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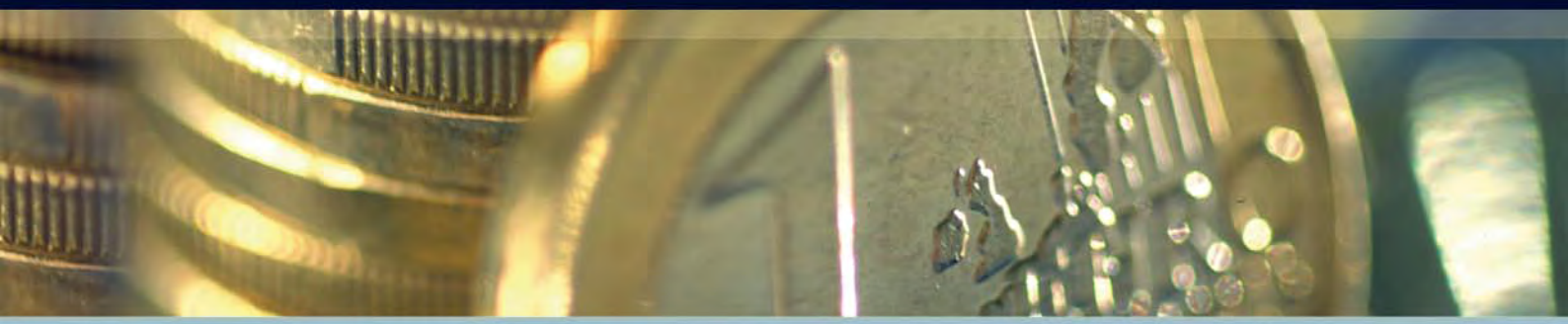

Resilience of Emerging Market Economies to Economic and Financial Developments in Advanced Economies

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EXECUTIVE SUMMARY

Emerging Market Economies (EMEs) have become prominent on the world economic stage, accounting for a substantial fraction of global growth and rising in importance by virtually any economic criterion. In particular, EMEs now play an increasingly important role in international trade and financial flows, implying major shifts in the patterns of global linkages. These developments are likely to have wide-ranging implications for the structure of the global economy.

Before the crisis, there was a growing sense among investors and policymakers that EMEs, with their newfound economic might, had become more resilient to shocks originating in advanced countries. Indeed, empirical evidence indicates that over the last two decades there has been a convergence of business cycles among EMEs and among advanced economies but a gradual divergence *between* these two groups of countries. Financial markets have of course become much more correlated across these two groups but that has not necessarily translated into greater spillovers of real economic activity.

The global financial crisis has cast a shadow over the ability of EMEs to insulate themselves from developments in advanced countries. Still, the EMEs as a group have weathered the global recession better than the advanced economies; in some EMEs, growth rates have bounced back briskly during the past year. There is, however, significant variation in the degree of resilience displayed by different groups of EMEs.

This paper provides a comprehensive analysis of the changes in the nature of cyclical linkages between the advanced economies and the EMEs in order to analyze the resilience of the latter group to global economic and financial developments. The core fundamentals of the EMEs suggest that most of these countries have the potential to generate sustained high growth over the longer term, so it is likely that the shift in the locus of global growth from the advanced economies to the EMEs will continue. The growing size of EMEs, their rapidly expanding domestic markets, and the rising shares of trade and financial flows within the group of EMEs relative to their overall flows all make the cyclical dynamics in EMEs less closely tied to advanced economy business cycles.

The resilience of certain EMEs to the crisis while others in the group have fared badly reflects policy choices as well as structural factors that differ between these two groups. EMEs with disciplined macroeconomic policies, high levels of domestic saving, and less dependence on foreign finance (especially external debt and bank loans) appear to have been less affected by the crisis. Countries with higher levels of foreign exchange reserves and underdeveloped financial markets also weathered the crisis better, although these factors could have adverse implications for long-term growth and economic welfare.

The rapid integration of EMEs into the global economy has important implications for the EU. First, EU economies should be looking to expand trade linkages with the EMEs. Second, the EU should also consider ways to promote greater financial integration with EMEs, particularly by creating more channels for two-way private capital flows that could be mutually beneficial. Third, the single currency has obviously provided enormous benefits to the euro zone. However, as recent events have clearly demonstrated, the single currency has also increased the need for sustainable and stable macroeconomic policies in member countries, so they can work as shock absorbers in response to both domestic and external shocks, including those emanating from EMEs.

I. Introduction and Overview

Over the last two decades, the emerging market economies (EMEs) have become a dominant presence in the world economy. They now account for a substantial share of world output and, with their rapid growth rates, have become a major driver of global growth during the past decade. Trade and financial linkages between advanced economies and EMEs have also become much stronger, speeding up the process of global integration.

The spectacular growth performance of EMEs in recent decades has attracted the most attention.[1] As a group, the EMEs have experienced far greater cumulative growth since 1960 than other developing countries and the advanced economies (Figure I.1). Excluding Brazil, China and India—three of the most prominent large, dynamic economies—from the list of emerging markets makes the performance of this group look less spectacular, although it is still much better than that of the group of other developing countries. Other economic indicators provide a broader snapshot of the rising prominence of emerging markets in the world economic order (Figure I.2). While their shares of the world population and world labor force have remained relatively stable from 1990 to 2008, the EMEs have now become more important on virtually every other economic dimension. Emerging markets' share of world GDP, private consumption, investment and trade have nearly doubled in the space of less than 20 years. The share of world foreign exchange reserves held by emerging markets has jumped from about 20 percent in 1990 to nearly 75 percent in 2008.

The changes in the world economic order have prompted questions about the relevance of the conventional wisdom that when the U.S. economy sneezes, the rest of the world catches a cold. The conventional wisdom was coming into question because emerging market growth continued to be strong despite relatively tepid growth in the advanced economies over the period 2003-2007. Indeed, a fierce debate got underway in 2006-07 about whether global business cycles were converging or whether cycles in emerging markets had started to

[1] We fully recognize that membership in the group of EMEs is largely the *consequence* of these countries' growth performance and their opening-up to trade and financial integration. We use this term as a descriptive label and do not ascribe any causation to it.

diverge from fluctuations in advanced country business cycles.[2] Some observers even argued that the advanced countries had themselves become more dependent on demand from the fast-growing emerging markets.

The divergence argument is of course directly linked to the issue of the resilience of EMEs as it implies that those economies have become less vulnerable to external shocks emanating from the advanced economies. A notable development over the last decade is that trade and financial linkages *among* EMEs have been rising at an even faster rate than that of overall global integration. This has further enhanced the perception that EMEs have become less dependent on advanced economies and that business cycles among EMEs have become more correlated and simultaneously less closely linked to advanced country cycles.

The global financial crisis has changed the direction of this debate and cast a shadow over the ability of the EMEs to insulate themselves from shocks in advanced countries. In particular, the problems in the financial systems of advanced countries rapidly spread to a number of EMEs during the last quarter of 2008 and the first half of 2009, disrupted their asset markets and stunted short-term growth prospects. As the global financial crisis has vividly shown once again, financial markets around the world are closely tied together and shocks in one part of the global financial system can and often do have large and immediate effects on other parts. Moreover, the crisis has been a bitter reminder that, for all their benefits, deeper trade and financial linkages can serve as a mechanism for magnifying shocks and intensifying their effects on the real side of the economy.

As a significant fraction of EMEs followed the advanced countries into recession, the crisis called into question the notion of greater resilience of EMEs to advanced country shocks. This was not altogether a surprising outcome as past episodes of business cycles suggest that deep and highly synchronized recessions in advanced countries tend to have much larger

[2] For a discussion of these debates, see Kose (2008), Kose, Otrok, and Prasad (2008), and IMF (2007, 2008).

spillovers to the EMEs. Remarkably, however, a number of EMEs have bounced back briskly from the global recession since mid-2009 and, as a group, the EMEs have weathered the crisis much better than the advanced economies. There is of course significant variation in the degree of resilience displayed by different groups of emerging markets. For instance, Asian emerging markets, especially China and India, have done far better than the economies of Emerging Europe. Nevertheless, the core fundamentals of the EMEs suggest that most of these countries have the potential to generate sustained high growth over the longer term, and it is likely that the shift in the locus of global growth from the advanced economies to the EMEs will continue.

In light of these developments, there is need for a deeper analysis of the implications of shifts in the global economic structure. Does economic theory provide clear guidance about how rising integration within and between groups of countries should affect business cycle synchronicity? In fact, different classes of theoretical models have highlighted two opposing effects of rising trade integration. Rising trade interdependence should increase cross-country demand spillovers and increase within-group business cycle synchronization. On the other hand, if rising trade linkages lead to greater specialization of production, then the correlation of output fluctuations within the group could decline. There are similar contrasting effects of financial integration on within-group correlations; it magnifies potential shock spillovers but this could be offset by greater industrial specialization if countries can use financial markets to smooth consumption relative to the resulting country-specific income risk. In short, the overall net effect of rising within and between-group trade and financial integration is hard to pin down in a theoretical model.

The level of development also plays a role in determining the nature of the transmission mechanism. Trade and financial integration could help low-income underdeveloped economies diversify their production base as integration gives them access to foreign finance for investment projects as well as access to larger foreign markets. It is only at higher per capita income levels that the specialization effect dominates the diversification effect of greater integration.

We discuss these theoretical mechanisms and the associated literature in more detail later in the paper, but the main implication is that the net effects of trade and financial integration on within- and between-group correlations of business cycles can only be resolved empirically. Another implication is that the level of development may have a bearing on how integration affects a country's business cycle synchronicity with the rest of the world, suggesting the need for a breakdown of country groups not by region but by level of development.

Against this background of ambiguous predictions from theory, the objective of this study is to provide a systematic empirical analysis of the changes in the nature of cyclical linkages between the advanced economies and the EMEs in order to analyze the resilience of the latter group to global economic and financial developments. We focus on four specific questions: First, how have the trade and financial linkages between the advanced countries and EMEs evolved in recent decades? Second, what have been the implications of the dramatic changes in international linkages for the dynamics of cyclical spillovers between the advanced countries and EMEs? Third, how (and through which channels of transmission) has the latest global financial crisis impacted the short-term macroeconomic stability and long-term growth prospects of the EMEs? Finally, what are the policy implications of these changes for advanced countries and emerging markets? In addition to this set of questions, we also provide an analysis of the performance of the economies of Emerging Europe during the recent crisis and the implications for the European Union. However, a more formal econometric analysis of changes in business cycle synchronicity between the EU and Emerging Europe is severely constrained by the lack of historical data.

The study is organized as follows. In Section II, we provide an extensive survey of the empirical and theoretical literature on the cyclical implications of rising global trade and financial linkages for the transmission and synchronicity of business cycles, with specific attention to the vulnerability and resilience of EMEs to developments in advanced countries. It turns out that there are few conclusive theoretical implications about how greater global integration should affect business cycle correlations, making this an issue that can only be resolved empirically.

In Section III, we present the details of our database, which covers the main advanced economies and emerging markets, along with a large group of other developing economies. The latter group includes low income countries that are typically less integrated into the world economy. In Section IV, we study the changes in global growth dynamics and focus on the evolution of the size distribution of different groups of countries and the dynamics of sectoral output over time. This allows us to characterize the rising importance of EMEs in the world economy and also to examine how the internal structures of these economies have shifted over time.

Building on this analysis, in Sections V and VI we study the changes in global trade and financial linkages in recent decades. We document how EMEs have become major players in global trade and finance due to rapid economic growth fueled by the dramatic changes in their sectoral structures and the extent of their integration into the global economy. We also provide an analysis of changes in the composition and direction of trade and financial flows of emerging markets, both amongst themselves and with other groups of economies.

In Section VII, we study the impact of the rapid increase in global linkages on the volatility of business cycles. Given that volatility is an integral moment for a study of the resilience of EMEs, this section presents a baseline for evaluating the impact of globalization on business cycle fluctuations. We analyze the evolving nature of the dynamics of volatility of output, consumption, and investment across groups of countries and over time.

In Section VIII, we examine the degree of business cycle comovement among and between advanced economies and EMEs. We also consider the changes in the extent of comovement during the global financial crisis using the latest available data. We separately examine the comovement of real and financial variables using aggregate as well as sectoral data in order to provide a more complete picture of cross-country comovement.

In Section IX, we use more sophisticated econometric techniques to undertake a formal examination of the degree of comovement to examine whether economic fluctuations among and between the two groups of countries have changed over time. Our empirical analysis is

based on state-of-the-art dynamic factor models that allow us to flexibly capture the dynamic transmission and propagation of different types of shocks across countries.

In addition to the aggregate analysis, we also study the nature of business cycle spillovers among emerging markets in specific regions such as Asia and Latin America. The increasingly prominent role of Asian economies, especially China and India, is particularly relevant to the debates about the decoupling and resilience of EMEs, which has focused on the ability of this region to insulate itself from a slowdown in advanced economies during the current crisis. Contrasting the spillover effects in different regions allows us to explore the mechanisms by which countries may be more or less insulated from global shocks, even if they have similar levels of integration.

In Section X, we provide an overview of business cycle dynamics around recessions in EMEs. One of our objectives is to study the resilience of these countries during the global financial crisis. Since a number of emerging market countries experienced recessions because of the crisis, a natural first step is to review the main characteristics of these episodes. We also provide a brief analysis of the behavior of key real and financial aggregates in emerging markets around these episodes, contrasting these patterns with those for advanced economies. In addition, we analyze the implications of recessions accompanied by financial crises. That analysis provides a baseline for evaluating the performance of key EMEs during this crisis.

In Section XI, we investigate in more detail the resilience of EMEs to the global financial crisis. Considering the unique nature of the crisis, we first provide a metric to examine the cost of the crisis and compare this cost with that of previous episodes. We then provide a bird's-eye view of how the EMEs in different regions were affected by the crisis. Next, we undertake detailed case studies of two groups of EMEs—those in Asia and Europe—that displayed strikingly different degrees of resilience to the global financial crisis. China and India, in particular, weathered the crisis with just a small stutter in their growth rates while EMEs in Eastern Europe suffered deep recessions during 2008-09 and are experiencing weak and uncertain recoveries. These regional case studies set the stage for a discussion of the factors underlying the resilience of emerging markets as a group and also the differences in

the degree of resilience of different groups of EMEs.

We conclude the paper in Section XII with a summary of our findings and a discussion of their implications for the design of macroeconomic policies for advanced countries and emerging markets. We focus specifically on the implications for policymakers in the European Union and also for policymakers in EMEs with different levels of integration into the global economy. Our analysis points to a number of interesting avenues for future research, which we also summarize in the concluding section.

II. Cyclical Implications of Rising Global Linkages: A Survey

This section provides an overview of the literature about the implications of global trade and financial linkages for the properties of business cycles in advanced countries and EMEs. We first present a brief summary of theoretical arguments and empirical evidence about how greater trade and financial linkages could influence the volatility and synchronization of business cycles. We then turn our attention to empirical studies analyzing various aspects of cyclical linkages between advanced countries and EMEs.

II.1. Theoretical Implications

Volatility and synchronization of output in theory

There is no consistent theoretical prediction across different models about how trade and financial linkages affect output volatility.[3] The effects of trade and financial integration depend in different models on the level of development, the nature of shocks and the form of specialization patterns.

International trade linkages generate both demand and supply-side spillovers across countries, which can increase the degree of business cycle synchronization. For example, on the demand side, an investment or consumption boom in one country can generate increased demand for imports, boosting economies abroad. On the supply side, a positive shock to output in tradable goods leads to lower prices; hence, imported inputs for other countries become cheaper.

However, both classical and "new" trade theories imply that increased trade linkages lead to increased specialization. How does increased specialization affect the degree of synchronization? The answer depends on the nature of specialization (intra- vs. inter-

[3] See a description of these arguments in Razin and Rose (1994), Easterly, Islam and Stiglitz (2001), Kose, Prasad and Terrones (2003), and Buch, Dopke and Pierdzioch (2005).

industry) and the types of shocks (common vs. country-specific). If stronger trade linkages are associated with increased inter-industry specialization across countries, then the impact of increased trade depends on the nature of shocks. If industry-specific shocks are more important in driving business cycles, then international business cycle comovement is expected to decrease.[4] If common shocks, which might be associated with changes in demand and/or supply conditions, are more dominant than industry-specific shocks, then this would lead to a higher degree of business cycle comovement (see Frankel and Rose, 1998).

The effects of financial integration on cross-country correlations of output growth are also ambiguous in theory. Financial integration could reduce cross-country output correlations by stimulating specialization of production through the reallocation of capital in a manner consistent with countries' comparative advantage.[5] However, financial linkages could result in a higher degree of business cycle synchronization by generating large demand-side effects as the changes in equity prices affect the dynamics of wealth. Furthermore, contagion effects that are transmitted through financial linkages could also result in heightened cross-country spillovers of macroeconomic fluctuations (see Claessens and Forbes, 2001).

