateral exchange rates of the Deutsche mark, the French franc, the Italian lira, the pound Sterling, the yen and the Canadian dollar against the US dollar since 1967.[32]

As Graph 6.1 shows, since its introduction, the euro has experienced three distinct phases, separated by temporary periods of relative stability (see also European Commission, 2007b, Chapter I.2). This is essentially true regardless of whether one looks at the bilateral exchange rate against the dollar or at the euro's effective exchange rate. First, between January 1999 and the trough of June 2001 (at 0.85 dollar per euro), the euro showed a rather marked depreciation trend, which prolonged a trend already visible since 1995. Second, following a temporary pause, the euro started to recover in mid-2002 and continued to appreciate until 2005. A new interruption, characterised by a moderate downward correction, took place in 2005. After that, the appreciation trend resumed and continued until mid-2008, with the euro reaching a temporary high against the dollar of nearly 1.60 in April 2008.

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[28]Döhring (2008) discusses natural hedges that can offer more protection over the medium term.

[29]See Baldwin et al. (2005) for an overview.

[30] The seminal paper by Rose (2000) found a very large currency-union effect on trade. It sparked a series of studies on the impact of EMU on intra-euro area trade (e.g. Micco et al., 2003, Baldwin et al., 2005), which conclude that EMU has led to a significant increase in intra-euro area trade (though smaller than Rose's initial work suggested).

[31]See Fidora et al. (2007). A striking example of the impact of exchange rate volatility on capital flows is the so-called carry trade (i.e. borrowing in a currency that has a low interest rate in order to invest in a currency that carries higher interest). The risk associated with carry trade depends on the level of exchange rate volatility, and there have been several episodes of sharp unwinding of carry trades in a context of increased exchange rate volatility (e.g. the unwinding of yen carry trades in 1998 and 2007).

[32] From 1 January 1999, the exchange rate of the mark, the franc and the lira to the dollar is calculated using their fixed conversion rate to the euro.

Graph 6.1: EUR-USD and effective exchange rates against 41 countries
(Monthly data, index, Jan 1999=100)
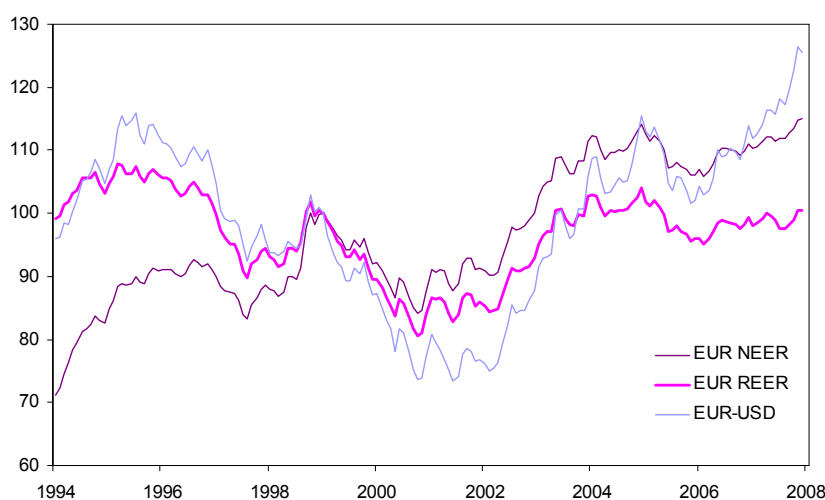
Source: European Commission

Graph 6.2 makes it clear that the Bretton Woods system was not free of medium-term swings in nominal exchange rates, which involved occasional realignments of parities. Thus, for example, the Deutsche mark appreciated by 19%, and the pound Sterling depreciated by the same amount, against the US dollar between early 1967 and late 1972. Nonetheless, when fixed exchange rates were finally abandoned in March 1973, both medium-term exchange rate swings and short-term volatility increased markedly.[33] The amplitude of medium-run exchange rate fluctuations involving the US dollar culminated in the early and mid-1980s, which were characterised by the dollar appreciation that led to the Plaza agreement and the subsequent sharp dollar depreciation until 1987. The period from the late 1980s to the mid-1990s saw subdued medium-term swings until, from 1994, another period of broad dollar appreciation set in, which, as noted, continued during the first three years of the euro's life before giving way to a new depreciating trend.

In terms of long-run exchange rate trends, euro predecessor currencies can be divided into three broad groups exemplified, respectively, by the Deutsche mark, the French franc and the Italian lira in Graph 6.2 (for the other euro predecessor currencies, see graph A1 in the Annex). The first group of currencies (including the Deutsche mark, the Dutch guilder and the Austrian schilling) exhibited a long-run appreciating trend against the US dollar from the end of the Bretton-Woods system to the introduction of the euro. The second group (including the French franc, the Belgium franc and the Irish punt) had broadly stationary exchange rates against the dollar, while the currencies of the third group depreciated[34] against the dollar.

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[33]Krugman (1989), Obstfeld (1985) and Isard (1995) contain accounts of the early years of floating exchange rates.

[34] The behaviour of exchange rates in the third group is less uniform than in the other two groups. In particular, some currencies saw periods of strong depreciation (i.e. the lira, the peseta and the escudo in the 1970s and early 1980s) followed by some stabilisation. In other cases, the period of broad depreciation lasted throughout the 1990s (Greek drachma, Slovenian tolar).

Graph 6.2: Bilateral exchange rates against the US dollar
(Daily values; January 1967 – March 2008)
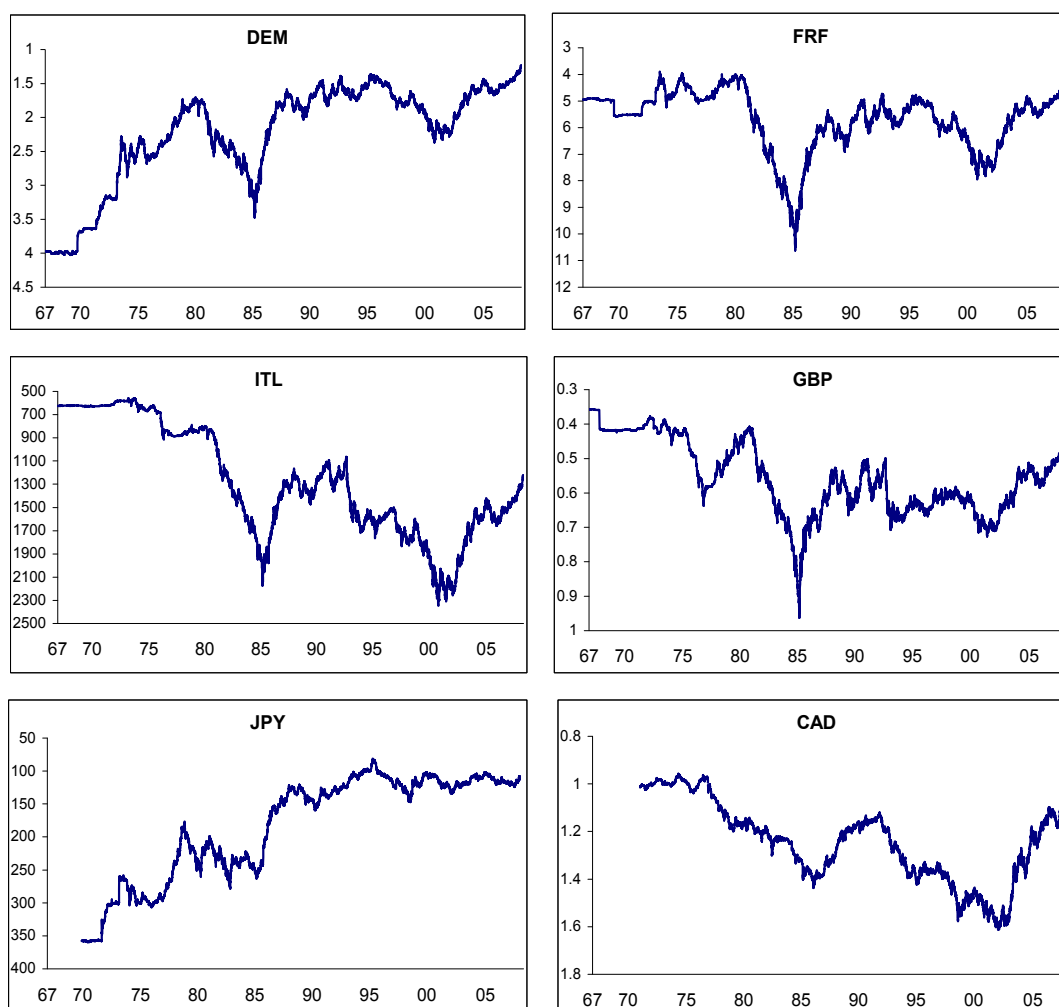
Source: Eurostat, US Federal Reserve