Financial integration allows relatively capital-poor EMEs and other developing economies (ODEs) to diversify away from their narrow production bases, thereby reducing their output volatility. At a more advanced stage of development, however, trade and financial flows could allow for enhanced specialization. This could make advanced countries and EMEs more vulnerable to industry-specific shocks and thereby could lead to higher output volatility (see Kalemli-Ozcan, Sørensen, and Yosha, 2001). That leaves open the question of whether financial integration promotes better risk sharing across countries, which we discuss next.

[4] Krugman (1993) provides an extensive description of this case in the context of European unification.

[5] Earlier studies document that the observed correlations of output and consumption are not compatible with the predictions of the DSGE models (see Backus, Kehoe, and Kydland, 1992).

Consumption risk-sharing in theory

Basic theory has the strong prediction that, because financial integration should help countries diversify away country-specific shocks; it should result in more stable consumption patterns and stronger comovement of consumption growth across countries. Since consumers and, by extension, economies are risk-averse, basic theoretical models predict that consumers should desire to use international financial markets to insure against income risk, thereby smoothing the effects of temporary idiosyncratic fluctuations in income on consumption. In particular, if output fluctuations are not perfectly correlated across countries, in a world with complete markets trade in financial assets can be used to delink national consumption levels from the country-specific components of output fluctuations. In turn, this should make consumption growth less volatile relative to income growth. And from a cross-country and time series perspective, increasing financial linkages should lead to lower and declining relative volatility of consumption growth (see Lewis, 1999; van Wincoop, 1999).

While the benefits of international risk-sharing could be quite large, the magnitudes do depend on various model-specific features. In particular, the welfare gains in these models depend on the volatility of output shocks, the rate of relative risk aversion, the risk-adjusted growth rate and the risk free interest rate (see the discussion in Obstfeld and Rogoff, 2004, Chapter 5; Lewis, 1999). These benefits are expected to be greater for EMEs and ODEs as they are intrinsically subject to higher volatility because they are less diversified than advanced economies in terms of their production structures. Recent research suggests that EMEs and ODEs countries can indeed reap large benefits from international risk-sharing arrangements (see Prasad et al., 2003; Pallage and Robe, 2003).

II.2. Empirical Evidence

Business cycle synchronization

Recent empirical studies are unable to provide a concrete explanation for the impact of stronger global linkages on the comovement of business cycles. Some of these empirical

studies employ cross-country or cross-region panel regressions to assess the role of global linkages on the comovement properties of business cycles in advanced countries.[6] While Imbs (2004) finds that the extent of financial linkages, sectoral similarity, and the volume of intra-industry trade all have a positive impact on business cycle correlations, Baxter and Kouparitsas (2005) and Otto, Voss and Willard (2003) document that international trade is the most important transmission channel for business cycle fluctuations. The results of Kose, Prasad and Terrones (2003) suggest that both trade and financial linkages have a positive impact on cross-country output and consumption correlations.

Empirical studies do not provide a definite answer on how comovement varies in response to changes in the volume of trade and financial flows. Findings on the temporal evolution of business cycle synchronization in response to increases in financial integration are diverse. Differences in country coverage, sample periods, aggregation methods used to create country groups, and econometric methods employed seem to contribute to these varying conclusions. Some studies find evidence of declining output correlations among advanced economies over the last three decades (Heathcote and Perri, 2004; Stock and Watson, 2003). However, other studies document that business cycle linkages have become stronger over time. Kose, Otrok and Whiteman (2007), employing a Bayesian dynamic factor model, find that for advanced countries business cycles correlations on average have risen since 1960. Using a longer sample of annual data (1880-2001), Bordo and Helbling (2003) also document that the degree of synchronization among advanced countries has increased over time. The evidence for a European business cycle and increasing business cycle movement in the EU area has also been mixed. For instance, Artis, Krolzig, and Toro (2004) find evidence of a European business cycle while Canova, Ciccarelli, and Ortega (2007) argue that, since the 1990s, there is no evidence of a specific European cycle.

[6] Frankel and Rose (1998), Clark and van Wincoop (2001), and Kose and Yi (2006) show that, among industrialized countries, pairs of countries that trade more with each other exhibit a higher degree of business cycle comovement. Imbs (2004) documents that financial integration leads to higher cross-country output and consumption correlations among industrialized economies.

Volatility of output and consumption

Existing evidence, using a variety of regression models with different country samples and time periods, reports no systematic empirical relationship between the intensity of trade and financial linkages and output volatility. Some studies report that the ratio of consumption growth volatility to income growth volatility actually increased during the recent period of globalization for emerging market economies (see Kose, Prasad and Terrones, 2003b). Importantly, they find that the volatility of consumption rose (perhaps because of crises experienced by some of these economies) by *more* than income volatility did. This result runs counter to the theoretical prediction that financial integration allows countries to share income risk and smooth consumption. These authors also report that increasing financial integration is associated with rising relative volatility of consumption, albeit only up to a threshold. Beyond a certain level of financial integration, an increase in integration actually reduces the relative volatility of consumption. Other studies, such as Bekaert, Harvey, and Lundblad (2006), find that, following equity market liberalizations, there is an outright decline in consumption volatility.[7] Differences across these studies could arise from variations in the definitions of financial integration, the measures of consumption volatility, data samples, and methodologies. Nevertheless, the evidence so far is ambiguous.

Why have financial flows been associated with an increase in the relative volatility of consumption in emerging market economies? One explanation is that positive productivity and output growth shocks in these countries led to consumption booms that were willingly financed by international investors. These consumption booms were accentuated by the domestic financial liberalization many of these countries undertook at the same time that they

[7] Using both micro and macro datasets, Kalemli-Ozcan, Sorenson and Volosovych (2009) examine the links between "deep" financial integration, a concept based on the idea of foreign ownership, and business cycle volatility. They report that there is a positive association between foreign ownership and the volatility of firm's various outcomes, a result that extends to aggregate data as well. Cardarelli, Elekdag, and Kose (2010) study the implications of surges in capital flows for short-term growth dynamics in small open economies.

opened up to international financial flows, thereby loosening financing constraints at both the individual and national levels. When negative shocks hit these economies, however, they rapidly lost access to international financial markets, depressing consumption. Consistent with this, a growing literature suggests that the procyclical nature of capital flows explains the adverse impact of international financial integration on consumption volatility in these economies. One manifestation of this procyclicality is the phenomenon of "sudden stops" of capital inflows (Calvo and Reinhart, 1999).

Consumption and income risk-sharing

There is a rich empirical literature directly studying various dimensions of international consumption risk sharing, also in response to changes in financial integration. It is possible to divide this literature into three categories. The first category includes studies focusing on the patterns of international correlations to determine the degree of consumption risk sharing. Recent studies include Canova and Ravn (1997), Pakko (1998), Kose, Prasad and Terrones (2003), and Ambler, Cardia and Zimmermann (2004). The results of these studies indicate that the theoretical predictions regarding perfect risk sharing do not have much empirical support for three reasons. First, empirical studies indicate that the correlations between the consumption paths of various countries are relatively low. Second, consumption correlations are lower than those of output. Third, correlations between consumption and domestic output are generally higher than those between consumption and world output.

The second category tests more formally the hypothesis of perfect risk sharing with the help of regression models. In addition to the basic stylized facts reviewed above, researchers have employed more rigorous methods to test the risk sharing implications of models with financial integration. These tests generally use some versions of reduced form solutions (or first order conditions) of models and focus on the links between various measures of domestic consumption and world consumption.[8] For example, Lewis (1996) finds that risk

[8] Cochrane (1991) and Mace (1991) provide early examples of these types of tests using consumer level data and analyzing the extent of risk sharing between individual and aggregate consumption.

sharing among countries with relatively little capital controls is rejected but correlations between domestic consumption and output are higher for countries with more restrictions.[9]

The third category of studies employs various regression models to measure the extent of risk-sharing and the impact of financial flows on the degree of risk sharing. For example, Sørenson, Yosha, Wu and Zhu (2006) analyze the relationship between home bias and international risk sharing. They document that the extent of international risk sharing has risen during the late 1990s, while home bias in debt and equity holdings has declined in advanced countries. However, Kose, Prasad and Terrones (2009), using a variety of empirical techniques, conclude that there is at best a modest degree of international risk sharing, and certainly nowhere near the levels predicted by theory. In addition, only advanced countries have attained better risk sharing outcomes during the recent period of globalization, with developing countries, by and large, shut out of this benefit. Even emerging market economies, which have witnessed large increases in cross-border capital flows, have seen little change in their ability to share risk.[10] The composition of flows appears to be an important factor behind the modest degree of risk sharing in emerging markets, as portfolio debt—the dominant kind of capital inflows to these economies—seem to be not conducive to risk sharing.

Although the implications of financial integration for business cycle volatility and comovement have substantial implications for stability and welfare, the existing theoretical studies and empirical evidence are thus inconclusive on this issue. In particular, financial integration does not always reduce the amplitude of business and financial cycles, and may actually increase it. While risk-sharing benefits of integration are apparent in theory, it is hard to find conclusive empirical evidence in support of these benefits. Why is it so difficult

[9] Obstfeld (1995) examines the empirical links between domestic consumption growth and world consumption growth for the G7 economies. His results suggest that that the hypothesis of perfect risk sharing is rejected in most cases during these periods.

[10] Giannone and Reichlin (2006), Artis and Hoffmann (2006), Bai and Zhang (2005) and Moser, Pointner and Scharler (2003) also examine the implications of financial flows for the extent of risk sharing.

to obtain sharp results about the implications of financial integration for volatility and comovement? One potential reason could be the changes in the nature of shocks as cross-border linkages become more intensive, which we discuss next.

II.3. Changing Nature of Shocks and Linkages

Increased integration could also affect the dynamics of comovement by changing the nature and frequency of shocks. First, as trade and financial linkages get stronger, the need for a higher degree of policy coordination might increase, which, in turn, raise the correlations between shocks associated with nation specific fiscal and/or monetary policies. This could have a positive impact on the degree of business cycle synchronization.[11]

Second, shocks pertaining to changes in productivity could become more correlated, if rising trade and financial integration lead to an increase in knowledge and productivity spillovers across countries (see Kose et al., 2009). More financially integrated economies are able to attract relatively large foreign direct investment flows, which have the potential to generate productivity spillovers.

Third, increased financial integration and developments in communication technologies lead to faster dissemination of news shocks in financial markets.[12] This could have a positive impact on the degree of business cycle synchronization if, for example, good news about the future of the domestic economy would increase domestic consumption through its impact on wealth and if consumers in other countries, who hold stocks in the domestic country, raise demand for goods in their countries. In other words, shocks associated with news, which are

[11] For the impact of increased fiscal policy coordination on the degree of business cycle correlations, see Rose, Darvas, and Szapary (2005). For the impact of the widespread use of inflation targeting regime on business cycle synchronization, see Flood and Rose (2009). Crucini, Kose and Otrok (2009) analyze the importance of monetary and fiscal policy shocks in explaining business cycle comovement among the G-7 countries.

[12] Cochrane (1994) argues that the role of shocks associated with unobserved news could be important in driving business cycle fluctuations. Jaimovich and Rebelo (2008) analyze the effects of news on business cycles about future productivity in a small-open economy model.

rapidly transmitted in global financial markets, could lead to a higher degree of interdependency across economic activity in different countries.

II.4. Linkages between Advanced Countries and Emerging Markets

In addition to the large literature considering the implications of trade and financial linkages for the properties of business cycles, a number of studies consider how such linkages affect the nature of cyclical interactions between EMEs and advanced economies. Some of these studies focus on changes in the time-series patterns of the interdependency across the two groups of countries. Some others attempt to measure the magnitude of spillovers between the two groups.

How have linkages between advanced countries and EMEs changed over time?

There has been a rich literature analyzing the evolution of the linkages between advanced countries and EMEs and ODEs. In its early incarnation, most of the studies in the literature focused on the dependency of the EMEs and ODEs of the South to the advanced countries of the North. In his Nobel Prize lecture, for example, Lewis (1979) notes that *"…For the past hundred years the rate of growth of output in the developing world has depended on the rate of growth of output in the developed world. When the developed world grow fast the developing world grow fast, when the developed slow down, the developing slow down. Is this linkage inevitable?..."* [13] During the past two decades, this literature has attempted to answer this question using a variety of approaches.

Hoffmaister, Pradhan, and Samiei (1998) analyze the long-run growth linkages between the advanced countries of the North and the EMEs and ODEs of the South using annual data for the 1967–93 period by constructing group specific output aggregates. They show that despite the long term co-integrating relationship between the growth dynamics of the two groups, the influence of the North countries on the output growth of the South countries has declined

[13] For a summary of these earlier empirical studies, see Currie and Vines (1988). Chui and others (2002) provide a survey of theoretical North-South models focusing on trade and growth.

over time. They also document a potential structural break in the North-South relationship around the late 1980s. In addition, they report that the South, especially Asia, has become more resilient to cyclical movements in the North possibly because of structural changes that have taken place among the emerging Asian economies over the last decades.

A few papers have also looked at the degree of business cycle co-movement across advanced economies and EMEs using sectoral data (Kouparitsas, 1998, 2001). Kouparitsas (2001) concludes that the relationship between the these groups is unidirectional and terms of trade movements are equilibrium responses to the transmission of business cycles from the manufacturing sector in the advanced countries to the export sector of the EMEs. Loayza, Lopez, and Ubide (2001) use sectoral-level data (industry, services and agriculture) to analyze the common economic patterns across countries in Latin America, East Asia, and Europe. They find that growth fluctuations in the European and East Asian countries exhibit a significantly high degree of co-movement. For Latin America, however, they document that the country-specific components are more dominant owing to the fact that the Latin American countries have more heterogeneous economic structures and are relatively more closed to international trade and financial flows.

There has been a recent debate about the temporal evolution of the cyclical linkages between advanced economies and EMEs. This debate focuses on the ability of emerging market economies, especially emerging countries in the Asia-Pacific region, to decouple from a potential slowdown in the United States (see Helbling and others, 2007).[14] Kose, Otrok, and Prasad (2008) examine the sources of macroeconomic fluctuations in the developed economies of the North and the developing countries of the South using dynamic factor models and the series of output, consumption, and investment for the 1960–2005 period. [15]

[14] For additional information about the decoupling debate in the context of Asia, see He, Cheung and Chang (2007), Asian Development Bank (2007), IMF (2008), and Fidrmuc and Korhonen (2009). In addition, there are numerous studies analyzing the dynamics of business cycle co-movement in specific regions. For instance, authors such as Shin and Wang (2004), Kumakura (2006) and Rana (2006, 2007) analyze cross-country business cycle correlations in Asia.

[15] Several other researchers find relatively stronger business cycle co-movement among developed economies using factor models (see Kose, Otrok, and Whiteman, 2007; and Canova, Ciccarelli, and Ortega, 2007).

They argue that these findings provide some partial support for the decoupling of business cycles of EMEs from those of advanced countries. We build on their work later in the paper and extend their analysis using the latest available data series. Other studies also provide support for the decoupling hypothesis (see Dooley and Hutchison, 2009; Rossi, 2009).[16]

Some recent papers, however, employ simple correlations to provide arguments against the case of decoupling.[17] For example, Flood and Rose (2009) use GDP data for 64 countries over the period 1974-2007. After detrending these series using various filters, they analyze the rolling-window correlations across advanced countries and developing economies and conclude that, while the average level of cross-correlations changes over time, there is no strong evidence that these correlations have become statistically significantly lower in the later parts of their sample. In a related study, Walti (2009) reports that the extent of comovement of cycles across advanced countries and EMEs has not changed much since the early 1980s.[18]

However, as we discuss in the later sections of the paper, it is difficult to arrive at conclusive results about the evolution of business cycle comovement over time using simple correlation measures or based just on data since the 1980s. Moreover, Flood and Rose (2009) and Walti (2009) employ models that do not account for the dynamic comovement of macroeconomic aggregates over time, which is the essence of the decoupling debate. They focus just on output series, which provide a useful but incomplete picture about the dynamics of business

[16] Dooley and Hutchison (2009) analyze the cross-country financial linkages using VAR models and report that the decoupling hypothesis has been supported by the data through mid-2008. Using some basic statistics, Rossi (2009) concludes that the decoupling hypothesis is relevant considering the long-term changes in the global economic order.

[17] These recent studies use results from an earlier version of Kose, Otrok and Prasad (2010) as a baseline reference.

[18] Some of these papers argue that emerging markets have higher trend growth than advanced economies due to convergence effects and that the impact of advanced economy business cycles on EMEs has fallen over time for purely mechanical reasons. Convergence, however, is largely about first moments and the decoupling issue is about comovement in growth rates rather than about average growth rates. Even if convergence effects are important, their effects on average growth rates will be captured by the constant terms in the dynamic factor models we employ later in the paper. Moreover, differences in average growth rates do not affect the variance decomposition results we document later in the paper.

cycles. These studies use a rather small sample of countries relative to the sample we examine here.

Mumtaz, Simonelli, and Surico (2009), on the other hand, employ a dynamic factor model and report findings similar to ours using data for a smaller group of 36 countries but over a 75-year period. Fidrmuc and Korhonen (2009) study the spillover effects of the global financial crisis on business cycles in China and India. Using dynamic correlation measures, they document that the pattern of business cycles in emerging Asian countries indicates a low degree of cyclical comovement with the advanced countries. They argue that their findings lend support to the decoupling hypothesis. However, these papers, like earlier studies in the literature, focus on a small set of specific geographical regions or groups of countries.

How important are economic developments in advanced countries for the EMEs?

Some recent papers examine the role of trading partners' economic performance in driving the dynamics of growth. For example, Arora and Vamvakidis (2004) find that advanced economies benefit from trading with rapidly growing emerging markets while developing countries benefit from trading with the relatively high-income advanced economies. Helbling and others (2007) find that while spillovers from the U.S. to other countries have increased with greater trade and financial integration, the importance of these links should not be overestimated. Spillovers are most important for countries with close trade and financial ties with the U.S., particularly Latin America and some advanced countries, and they tend to be larger during recessions, when import growth turns sharply negative, than during mid-cycle slowdowns.

Akin and Kose (2008) examine the extent of growth spillovers from the advanced countries to the EMEs using GDP and sectoral output of individual countries. They employ a panel regression model to analyze the quantitative importance of group-wide indices of GDP and sectoral output in explaining domestic economic activity after controlling for various factors, including the standard growth determinants, export structure, trade and financial openness, and oil price changes. They report that the impact of the advanced economies on the growth dynamics of the EMEs has declined in the globalization period (1986–2005) relative to the

earlier periods. Moreover, both the advanced countries and EMEs have started to exhibit more intensive intra-group growth spillovers.

II.5. Summary

We now briefly summarize the main points from the above discussion and then review our study's intended contributions relative to the existing literature. Theoretical models offer varying predictions about the effects of greater trade and financial integration on the volatility and cross-border synchronization of business cycles. The effects depend on the extent and nature of such bilateral and multilateral integration, but are also affected by the levels of development of particular groups of countries. While rising global integration creates more channels for business cycle spillovers, it also creates opportunities for diversification among low-income countries and for specialization in production accompanied by more efficient risk-sharing for advanced economies. Ultimately, the evolution of international business cycle correlations depends on complex interactions among factors such as the openness to trade and financial flows, nature of shocks and level of development.

In view of the ambiguous predictions of different theoretical models, the effects of rising globalization on these correlations can only be resolved empirically. Understanding changes in these correlations is also relevant for determining the resilience of an economy to external shocks that could be of different kinds—global shocks versus shocks specific to a group of countries; real versus financial shocks; and transitory versus permanent shocks. Hence, we now turn to an empirical examination of different aspects of global comovement of business cycles and then link this analysis to a systematic evaluation of the resilience of different groups of emerging markets to the global financial crisis. In the next section, we describe how we construct a database that allows us to undertake these empirical exercises.

III. DATABASE

We develop a comprehensive database consisting of a large number of countries and covering the period since 1960. In order to provide a broader measure of business cycle transmission across countries, we study the extent of global business cycle comovement in a number of macroeconomic variables rather than solely focusing on output. Specifically, we focus on three key macroeconomic aggregates—output, consumption and investment. Our use of multiple macroeconomic indicators rather than just GDP to characterize business cycles follows an approach that can be traced back to classical scholars of business cycles (Burns and Mitchell, 1946; Zarnowitz, 1992). The common practice in econometric studies of measuring business cycles and spillovers based on fluctuations in output can be quite restrictive. Recognizing this, the NBER also looks at a variety of indicators for determining turning points in U.S. business cycles.[19]

Our basic dataset, drawn mainly from the World Bank's World Development Indicators and the IMF's World Economic Outlook and International Financial Statistics databases, comprises annual data over the period 1960–2008 for 106 countries. Real GDP, real private consumption, and real fixed asset investment constitute the measures of national output, consumption, and investment, respectively. All variables are measured at constant national prices.

For a smaller group of countries, we use higher frequency industrial production data. Industrial production indexes cover the manufacturing sector (and construction in some countries) and are usually available at a quarterly and/or monthly frequency. While it covers only a modest portion of the economy, economic activity in the manufacturing sector tends to be highly correlated with the aggregate business cycle and is also very relevant for our

[19] The NBER focuses on the evolution of five indicators—real GDP, real income, employment, industrial production, and wholesale-retail sales. Others have used variables such as real GDP and unemployment to pin down the sources of business cycles (Blanchard and Quah, 1989). King et. al (1991) study joint fluctuations in output, consumption and investment to identify trends and cycles. Claessens, Kose, and Terrones (2009) apply a similar idea. We analyze recessions and financial market disruptions later in the paper using the classical approach to analyzing business cycles.

purposes as it constitutes the traded goods sector and is therefore relevant for analysis of cross-border business cycle transmission. Since it is available at a higher frequency, use of industrial production data allows us to check the sensitivity of a few of our key results to the choice of data frequency. However, industrial production data are not available for many low-income countries, so we use these data mainly for studying growth and business cycle dynamics in the advanced and emerging economies.

In addition, we expand the dataset to incorporate sector-level data. This allows us to examine sectoral interactions in addition to the conventional macroeconomic channels of interdependence. The earlier literature on international linkages has mostly focused on the channels of transmission considering fluctuations in the standard macroeconomic aggregates, such as output, consumption, and investment. The sectoral analysis allows us to study the implications of dramatic shifts across industry, service, and agriculture sectors that have taken place over the past two decades.

There is considerable interest in exploring the effects of the global financial crisis on basic stylized facts as well as patterns of synchronicity. Although it is difficult to make conclusive statements as the impact of the crisis is likely to reverberate for some years to come, we extend our dataset to cover the latest available data and complement that in some cases with country forecasts from the IMF's World Economic Outlook. We also analyze the impact of the crisis on economic growth in different groups of countries later in the paper.

In order to examine the effects of globalization, our dataset includes a broad array of measures of trade and financial openness. We incorporate several standard measures of de jure capital account openness and de facto financial openness and complement these with new data from the IMF and sources such as the BIS. In addition to these conventional measures, we employ measures to analyze the links between local and foreign banks and explore alternative metrics to analyze how the process of deleveraging affects the channels of cyclical transmission. Our trade openness measures are based on the standard de facto measure (exports plus imports as a ratio to GDP) as well as policy-based measures (Wacziarg-Welch extension of the Sachs-Warner database, with further updates).

III.1 Country Groups

We divide the countries into three groups: advanced economies (23), emerging market economies (24 EMEs), and other developing economies (59 ODEs). For our purposes, the key distinction among the EMEs and ODEs is that the former group has attained a much higher level of integration into global trade and finance.[20] For instance, the average growth rate of total trade (exports plus imports) has been more than twice the growth rate of GDP in the former group since the mid-1980s, while the corresponding figure for the ODEs is much lower. EMEs have also received the bulk of private capital inflows going from advanced economies to the rest of the world.

A great deal of attention has been focused on four of the largest emerging markets—Brazil, Russia, China and India, which have come be known as the BRICs. In some of our descriptive analysis, we will examine growth dynamics of this group separately, although we sometimes have to exclude Russia for lack of data. We also consider Emerging Europe as a separate group in some of our descriptive analysis. Unfortunately, the availability of high-quality and reliable macroeconomic data for this group of countries is limited to the last decade or two, making it difficult to incorporate this group into much of the formal econometric analysis.

III.2 Time Periods

To study how business cycles have evolved over time in response to trade and financial integration, we divide our sample into three distinct periods.[21] The period 1960-72 corresponds to the Bretton Woods fixed exchange rate regime. The remaining years are

[20] The emerging markets in our sample roughly correspond to those in the MSCI Emerging Markets Index. The main differences are that due to data limitations we drop some countries while we include some other more "mature" emerging markets. As we examine later in the paper, on average, EMEs also had higher per capita incomes and experienced higher growth rates than ODEs over the last two decades. In addition, the trade openness ratio for EMEs has risen rapidly over the last two decades.
[21] This time demarcation is influenced by the results of the studies by Kose, Prasad and Terrones (2003) and Kose, Otrok and Whiteman (2008).

classified into two periods—the pre-globalization period (1973-1985) and the globalization period (1986-present). There are a number of reasons for this demarcation into three distinct periods. First, after a period of stable growth during the 1960s, the pre-globalization period witnessed a set of common shocks associated with sharp oil price fluctuations in the 1970s and a set of synchronized contractionary monetary policies in the major advanced economies in the early 1980s. This demarcation is essential for differentiating the impact of these common shocks from that of globalization on the degree of business cycle comovement.

Second, global trade and financial flows have increased markedly since the mid-1980s. Countries have intensified their efforts to liberalize external trade and financial account regimes and the fraction of countries with a fully liberalized trade and financial accounts in our sample has increased rapidly over the past two decades.[22] These factors have led to a dramatic increase in global trade and financial flows, both in absolute terms and relative to world income, during the globalization period. In other words, global economic linkages clearly became much stronger during the second period. We provide additional quantitative evidence later in the paper to support the first two reasons discussed here.

Third, the beginning of the globalization period coincides with a structural decline in the volatility of business cycles in both advanced and other economies. Until the financial crisis erupted in mid-2008, the latest period had come to be known as the period of the Great Moderation because of the prolonged decline in the volatility of output accompanied by relatively low and stable levels of inflation in advanced countries.[23] We do not yet have much data for the post-crisis period but will attempt to briefly evaluate whether the sharp global recession associated with the crisis has shifted the basic patterns in any crucial way.

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[22] Moreover, the beginning of the globalization period marks the start of the Uruguay Round negotiations that speeded up the process of unilateral trade liberalizations in many developing countries (see Akin and Kose, 2008).

[23] See Blanchard and Simon (2001), McConnell and Perez-Quiros (2000) and Stock and Watson (2005). Explanations for this decline in volatility are many, ranging from “the new economy” driven changes to the more effective use of monetary policy.

IV. Changes in the Dynamics of Global Growth

In this section, we provide a detailed analysis of the size distribution of countries in three groups (advanced economies, emerging market economies (EMEs) and other developing economies (ODEs)) and their growth dynamics. We analyze the evolution of the size distribution of countries and cross-country economic linkages in three distinct sub-periods: 1960-72, 1973-1985, 1986-present. As noted before, these three periods correspond to what we call the Bretton Woods period, the pre-globalization period and the period of globalization. We also study data for the two most recent years, 2008-09, to examine if the financial crisis has significantly affected the broader trends revealed by the averages over longer time periods.

IV.1. The Distribution of World GDP

There have been major changes in the size distribution of countries over the past five decades. During the period 1960-1985, advanced economies on average accounted for about three-quarters of global GDP measured in purchasing power parity (PPP) adjusted current dollars (Table IV.1). This share has declined gradually over time—by 2008-09, it was down to 57 percent, a fall of more than 20 percent relative to the 1960s.

By contrast, the share of emerging markets has risen steadily, from just about 17 percent in the 1960s to 31 percent during the globalization period, 1986-2009. Consistent with the trend of a steadily rising share, the last column of Table IV.1 shows that the share of emerging markets was up to 39 percent by 2008-09. The share of other developing economies has remained modest and steady in the range of 3-4 percent of world GDP over the last five decades, highlighting the dramatic difference in growth performance between this group and the more dynamic group of EMEs.

To examine these shifts in more detail, the bottom rows of Table IV.1 provide data on the relative sizes of some key countries and country groups. The U.S. remains the dominant economy in the world, although its share has declined from 33 percent of the world economy in 1960-72 to 24 percent in 1986-2009. The share of the EU-15 countries (the initial group

that constituted the EU until 2004) falls more over this period, from 34 percent to 26 percent. The most dramatic shift is for the three major emerging markets—Brazil, China and India—whose share nearly doubles in a relatively short period, from 9 percent in 1973-85 to 15 percent in 1986-2009. By 2008-09, these three countries account for 23 percent of world GDP, even more than the group of EU-15 countries (22 percent) and very close to the share of the U.S. (24 percent).

A substantial part of the increase in the share of the EMEs in the world GDP has been due to China and India. For example, China's share of world GDP has increased sharply from 3.2 percent during the Bretton Woods period to 9.8 percent in the globalization period. Similarly, the share of India has risen from 4.4 percent to 5.6 percent over these periods.

Next, we expand the sample of countries in the globalization period to include the emerging markets of Europe, along with a number of other smaller developing countries for which consistent data are available only for the last couple of decades. This allows us to provide a more comprehensive picture of the shifts in the world GDP distribution, although for a shorter period. Figure IV.1 shows the output shares of different groups of countries for 1990 and 2008. The top panel of this figure, which shows PPP-adjusted shares of each country or group in world GDP, clearly shows the rising importance of China and India and the relative decline of the U.S. and other advanced economies. Compared to their shares in 1990, the emerging economies of Europe have a smaller share of GDP in 2008. The GDP numbers in these economies before and around the initial stages of transition are of course difficult to interpret. The remaining emerging markets outside of Europe have a small increase in their relative share. The shares of the EU-15 and other advanced economies also decline during the 2000s.

The lower panel of Figure IV.1 shows similar calculations as the top panel but based on domestic GDP converted to a common currency (U.S. dollars) at market exchange rates. China and India still account for a larger share of world GDP in 2008 than in 1985, but the increases in their shares, as well as that of other emerging markets, is much smaller when market exchange rates rather than PPP exchange rates are used in the calculations. The broad

patterns seen in the top panel are preserved, although it is clear that the choice of exchange rate used in these calculations makes a significant difference because of the large deviations between market and PPP exchange rates, especially in the case of emerging markets.

IV.2. The Distribution of World Growth

We turn next to an analysis of the distribution of world growth, not just in terms of GDP but also in terms of the key components of final demand—private consumption and investment, with all variables measured in PPP terms. This allows us to examine the quantitative contribution of each region or country to world growth. It also permits us to shed light on the sort of questions that have become of keen interest during the global economic recovery—can emerging markets become (or, indeed, have they already become) a "driver" of world growth or is the world economy still reliant on the U.S. and other advanced economies for providing final demand. We also look at export growth contributions of different regions in order to analyze this issue further.

The top panel of Table IV.2 shows the growth in world GDP, consumption, investment and exports, averaged over the three periods discussed earlier and also just for 2008-09. The next three panels show the growth contributions to each variable coming from different regions, which add up to overall world growth of the corresponding variable.[24]

World GDP growth averaged 5.9 percent per annum during the period 1986-2009; this figure dropped to 2.7 percent in 2008-09.[25] Going from the pre-globalization period to the globalization period, one can already see the sharp changes in the relative contributions of

[24] The contribution of country i to world GDP growth from time t to t+1 is given by [GDP(country i, time t+1) – GDP(country i, time t)] / GDP(world, time t). The sum of the growth contributions of the three regions that constitute the world economy add up to total world GDP growth.

[25] These growth rates are calculated using PPP exchange rates to evaluate the GDP weight of each country in world GDP. World GDP growth based on market exchange rates was lower during 2008-09 than the number mentioned here, largely because the main emerging markets continued to post relatively strong growth during the global recession and these economies of course have a much higher PPP-based weight in world GDP.

different country groups. The contribution of the advanced economies to world GDP growth in 1973-85 was 7.2 percent, almost three-quarters of world growth of 10.2 percent. Emerging markets contributed 2.7 percentage points to world growth during this period.

During the globalization period, the emerging markets contribute to about 41 percent of world growth (2.42/5.89) while the share of advanced economies falls to about 55 percent. The picture of average growth during the two years of the financial crisis shows a dramatic shift in these relative contributions, with emerging markets accounting for 86 percent of world growth during 2008-09 (2.34/2.73), while the share of advanced economies falls to a paltry 6 percent (0.17/2.73). In other words, the direct contribution of emerging markets to GDP growth has continued to increase over time and was further accentuated during the financial crisis, while the reverse has been true for advanced economies. During 2008-09, the period of the financial crisis, emerging markets account for 86 percent of global growth (2.34/2.73). We provide a more detailed analysis of the implications of the global financial crisis for different groups of countries later in the paper.

The lower panels of Table IV.2, which show the results for three key sets of advanced economies and also for the three major emerging markets (the group of Brazil, China, India) shows these patterns more clearly. The relative contributions of the U.S., Japan and the set of EU-15 countries has declined markedly in the globalization period relative to the pre-globalization period and all of them have experienced virtually no growth during the crisis years of 2008-09. By contrast, the group of three major emerging markets by themselves account for 71 percent of world growth during the two crisis years.

Figure IV.2 shows similar calculations for world GDP growth for an expanded group of countries including the economies of Emerging Europe but only since 2000. This figure complements the data in Table IV.2 by showing the contributions of different countries or groups as shares relative to world GDP growth (the table shows absolute contributions rather than shares). To highlight the general trend in the globalization period and distinguish it from the first year of the crisis, we show growth contributions of different countries and regions for 1990, the average for 2000-07 and separately for 2008.

The top panel of Figure IV.2 shows growth contributions based on PPP-adjusted GDP data. The growth contributions of China, India, other emerging markets, and emerging Europe all increase from 1990 to 2000-2007, offsetting a decline in the shares of the U.S. and other advanced economies. In 2008, the growth contributions of China, India and other emerging markets continue to rise, but the shares accounted for by the U.S. and other advanced economies fall and the contribution of Emerging Europe remains steady.