In order to assess more precisely trends in long-term exchange rate variability, Table 6.1 presents a simple gauge, namely the range between the lowest and the highest daily exchange rate in the periods 1980-89, 1990-98 and 1999-07, expressed as a percentage of the respective period average. It covers the NEERs and selected bilateral exchange rates of the first thirteen[35] euro predecessor currencies and (since 1999) the euro[36] thereafter. Developments in the euro-area exchange rates are compared with those in the non-euro G-7 countries as well as Switzerland.

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[35] As Belgium and Luxemburg had a currency union, a single exchange rate "BLF" is shown for their currencies.

[36] The Greek drachma and Slovenian tolar were replaced by the euro only in 2001 and 2007, respectively. Their averages for the 1999-2007 period differ, therefore, from those of the euro.

Table 6.1: Medium-term exchange rate fluctuations

(Range of largest deviations from period average, in %)[1]

	DEM	NLG	ATS	FRF	BLF	IEP	ITL	ESP	PTE	FIM	GRD	SIT	USD	JPY	GBP	CHF	CAD
NEER-24																	
1980-89	35	25	24	29	19	17	35	40	97	13	125	-	59	87	32	39	16
1990-98	19	14	13	16	13	12	36	24	13	32	47	-	34	63	25	25	29
1999-2007	15	9	9	13	10	17	14	11	8	14	13	-	26	30	10	15	34
vs USD																	
1980-89	84	86	84	99	96	90	98	101	116	-	-	-		79	90	87	23
1990-98	32	33	32	29	32	33	52	55	44	53	77	-		66	34	33	35
1999-2007	59										59	49		28	42	51	51
vs JPY																	
1980-89	65	67	64	94	84	93	100	102	149	-	-	-			106	69	94
1990-98	47	47	47	53	51	65	103	82	63	82	88	-			78	58	85
1999-2007	66										66	54			52	52	55
vs GBP																	
1980-89	64	59	64	32	38	28	41	44	83	-	-	-				75	69
1990-98	35	35	35	32	35	31	43	47	41	39	77	-				43	41
1999-2007	25										26	30				26	29
vs CHF																	
1980-89	20	21	18	50	39	48	58	71	112	-	-	-					79
1990-98	15	15	15	19	15	31	66	50	36	45	70	-					54
1999-2007	15										17	29					35
vs CAD																	
1980-89	72	73	71	79	76	70	79	82	106	-	-	-					
1990-98	50	51	50	47	50	37	39	42	33	51	58	-					
1999-2007	37										40	49					

Source: Eurostat, own calculations

(1) For the NEERs, quarterly data. For the bilateral exchange rates, daily data.

The upper panel of Table 6.1 shows that the amplitude of *medium-term swings in the NEER* against 24 industrial countries decreased broadly from the 1980s to the 1990s. With the introduction of the euro, it declined further for all the euro area countries except Ireland.[37] A decrease of similar magnitude is also visible in the effective exchange rates of practically all the non-euro-area countries used as control group. The only exception here is the Canadian dollar, which saw the swings in its NEER increase over the decades.

Turning to *bilateral exchange rates* (the lower four panels of Table 6.1), a reduction in the amplitude of medium-term exchange rate fluctuations from the 1980s to the 1990s can also be seen. However, the picture becomes more differentiated when it comes to the change from the 1990s to the period after 1999.

- Against the US dollar and the yen, the euro's fluctuations were wider than those shown by most predecessor currencies during the 1990-98 period (although they were lower than those experienced by the predecessor currencies in the 1980s). The bandwidth of fluctuations against the dollar and the yen decreased only for those euro predecessor currencies that had previously displayed a long-run depreciating trend against the US dollar as described above.

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[37]While, by definition, all euro area Member States experience the same bilateral exchange rate movements after the adoption of the euro, their effective exchange rate movements can still differ, given the different geographical orientation of their exports, which underlies the calculation of the effective exchange rate.

- By contrast, against the pound Sterling and the Swiss franc, the amplitude of medium-term fluctuations decreased since the introduction of the euro. The amplitude of the euro's fluctuations against Sterling and the Swiss franc is also less than half that its fluctuations against the dollar or the yen. This suggests a regional pattern of reduced fluctuations among the main free-floating European currencies.

- Developments in the bilateral exchange rates not involving the euro have also diverged since 1999. A strong reduction in the amplitude of fluctuations can be noted in the pound Sterling-Swiss franc pair. At the same time, the amplitude of fluctuations of the Swiss franc and Sterling against the US dollar increased. This also supports the idea of a regional pattern.[38]

6.2   Short-run exchange rate volatility

6.2.1   Daily volatility of bilateral exchange rates

Graph 6.3 plots the daily volatility (standard deviation of daily movements measured over one quarter) of selected euro area currencies, the euro and four control currencies against the US dollar. The following patterns emerge from it:

First, although the daily volatility series varies considerably from quarter to quarter, it confirms that the breakdown of the Bretton-Woods system led to a marked increase in volatility from the relatively low levels that had prevailed during that system. Daily volatility continued to increase until the mid-1980s. The increase in volatility following the demise of the Bretton Woods adjustable pegging system has been well documented (see, for example, IMF, 1984, and Isard, 1995).

Second, volatility generally showed a downward trend since the mid-1980s, yielding a somewhat hump-shaped pattern of volatility over the decades. This downward trend was however interrupted in the years around the introduction of the euro, before resuming in 2002. As in the case of long-term swings, only the short-term volatility of the US dollar-Canadian dollar rate shows a different pattern as it gradually increases over the decades.[39]

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[38] Interestingly, the swings of the Canadian dollar against the US dollar also became larger, while its amplitude against other currencies decreased.

[39] The Canadian Dollar has been floating since Canada left the Bretton Woods system already in 1970 (after having joined as late as 1962). However, until 1998, the Bank of Canada intervened systematically in the foreign exchange market in order to smooth out daily volatilities.