The lower panel of Figure IV.2 shows similar calculations based on GDP converted to a common currency at market exchange rates. As was the case with the GDP levels, the patterns of growth contributions based on market exchange rates are quite similar to those based on PPP exchange rates, but are quantitatively less favorable to emerging markets. Interestingly, the growth contributions of Emerging European economies increase in 2008 relative to 2000-07 when measured on the basis of market exchange rates.

IV.3. The Evolution of the Sectoral Growth Dynamics

We now examine the changing structures of these economies in order to better understand the growth dynamics we have characterized above, and also to look at the potential implications of the rising importance of the EMEs in the world economy. Table IV.3 shows the composition of output--broken down into the shares accounted for by agriculture, industry and services—for different country groups over time. For the world as a whole, the average shares of output accounted for by agriculture and industry have fallen by about 2 percentage points each during the past five decades, with the difference being made up by a rise in the share of the services sector.

There is an interesting contrast between the advanced economies and the EMEs. In advanced economies, the share of agriculture has fallen to below 2 percent in the last two decades and the share of manufacturing has declined to 28 percent from 34 percent in the 1960s. Among the EMEs, the share of agriculture has fallen even more sharply but still accounts for about 12 percent of output. The share of industry in GDP, on the other hand, has risen markedly, to

34 percent over the last two decades. Among the other developing economies, agriculture remains quite important, at about 20 percent of GDP.

It is also interesting to look at the growth rates of output in different sectors to get a better picture of how the sectoral distribution of output growth is evolving (Table IV.4). Among the advanced economies, growth in services has been one of the main drivers of growth. Among the emerging markets, both industry and services turn in strong growth performances in recent decades, but industrial output has been growing slightly faster than service sector output in the last two decades. For other developing economies, growth has been more similar across sectors, with agriculture continuing to play an important role in contributing to overall GDP growth.

The pattern of strong service sector growth in advanced economies is accentuated when we examine the data for specific countries such as the U.S. and Japan or for a specific group such as the EU-15. In all of these cases, growth in services is dominant relative to the other sectors. Among the major emerging markets, both industry and services register strong growth rates. Of course, this masks a substantial difference within this group, with China registering very strong industrial sector growth while in India service sector growth has tended to be dominant in recent years (see, e.g., Gordon and Gupta, 2006; Kochhar et al., 2008).

IV.4. Summary

What are the implications of the changes in the patterns of distribution of GDP levels and growth rates that we have characterized in this section? First, emerging markets have become key players in the world economy in terms of their sheer size. This phenomenon has been accentuated during the period of globalization and has further intensified during the global financial crisis as the group of emerging markets continued to expand at a relatively robust rate while advanced economies essentially came to a standstill. Second, it is clear that EMEs have become increasingly more important in terms of driving global GDP growth. Again, this group has essentially been responsible for most of global GDP growth during the latest

financial crisis. Third, the larger share of industrial output in GDP among EMEs compared to other groups of countries, and the high growth rate of industrial output in the EMEs together imply that we will continue to see a secular shift of manufacturing towards the EMEs while the advanced economies increasingly specialize in services. This will have implications for global trade patterns as well.

V. GLOBAL TRADE LINKAGES

There have been substantial changes in the volume and nature of international trade linkages during the globalization period. These changes have been associated with the liberalization of trade policies around the world, rapid declines in the costs of transportation, and communication. Figure V.1 shows that the fraction of countries with a fully liberalized trade regime has increased sharply in the globalization period. This is a measure that captures the restrictiveness of trade policies in each country, based on policy measures such as tariffs, quotas and other restraints on cross-border trade.

Figure V.2 shows the evolution of de facto trade openness, measured by the ratio of total trade to GDP, for the world and separately for each of the three groups of countries. Although the extent of trade openness for the global economy was relatively stable until 1985, it increased at a rapid clip during the globalization period. In particular, the openness ratio for the EMEs has risen from less than 30 percent to roughly 80 percent over this period. Similarly, for advanced economies, the openness measure has increased from 26 percent to 46 percent during the globalization period. It is interesting to note that EMEs as a group now have the highest average trade openness ratios, indicating how important trade flows have been for their integration into the world economy.

The significant increase in the degree of openness of the EMEs has been partly due to their aggressive industrialization policies based on export driven growth strategies over the last two decades. During the period 1960-1972, the average growth rate of exports for this group was lower than that of the advanced countries, but since the mid-1980s it has been more than two times higher than the latter group. Table V.1 shows that emerging markets' export growth accounted for the lion's share of global export growth during the globalization period. During the financial crisis, export growth of emerging markets took a commensurately larger hit as final demand from advanced economies collapsed. Nevertheless, the long-term trends clearly suggest that the emerging markets will likely to continue to play an increasingly more important role in world trade.

As shown earlier (Table IV.3), these developments in world trade have been accompanied by a major shift in resources from agriculture to industry and services. The rising share of emerging markets in world exports is consistent with the fact that the industrial sector has grown most rapidly in these economies while the share of the services sector has increased in advanced economies. The industrial sector has traditionally been seen as the traded goods sector, although this link is becoming weaker over time as a widening array of services, especially financial services but also information technology services, are also being traded across national borders.

The comparative advantage of the EMEs has featured a dramatic shift from primary commodities to a diversified range of manufacturing products (and, in some cases, services) during the past five decades. Table V.2 documents that, prior to 1972, the EMEs and ODEs were in some ways similar in terms of the composition of their exports and imports. Both groups mainly exported primary commodities while manufacturing products constituted the bulk of their imports. Since the mid-1980s, the share of commodities in the EMEs' exports has declined to 25 percent while the share of manufacturing exports has shot up to 75 percent. For comparison, the average share of advanced economies' exports accounted for by manufacturing exports was 74 percent during 1973-85 and rose to 81 percent during 1986-2007.

The share of manufacturing imports has grown simultaneously with the growth of the manufacturing exports in the EMEs (Table V.2). One of the driving forces of these changes has been the rapid increase in intra-industry trade (see Akin and Kose, 2008). In particular, the extent of intra-industry trade, measured by the average bilateral Grubel-Lloyd index, has been rising at a steady pace among the G-7 and between EMEs and G-7 countries since 1970. The intra-industry trade intensity with the G-7 countries has been higher for Emerging Asia relative to other EMEs. The surge in intra-industry trade linkages is associated with vertical specialization of trade (see Hummels, Ishii and Yi, 2001, and Yi, 2003).

The rapid growth of intra-industry trade with advanced economies has coincided with a substantial change in the direction of trade flows around the world. The top panel of Figure V.3 shows that advanced economies remain the dominant destination for global trade flows.

However, the share of global trade accounted for by advanced economies has fallen from about 80 percent in the 1960s to just under 60 percent in 2008. The share of total world trade accounted for by the EMEs has increased significantly, from 14 percent in 1985 to 27 percent in 2008.

These changes in the relative importance of different groups in world trade have been accompanied by shifting patterns of trade among these groups. The remaining panels of Figure V.3 show how much of each of these groups' trade flows is accounted for by intra-group versus inter-group trade. The advanced economies largely trade amongst themselves; although intra-group trade within this group has declined gradually, it still accounted for roughly 63 percent of this group's trade in 2008. EMEs have also become an important market for advanced economies, with their share of advanced countries' exports rising from 13 percent in 1985 to about 20 percent in 2008.

The third panel (bottom left) panel of Figure V.3 shows that the intensity of intra- and cross-group trade linkages has increased among EMEs. For example, the share of intra-group trade in their total trade has increased nearly five-fold over the last five decades, from less than 9 percent in 1960 to slightly more than 42 percent in 2008. During this period, the share of EMEs' trade with advanced economies declined from 83 percent to 50 percent. For the group of other developing economies, exports to advanced economies still dominate overall trade, although this share has been falling gradually and is being replaced by rising trade linkages with emerging markets. Nevertheless, as of 2008, exports to advanced economies still accounted for nearly three-fourth of their total exports.

There are two clear patterns in the trade flows that are important for our further analysis. The first is that the share of emerging markets in world trade is on a secularly rising trend and, as these economies increase in size and reduce their barriers to trade, their impact on world trade is likely to continue growing for a number of years. The second is that intra-group trade has risen sharply among emerging markets and, on present trends, is likely to dominate this group's trade flows in the coming decades. One issue that remains unresolved is how much of the within-group flows among emerging markets are the result of supply chains resulting from vertical specialization of production across countries, leaving these countries still reliant

on advanced country export markets for final demand. This is difficult to disentangle even using bilateral flows data as one would need detailed disaggregated data on the composition of bilateral trade flows for a large number of countries and would need to match that up with knowledge of production structures in each country. Nevertheless, the phenomenal growth of EMEs trade has been instrumental in realizing the high growth rates we documented in the earlier section.[26]

Tables V.3 and V.4 provide more details about the evolution of the export shares of the main advanced economies and emerging markets accounted for by different export destinations and expressed as ratios to national GDP and a country's total exports, respectively. These tables show that intra-regional trade flows have played an increasingly prominent role in global trade. For example, trade flows within the Euro area and Emerging Asia have risen much faster than their trade with the United States. This reflects, in part, the process of economic unification in Europe and China's rapid growth during the past two decades.

The U.S. economy has been a much larger customer of exports of emerging market and developing countries than advanced economies when measured by the exports to GDP ratio (exports relative to GDP of exporting countries). The NIEs and ASEAN countries have significantly increased their intra-regional trade, but their exports (relative to their GDP) to the United States have been rather stable over the years. Compared with the euro area and Japan, the United States has seen a larger increase in trade with emerging market and other developing countries in general, not just with countries in the Western Hemisphere.

Export exposure to the United States—the share of exports to the United States as a percent of GDP—has generally continued to increase, even for countries where the U.S. share of total exports has declined, as trade openness has increased everywhere. Export exposure to

[26] For empirical evidence showing that trade openness has a direct and positive effect on economic growth, see, e.g., Frankel and Romer (1999) and Dollar and Kraay (2003). Rodriguez and Rodrik (2002) present a contrarian view but, as summarized in recent surveys by Berg and Krueger (2002), Baldwin (2004), and Winters (2004), the weight of the evidence supports the by-now conventional wisdom that trade is good for growth. In a recent paper, Wacziarg and Welch (2008) report that countries that liberalized their trade regimes experienced much higher growth rates.

the United States also tends to be larger than that to the euro area and Japan, except in neighboring regions.

Table V.4 shows how the relative importance of different final destinations of exports has changed, revealing a picture that is different from Table V.3 in some important ways. For Emerging Asia, the share of exports accounted for by the U.S. and Japan has fallen significantly from 1981-95 to 2006-08, while the share of exports going to the Euro area has risen slightly. Other emerging markets now account for the dominant share of exports from emerging Asia, accounting for 42 percent of total exports emanating from countries in the region in 2006-08. There are similar, although less dramatic patterns for the other groups of emerging markets. For Latin American emerging markets, the share of exports accounted for by the U.S. rose sharply at the beginning of this decade, largely due to Mexico's accession to NAFTA. Since then, the relative importance of the U.S. as a destination even for Latin American exports has begun to decline. The two patterns that stand out in this table are the rising share of emerging market exports accounted for by other emerging markets and the considerable declines in the importance of the U.S. and Japan as final destinations for exports.

VI. GLOBAL FINANCIAL LINKAGES

We now turn to a detailed analysis of the evolution of financial linkages with the world economy for different country groups. The growth of international financial flows has been much higher than the growth of trade flows in the globalization period. This unprecedented change has mainly been associated with the rapid liberalization of capital account regimes since the mid-1980s. Figure V.1 shows that the fraction of countries with liberalized financial systems has increased sharply in the globalization period. In addition, several "pull" and "push" factors have changed the composition of financial linkages between the advanced countries and the groups of the EMEs and ODEs during the globalization period. As a consequence, the composition of capital flows, in particular to the EMEs, has changed rapidly, and portfolio equity and foreign direct investment inflows have become more prominent.

Most of these structural changes that can be classified as "pull factors" have taken place in the EMEs. Privatization of state-owned enterprises, removal of restrictions on the acquisition of assets by foreigners, liberalization of domestic banking systems and stock markets, as well as gradual establishment of liberal capital account regimes have attracted the international capital flows towards the developing countries. As for the "push factors", demographic changes in the advanced countries have resulted in a search for higher returns.[27]

Figure VI.1 displays the absolute level of integration of different country groups into global financial markets, calculated as the sum of gross international financial assets and liabilities. Financial openness has increased sharply for all three groups of economies during the globalization period, although the rate of increase has been highest during this decade for advanced economies and emerging markets, while the other developing economies have experienced a more subdued but still rapid rate of increase. While the level of integration is clearly highest for the advanced economies, the EMEs have accounted for the bulk of the

[27] For a detailed discussion of the evolution of foreign assets and liabilities around the world, see Lane and Milesi-Ferretti (2007). See Kose and others (2009) for different approaches to measuring the degree of financial integration.

integration experienced by developing economies. The gross stocks of assets and liabilities of the EMEs have risen rapidly during the globalization period and their total stood at nearly 20 trillion at the end of 2007, compared to about 165 trillion for the advanced economies.

Figure VI.2 presents the evolution of the composition of total foreign assets and liabilities for different groups of countries. Among the advanced economies, the major increase has been in the share of portfolio equity during the globalization period. The share of debt, which includes portfolio debt as well as bank lending, has been relatively stable at around 60 percent. Among the emerging markets, the most striking feature is the sharp fall in the share of debt in gross stocks of foreign assets and liabilities. During the early to mid-1980s, debt accounted for nearly three-quarters of all assets and liabilities of the EMEs. This share has declined sharply since then, falling to about one-third by 2007. This has been offset by a corresponding increase in the shares of FDI and portfolio equity. During this decade, accumulation of official international reserves has accounted for a significant portion of the increase in gross foreign assets of the EMEs. Among the ODEs, there has been a similar fall in the share of debt, although it still accounts for about half of overall external assets and liabilities, with increases in FDI and stocks of foreign reserves compensating for this decline. The share of portfolio equity has been rather small in the total external assets and liabilities of the ODEs.

To examine these patterns in more detail, we break down the data separately into gross external assets and gross external liabilities of the different groups. Figure VI.3 shows that, for advanced economies, debt remains the dominant form of external assets. The share of foreign exchange reserves has fallen slightly while the share of portfolio equity has increased considerably. This is partly the result of increased portfolio investment going from advanced economies to emerging market economies, many of which started liberalizing their equity markets and opening them up to equity investment flows in the mid-1980s. For both EMEs

and ODEs, the share of external assets held as foreign exchange reserves has increased sharply over the last decade.[28]

Figure VI.4 shows that, for advanced economies, the share of debt in gross foreign liabilities remains dominant. By contrast, for EMEs the share of debt has fallen steeply from about 80 percent in 1985 to about below 40 percent in 2007, with the difference being made up for by substantial increases in the shares of FDI and portfolio equity. There is a similar although not as large fall in the share of debt in external liabilities of ODEs. For this group, the big increase is in FDI, with portfolio accounting for a minuscule share as many of these economies do not have well-developed equity markets.

The shift in the structure of foreign liabilities of emerging markets away from debt and towards FDI and portfolio equity has important ramifications for their financial stability. A common theme that emerges from different strands of the recent literature on financial globalization is that, in terms of evaluating the potential benefits and risks of financial integration, the composition of the stock of external liabilities is highly relevant in a number of dimensions.

The literature about the indirect benefits of financial integration emphasizes that the main benefits of financial integration are in terms of TFP growth (Kose and others, 2009). Interestingly, while there has been a vast literature examining the effects of integration on output growth, scant attention has been paid to its effects on TFP growth. In a recent contribution, Kose, Prasad and Terrones (2009) find that de jure capital account openness is positively associated with TFP growth. Surprisingly, however, overall de facto financial integration is not correlated with TFP growth. This turns out to mask a novel and interesting result. FDI and portfolio equity liabilities are in fact associated with much higher productivity growth, while stocks of debt liabilities are negatively correlated with TFP

[28] Although these shares seem comparable to those in the early 1960s, the level of integration in the 1960s was much lower than in the last two decades, so the shares in the earlier period are less meaningful.

growth, especially in economies with underdeveloped financial systems. What explains this difference? The indirect “collateral” benefits of financial flows tend to flow from FDI, in terms of technological and skill spillovers, and from portfolio equity, in the form of increased depth and innovations in equity markets. Financial sector FDI has also been found to help in the import of good governance practices and financial innovations (Goldberg, 2004).