Graph 6.3: Daily exchange rate volatility against the US dollar
(Standard deviation, in %; 1967- 2007)
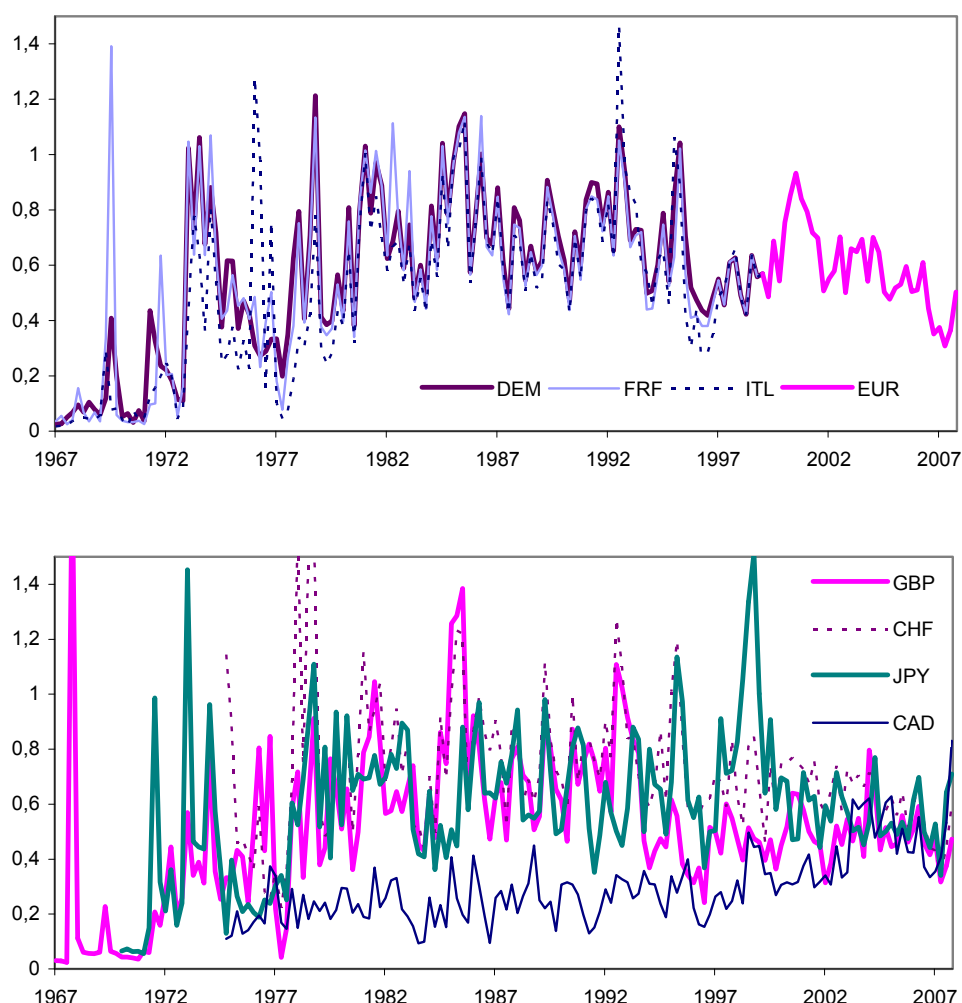
Sources: Eurostat, own calculations

Beyond these general developments, all the currencies examined (except the Canadian dollar) have at times experienced strong peaks of volatility against the US dollar. Already in the late years of the Bretton Woods system, generally low volatility was at times interrupted by volatility peaks related to realignments. Frequent spasms of volatility continued through the second half of the 1970s and the 1980s. The Swiss franc was subject to particularly strong peaks of volatility, mostly in the late 1970s (but, to a lesser degree, until the early 1990s), probably reflecting its role as safe-haven currency in periods of financial-market and political tension. The Asian crisis of 1997 and the related unwinding of yen carry trade in 1998 provoked a strong surge in yen volatility. For the European currencies, including the euro predecessor currencies, the 1990s were characterised by jolts of volatility in 1992 (the time of the EMS crisis) and 1995 (abrupt dollar depreciation in the wake of the Mexican crisis).

Table 6.2: Daily volatility of euro, euro predecessor currencies and extra-euro-area exchange rates
(Standard deviation in %)

	BLF	DEM	ESP	FRF	IEP	ITL	NLG	ATS	PTE	FIM	GRD	SIT
vs USD												
1980-89	0.77	0.77	0.71	0.78	0.77	0.72	0.76	0.77	0.69	0.61	0.84	-
1990-98	0.67	0.67	0.65	0.64	0.65	0.65	0.67	0.67	0.65	0.72	0.65	0.84
1999-2007	0.60										0.60	0.61
vs JPY												
1980-89	0.53	0.50	0.55	0.54	0.53	0.50	0.50	0.51	0.62	0.51	0.74	-
1990-98	0.70	0.70	0.74	0.69	0.76	0.77	0.70	0.70	0.72	0.80	0.70	1.10
1999-2007	0.67										0.67	0.67
vs GBP												
1980-89	0.52	0.51	0.51	0.53	0.50	0.51	0.50	0.51	0.63	0.47	0.72	-
1990-98	0.46	0.46	0.47	0.44	0.39	0.50	0.46	0.46	0.46	0.56	0.48	1.00
1999-2007	0.41										0.41	0.42
vs CHF												
1980-89	0.31	0.26	0.42	0.33	0.32	0.33	0.26	0.29	0.57	0.42	0.66	-
1990-98	0.32	0.30	0.45	0.34	0.45	0.52	0.30	0.30	0.40	0.54	0.40	1.08
1999-2007	0.21										0.22	0.24
vs CAD												
1980-89	0.76	0.75	0.69	0.76	0.75	0.70	0.74	0.75	0.69	0.60	0.84	-
1990-98	0.74	0.75	0.72	0.71	0.71	0.72	0.74	0.75	0.72	0.79	0.72	0.89
1999-2007	0.70										0.71	0.71

Extra-euro-area cross rates									
	USD-GBP	USD-CHF	USD-JPY	USD-CAD	GBP-JPY	GBP-CHF	GBP-CAD	CHF-JPY	CHF-CAD	JPY-CAD
1980-89	0.73	0.81	0.69	0.25	0.63	0.54	0.72	0.51	0.80	0.69
1990-98	0.60	0.78	0.74	0.28	0.77	0.56	0.68	0.74	0.85	0.80
1999-2007	0.49	0.62	0.59	0.46	0.64	0.46	0.63	0.66	0.74	0.73

Sources: Eurostat, own calculations

In the euro predecessor currencies, volatility against the US dollar quickly abated after 1995, reaching in 1997 its lowest level in 20 years. Around the euro introduction, volatility temporarily increased until 2001 but decreased thereafter. The reduction of bilateral exchange rate volatility has been substantial and consistent across euro area countries. The upper panel of Graph 6.2 and Table 6.2 show that, already in the 1980s, the bilateral volatilities of the later euro-area currencies against the US dollar were remarkably similar at most times, reflecting the operation of the EMS. This similarity increased further during the 1990s, in the run-up to EMU, not only with respect to the dollar but also with respect to the other main currencies.

Table 6.2 shows that, from the 1980s to the 1990s, the average volatility of the euro predecessor currencies decreased against the US dollar and the pound Sterling, remained broadly stable against the Canadian dollar and increased substantially against the yen. However, the increase in the volatility of exchange rate pairs involving the yen is also found for the non-euro area currencies, suggesting that the yen was largely responsible for this increase in volatility.[40] The volatility of the average euro predecessor currency against the Swiss franc increased somewhat, albeit from a lower level.

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[40]Tims (2006) decomposes the intra-daily volatility of bilateral exchange rates (which he defines as the logarithmic range between their daily peaks and troughs) in order to discover the currency at the origin of volatility. In line with the above, he identifies the yen as a strong source of volatility in the second half of the 1990s.

Despite the temporary increase in volatility experienced in the first three years of EMU, the average daily volatility of the euro against the four main partner countries has been lower than the volatility shown by its predecessor currencies in the two decades prior to the introduction of the euro (see Table 6.2). The decrease was most pronounced for the volatility against the Swiss franc, which for the average euro predecessor almost halved from an already low level. The daily volatility of the euro against Sterling is also substantially lower than that of its predecessor currencies with the exception of the Irish pound. The volatility of the euro against the yen has remained high, although it is off the levels seen in the 1990s.

Volatility has also decreased since 1999 for the other exchange rate pairs under analysis. The lowest daily volatilities can be observed in the euro-Swiss franc, euro-Sterling and Sterling-Swiss franc pairs, which corroborates the idea of a regional pattern already detected for medium-term swings in the major exchange rates.

6.2.2 Quarterly volatility of effective exchange rates

The analysis of the short-term volatility of effective exchange rates confirms the findings based on bilateral exchange rate series. Table 6.3 displays the quarterly volatility of *nominal effective exchange rates (NEERs)* measured against 24 industrial countries.[41] Data are reported for the 11 euro area currencies under analysis, the euro and a broader control group. Table 6.3 shows that the quarterly volatility of the NEER decreased between the 1980s and the 1990s for most countries, the exceptions being Ireland,[42] Canada as well as four countries that experienced financial turmoil in the 1990s, namely Japan, Finland, Sweden, and Turkey.

Table 6.3 also shows that the average quarterly volatility of the NEERs of the euro area Member States during the EMU period was lower than those shown by its predecessor currencies in the decade prior to the introduction of the euro. NEER volatility was more than halved for Spain, Italy and Finland, while the reduction was more moderate for the other euro-area countries. It is important to note, however, that this observed reduction in volatility is to a large extent mechanical: effective exchange rates are calculated as trade-weighted exchange rate against a group of trading partners. For most euro-area countries, the bulk of trade takes place within the euro area, where nominal exchange rate volatility disappeared with the introduction of the euro. By contrast, the effective exchange rate of the euro is based only on extra-euro-area trade and does not display this mechanical reduction of volatility. As a consequence, the volatility of the euro's NEER decreased by much less than that of the euro-area Member States.

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[41] Broader series for effective exchange rates also capture key emerging market economies, but do not reach sufficiently far back in time. The Slovenian tolar is not covered by this series, but its effective exchange rate (differently defined) also displays a strong decrease in volatility after 1999.

[42] Note that Sterling has a very high weight in the effective exchange rate of the Irish pound. The Irish pound was de-pegged from Sterling in 1979, when Ireland joined the EMS.

Table 6.3: Volatility of quarterly nominal effective exchange rates against 24 industrial countries
(Standard deviation in %)

Euro and euro area Member States												
	EUR[1]	BLF	DEM	GRD	ESP	FRF	IEP	ITL	NLG	ATS	PTE	FIM	Average[2]
80-89	3.1	1.6	1.9	3.5	2.3	2.0	1.9	1.7	1.5	1.2	2.5	1.6	2.0
90-98	2.5	1.3	1.6	1.7	2.1	1.3	2.0	3.2	1.2	1.0	1.4	3.0	1.8
99-07(Q2)	2.4	0.9	1.2	1.1	0.9	1.1	1.5	1.1	0.8	0.7	0.8	1.1	1.0
Non euro area countries												
	GBP	USD	JPY	CHF	SEK	DKK	NOK	TRY	CAD	MEX	AUD	NZD	Average
80-89	3.8	3.5	4.2	2.8	2.6	2.0	1.6	6.7	1.6	9.9	5.0	4.2	4.0
90-98	3.1	2.9	5.3	2.4	3.4	1.6	1.5	6.9	1.7	6.9	3.9	2.7	3.5
99-07(Q2)	1.5	2.2	3.4	1.4	1.8	1.0	2.2	8.8	2.6	2.9	2.9	3.7	2.9

Source : Commission Services
(1) Before 1999, synthetic euro.
(2) Simple average of volatilities shown by euro area member countries.

Outside the euro area, volatility also decreased after 1999, with the exception of Canada, Norway, New Zealand (due to the price volatility of their commodity exports) and Turkey (where there was again financial instability). Data on *real effective exchange rates* (Table A1 in the Annex) confirm this picture.

6.3   Observed exchange rate stability in light of pre-EMU predictions

Before the euro introduction, the literature had held contradictory views on whether the single currency would lead to more or less exchange rate volatility. From the preceding analysis, it emerges that the outcome is somewhat differentiated, depending on the indicator of exchange rate variability that is used and on the exchange rates under scrutiny.

The amplitude of *medium-term exchange rate fluctuations* (both in effective terms and for the main bilateral rates) decreased from the 1980s to the 1990s for practically all currencies and, in nominal effective terms, continued to do so after 1999 by a similar degree in euro area countries and their main partner economies. This suggests that the stabilisation in long-run exchange rate swings was mostly related to global factors (the Great Moderation) rather than a specific EMU effect.

However, the differentiated performance in bilateral exchange rates provides two interesting insights. First, the fact that, with the exception of the weaker predecessor currencies, the euro's medium-term swings against the dollar have been larger lends some support to the predictions of the "openness argument". The larger medium-term swings against the dollar and the yen suggest that the exchange rate continues to play an important role as absorber of asymmetric economic developments between the euro area and the US/Japan. However, to the extent that the exchange rate overshoots developments in the underlying fundamentals, this implies costs for international trade, output and financial stability.

Second, the fact that EMU has been accompanied by a reduction in long-term fluctuations against the pound and the Swiss franc, as well as between these two currencies, points towards a possible regional stabilisation effect of EMU on exchange rates. As noted in Section 4, the increased synchronisation of business

cycles and interest rate fluctuations between the euro area and the UK/Switzerland may be contributing to this.

Turning to *short-term volatility*, the euro has had an unambiguous stabilising effect. Despite a temporary surge in volatility in the first three years of EMU, the daily volatility of the euro against other key world currencies has been on average significantly lower than that experienced by its predecessor currencies. The same is true for most of the cross rates of the key currencies outside the euro area. Indeed, following the 1999-2001 spike, volatilities fell distinctly for most currencies and remained at historically low levels until the financial turbulences triggered by the US subprime crisis began to push them back up. Consistent with the regional pattern observed in medium-term fluctuations, the bilateral volatility of the euro against Sterling and the Swiss franc (as well as that of the Sterling/Swiss franc pair) has fallen to levels that are particularly low. The volatility of effective exchange rates has also decreased substantially both for the euro area countries and for the control currencies. The reduction in the volatility of effective exchange rates is to a large extent mechanical, reflecting the abolition of exchange rate volatility within the euro area. This is the expected manifestation of the "vanishing volatility" argument. But this does not make it less important. By avoiding the type of intra-EU exchange rate tensions that the EMS used to generate, the euro has partly sheltered the euro area from global exchange rate and financial turbulences. This point is illustrated by the relative resilience shown by the euro area to the international financial turmoil and marked dollar depreciation of 2007-08, although the euro area has obviously not been immune to this crisis.

Finally, there was also a discussion, ahead of EMU, whether the elimination of intra-euro area exchange rate volatility would show up in the euro's exchange rate against third-country currencies. On the basis of the analysis in this section, one can conclude that such a transfer of short-term volatility from within the euro area to the exchange rates of third countries has not occurred.

7. POLICY COORDINATION IN A MORE SYMMETRIC INTERNATIONAL MONETARY SYSTEM

As noted in Section 2, EMU was expected to change the international monetary geometry. Some observers argued that by shifting the international monetary system from a unipolar (or hegemonial) to a bipolar structure, EMU could affect its stability, including by altering the incentives and the capacity to undertake international policy coordination Such a bi-polar monetary world would be characterised by three main features. First, the existence of two large hegemonic areas of similar economic and financial weight. Second, the existence of two currencies acting as the dominant international currencies. Third, the economies issuing those currencies would have a similar capacity to shape international macroeconomic and financial policies.

This section reviews the changes in the international monetary system since the advent of the euro, compares them to earlier predictions and discusses the outlook

based on recent developments and trends. The main conclusion is that, although
EMU has created a monetary area similar in size to that of the US and although the
euro is playing an increasingly important international role, the US dollar continues
to play a dominant role in the international monetary system and EMU has not led
so far to a more active international coordination in the area of macroeconomic
policy. While there have been some advances towards a strengthening of the euro
area's international monetary and exchange rate policy role, the euro area continues
to play a global policy role that is not commensurate with its economic and financial
power, partly reflecting the fragmented nature of its external representation. This
has also prevented so far the reduction in the costs of international policy
coordination that EMU was expected to bring about.

7.1   The euro area: an economic power on a par with the US

Table 7.1 compares the size of the euro area with that of the US and other major
world economies in 2006 on the basis of four indicators: GDP, trade flows, financial
size and population. The euro area is responsible for a similar share of world trade in
goods and services than the US and the size of its financial system (measured by
aggregating stock market capitalisation, the stock of debt securities and bank assets)
is also very close to that of the US. At 317 million, its population is a few millions
above that of the US (300 million). Its GDP remains below that of the US,
accounting (at market exchange rates) for about 22% of world GDP, compared to
about 27% for the US. But as membership of the euro area is expected to expand in
the years to come, the gap between the GDPs of the two areas should shrink. This
would be particularly the case should the UK join the euro zone one day. The entry
of the UK would also have an important impact on the size and efficiency of the
euro area's financial system, given the large size and sophistication of London's
financial centre.