Another issue is that emerging markets by and large do not seem to have attained the risk-sharing benefits of financial globalization. Kose, Prasad and Terrones (2009) document this result and also look for explanations for the divergence of these results from the predictions of theoretical models. They find that stocks of FDI and portfolio equity liabilities are in fact associated with better risk sharing outcomes while stocks of external debt liabilities are not. Indeed, this goes a long way towards explaining the paradoxical risk-sharing outcomes for emerging markets. Until recently, as noted above, financial integration for these economies largely took place in the form of debt accumulation. Not only are debt flows themselves procyclical, interest payments on external debt are typically not indexed to the business cycle, so they have a procyclical element to them as well. FDI and portfolio equity flows by their very nature involve a sharing of risk between foreign investors and their host countries. They have also tended to be more stable than debt flows. Interestingly, advanced economies do not seem to suffer similar problems from debt flows, which still dominate cross-border flows among these economies. This could be because they have better-developed financial markets and, typically, more flexible exchange rates, both of which act as shock absorbers in the face of capital flow volatility.

A further complication associated with financial integration is that there appear to be some threshold conditions that influence its cost-benefit tradeoff for emerging markets. Indeed, factors such as financial market development and the quality of institutions also seem to play a crucial role in determining the extent of benefits a country can derive from financial openness and also how vulnerable it is to the risks associated with capital flows. These

thresholds are considerably lower for certain types of financial flows—FDI and portfolio equity, in particular—and higher for debt inflows.[29]

Consistent with this discussion, the group of emerging markets that was most seriously affected by the financial crisis was in emerging Europe, which had relied heavily on bank financing for its current account deficits. In particular, the Baltic countries had been running large current account deficits that were financed by capital flows, making these countries particularly vulnerable to sudden stops of these inflows.

In order to understand the potential for transmission of shocks through financial channels, we now examine the quantum and direction of overall financial flows, both of which have been changing at a rapid pace. Table VI.1, which shows external portfolio assets and liabilities as a share of national GDP, indicates that international portfolio exposure is much greater relative to economic size for advanced economies than for EMEs. Starting from a low base, however, the increase in the pace of financial integration of EMEs has been much greater.

While financial flows among advanced economies still constitute the main driving force behind the expansion of global financial flows, there has been a significant increase in the volume of flows between advanced and emerging market economies over the past two decades. Table VI.2 shows that intra-regional flows have been on the rise for the past decade, especially in the Euro area and Emerging Asia. The sustained pace of intra-regional financial integration in Emerging Asia is indicated by the rapid increase in the share of intra-regional holdings of foreign assets (as a share of all foreign assets of the relevant countries) even over the period from 2004 to 2007, from 22 percent to 38 percent. The share of intra-regional

[29] Kose, Prasad and Taylor (2010) review the theoretical basis for such threshold effects and provide some quantitative evidence that thresholds matter, even though it proves difficult to pin down precisely the exact levels of various thresholds. Mukherji (2009) provides evidence that higher levels of financial development and stable macroeconomic policies enable countries to gain modest growth benefits from capital account convertibility, while weak financial systems and macroeconomic vulnerabilities increase growth instability without raising average growth.

holdings of liabilities in Emerging Asia (as a share of foreign liabilities of the relevant countries) rose from 17 percent to 20 percent over the same period.

Reflecting the size and depth of its financial markets, as well as its increasing net external liabilities, claims on the United States typically account for a large share of extra-regional foreign portfolio assets of the rest of the world. At the same time, the share of foreign portfolio liabilities held by U.S. investors typically also exceeds the holdings of investors elsewhere, except for the euro area, where intraregional holdings are more important. This illustrates the extent of importance of international financial linkages with U.S. markets.

For Emerging Asia, the U.S accounts for about 17 percent of external assets and 32 percent of external liabilities in 2007. For Latin America, whose economies are more closely linked to that of the U.S., the shares of both external assets and liabilities accounted for by the U.S. are nearly 55 percent in 2007. Among the economies of Emerging Europe, however, integration with Euro area counties is far more important in terms of overall financial exposure. For Emerging Europe, the Euro area accounted for about 58 percent of external assets and 48 percent of external liabilities in 2007. For all groups of emerging markets, the share of external assets and liabilities accounted for by intra-regional holdings either stays stable or increases from 2004 to 2007.

VII. Business Cycle Volatility

Now that we have characterized the integration of different groups of economies into the global economy through trade and financial flows, it is useful to examine the implications of rising integration for business cycle volatility. This provides a baseline for evaluating the impact of globalization on business cycle fluctuations and also for examining the resilience of EMEs during the recent global recession. In this sub-section, we first present some stylized facts concerning the dynamics of output, consumption, and investment volatility across groups of countries and over time. Next, we briefly discuss the implications of globalization for volatility.

VII.1. Evolution of Volatility

We measure volatility by the standard deviations of the annual growth rates of individual country output, consumption, and investment. Table VII.1 (column 1) shows the cross-sectional medians for different country groups of the volatility of output, consumption, and investment growth over the full sample, 1960–2008. The results line up as expected, with median volatility of output, consumption, and investment being lowest for the advanced country sub-sample and, among developing countries, for EMEs, which tend to be more open and diversified than other developing economies. The first panel reports the results for the global economy as a whole using the full sample of countries. As has been well documented in the literature, the volatility of investment is higher than that of output and consumption. Interestingly, the volatility of consumption is often slightly higher than that of output.[30]

In order to explore the effects of globalization on volatility, we look at changes over time in patterns of macroeconomic volatility. Table VII.1 (columns 2–5) presents summary statistics for the volatility of output over each of the three specific periods defined above. Median

[30] The fact that consumption growth is more volatile than output growth suggests a violation of consumption smoothing behavior. Kose, Prasad, and Terrones (2003a) show that this "puzzle" is considerably attenuated if one accounts for government consumption and uses a measure of national income that incorporates a terms of trade adjustment to GDP (or GNP).

output volatility rises in all groups during the common shocks period (1973-1985). During the globalization period, however, median output volatility declines to a level lower than that of even the relatively calm first period in advanced countries. There is a similar pattern of a modest decline in output volatility for EMEs and ODEs during the globalization period.

As one would expect, for all three groups of countries, consumption volatility goes up in the second period relative to the first period. Then, similar to the behavior of output volatility, the volatility of consumption decreases in the globalization period. In particular, for advanced economies and ODEs, there is a sharp decline in consumption volatility in the globalization period, relative to the common shock period. The median volatility of consumption goes down by around 25 percent (from 2.4 to 1.8) in the group of advanced economies and it decreased by about 9 percent (from 8.1 to 7.4) in LFI countries. The major difference is again for EMEs, which experience a much smaller decline of approximately 5 percent (from 5.1 to 4.8), in their median consumption volatility in the globalization period, relative to the common shock period.

The volatility of investment is highest in the common shock period for ODEs. For advanced countries and ODEs, there is a substantial decrease in the volatility of investment in the globalization period, relative to the common shock period. The volatility of investment is essentially unchanged from the common shock period to the globalization period in the EMEs. Another interesting observation is that the volatility of investment is lower in the globalization period than in the first period for all groups of countries. This result is not consistent with the theoretical predictions that we discussed in the earlier sections. However, there is at least one potential explanation of this result: there have been some major structural changes associated with inventory management techniques and production technologies that have helped firms to reduce the volatility of their investment demand during the 1990s. This could have resulted in the lower volatility of aggregate investment (see McConnell, Mosser, and Quiros, 1999; and Stock and Watson, 2003).

We also report the evolution of volatility in key macroeconomic aggregates for the groups of G-7 and EU-15 countries. The dynamics of volatility for these groups are quite similar to

those of advanced countries. However, the decline in the volatility of investment from the common shock period to the period of globalization is much smaller for the G-7 and EU-15 countries relative to the advanced countries.

VII.2. Volatility and Growth

How do the changing dynamics of volatility affect growth prospects in EMEs? Before answering this question, we need to briefly examine the literature on the relationship between growth and volatility. In an influential paper, Ramey and Ramey (1995) documented an empirical relationship that has now come to be regarded as conventional wisdom—that volatility and growth are negatively correlated.[31] This is an important result since it suggests that policies and exogenous shocks that affect volatility can also influence growth. Thus, even if volatility is considered intrinsically a second-order issue, its relationship with growth indicates that volatility could indirectly have first-order welfare implications.

How do the forces of globalization affect the relationship between growth and volatility? Recent research analyzes how trade and financial integration affect the negative relationship between volatility and economic growth. Although countries prone to higher macroeconomic volatility would be expected to show worse growth performance than more stable ones, this interpretation does not seem to be entirely borne out by the data. In particular, while emerging market countries affected by the recent financial crises faced episodes of high output volatility, they actually posted much better growth rates on average than other developing countries since the mid-1980s. As we documented in the previous sections, while a number of EMEs experienced financial crises since the mid-1980s, their average growth of output was much higher than that of ODCs. Does this mean that, in a period of rising globalization, the negative relationship between volatility and growth has changed?

[31] Aghion and Banerjee (2005) and Aizenman and Pinto (2006) also document the negative relationship between growth and volatility.

Recent research addresses this question by studying the relationship between growth and volatility in a large sample of countries over the past four decades (Kose, Prasad and Terrones, 2005 and 2006). Their results indicate that while the negative relationship between growth and volatility reported by previous research for the period 1960-85 has persisted into the 1990s, it is far from homogeneous when broken down by country groups. The relationship appears positive for advanced countries—indicating that, for countries at an advanced stage of development and integration into the global economy, volatility is not necessarily associated with lower growth. Among developing countries, it is positive on average for emerging market economies and negative for the other developing countries that have not participated as much in the process of globalization.

These authors also report that both trade and financial integration appear to have played important roles in changing the nature of the volatility-growth relationship among EMEs. The relationship between growth and volatility is negative before trade liberalization and positive after. For financial integration, there is a similar, although less strong, result. In other words, there is suggestive evidence from EMEs that both trade and financial integration change the sign of the relationship between volatility and growth.

Regression analysis by Kose, Prasad and Terrones (2005 and 2006) also suggests that, although on average volatility is still negatively associated with growth, higher trade and financial integration make this relationship weaker. In other words, economies that are more integrated into the global economy have the ability to withstand higher levels of volatility with less adverse effects on growth.[32] These effects appear quantitatively important. When these authors compare the growth/volatility performance of advanced and developing countries, they find that the higher levels of trade/financial openness of emerging markets could, under some assumptions, account for about 40 percent of the observed difference in average growth rates between these country groups. Overall, these findings suggest that the

[32] While FDI flows help dampen the adverse impact of volatility on economic growth, other types of flows do not appear to have a significant effect on the relationship between volatility and growth (Kose, Prasad and Terrones, 2005 and 2006).

forces of trade and financial integration could help reduce the adverse impact of volatility on economic growth.

A related strand of literature examines the importance of trade openness in reducing the vulnerability to crises. For example, Calvo, Izquierdo, and Mejia (2004) show that trade openness makes countries less vulnerable to financial crises, including sudden stops and currency crashes. Controlling for the endogeneity of trade strengthens this effect. Frankel and Cavallo (2004) and Cavallo (2005) report similar findings. They conclude that a 10 percentage point increase in trade openness reduces the probability of a sudden stop by about 30 percent.

Does trade integration play an important role during the recovery phases from crises? Calvo and Talvi (2005) claim that the collapse of capital flows to Argentina and Chile in the 1990s had a smaller impact on Chile since it is more open to trade flows.[33] Recent research also confirms that, among countries that have experienced sudden stops and current account reversals, those that are more open to trade suffer smaller growth declines.[34] For example, Edwards (2005) reports that a decline in trade openness of roughly 30 percentage points increases the negative effect of a current account reversal on growth by approximately 1.2 percentage points.

Kose et. al (2009) survey the large literature analyzing the macroeconomic implications of financial globalization. They consider whether financial openness increases the vulnerability of countries to crises. They conclude that there is little formal empirical evidence to support the oft-cited claims that financial integration in and of itself increase the vulnerability to various types of financial crises, including currency crises, banking crises and sudden stops (see Glick, Guo, and Hutchison, 2008; Glick and Hutchison, 2001).

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[33] Kose, Meredith, and Towe (2004) argue that trade integration has made the Mexican economy more resilient to shocks and contributed to its faster recovery from the 1994–95 peso crisis than from the 1982 debt crisis.

[34] See Edwards (2004, 2005), Desai and Mitra (2004), and Guidotti, Sturzenegger and Villar (2004).

VII.3. Summary

Our analysis in this section indicates that the dynamics of volatility have changed over time and across different country groups in response to increased trade and financial flows. There are two key implications of the analysis in this section. First, even if trade and financial integration may have increased the volatility of growth in EMEs, the component of volatility attributable to greater integration has not adversely affected growth. Second, having access to global trade and financial markets has been important for recovery from cyclical downturns and crises, especially for EMEs with good macroeconomic policy fundamentals. These results will clearly have a bearing on understanding the resilience of certain emerging markets during the recent crisis.

VIII. Business Cycle Comovement

In this section, we provide a detailed analysis of the extent of business cycle comovement between advanced countries and EMEs from a variety of angles. First, we examine the correlations of GDP growth and the sectoral components of GDP growth within and among different regions. Second, we examine correlations of industrial production indexes. Since these data are available at a monthly frequency and can be aggregated up to quarterly or annual data, this also allows us to analyze the effects of time-averaging of data on business cycle correlations. Third, we study the correlations of stock returns within and across country groups, which allows us to compare and contrast the synchronization of real and financial variables based on the same empirical approach.

VIII.1. Output Correlations Across Groups

We begin by looking at correlations of output growth across different country groups. To provide a summary measure of synchronization across groups, we create an output-weighted index of GDP growth for each group and then examine the cross-group correlations of the growth rates of those GDP aggregates. Table VIII.1A shows that correlations between advanced economies and EMEs have fallen since the pre-globalization period of 1973-1985, from 0.48 to 0.25 during the period 1986-2008. The correlations in the pre-globalization period were in fact higher during 1973-1985 compared to the entire period 1960-1985, suggesting that these correlations rose during the common shocks period of the mid 1970s and early 1980s. The correlation between the GDP indexes of the advanced economies and ODEs has also fallen sharply, from 0.32 percent in 1960-85 to 0.12 in 1986-2008. Over both periods, the correlation between the GDP indexes of EMEs and ODEs have been much higher, averaging about 0.4-0.5. Similar to the pattern for the full set of advanced economies, the correlations between the output indexes of the EU-15 and emerging markets fall from 0.52 in 1973-85 (or 0.63 in 1960-85) to 0.17 in 1986-2008.

The remaining rows of Table VIII.1A examine the correlations of similar indexes for each group but with the indexes constructed separately for each of the main economic sectors—

agriculture, industry and services. The cross-group correlations of industrial output are typically higher than those of other sectors, although the correlations of industrial output in the advanced economies with those of the other two groups have declined quite sharply in the globalization period. The corresponding correlations for the other two sectors, agriculture and services, are either close to zero or negative. In short, there appears to be a delinking of business cycle fluctuations, measured either at the level of GDP or sectoral output, between advanced economies on the one hand and EMEs or ODEs on the other hand.

A different way to conduct this exercise is to look at the bivariate correlations between growth rates for each advanced economy in our dataset and the output-weighted index of growth in emerging markets. Table VIII.1B shows that these correlations reveal a similar pattern—the average correlations of aggregate and sectoral output growth between advanced economies and EMEs has declined significantly in the globalization period. Indeed, for industrial output, which can be considered the main traded goods sector and which should show the most clear evidence of international business cycle spillovers, the average correlation between the two groups of countries plummets from 0.45 during 1960-1985 to essentially zero during 1986-2008. The corresponding correlations for the EU-15 with emerging markets go from 0.31 to 0.07.[35]

VIII.2. Output Correlations Within Groups

Next, we analyze the changes in the extent of intra-group growth linkages. Table VIII.2 presents the averages of bilateral correlations of individual country GDP and sectoral growth rates with the respective aggregate output-weighted indices for two groups of countries—the advanced economies and the emerging markets. The average correlations of GDP growth within the two groups have risen significantly over time in the two periods. For advanced economies, the average correlation rises to as much as 0.71 during the globalization period,

[35] Our objective in reporting these and other correlations in this section is mainly to highlight patterns in the data and motivate the more formal econometric analysis in Section IX. Hence, we do not report statistical significance of these correlations (either levels or changes) but generally discuss only those that are large in absolute magnitude.

while it rises to 0.46 for emerging markets during this period. For the EU-15 group of advanced economies (which is included in the broader group of advanced economies in the top panel of the table), intra-group correlations rise from 0.65 to 0.80.

The correlations of the sectoral growth indices show a similar pattern of rising synchronicity among the emerging markets in terms of sectoral fluctuations. However, the sectoral growth indices show either flat or declining within-group correlations for advanced economies. A similar pattern holds for the EU economies. One possible explanation is that there is increasing specialization in these economies at higher levels of sectoral disaggregation, which would reduce sectoral growth correlations across countries if shocks hitting these economies were predominantly at the sectoral rather than aggregate level.

To summarize the results from the between- and within-group correlation analysis so far, it appears that the extent of comovement of growth fluctuations in the EMEs with those in the advanced countries has become gradually weaker over the period 1960-2008, notwithstanding the greater integration of both groups into global trade and finance. On the other hand, there has been an increase in the degree of comovement of growth fluctuations among the advanced countries. In addition, growth fluctuations in the EMEs have become more strongly associated with their partners within the same group.

VIII.3. An Alternative Perspective: Comovement of Industrial Production Indexes

The industrial sector tends to be highly correlated with the aggregate business cycle in most economies. It is also representative of the traditional traded goods sector, implying that it should provide a broader window to detect cross-country business cycle spillovers. We have already examined these correlations for the industrial sector using value added data from the national income accounts. We now evaluate correlations using industrial production indexes, which are typically based on surveys of manufacturers and different data collection procedures and definitions than the national accounts data. Industrial production data are generally available at a monthly (or at least quarterly) frequency for most countries, so this also allows us to examine the effects of time-averaging on correlation patterns since most of

our other analysis is based on annual data (given the large number of countries in our sample, it is not possible to get higher frequency data for a long period).[36]

Panel A of Table VIII.3 shows the correlations between growth rates of output-weighted indexes of annual industrial production for advanced economies and emerging markets (as before, all correlations are for growth rates of the respective variables). This correlation rises significantly from 1973-1985 to 1986-2009, but it turns out that the period of the global financial crisis is crucial for this result. The correlation for the period 1986-2007 is lower than in the pre-globalization period, but it is still higher than the 1960-1972 period. The same pattern holds when we look at the evolution of correlations for the EU-15 economies with emerging markets. The drop in the correlations from the pre-globalization to the globalization period are similar to the result using industrial sector value added data from the national income accounts.

Panel B of Table VIII.3 shows the correlations between growth rates of each advanced economy's industrial production index and the output-weighted emerging market industrial production index, with the bottom rows of this panel showing the average correlations across all of the countries. The average correlation rises from 1973-1985 to 1986-2009 but again this result is sensitive to inclusion of the data for the latest financial crisis. It is also interesting to note that correlations of U.S. industrial production with the emerging markets' industrial production index are among the highest bilateral correlations since the 1970s, suggesting a high degree of comovement between emerging markets and the United States.

Panel C of Table VIII.3 shows the average correlations within each group—correlations are computed between growth rates of each country's industrial production index and the output-weighted industrial production index of its respective group, and the correlations are then

[36] Industrial production indexes are constructed separately from the sectoral breakdown of national GDP into industry, services and agriculture. The latter are based on value added data. The advantage of IP indexes is that they are available at a high frequency (monthly) but their growth rates do not necessarily match perfectly the growth rates of industrial output from the national income accounts.

averaged within each group. Interestingly, the within-group correlations are relatively stable over the periods 1973-1985 and 1986-2009.

In order to examine the effects of the choice of data frequency on correlation patterns, we also repeated the exercises using quarterly and monthly data (not reported here). The correlations were in general lower using quarterly relative to annual data. This was to be expected given that there is a lot more volatility in quarterly data compared to annual data. Nevertheless, the broad patterns of across-group correlations and intra-group correlations for advanced and emerging economies were generally preserved.

VIII.4. Comovement Across Financial Markets

We now turn to an analysis of correlations in financial rather than just real variables. In order to determine the degree of comovement of financial variables, we need consistent data series across advanced and emerging market economies. Variables such as domestic interest rates are not easy to interpret in some emerging markets that have a high degree of financial repression. Hence, we select a variable that is easier to obtain and can be interpreted in a consistent manner for a broad range of advanced and emerging economies—stock returns. Rather than looking at bivariate correlations, we examine the correlations of each country's stock returns data with the returns on a weighted world index, and then average those correlations within each group of countries.

Figure VIII.1 shows the correlation of stock returns between PPP-based output-weighted weekly stock returns for advanced economies and emerging markets, with the correlations computed using a three-year rolling window. The correlation between returns in these two groups of economies has clearly risen sharply over the last two decades. Figure VIII.2 repeats this exercise but now shows a cross-section average of correlations between individual countries in one group and a composite measure of returns for the other group. The pattern of rising correlations in stock returns between the two groups of countries comes through clearly once again.

Figures VIII.3 shows the average correlation, within each group, of the correlations between individual country stock returns and world stock returns. These have been rising over time for both advanced and emerging market economies. In Figure VIII.4 we show a similar set of results but with the correlations calculated using weekly stock returns over rolling windows of different length, which allows us to more easily characterize the evolution of stock market comovement over time. As expected, the evolution of the correlations is smoother for wider windows of the data. What is more interesting, however, is that the evolution of the correlations is the same, irrespective of the size of the window. The average correlations are generally much higher for the advanced economies than for emerging markets. For both groups, there is a distinct upward trend in the average correlations, clearly showing the rising synchronicity of world stock market fluctuations.

Figure VIII.5 breaks down these results for different groups of emerging markets. The correlations are in general quite high for Latin American, Asian and Eastern European countries and somewhat lower for Middle Eastern economies. For all groups, however, the key conclusion is again that there is increasing comovement with world stock returns.

These results are consistent with those of a number of recent studies that consider the implications of increasing financial integration for the degree of stock market synchronization. For example, Bekaert and Harvey (2000), Goetzman et al. (2005), Quinn and Voth (2008) all report that stock markets in countries with a higher level of capital account openness tend to exhibit much higher correlations with world indices. Goetzman et al. (2005) and Quinn and Voth (2008) use a long-run dataset on capital account regulations over 100 years and find evidence of a positive relationship between the level of capital account openness and stock return correlations. Some studies find that both trade and financial linkages have a positive impact on these correlations (Forbes and Chinn, 2004; Beine and Candelon, 2007; and Morana, 2008). As we report in section IX, some recent studies also document that the episodes of downturns in financial markets tend to be highly synchronized across advanced countries and EMEs.

VIII.5. Summary

The evidence in this section portrays a mixed picture. Intra-group correlations of aggregate and sectoral output indexes have been rising for both advanced economies and emerging markets, while across-group correlations have fallen during the period of globalization. Correlations based on industrial production data suggest a slightly different picture, with rising across-group correlations and stable intra-group correlations. Comovement of stock returns has been rising for all country groups and also for different regional groupings of emerging markets, providing clear evidence of rising synchronization of financial markets. In other words, the correlations show that transmission of shocks through financial markets has strengthened over time, both within and across groups of countries. With the increasing size of financial markets in EMEs and with rising financial integration, finance could end up becoming the main cross-border transmission mechanism for shocks.

Ultimately, however, what matters is whether shocks transmitted through financial or other channels lead to greater spillovers of real activity. Our results above suggest that even the existence of large cross-border spillover effects across financial markets need not necessarily imply real spillovers of similar magnitude. This indicates the need for considerable caution in discussions of synchronization or decoupling since these phenomena can capture very different aspects depending on whether one is looking at real or financial variables.

The correlations we have presented in this section are useful for characterizing patterns in the data but do not take account of lags and leads in business cycle dynamics. More importantly, they do not provide any measure of the quantitative significance of common fluctuations for country or group-specific fluctuations of macroeconomic or financial aggregates. Hence, in the next section we turn to a more formal dynamic analysis of within- and between-group business cycle comovement.

IX. Understanding the Sources of Comovement: A Dynamic Factor Model

We now provide a comprehensive empirical characterization of business cycle linkages between the advanced countries and EMEs using a dynamic factor model. In particular, we focus on the following questions: First, what are the major factors driving business cycles in different groups of countries? Are these factors mainly global or are there distinct factors specific to particular country groups (advanced, EMEs and ODEs)? Second, how have these factors evolved as the process of globalization has picked up in pace over the past two decades? We begin with a brief description of the methodology, present results for the full sample period (1960-2008), show how the results have changed between the pre-globalization (1960-85) and globalization (1986-2008) periods, and also break down the results by regional groupings of countries (rather than just by level of development and openness). We also examine the evolution and sources of comovement within the EU compared to other groups of advanced countries.

IX.1.Database and Methodology

We construct a dynamic latent factor model that contains: (i) a global factor common to all variables (and all countries) in the system; (ii) a factor common to each group of countries (advanced, EMEs and ODEs); (iii) a country factor common to all variables in each country; and (iv) an idiosyncratic component for each series. Since our primary interest is in comovement across all variables in all countries (or groups of countries), we do not include separate factors for each of the macroeconomic aggregates (including factors in yet another dimension would also make the model intractable for the number of countries we study).

The dynamic relationships in the model are captured by modeling each factor and idiosyncratic component as an autoregressive process. Specifically, let $Y_t^{i,j,k}$ denote the growth rate of the i^{th} observable variable in the j^{th} country of economy type k. Here we have three variables per country (indexed by *i*), three economy types (indexed by *k*), and 106 countries (indexed by *j*). The model can then be written as:

$$Y_t^{i,j,k} = \beta_{global}^{i,j,k} f_t^{global} + \beta_{economy\ k}^{i,j,k} f_t^{economy\ k} + \beta_{\text{country j}}^{i,j,k} f_t^{country\ \text{j}} + \varepsilon_t^{i,j,k},$$

$$f_t^m = \phi^m(L) f_{t-1}^m + \mu_t^m \text{ for m = 1…(1+ K + J),}$$

$$\varepsilon_t^{i,j,k} = \phi^{i,j,k}(L)\varepsilon_{t-1}^{i,j,k} + \nu_t^{i,j,k}$$

where f_t denotes the factors, $\phi^{i,j,k}(L)$ and $\phi^m(L)$ are lag polynomial operators, $\nu_t^{i,j,k}$ are distributed $N(0, \sigma_{i,j,k}^2)$, μ_t^m are distributed $N(0, \sigma_m^2)$, and the innovation terms μ_t^m and $\nu_t^{i,j,k}$ are mutually orthogonal across all equations and variables in the system. The β parameters are called factor loadings and capture the sensitivity of each observable variable to the latent factors. For each variable, the estimated factor loadings quantify the extent to which that variable moves with the global factor, the factor for its economy type, and the country-specific factor, respectively. The lag polynomials can in principle be of different order; however, for simplicity and parsimony, we restrict them to be AR(3) for each factor and idiosyncratic term. Since we are using annual data in this part of the analysis, this should capture most spillovers, either contemporaneous or lagged, across variables and countries (for details and related implementations of this model, see Kose, Otrok and Whiteman, 2003, 2008).

The factor model is well suited to studying the joint properties of fluctuations in output, consumption, and investment. Using multiple macroeconomic aggregates, rather than just output, allows us to derive more robust measures of national and global business cycles. Moreover, since each variable can respond with its own magnitude and sign to the common factors, the model can simultaneously capture the effects of changes in comovement across different macroeconomic aggregates.

The model we employ is quite flexible in capturing the degree of and changes in the patterns of comovement across different countries, groups of countries, and macroeconomic aggregates. It can also handle dynamic propagation of shocks from various sources. The dynamic factor model is in fact a decomposition of the entire joint spectral density matrix of

the data. As such, it incorporates all information on the dynamic comovement of the data. In the process, it allows us to identify the relative importance of different types of global, group-specific, country-specific and idiosyncratic factors. The model is computationally intensive but tractable without a priori restrictions on the effects or propagation structure of various shocks.[37]

Our approach has a number of other advantages as well. Rather than focusing on specific regions or groups of countries, our analysis provides a global perspective about the evolution of business cycles. First, the statistical model we employ simultaneously estimates a global factor and factors specific to particular groups of countries. This avoids the problem that, while countries in groups (regional or otherwise) could display comovement, the source of this comovement may not be distinctly group-specific, but rather, worldwide. Our analysis also shows that the relevant grouping for detecting common cycles is based not necessarily on geographic proximity but on levels of economic development and integration into global trade and financial markets. Moreover, our sample is much more comprehensive than those used in earlier studies.[38]

We use variance decompositions to measure the relative contributions of the global, group-specific and country-specific factors to business cycle fluctuations in each country. This provides an empirical assessment of how much of a country's business cycle fluctuations are associated with global fluctuations or fluctuations among a group of countries. We estimate

[37] There is a rich literature on large dynamic factor models that is closely related to our work (see, e.g., Forni, Hallin, Lippi and Reichlin, 2000; Stock and Watson, 2002; Doz, Giannone and Reichlin, 2008). Our approach builds upon this literature but the advantage of our methodology is that we can use a factor structure where there are simultaneously estimated factors using large and small cross-sections of the data. In our parametric approach, we can estimate factors for small cross-sections of the data (e.g., individual countries) conditional on larger cross-sections (i.e., global and group factors). On the other hand, full maximum likelihood estimation of this model is not tractable because of the dimensionality of the problem. We use Bayesian techniques for estimating our model, which is not subject to such problems.

[38] For instance, Kose, Otrok and Whiteman (2003) use data from 60 countries, but their sample period is limited to 1960-1990. The use of recent data is important since globalization really picked up steam only in the mid-1980s. Moreover, our use of a larger sample (and larger sub-samples within each group) allows us to draw a sharper contrast across country groups in terms of their exposure to the global economy.

the share of the variance of each macroeconomic variable attributable to each of the three factors and the idiosyncratic component.

IX.2. International Business Cycles: 1960-2008

We first examine the sources of business cycle fluctuations with the help of variance decompositions over the full sample period. As a summary measure of the importance of the factors, we present the average variance shares (within the relevant groups of countries) attributable to each factor for the world and the three groups of countries defined earlier. We do not report standard errors for these cross-country averages but will do so when we look at individual country results. Although most of the literature on international business cycle transmission has tended to focus on output as the key indicator of domestic cycles, we discuss the sources of fluctuations in consumption and investment as well. [39]

Common Cycles: Global and Country-Specific Factors

Table IX.1 shows that the global factor accounts for a significant fraction of business cycle fluctuations in all three macroeconomic variables over the period 1960-2008, implying that there is a "world business cycle." The global factor on average explains 12 percent of output growth variation among all countries in the sample. It also accounts for 9 percent and 6 percent of the volatility of growth rates of consumption and investment, respectively. While these numbers may seem small at first glance, note that the common factor across the three macroeconomic aggregates is for a very large and diverse set of countries.

The factor loadings associated with output and consumption growth on the global factor are positive for most countries (i.e., the posterior distributions of the factor loadings have very

[39] We also calculated the median (rather than mean) variance shares attributable to each factor for the full sample and each group of countries. These were generally close to the average shares reported in the tables in this section, indicating that there are no obvious outlier countries driving our results. Hence, we only report results using means.

little mass in symmetric intervals about zero). Since the global factor is identified by a positive factor loading for U.S. output growth, these findings also imply that positive developments in the U.S. economy are generally associated with positive developments in the rest of the world. To conserve space and focus on the sources of fluctuations, which are of more interest in this analysis, we do not report factor loadings in detail here.

While the global factor is important in each group of countries, on average it plays a more dominant role in explaining business cycles in advanced economies. The average variance share of output growth attributable to the global factor in these countries is 31 percent, about four to five times as much as in the other two groups. The global factor is also associated with a substantial share of the variance in consumption and investment growth among advanced economies, accounting on average for 26 percent and 15 percent of the total variance of these variables, respectively. These shares are also much larger than the corresponding shares for EMEs or ODEs.

Once we account for the world business cycle, are there common cycles across any of the remaining groups of countries? Table IX.1 shows that the group-specific factor accounts for about 5 percent of output growth fluctuations in the full sample. This factor, like the global factor, is also more important for advanced economies than for EMEs or ODEs. On average, it accounts for 10 percent of output growth fluctuations in advanced economies, compared to 7 percent and 2 percent, respectively, for EMEs and ODEs.

A more comprehensive measure of how much a country's cyclical fluctuations are tied in to those of other countries is the sum of the variance contributions of the global and group-specific factors. Using this measure, the rankings of the different groups remain much the same, although the magnitudes are of course larger. Among advanced economies, the total contribution of these two factors averages 41 percent for output and nearly 30 percent for consumption and investment. For EMEs, the corresponding averages are 14 percent and 8 percent, respectively. The histogram in Figure IX.1 shows the cross-country distribution of the variance contributions of the common factors. It confirms that a significant fraction of output variation is indeed attributable to the common factors. In half of the countries in our

sample, the common factors together account for more than 10 percent of the variation in output growth.

National Cycles: Country and Idiosyncratic Factors

The country and idiosyncratic factors also play important roles in driving business cycles around the world (Table IX.1). The country factor is on average more important in explaining output variation than is the idiosyncratic factor (47 percent versus 35 percent), but the reverse is true for fluctuations in consumption and investment. Looking across the three groups of countries, it is evident that as countries become more developed (and also become more exposed to global trade and financial flows), the global and group-specific factors appear to become more relevant in explaining national business cycles at the expense of the country and idiosyncratic factors.

A striking result is that, among EMEs, country-specific factors account for 61 percent of the variation in output growth, much higher than in advanced economies (39 percent) or ODEs (45 percent). This means that the degree of comovement across the three main macroeconomic aggregates is much greater within each of the countries in this group, once we've stripped out the part of the comovement attributable to factors that are common across all countries in the sample or across all EMEs. Interestingly, the pattern is reversed for consumption fluctuations in EMEs. Among these countries, the contribution of the idiosyncratic factor is highest (51 percent) and the combined share of the global and group-specific factors in explaining consumption fluctuations is only 8 percent. This pattern holds for ODEs as well, with the total contribution of common factors to consumption fluctuations amounting to only 5 percent.