Table 7.1: Key characteristics of main economies, 2006

	Population (millions)	Share of world GDP (%) (1)	Share of world trade in goods and services (%) (2)	Size of financial system (3) Billion US$	Size of financial system (3) % of GDP
EU	493	30.3	17.4	72914	534.4
Euro area	317	21.9	13.3	53269	503.1
US	300	27.3	13.1	56509	428.3
UK	61	5.0	6.1	19931	456.5
Japan	128	9.1	7.1	16305	680.9
China	1314	5.5	n.a.	n.a.	n.a.

Sources : IMF World Economic Outlook database, WTO, European Commission

(1) GDP measured at market exchange rates.

(2) Excluding intra-euro area (or intra-EU) trade.

(3) Sum of stock market capitalisation, stock of debt securities and commercial bank assets.

In terms of GDP, trade flows, financial size, and population, therefore, EMU has
created an economic power on a par with the US. Moreover, as underlined by Sapir
(2007), the euro area's presence in the world economy manifests itself not only
through trade, capital or migratory flows but also through the EU's intense

regulatory activity. It is clear therefore that EMU has contributed to the creation of a more symmetric world economic and financial geometry.

7.2   The international role of the euro

Let us now look at whether EMU has also led to a more symmetric distribution of the international currency role. The euro's international role and its structural underpinnings have been extensively discussed elsewhere.[43] In a nutshell, the structural underpinnings deemed necessary for an international currency role to develop are the existence of a large and dynamic domestic economy with a macroeconomic framework conducive to currency stability as well as deep and liquid financial markets. As documented above, the euro-area economy is similar in size to that of the US. It has also been catching up in terms of growth potential in recent years. The macroeconomic framework of the euro area has proven its merits in providing stability, and financial market integration and development are progressing, although the euro area financial markets continue to lag behind those of the US in terms of efficiency and liquidity.[44] All this has allowed the euro to quickly assume an international role that is larger than that of its predecessor currencies combined and second only to that of the US dollar.[45]

In some international currency functions,[46] the euro has made substantial gains. The rise of the euro as an international financial currency, where on a broad measure it has even surpassed the dollar, has been particularly impressive (see Graph 7.1). The euro also plays a dominant role in the interest rate segment of the derivatives market and as parallel cash and banking currency in the euro area's neighbourhood, notably in Central and Eastern Europe and the Western Balkans (ECB, 2007). In other functions progress has been more moderate, or has been largely concentrated on certain regions (mostly surrounding the euro area), revealing a strong regional and institutional pattern. This is the case of the exchange rate anchor role (see Table 7.2), the trade invoicing role and the reserve currency and parallel currency roles. And in the functions where the incumbency advantages of the dollar are more important, namely the role as foreign exchange vehicle and as a pricing currency for international commodities, the euro's inroad has been very limited.[47]

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[43]See, for example, Bergsten (1997), European Commission (2008b) and Papaioannou and Portes (2008a).

[44]See European Commission (2008b), Chapter II.7.

[45]See ECB (2007 and 2008) and European Commission (2008b).

[46] Following Kenen (1983), these are usually classified as follows: 1) *store of value* (reserve currency, investment currency, parallel currency); 2) *medium of exchange* (official foreign exchange intervention currency, vehicle currency in the foreign exchange market, parallel currency); and 3) *unit of account* (exchange rate anchor, trade invoicing currency, quotation currency for international commodities, currency of denomination of international financial transactions, parallel currency).

[47]Recent data from the BIS (2007) indicate, however, that the euro is already playing an important role in the foreign exchange markets of countries neighbouring the euro area.

Graph 7.1: Stock of international debt securities: broad definition[1]
(In % of total amount outstanding, at current exchange rates)
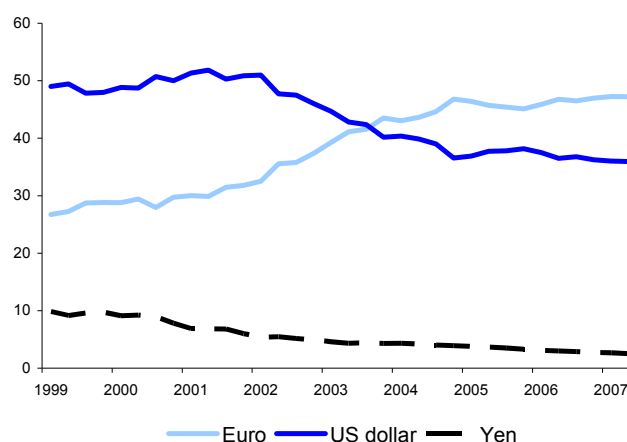
Source : BIS

(1) Including home currency issuance if targeted to the international market.

Table 7.2: Countries and territories with exchange rate regimes linked to the euro
(as of 1 March 2008)

Region	Exchange rate regimes	Countries/territories
European Union (non-euro area)	ERM II	Denmark, Estonia, Latvia, Lithuania, Malta, Slovakia
	Euro-based currency boards	Bulgaria
	Peg arrangements with fluctuation band based on the euro	-
	Managed floating with the euro as reference currency	Czech Republic, Romania
Candidate and potential candidate countries	Unilateral euroisation	Montenegro
	Euro-based currency boards	Bosnia and Herzegovina
	Peg arrangements or managed floating with euro as reference currency	Croatia, FYR Macedonia, Serbia
Others	Euroisation	Republic of San Marino, Vatican City, Principality of Monaco, Saint-Pierre-et-Miquelon, Mayotte
	Unilateral euroisation	Andorra, Kosovo
	Peg arrangements based on the euro	CFA franc zone(1), French overseas territories, Cape Verde, Comoros
	Peg arrangements and managed floats based on the SDR and other currency baskets involving the euro	Seychelles, Russian Federation, Libya, Botswana, Morocco, Myanmar, Tunisia, Vanuatu

Notes: 1) WAEMU (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo) and CAEMC
(Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, Gabon).
Source: ECB, Review of the International Role of the Euro, June 2008.

The fact that the euro's advances as a reserve currency and as foreign exchange vehicle have been modest is particularly relevant because these two functions are central for its overall influence in the international monetary system. Although the share of the euro in disclosed official reserves increased from 17% in 1998 to 26% at the end of 2007, the dollar remains by far the most important reserve currency, accounting for 64% of global reserves at the end of 2007 (see Table 7.3). Similarly, BIS data for April 2007 show that, in the foreign exchange market, the euro was in

one side of only 37% of all transactions, compared to 86% for the US dollar (Table 7.4).[48] In these functions, therefore, the dollar remains by far the leading international currency.

Table 7.3: Currency compositon of official foreign exchange reserves
(Percentage share of disclosed reserves)

Currency	1995	1998	2001	2004	2007
US dollar	59	69	72	67	64
Euro (1)	27	17	18	24	26
Japanese yen	7	6	5	4	3
Pound sterling	2	3	3	3	5
Memo item:					
Unallocated reserves	26	22	22	28	36
(in % of total reserves)					

Source : IMF's COFER data base.

(1) For 1995, sum of reserves held in Deutsche marks, French francs, Dutch guilders and ECU

Table 7.4: Currency composition of foreign exchange market turnover
(Percentage shares of average daily turnover in April) (1)

Currency	1995	1998	2001	2004	2007
US dollar	83.3	87.3	90.3	88.7	86.3
Euro (2)	36.1	30.1	37.6	37.2	37.0
Japanese yen	24.1	20.2	22.7	20.3	16.5
Pound sterling	9.4	11.0	13.2	16.9	15.0

Source : BIS Triennial Central Bank Survey 2007.

(1) Because two currencies are involved in each transaction, the sum of the percentage shares of individual currencies totals 200% instead of 100%.

(2) Before 1999, it refers to the Deutsche mark.