Taken together, these results tie in well with a recent literature showing that developing countries have not been able to achieve much international risk sharing, as measured by correlations of domestic consumption with world consumption (or income). Their consumption fluctuations are closely correlated with their own output fluctuations and, in addition, their consumption fluctuations are not correlated with those of other countries.

We also note that, for the sample as a whole and also for each group of countries, the total contribution of the global and group-specific factors is greater for output than for consumption. Indeed, Figure IX.2 shows that this is true even when we look at the global and group-specific factors by themselves. This implies that, on average, country-specific and idiosyncratic factors play a more important role in explaining consumption fluctuations than is the case for output fluctuations. This result echoes a well-known stylized fact in the literature that, contrary to the predictions of conventional theoretical models of international business cycles, output is more highly correlated across countries than consumption (Backus et al., 1995). This result is also related to another well-known observation which we discussed in section II: the lack of international consumption risk-sharing. We return to this issue in the next sub-section when we examine the evolution of variance shares over time.

Another notable result from Table IX.1 is that, among ODEs, the contribution of the idiosyncratic factor is greater than that of any other factor. This is true for all variables, but especially so for investment, where on average the idiosyncratic factor accounts for 73 percent of fluctuations. This finding suggests that investment fluctuations in these countries do not seem to be closely tied to either domestic or world business cycles.

Although the results in Table IX.1 reveal interesting contrasts across different groups of countries, they also mask large differences in the relative importance of different factors among individual countries. This becomes evident even when we use a finer breakdown of the three coarse country groups. Table IX.2 is a counterpart of Table IX.1 but shows the results for smaller groups of advanced economies. These results are based on the estimation of the full model and the group-specific factor here refers to that for all advanced economies. On average, the global factor is more important for the G-7 and EU-12 countries than for other groups.

It is interesting to note that the relative importance of common factors for fluctuations in all three of the macroeconomic aggregates is largest for the group of EU-12 economies suggesting a great deal of commonality in their fluctuations over the last five decades. Tables

IX.3 and IX.4 show similar breakdowns of the results by smaller groups within the broader groups of EMEs and ODEs. Again, the patterns are quite consistent within each of these smaller groups.

To summarize, there are three major results from our analysis of variance decompositions for the period 1960-2008. First, there exists a global business cycle. The global factor accounts for a modest but significant share of macroeconomic fluctuations across all country groups, although it is more important for explaining business cycles in advanced economies than in EMEs or ODEs. Second, there appear to be cycles specific to each group of countries, but even the group-specific factor plays a significantly more important role among advanced economies than among the other two groups. This is consistent with other evidence that advanced economy business cycles are more closely aligned with each other and with the global business cycle. As noted earlier, we do not weight countries by their GDP weights, so this is not a mechanical result.

Third, the contributions of global and group-specific factors together to the variance of output growth are much higher—across country groups, time periods etc.—than their contributions to the variance of consumption growth, suggesting that there are still unexploited opportunities for international risk sharing. This differential is greater for EMEs and ODEs than for advanced economies, implying that the potential benefits of efficient international risk sharing could be even greater for these two groups (see Prasad et. al, 2003).

IX.3. The Evolution of International Business Cycles: 1960-1984 and 1985-2008

We now turn to the question whether the patterns of international business cycle synchronicity have changed over time in response to the forces of globalization. We also consider the evolution of the extent of risk sharing around the world based on cross-country comovement of consumption and then briefly analyze how the contributions of different factors to investment fluctuations have evolved over time.

The convergence hypothesis suggests that, with closer economic integration, business cycles should become more synchronized across countries over time. Table IX.5 shows the variance decompositions in a manner analogous to Table IX.1 but based on models estimated separately for the pre-globalization period, which covers the data sample from 1960 to the mid-1980s, and globalization period, which refers to the period over the mid-1980s to 2008. Contrary to the convergence hypothesis, the average contribution of the global factor to output fluctuations *falls* in half, from 15 percent to 8 percent for the full set of countries in the sample. The same pattern holds for consumption fluctuations and, to a much lesser degree, for fluctuations in investment (see Figure IX.3). These patterns also hold up for each of the country groups. In fact, they are much stronger when we look at output fluctuations by country group. For advanced economies, the average contribution of the global factor falls sharply, from 28 percent to 14 percent. The decline is also large for EMEs—from 13 percent to 5 percent—while it is somewhat smaller for ODEs—from 10 percent to 7 percent.

In contrast to the declining importance of the global factor, the group-specific factor has on average played an increasingly more dominant role in explaining business cycles over time (Figure IX.4). For example, the average share of the variance of output and consumption attributed to the group-specific factor has nearly doubled during the globalization period. These patterns are particularly strong, for all three macro aggregates, among the advanced economies and EMEs. In contrast, the group-specific factor for ODEs has played only a minor role in either period. Our long sample, which covers a substantial period of the recent era of globalization, and our demarcation of the pre-globalization and globalization periods are essential in enabling us to identify the emergence of group-specific cycles in the advanced economies and EMEs during the period of globalization.

As noted earlier, a useful metric to measure the extent of business cycle synchronization around the world is the sum of the variance shares of the global and group-specific factors. Interestingly, when we look at the total contributions of these two common factors, there is much greater stability in their contributions to fluctuations in each of the macro aggregates and for each of the country groups (Table IX.5 and Figure IX.5). This is of course the consequence of a substantial increase in the relative importance of the group-specific factor.

For instance, looking at the variance decompositions for output fluctuations, the relative contributions of the group-specific factor rise from 17 percent to 30 percent for advanced economies and from 3 percent to 7 percent for EMEs. This largely offsets the decline in the variance contributions of the global factor, implying that the sum of the contributions of the two factors is only slightly smaller in the globalization period relative to the pre-globalization period. These results also show that, contrary to the convergence hypothesis, national business cycles have not in general become more synchronized at the global level.

Consumption Comovement

We turn next to look at the evolution of variance shares in explaining consumption fluctuations. For advanced economies, the increase in the variance contribution of group-specific factors to consumption fluctuations is particularly large—from 9 percent to 24 percent (Table IX.5)—but the joint share of the global and group-specific factors hardly changes. For EMEs and ODEs, the two common factors jointly account for a slightly *lower* share of consumption fluctuations in the globalization period. One interpretation of these results is that advanced economies have been able to use financial globalization to effectively share risk amongst themselves, a result found by various other authors as well (Sorensen et al., 2007). On the other hand, EMEs and ODEs are yet to attain this benefit of globalization as their consumption fluctuations are still closely tied to domestic cycles (see Kose, Prasad and Terrones, 2007). Consumption comovement measured in this manner is of course not a decisive test of risk sharing, although a broad class of open economy models does yield this interpretation.

Dynamics of Investment

For advanced economies and EMEs, the share of investment variance attributable to the global and group-specific factors goes up in the globalization period. This is a curious result for which conventional theoretical models do not yield a convincing explanation. While one can easily rationalize the increase in the importance of the global and group-specific factors in explaining output and consumption variation over time, it is not clear what drives the

increase in the investment variance explained by these common factors. In standard stochastic dynamic business cycle models, stronger trade and financial linkages generally lead to lower investment correlations across countries. Reduced restrictions on capital and current account transactions should induce more "resource shifting", through which capital and other resources rapidly move to countries with more favorable technology shocks (see Backus, Kehoe, and Kydland, 1995; and Heathcote and Perri, 2002).[40]

Results for Sub-groups of Countries

In order to gain a better perspective on the results within each broad group of countries, we now break down the results by different levels of disaggregation. First, we look at smaller groups of countries to check if a particular set of them may be driving the results. For instance, there has been a sharp increase in trade and financial flows amongst EU-15 countries. Among the EMEs, the level of trade and financial integration among Asian economies has increased quite sharply over the last decade. Perhaps the result we have uncovered is specific to such smaller groups of countries.

Table IX.6 shows cross-country means from the decompositions for selected sub-groups within the larger group of advanced economies. As before, the decompositions are based on estimates of the full model and the group-specific factor refers to the factor common across all advanced economies. The key patterns we identified for advanced economies—in particular, an increase in the contribution of the group-specific factor, a decline in the contribution of the global factor, and a small decline in the sum of the two--come through very strongly for the G-7 and the EU-15. The patterns are similar, although less strong, when we consider just the U.S. and Canada by themselves. The EU-15 is a particularly interesting group to look at—the relative importance of the group-specific factor jumps sharply in the globalization period for all three variables. For instance, the average share of variance of output fluctuations accounted for by this factor goes from 20 percent during 1960-1984 to

[40] Some recent theoretical papers produce results consistent with the dynamics of investment we report here (see Head, 2002; and Heathcote and Perri, 2004).

close to 40 percent in 1985-2008, roughly matched by a corresponding drop in the relative importance of the global factor. Table IX.7 presents variance decompositions for output for each of the EU-15 countries. In the majority of the countries (10 out of 15), the share of output variance explained by the group factor increases in the globalization period while the share for the global factor declines.

Table IX.8 shows the results of a similar exercise for EMEs, using regional groupings of countries. Our main result comes through very strongly for emerging markets in both Asia and Latin America, indicating that our key result is not an Asia-centric phenomenon. For instance, among the emerging markets in Latin America, the contribution of the global factor to the variance in output growth fluctuations falls from 23 percent in the pre-globalization period to 4 percent in the globalization period. The contribution of the group-specific factor, by contrast, goes from 1 percent to 8 percent. The results for Africa are mixed and do not show any clear patterns.

Table IX.9 has results for regional groupings among the ODEs. One interesting pattern is that the total contribution of the world and group-specific factors is on average much smaller for Asian and African ODEs than it is for Latin American ones during the pre-globalization period. For the Latin American countries, the contribution of the global factor declines in the globalization period but the contribution of the group-specific factor is small in both periods, implying that common factors have a far less important role in macro fluctuations in these countries during the globalization period.

Changes in the Importance of Global and Group Factors: Country-Specific Results

We now address the question of whether the averages that we have presented in the tables so far are representative of what is going on at the country level. To address this issue, for each country we now break down the relative contributions of the different factors to each of the variables. Figures IX.6-7 show the relative contributions of the global and group-specific factors to output fluctuations in individual advanced economies and emerging markets, with the contributions shown separately for the pre-globalization and globalization periods. We

also show the posterior coverage intervals (of length two standard deviations) around the posterior means of the estimated variance contributions. Non-overlapping posterior coverage intervals indicate statistically significant changes between the two periods.

Among advanced economies, the variance contribution of the global factor drops from the first period to the second for 14 countries, increases for 4 countries and remains unchanged for the rest. The picture is reversed for the relative importance of the group-specific factor, which goes up for 10 countries and declines for 3. These patterns are quite similar when we look at emerging markets as well, with the relative importance of the global factor going up for only 3 countries but declining for 14. The relative importance of the group-specific factor, by contrast, rises for 12 emerging markets and declines for none of them.

Thus, the individual country results confirm that the relative contribution of the global factor to advanced economy and emerging market business cycles has fallen significantly in the globalization period, while the contribution of the respective group-specific factors has risen.

Robustness Tests

One important question is whether our results are driven entirely by crises. This is a concern mainly for emerging markets, some of which experienced simultaneous crises. During the globalization period, the most prominent widespread crisis has of course been the Asian financial crisis of 1997-98, which directly affected a handful of countries in our sample. We cannot just exclude the crisis years since they are an integral part of the analysis of fluctuations; from a more mechanical perspective, that would also distort the lag-lead patterns in the data.

Nevertheless, to account for this episode, we first re-estimated the models including dummies for the crisis years (the models already include country fixed effects) and interactions of those dummies with the countries that were hardest hit by the Asian crisis (Korea, Malaysia, Philippines, Thailand). Second, we used the original model estimates and then calculated the mean pre-globalization and post-globalization contributions of different factors for the

emerging markets group excluding the crisis countries. Neither of these experiments yielded results very different from the ones that we have presented so far, so we do not report those results in detail here.

Another issue relates to the choice of breakpoint. We have already discussed a variety of reasons why the mid-1980 is a logical cutoff point for identifying the beginning of the globalization period. Nevertheless, we estimated the full factor model based on break dates ranging from 1983 to 1987 and found nearly identical results, confirming that our results are not crucially dependent on the exact break date.

IX.4. Summary

We now summarize our key results from this section. The global factor has become less important for macroeconomic fluctuations in industrial economies and EMEs during the period of globalization. In addition, there has been a slight decrease in the degree of international synchronization of business cycles as measured by the joint contribution of the global and group-specific factors to explaining business cycles in the globalization period. By contrast, for both advanced economies and EMEs, the importance of group-specific factors has increased markedly. This result runs contrary to the notion that globalization induces greater business cycle synchronicity across all countries, rather than just groups of countries at comparable stages of economic development. These patterns hold up not just for output, but also for consumption and investment fluctuations. In short, there has been a substantial convergence of business cycles among industrial economies and among EMEs, but there has also been a concomitant divergence of business cycles *between* these two groups of countries.

Our findings suggest the need for a nuanced approach to the hypotheses of convergence and divergence (or decoupling). While there appears to be no support for the hypothesis of global convergence of business cycles, there is a higher degree of synchronization in business cycles within the groups of advanced countries and EMEs during the globalization period, implying that the convergence hypothesis is valid at least for these groups of countries. At the same

time, the emergence of group-specific cycles provides partial support for the divergence (or decoupling) hypothesis as it suggests that business cycles in EMEs are now influenced more by their own group-specific dynamics than they were in the pre-globalization period.

How can we explain these results? As noted earlier, there were large common disturbances during the pre-globalization period—the two oil prices shocks—and some correlated shocks in the major advanced economies, notably the disinflationary monetary policy stance in the early 1980s and the associated increase in real interest rates in the group of advanced economies. From the mid-1980s onward (globalization period) and until just before the latest global financial crisis, however, common global disturbances have become less important in explaining international business cycle fluctuations. These developments have led to a decline in the importance of global factor in explaining business cycles.

At the same time, intra-group trade and financial linkages among advanced economies and EMEs have risen rapidly, especially after the mid-1980s. While there has been a sharp increase in intra-group financial linkages among advanced economies, intra-group trade linkages have become particularly strong among EMEs during this period. For example, as noted in Section V, the share of intra-group trade in the total international trade of EMEs has more than doubled from 1985 to the present, while EMEs' trade with the group of advanced economies as a share of the EMEs' total trade has declined by about one-third.

Moreover, during the period of globalization, the countries in these two groups have increased the pace of diversification of their industrial (and trade) bases. As we have already discussed in the earlier sections, this has been accompanied by a greater degree of sectoral similarity across countries within each group. With these changes, intra-group spillovers have begun to contribute more to concurrent cyclical fluctuations than common disturbances. These changes have been associated with a notable increase in the roles played by group-specific factors for the groups where such intra-group linkages have become much stronger. Not surprisingly, the importance of the global and group-specific factors in explaining

business cycles in ODEs, the group least exposed to the forces of globalization, has barely changed between the two periods.

How do our findings compare with the results in the earlier literature? Earlier studies have typically focused on just output fluctuations and limited their analysis to groupings of countries within the same geographic region. However, these studies often report conflicting results. For example, some recent papers document that there is a distinct European business cycle while others argue the opposite.[41] Other authors find regional cycles specific to East Asia and North America (see Helbling et. al, 2007). Kose, Otrok, and Whiteman (2008) find that a common G-7 factor, on average, explains a larger share of business cycle variation in the G-7 countries since the mid-1980s compared with 1960–72. [42] This finding is consistent with our results since we also report that the group-specific factor has become more important in accounting for business cycles in advanced economies since the mid-1980s. As we discuss in the next section, the increase in the share of variance due to the group-specific factor is quite large for the G-7 countries.

Do stronger global linkages result in an increase in the degree of international business cycle comovement as suggested by our findings? As we summarize in section II, a number of studies report that cross-sectional differences in bilateral output correlations are systematically related to differences in the strength of bilateral trade and financial linkages. In addition, financial linkages are an important factor in explaining higher degrees of synchronization of both output and consumption fluctuations. While the latter is to be

[41] For evidence of a European business cycle, see Artis, Krolzig, and Toro (2004) and references therein. Canova, Ciccarelli, and Ortega (2007) argue that, since the 1990s, the empirical evidence does not reveal a specific European cycle. Bordo and Helbling (2004) find a trend toward increased synchronization among advanced economies, while Monfort et. al (2003) conclude that the degree of comovement among G-7 economies has been declining. Changes in bilateral output correlations often are not significant, a point emphasized by Doyle and Faust (2005).

[42] They document that business cycle synchronization among the G-7 countries increased during the 1970s and early to mid-1980s. The subsequent decline reflects decreased synchronization with Japan and, to a lesser extent, Germany. Stock and Watson (2005) report that the share of output fluctuations in the other five G-7 countries that can be attributed to common factors increased from 1960-83 to 1984-2002.

expected, as financial integration should reduce country-specific income risk through asset diversification, the former is less obvious since increases in financial integration between two countries could, in principle, reduce the correlation between their outputs because of increased specialization.