Looking forward, some structural elements will continue to favour the dollar (e.g. the US' large and liquid financial markets, the smaller number of policy actors, which makes the macroeconomic policy framework simpler than the necessarily more complex one of the euro area). Moreover, even at equal attractiveness in terms of the underlying structural features, the incumbent's advantages from economies of scale and network externalities (which make it reasonable for agents to use the same currency most others are using because this minimises transaction costs) will continue to support the dollar. In this respect, historical experience has demonstrated that these inertial forces can prolong the international status of a currency for some time even after it has lost its underlying structural advantages.[49]

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[48]Note that the shares of the euro in foreign exchange reserves and in the foreign exchange market at the end of 2007 were very similar to the combined shares of its predecessor currencies (including the ECU) in the mid-1990s. This is explained by role these currencies (notably the Deutsche mark) played within the EMS and for the settlement of intra-regional trade and financial transactions among EU countries before EMU. By eliminating the need to hold Deutsche marks and ECU reserves within the EMS and shifting to the settlement in euros (e.g. in local currency) of intra-euro area trade and financial transactions, EMU initially reduction the role of the euro in reserves and the foreign exchange market relative to that played by its predecessor currencies combined.

[49]The survival of the British as the dominant international currency until the 1930s, well after the loss of the UK's economic hegemony, is perhaps the best known example.

However, as the euro area financial markets, supported by deepening financial integration in the euro area, continue to gain liquidity and efficiency, the dollar's advantages from network externalities and economies of scale will increasingly be set against the advantages of diversifying towards the euro. This, combined with the progressive enlargement of the euro area, should help the euro to further increase its international status. In this respect, Chinn and Frankel (2005 and 2008) consider a scenario where all EU countries adopt the euro and predict that the euro could overtake in that case the US dollar as the main international currency within 15 years.[50]

As demonstrated by the current international financial turmoil, of which the US is the epicentre, doubts about the US economy, and in particular about the sustainability of its external imbalance, may encourage shifts of investor preferences between the US dollar and the euro. The dollar depreciation trend observed since 2002 is increasing the incentives for countries holding large foreign exchange reserves to diversify away from the US dollar in order to limit possible valuation losses. In a context of rising global inflation due to markedly higher international energy and food prices, this is also putting pressure on countries with large current account surpluses and undervalued exchange rates (such as some oil producing countries) to abandon their pegs to the dollar.

Should these diversification forces operate in a sudden and abrupt manner, they could set in motion a spiral of selling of US assets and depreciation from which the euro might emerge in a much stronger reserve-currency position. This could be accompanied by increased exchange-rate volatility in line with Mundell's (2000) argument that changes in international currency status are not smooth. However, this diversification process need not take place abruptly (and some economists believe that it might not take place at all).[51] To the extent that the process is gradual, it need not result in higher global instability. Moreover, as we have already begun to see, the consolidation of the euro as an alternative international currency should help limit the problem of global imbalances because it will reduce the US capacity to run large current account deficits, as stressed by Cohen (2006a). This could, over the medium term, have positive repercussions for world stability.

In sum, despite the successful arrival of the euro as a new international currency, the international monetary system continues to be dominated by the dollar with the exception of the regions surrounding the euro area. The international monetary system is however no longer the unipolar dollar system it used to be. The euro represents today a serious contender of the dollar. To the extent that this increases the substitutability of euro and dollar assets, it could increase the incidence of portfolio shifts between both currencies, with negative implications for exchange rate and interest rate volatility. Volatility could increase in particular, although in a temporary manner, should there be an abrupt shift in portfolio preferences from the

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[50]For more sceptical views, see Cohen (2006b) and Sapir (2008). Sapir argues that although the euro might become a more important international currency in functions where diversification matters, the dollar is likely to retain its supremacy in functions that involve substantial network externalities.

[51]For a survey of the literature on the potential for portfolio diversification away of the dollar, see European Commission (2008b), Box II.7.1.

dollar to the euro. As discussed in Section 6, however, there is little evidence so far that this is happening. Exchange rate and interest volatility has basically declined, not increased, since the introduction of the euro.

7.3 Towards closer international policy coordination?

Turning to the policy dimension, there is little evidence so far that EMU has resulted in a more active international coordination of macroeconomic policies. Following the relatively successful Plaza Agreement of February 1985 and the Louvre Accord of February 1987[52], coordination among G-7 countries in the area of exchange rate and monetary policy has been rare. The only case of coordinated foreign exchange intervention by G-7 central banks since the introduction of the euro took place in September 2000, to stem the depreciation of the euro, and was followed by additional, unilateral interventions by the ECB in November of that year. Also, in September 2008, in the context of the international financial crisis, the central banks of the US, the euro area, Japan, Canada, Switzerland and the UK undertook massive coordinated injections of liquidity into the interbank market. The only other significant effort at international macroeconomic policy coordination since the advent of the euro is the multilateral consultations on global current account imbalances organised by the IMF in 2006-07, which involved China, the euro area, Japan, Saudi Arabia and the US (see IMF, 2007a). But exchange rate policy did not play a major role in these consultations, and question marks remain regarding the implementation of the other macroeconomic and structural policy commitments.

Discussions on the possible introduction of a system of target zones for the key exchange rates, which figured prominently around the time of the Plaza and Louvre agreements[53] and resurfaced immediately before the introduction of the euro[54], have

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[52]The Plaza Agreement, involving the five largest industrialised countries (G-5), aimed at depreciating the dollar through coordinated foreign exchange intervention and adjustments in fiscal and monetary policies (including fiscal tightening in the US, tax cuts in Germany and measures to boost private demand in Japan). The package was so successful in producing a depreciation of the dollar that the Louvre Accord was necessary to curb the dollar depreciation. The Louvre Accord secretly established a narrow voluntary intervention grid as well as wider reference zones for the currencies of the G-7 countries, and was also backed up by fiscal policy measures (see Funabashi, 1989, and Cline, 2005). Other significant milestones in international macroeconomic policy coordination among industrialised countries since then include the coordinated interest rate reductions of March-April 1986 and the creation of the G-7 Finance Ministers meetings in May 1986. For the genesis and evolving role of the G-7, see Bergsten and Henning (1996) and Bergsten (2006).

[53]See, for example, Williamson and Miller (1987) and Krugman and Miller (1992).

[54]Following the election of a new, SPD-Green government in Germany in 1998, the new German minister of finance, Oskar Lafontaine, called for the establishment of a target zone system among the US dollar, the euro and the yen, with relatively wide bands that could be adjusted to take into account inflation differentials. However, his proposals were criticised as impracticable by other governments and by many central banks (including from within the EU) and fell largely into oblivion after Mr. Lafontaine resigned in March 1999 (see Henning, 2006). Only the French Minister of Finance, Dominique Strauss-Kahn, seemed sympathetic to the idea, although the French preferred a much laxer system of macroeconomic coordination and exchange rate surveillance among G-7 countries. At the time, Japan's finance minister, Mr. Mizayawa, had also proposed the introduction of a system of managed flexibility among the world's largest currencies.

remained sterile and have subsided. In the absence of formal coordination on exchange-rate matters, transatlantic monetary cooperation has largely remained circumscribed to the regular exchange of views in the key international fora and to the often rhetoric and vague declarations on exchange rates included in the Communiqués issued by G-7 Finance Ministers at their regular meetings.

There are three main reasons why EMU has not resulted in closer international macroeconomic policy coordination, notably in the monetary and exchange rate area. First, all G-7 countries favour a high degree of exchange rate flexibility and are sceptical of any system of even lax and wide target zones. They also have significant doubts about the effectiveness of coordinated exchange rate intervention unless it is backed up by the appropriate changes in domestic monetary policies. This view has been supported by a substantial body of literature underling the ineffectiveness of sterilised foreign exchange interventions.[55]

Second, contrary to what some predicted, EMU has not made international coordination easier because the euro area's international representation on monetary and financial matters remains fragmented (see European Commission, 2008b, and van den Noord et al., 2008). At the meetings of G-7 Finance Ministers and Central Bank Governors, the euro area as such is represented by the President of the Eurogroup and the President of the ECB,[56] in addition to the three large euro-area members France, Germany and Italy, which have kept their seats. At the IMF, the euro area is represented via its Member States, which are dispersed over a large number of constituencies. The euro area as such is not a member of the IMF, although the ECB can attend certain Board meetings as an observer. In the G-20, the Financial Stability Forum and the OECD, the external representation of the euro area also remains fragmented and incomplete (see van den Noord et al., 2008).

This fragmented external representation makes it difficult for the euro area to convey a cohesive and assertive voice on global economic and financial matters. This not only causes it to punch below its economic and financial weight, as emphasized by many observers.[57] It also means that the reduction in the costs of international cooperation that EMU was expected to bring about cannot fully materialise since it assumes that the euro area can speak with a single voice.

The third reason why EMU has not led to more ambitious international policy coordination is that some of the key world players among the emerging market

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[55] In 1982, the G-7 economic summit at Versailles commissioned a study on foreign exchange intervention, known as the Jurgenson Report, which concluded that sterilised intervention had small and at most transitory effects (see Henderson and Sampson, 1983). For the early negative findings on the effectiveness of sterilized intervention, see Weber (1986) and Obstfeld (1990). Subsequently, this negative view on the impact of intervention has been challenged by other authors. See, in particular, Dominguez and Frankel (1993), who find that sterilised intervention can work, particularly if known by the markets and done in a coordinated manner in a G-7 context.

[56] The Commissioner for Economic and Monetary Affairs participates in the agenda items of meetings of the G-7 that pertain to work of the G8, but not in the discussions on the economic situation and exchange rates, despite the Commission's key role in the EU's fiscal coordination framework.

[57] See, for example, Bini-Smaghi (2004 and 2006) and Sapir (2007).

countries remain insufficiently represented in the international financial architecture. This diminishes the capacity of multilateral institutions to reach relevant agreements in some of the key policy areas (ranging from exchange rate policy and global imbalances to energy and financial sector policy).

On the positive side, some pragmatism is visible. The coordination of euro area positions has been improved (see van den Noord et al., 2008) and the euro area has made some progress towards speaking in a more coherent voice on exchange rate policy matters.[58] This includes the decision taken in 2005 to appoint the President of the Eurogroup for two-years, his enlarged participation in G-7 meetings and the practice of the Eurogroup of adopting "terms of reference" on exchange rate matters before key international meetings. The issues raised by the foreign exchange interventions of the autumn 2000 shed light on the roles of the different euro area institutions involved and underlined the need to avoid a cacophony of European voices publicly talking about exchange rates (see Henning, 2006). Also, in the recent multilateral consultations on global imbalances, the euro-area representation was streamlined, with the euro-area delegation being composed of the Eurogroup Working Group, the ECB and the Commission. Similarly, in bilateral discussions with the Chinese financial and monetary authorities in late 2007, the euro area was represented by the Presidents of the Eurogroup and the ECB and the Commissioner for Economic and Monetary Affairs, which contributed to convey a unified message to China on current account imbalances and exchange rate policy.

Another positive development is the efforts being made to strengthen the participation of key emerging market countries in the international financial institutions and fora. In addition to the creation of the G-20 in 1999, this has included the recent quotas and voice reform at the IMF, similar discussions ongoing at the World Bank, the outreach policies of the G-7, the G-8 and the enlargement and outreach policies of the OECD. Also, China and Saudi Arabia were invited, as noted, to the multilateral consultations on global imbalances, given their important share of global imbalances.

In spite of these endeavours, the international financial architecture is still in need of a substantial overhaul, one that will increase the legitimacy and relevance of their membership (by strengthening the voice of emerging and developing countries) while maintaining a workable number of countries or representatives in their decision-making bodies. As argued by van den Noord *et al.* (2008) and Ahearne and Eichengreen (2007), the consolidation of European representation in multilateral fora could facilitate both things and, at the same time, strengthen the euro area's influence in them.[59] It would allow the euro area and the world to gain from the simplification of, and stronger incentives for, international policy coordination that EMU offers.

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[58]For a description of the institutional setup for the euro area's exchange rate policy, see Kutos (2001), Henning (1996) and van den Noord et al. (2008).

[59]Bini-Smaghi (2006) and Leech and Leech (2005) show that, even with a lower aggregate percentage of votes, a unified representation in the IMF could increase the euro area's actual voting power.

8.   CONCLUSIONS

This paper has discussed the impact of EMU on global macroeconomic and financial volatility, comparing the predictions made by the literature with the empirical evidence gathered since the start of EMU. One challenge in identifying a specific impact of the euro arises from the fact that EMU, and the run-up to it (where some of its effects began to materialise), have coincided with a global trend towards lower volatility of output, inflation and financial variables. The paper therefore attempted to disentangle global from EMU-specific effects. In most cases, the available data did not cover the recent increase in financial market volatility associated with the 2007-08 international financial turmoil.

The main finding is that EMU has contributed to the reduction in financial and macroeconomic variability observed within the euro area, and that this has had, in some cases, positive spillover effects on other countries, particularly in neighbouring regions. Predictions that the euro would lead to increased international volatility are not borne out. In fact, the euro area, which accounts for about one fourth of the world economy, has become a pole of stability for the world economy.

EMU's strong stability-oriented macroeconomic framework and policies have contributed to an impressive reduction and convergence of interest rate and inflation levels and volatility among euro area countries. With a few exceptions, the euro area shows now the lowest interest and inflation volatility in the developed world. Similarly, EMU has helped to reduce output volatility in the euro area. Compared to the situation before 1999, EMU is helping to shelter its member countries from global turbulences, as illustrated by their relative resilience to the 2007-08 financial turmoil. Also, by contributing to foster regional integration, EMU (in combination with the Single Market programme) has deepened business cycle synchronisation among euro area countries beyond the trend observed at global level. A strong increase in business cycle correlations between the euro area and its surrounding countries, including both advanced and transition countries, is also visible, pointing to an "Europeisation" of the business cycles.

There is some evidence that these EMU-specific achievements in the area of macroeconomic and financial stability are in part being exported to the rest of the world. This appears to occur mainly through two channels. First, some studies have identified direct stability-enhancing spillovers on other OECD countries for interest rates and inflation and, to a lesser extent, output volatility. Like some of the EMU-specific effects on the euro area, part of these spillover effects already occurred during the convergence period in the 1990s. Countries with close trade, financial and exchange rate links with the euro area and showing strong cyclical synchronisation with it are likely to benefit more significantly from these spillover effects. Second, these economic spillovers are complemented in some cases by policy spillovers. In certain countries or regions (mostly located in the neighbourhood), the adoption of EMU-inspired macroeconomic rules and euro-based exchange rate regimes and the implicit guarantee associated with EU or euro area accession prospects are helping to reinforce policy credibility and macroeconomic stability.

The enhanced cyclical synchronisation among euro-area countries tends to increase world output volatility because variations in individual euro area country growth are offsetting each other to a lesser extent than before. However, the data indicate that the positive effect on world stability from the reduction in the variance of euro-area output volatility is quantitatively more important, meaning that, on a net basis, the euro area macroeconomic performance is having a positive effect on world stability.

Most empirical studies suggest that risk-sharing and consumption smoothing in the euro area and in the EU remain lower than in other OECD countries. However, there is evidence that, by helping to foster the integration and development of euro area financial markets, EMU is facilitating cross-border risk diversification both among euro area countries and worldwide. This EMU-specific effect may be reinforced by the rising international role of the euro, which tends to increase the liquidity and, therefore, the appeal of euro area securities markets for foreign investors and borrowers.

A particular focus of this paper was on the impact of EMU on the variability of exchange rates. Although exchange rate fluctuations have decreased overall since 1999, the euro has displayed larger medium-term swings against the US dollar and the yen than the most stable of its predecessor currencies. We tend to view the observed increase in the amplitude of exchange rate swings against the dollar and the yen as an indication that the exchange rate continues to play a significant role as absorber of idiosyncratic shocks relative to the US and Japanese economies. This view is underpinned by empirical evidence suggesting that exchange rate variability is negatively related to the volatility of output and consumption.

While long-run exchange rate swings against the dollar and yen have become larger than in the 1990s, they remain lower than in the 1970s and 1980s. Moreover, they have been muted against Sterling and the Swiss franc. This points, again, to a regional stabilisation function of EMU and is consistent with the increased synchronisation of European business cycles, high interest rate correlations and the important exchange rate anchor role the euro plays in the surrounding countries.

Developments in short-term exchange rate volatility have been far more homogeneous than those of medium-term swings. Despite a temporary surge in the first three years of EMU, the short-term volatility of the bilateral euro exchange rates against all the major partner currencies has been on average during the EMU period lower than that of any of its predecessor currencies. The average volatility of effective exchange rates has also decreased across the board. Therefore, while EMU has led to vanishing exchange rate volatility within the euro area, this volatility has not been transferred to the euro exchange rate against third country currencies as some economists had predicted.

Finally, many observers had predicted that EMU would lead to a bipolar international monetary system, in which the euro area and the US would have similar political clout and the euro and the US dollar would share the status of international currencies. Although the euro has emerged as the second most important international currency and euro area financial integration is creating a more serious alternative destination for international investment, the international

monetary system remains essentially dominated by the US dollar, both in terms of international currency use and of political influence, in particular as the euro area has not yet optimised its international representation. While there is no evidence supporting the argument that hegemonic decline would lead to an increase in world instability, there is currently also little evidence of enhanced monetary coordination among the major economies. A more cohesive representation of the euro area in multilateral fora should facilitate international coordination, with potential benefits for both the euro area and world stability.

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ANNEX

Graph A1: Daily exchange rates of euro predecessor currencies against the US dollar
(USD as base currency)

Source: Eurostat

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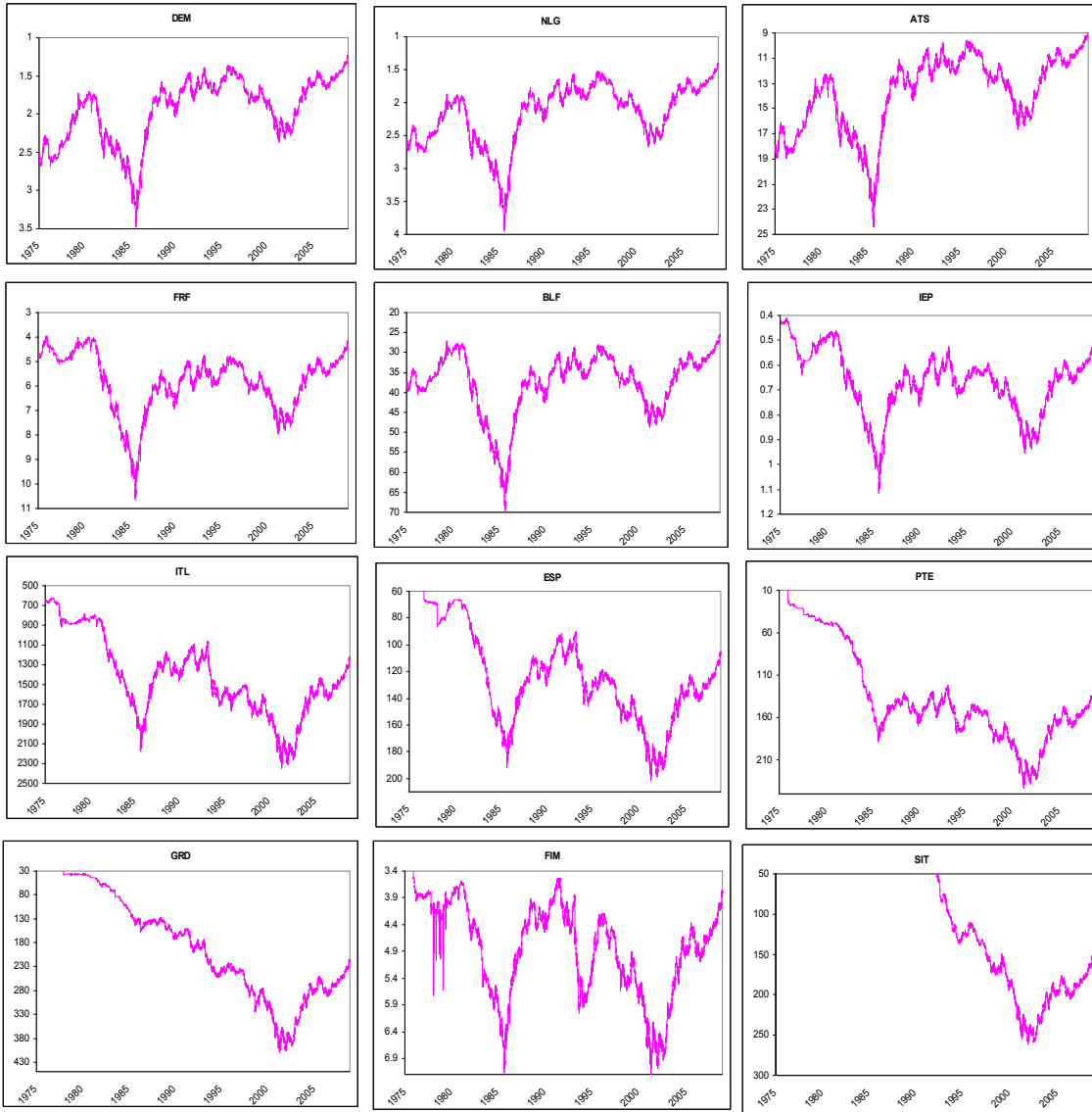
Table A1: Volatility of quarterly real effective exchange rates against 24 industrial countries
(Standard deviation in %)

Euro and euro area Member States

		EUR	BLF	DEM	GRD	ESP	FRF	IEP	ITL	NLG	ATS	PTE	FIM	Average[2]
REER (ULC)	80-89	3,02	1,73	2,08	3,94	2,24	1,77	2,05	1,42	1,76	1,22	2,22	1,68	2,01
	90-98	2,63	1,30	1,84	1,83	2,17	1,36	1,95	3,55	1,14	1,13	1,83	3,38	1,95
	99-07(q2)	2,54	0,97	1,21	1,32	0,89	1,15	1,68	1,33	0,94	0,76	0,78	1,21	1,11
REER (GDP deflator)	80-89	3,10	1,69	2,06	3,63	2,36	1,84	1,93	1,50	1,45	1,23	2,21	1,69	1,96
	90-98	2,58	1,32	1,72	1,48	2,16	1,29	1,89	3,27	1,09	1,05	1,63	3,17	1,83
	99-07(q2)	2,49	0,88	1,30	0,98	0,89	1,14	1,42	1,17	0,80	0,66	0,72	1,08	1,00

Non euro area countries

		GBP	USD	JPY	CHF	SEK	DKK	NOK	TRY	CAD	MEX	AUD	NZD	Average
REER (ULC)	80-89	4,15	3,61	4,31	3,04	2,75	2,04	1,87	8,24	1,77	8,72	5,22	4,53	4,19
	90-98	3,27	2,91	5,39	2,44	3,61	1,63	1,56	8,15	1,92	7,29	3,99	2,81	3,75
	99-07(q2)	1,50	2,25	3,17	1,52	1,69	1,19	2,29	7,90	2,70	3,20	2,90	3,75	2,84
REER (GDP deflator)	80-89	4,07	3,62	4,22	2,89	2,61	1,93	1,91	6,98	1,73	8,37	5,08	4,38	3,98
	90-98	3,15	2,91	5,31	2,43	3,26	1,49	1,61	7,25	1,78	6,68	3,90	2,69	3,54
	99-07(q2)	1,54	2,23	3,29	1,36	1,78	0,98	2,31	8,05	2,73	3,08	2,84	3,70	2,82

Source: European Commission