Our results point to two dimensions in which the data do not support the predictions of conventional theoretical models. Globalization has not yet been associated with an increase in the degree of risk sharing achieved by EMEs and ODEs as would be expected on the basis of standard international business cycle models. Moreover, contrary to the predictions of such models, the importance of global and group-specific factors for investment fluctuations has risen during the period of globalization, implying a higher degree of cross-country comovement of fluctuations in this variable.

X. Macroeconomics of Recessions and Financial Crisis

Understanding the features of past recessions is important as background for a study of resilience of EMEs during the recent crisis. In this section, we provide an overview of business cycle dynamics around recessions in EMEs. We first analyze the main properties of recessions in EMEs during the period 1978:1-2007:4.[43] We combine the information presented here with a detailed study of the recessions following the global financial crisis in the next section and then, in the context of this cumulative evidence, assess the resilience of emerging markets during the global financial crisis of 2008-09.

This section begins with a brief summary of the dataset and methodology we use for this part of the analysis. We then present the basic stylized features of recession episodes, including duration and amplitude. Next, we examine the dynamic behavior of various macroeconomic and financial variables during these episodes. This is followed by a brief discussion of the implications of recessions when they are combined with episodes of financial crises.

X.1. Database and Methodology

Our analysis in this section is based on the quarterly times series of macroeconomic and financial variables for 24 emerging market economies and 21 advanced ("core" OECD) countries over the period 1978:1-2007:4. Since our objective is to consider various features of recessions and financial market disruptions, we study a wide range of macroeconomic and financial variables, including the main components of national income accounts, industrial production, rates of unemployment and inflation, credit and equity prices. The time series of macroeconomic and financial variables are seasonally adjusted, whenever necessary, and are in constant prices.

[43] For an analysis of recessions and financial disruptions in emerging markets, see Claessens, Kose and Terrones (2010b).

The methodology we employ is based on the "classical" definition of a business cycle mainly because of its simplicity and widespread use in policy circles.[44] This definition goes back to the pioneering work of Burns and Mitchell (1946), who laid the methodological foundation for the analysis of business cycles in the United States (see Claessens, Kose and Terrones, 2009). The "classical" methodology focuses on changes in levels of economic activity.[45] Unlike other methods that identify a "growth cycle" as a deviation from this trend, the classical methodology does not depend on the detrending method used. The turning points identified by using the classical methodology are also robust to the inclusion of newly available data: in other methodologies, new data can affect the estimated trend and, thus, the identification of growth cycles.

For the specific dating of business cycles, we employ an algorithm introduced by Harding and Pagan (2002), which extends the so called BB algorithm developed by Bry and Boschan (1971), to identify the turning points in the *log-level* of a series. We search for maxima and minima over a given period of time. Then, we select pairs of adjacent, locally absolute maxima (peak) and minima (trough) that meet certain censoring rules, that is, a certain minimal duration for cycles and phases. We then define a complete cycle from one peak to the next with two phases, the recession phase (from peak to trough) and the expansion phase (from trough to peak). Our main macroeconomic variable used to identify turning points is output (GDP), which provides the broadest measure of economic activity.

Our methodology leads to a database of a large number of recessions. In particular, we identify 84 recessions in emerging market countries and 81 recessions in advanced countries.[46] We further classify recessions based on the extent of decline in output. In

[44] The idea of classical business cycle also constitutes the guiding principle of the National Bureau of Economic Research (NBER) in determining the turning points of U.S. business cycles.

[45] An alternative methodology would be to consider how economic activity fluctuates about a trend, and then to identify a "growth cycle" as a deviation from this trend (Stock and Watson, 1999).

[46] Note that since our time series for emerging market economies are not complete for each emerging economy, the number of recessions in this group is only slightly larger than that in advanced countries for which we have the entire time series available over the sample period. A better metric to analyze

(continued)

particular, we call recessions severe if the peak-to-trough output drop falls within the top quartile of all output drops in each group of countries we study. This implies that there are 21 (20) severe recessions in emerging (advanced) countries.

X.2. Recessions: Basic Features

We present the main features of recessions in emerging markets and advanced countries in Tables X.1 and X.2, respectively. These tables include the peak-to-trough changes in key variables for all, severe, and non-severe (other) recessions, where we also investigate for statistically significant differences. Not surprisingly, there are often significant differences between severe and non-severe recessions, which we discuss below. We also compare how recessions in emerging markets differ from those in advanced countries.

We first focus on the duration, amplitude and cumulative loss of output associated with recessions. The duration of a recession is the number of quarters between its peak and the next trough. The amplitude is the change in output from the peak of recession to the next trough. The cumulative loss is a proxy measure for the overall cost of a recession as it combines information on duration and amplitude.[47]

There is no noticeable difference across emerging and advanced countries in terms of the average duration of recessions. In emerging markets, an average recession lasts about four quarters (3.92), while in advanced countries, the average recession lasts slightly less, 3.73 quarters. In emerging economies, the median (average) decline in output from peak to trough, the recession's amplitude, is about 4.8 (6.5) percent. The amplitude of a typical emerging

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the intensity of contractionary periods of activity is the proportion of time a country has been in a recession, defined as the fraction of quarters the economy is in recession over the full sample period. Since this metric adjusts for the length of data series, it is more useful for a comparison of the relative intensity of recessions in emerging markets and advanced countries. The comparison shows that the fraction of time spent in recession is typically 50 percent longer for the group of emerging economies than for the group of advanced countries.

[47] The cumulative loss refers to the sum of output losses incurred during the recession relative to the level of output at the peak of the cycle.

country recession is about 3 times larger than that of advanced country. The slope of a recession, defined as the ratio of its amplitude to duration, is also typically much larger in emerging economies than industrialized countries, -1.2 versus -0.4, suggesting that recessions in emerging market countries are more violent macroeconomic events.

The cumulative loss for a typical (median) recession is about 9 percent in emerging markets, but the average loss is about 17 percent since the distribution is very skewed to the right. Recessions in emerging market countries thus lead to much larger cumulative losses than those in advanced economies. In particular, a typical recession is associated with more than three times larger cumulative loss in an emerging market country than it is for an advanced economy (9 percent versus 3 percent).

These findings are consistent with the widely documented result that macroeconomic fluctuations in emerging markets are typically more pronounced than those in advanced economies (Kose, Prasad and Terrones, 2007). The results also suggest that, while recessions in emerging markets are typically not longer than those in advanced countries, when recessions occur in emerging markets, they do tend to be much deeper than in advanced countries. This is in part because many recessions in emerging markets are associated with financial crises.

A recession is classified as severe when the peak-to-trough decline in output is in the bottom one-quarter, or below -8.4 percent in the case of emerging markets. The 21 such recessions typically last for five quarters, a quarter longer than the average recession. By construction, severe recessions are much more costly than other recessions, with a median decline of about 13 percent and a cumulative loss of about 27 percent, almost three times more costly than that of other recessions. These recessions are much more virulent, with a slope coefficient three times greater than that of other recessions. Comparing with advanced countries, the typical recession in emerging economies is like a severe recession in advanced countries in terms of its amplitude and cumulative loss.

We also examine how the main macroeconomic and financial variables typically vary during a recession in emerging economies. We find the expected patterns, with most macroeconomic variables exhibiting procyclical behavior. In a severe recession, consumption typically drops by more than 11 percent, compared to only 1 percent decline in other recessions. In contrast, consumption registers only a marginal fall (around 0.2 percent) during a typical recession in advanced countries. The decline in consumption during severe recessions in advanced countries tends to be one-tenth of that in emerging markets. In roughly 70 (50) percent of recessions, consumption registers a fall in emerging (advanced) countries. These results echo the implications of the lack of consumption risk sharing in emerging market countries documented in a number of earlier studies (see Kose, Prasad and Terrones, 2009).

The special role played by investment dynamics in explaining business cycles has been stressed in the literature**.** Indeed, the decline in investment is typically about 13 percent, much larger than the drop in output, but also with a large variation. While the drop is 10 percent in other recessions, it becomes 45 percent in severe recessions. The median decline in investment in emerging markets during recessions (severe recessions) is 3 (4) times larger than that in advanced countries.

Recessions in emerging markets tend to be associated with increases in exports, but there are not significant differences between severe and other recessions in terms of behavior of this aggregate. Imports contract more than 25 percent during severe recessions while they decline by only 8 percent during others. This is mostly due to the sharp depreciation of exchange rates during severe recessions. Both net exports and current account dynamics register substantial improvements during severe recessions—this reflects both a contraction in domestic demand and a real depreciation of the domestic currency.

These patterns are different than those observed in advanced countries, for which recessions often overlap with declines in international trade. Both exports and imports drop in advanced countries' recessions, although the declines in imports tend to be much larger than the

declines in exports. Similar to the case of EMEs, both net exports and current account balances improve during recessions in advanced countries as well.

In terms of other macroeconomic variables, the results are as expected. The fall in industrial production tends to be large in a typical recession, almost twice that of output. However, in severe recessions, industrial production tracks the drop in output very closely. The rate of unemployment increases by about 1 percent during a typical recession, but tends to be three times larger in severe recessions. Comparing with advanced countries, recessions in emerging market countries translate into larger increases in unemployment rates and larger contractions in industrial production.

The increase in the inflation rate is less than 1 percent in a typical recession as inflation goes down in only 40 percent of all recessions in emerging markets. This is quite different compared to the pattern observed in advanced countries where inflation typically drops slightly (in 60 percent of recessions). The increase in inflation in emerging markets is driven by the severe recession episodes combined with periods of hyperinflation.

In terms of financial variables, equity prices typically fall in recessions, with much larger declines in severe recessions than in other recessions. In particular, while the decline in equity prices during recessions is about 18 percent, during severe recessions the decline is roughly 46 percent. Credit tends to contract by about 2 percent in a typical recession, but it shrinks by roughly 20 percent during severe recessions. Credit declines in about 60 percent of recessions and equity prices fall in about 70 percent of all cases. These declines are much larger than those typically observed in advanced countries where credit declines in fewer than 40 percent of recessions and equity prices fall in 60 percent of them.

X.3. Dynamics of Recessions

Next, we examine how various macroeconomic, trade and financial variables behave around recessions. We focus on patterns in year-on-year growth in each variable for a 6-year window—12 quarters before and 12 quarters after a peak (Figure X.1). We focus on year-on-

year changes in the relevant variables as quarter-to-quarter changes can be quite volatile and provide a noisy presentation of recession dynamics. All panels include median growth rates of respective variables, unless indicated otherwise. While not displayed in the figures, we occasionally refer to the changes during severe recessions in our discussion below.

The evolution of output growth around a recession is as expected. Following the peak at date 0, output tends to register negative annual growth after 2 quarters, going down to -4 percent four quarters after the peak, and in severe recessions to -7 percent. The typical decline in the year-over-year growth rate of output in emerging markets from peak to trough of a recession is three times larger than that in advanced countries (10 percentage points vs. 3 percentage points). In other words, emerging markets experience much deeper recessions than advanced countries do. In a typical recession, consumption falls by close to 1 (8) percent during the first year of a typical (severe) recession in emerging markets. Both investment and industrial production also display much sharper declines in EMEs relative to advanced countries.

Regarding trade, the growth rate of exports slows but often stays positive in emerging markets (as the median number already suggested). Import growth, however, most often falls with the beginning of the recession and can decline to -10 percent in the first year of a recession. Both net exports and current account balances typically improve sharply in the first year of a recession, consistent with the typical slowdown or reversal in capital inflows during recessions and financial crises in emerging markets.

Credit growth also slows down sharply when a recession starts and contracts by about 2 percent in the first year of a recession in emerging markets. The growth rate of credit typically does not return to pre-recession growth rates for a number of quarters. In addition, recessions are often preceded by slowdowns in the growth rates of equity prices. In the first year of a typical recession, equity prices decline on a year-to-year basis by roughly 30 percent. However, there is also evidence that equity prices are forward looking as they often start registering positive growth after about six quarters in the recession, anticipating the recovery.

Across emerging and advanced countries, there are some differences in the behavior of trade and financial variables. In emerging markets, the growth rate of exports slows down sharply, but still stays above that of advanced countries. In contrast, the import sector goes through a much sharper adjustment in emerging markets than it does in advanced countries, and actually registers several quarters of negative growth. Both net exports and the current account correspondingly register much stronger improvements during recessions in emerging markets than in advanced countries, most often moving from a deficit to a surplus. Credit slows down in advanced countries during recessions, but it actually contracts in emerging markets. Finally, equity prices tend to exhibit a much sharper decline in emerging markets than advanced countries during recessions.

While almost all macroeconomic and financial variables thus exhibit much sharper adjustments in emerging markets than in advanced countries during recessions, the recovery trajectories of the same variables are also faster and stronger in emerging markets than in advanced countries. In other words, the picture of a V-shaped recovery fits the emerging markets much better than the advanced countries.

X.4. Recessions and Financial Crises

Recessions of the past two years coincided with a major financial crises. Are recessions associated with financial crises different than other recessions? We now explore how financial crises interact with recessions as many have pointed out the severe impacts of financial crises on the real economy (see Reinhart and Rogoff, 2009). Using the crisis dates compiled by Laeven and Valencia (2008), we consider a recession episode associated with a crisis when the recession begins at the same time or after the start of an ongoing crisis. We find 20 recession episodes associated with financial crises and 10 severe recession episodes associated with financial crises in emerging market countries.[48]

[48] Claessens, Kose and Terrones (2010b) examine the implications of recessions associated with financial crises in advanced countries. Confirming the results we report here, they report that these recessions are longer and deeper than those without crises.

The average duration of a recession associated with a financial crisis in emerging market countries exceeds that without a financial crisis, by only a quarter (Table X.3). There is typically a much larger output decline in recessions associated with crises compared to other recessions, -8.3 percent versus -4.3 percent. The cumulative output losses in (severe) recessions associated with financial crises are typically also larger compared to those without crises, by roughly two (four) times.

Recessions with crises tend to be associated with significantly sharper declines in consumption, investment, imports, and industrial production, compared to recessions without crises. Exports increase more during recessions associated with crises (although not significantly so) and, given the large decline in imports, the improvement in net exports is significantly larger. Correspondingly, the current account balance registers substantial improvements during recessions coinciding with crises. The increase in the rate of unemployment is larger during recessions associated with crises, but the difference across episodes is not significant. Both credit and equity prices register much larger and significant declines in recessions with crises, especially for the severe recessions in our sample.

Recent research also considers the synchronization of recessions and various types of financial market disruptions, such as credit contractions and asset price declines, across advanced economies and EMEs (Claessens, Kose and Terrones, 2009, 2010a). The measure of synchronization used in these studies corresponds to the fraction of countries experiencing the same event at the same time. Recessions tend to coincide with contractions in domestic credit and declines in asset prices in advanced countries as the fraction of countries experiencing recessions around the world is highly correlated with the fractions of those going through credit contractions or bear asset markets (see Figure X.2). In particular, credit contractions are closely associated with recessions. House price declines are also highly synchronized across countries, even though housing is a nontradable asset, and the degree of synchronization rises especially during recession episodes. Equity prices exhibit the highest degree of synchronization reflecting the stronger linkages across financial markets.

XI. Emerging Markets During the Global Financial Crisis

The earlier sections of this study have presented various types of formal analysis indicating a gradual structural divergence between the business cycles of advanced economies and EMEs. As we noted earlier in the paper, there is a strong connection between the divergence of business cycles across these two groups of countries and the resilience of EMEs. This divergence implies that, despite their rising trade and financial openness, EMEs have gradually become less vulnerable to adverse shocks emanating from advanced economies. Even if fluctuations in financial markets have become more highly correlated across these two groups of economies, this has not translated into higher correlations in cyclical fluctuations of real macroeconomic aggregates. These observations do not, however, imply that emerging markets are fully insulated from major global shocks, such as the recent financial crisis. Indeed, the effects of the crisis have been very different across emerging markets—there has been considerable heterogeneity in terms of when different countries were affected, how deeply they were affected, what sort of policy responses they were able to muster, and how well their recovery has progressed so far.

To explore these issues further, we first provide a metric to examine the cost of the global financial crisis and compare this cost with that of previous episodes.[49] Next, we present some basic data on how the EMEs in different regions were affected to varying degrees by the crisis. We then drill down more deeply into the experiences of two sets of emerging markets between which there is a sharp contrast in terms of resilience to the global financial crisis. In particular, we adopt a case study approach by first examining in detail the evidence for the group of Emerging Asian economies that has been particularly resilient during the financial crisis, both in terms of being less affected directly and bouncing back strongly to high growth. We then present a comparative case study of the group of Emerging European

[49] Claessens, Kose, and Terrones (2010b) provide a brief assessment of the similarities and differences between the latest crisis and previous ones. They argue that the latest crisis bears some close similarities to earlier ones, but it also exhibited some significant differences, including the implosion of opaque and complex financial instruments in highly integrated global financial markets.

countries that has been hit hard and where the recovery has been much more restrained.

These case studies, along with the analysis in previous sections of the paper, set the stage for a compilation of a set of reasons why certain emerging markets have not been greatly affected by the global financial crisis, why emerging markets as a group have weathered the crisis relatively well, and what the implications might be for the notion of divergence of business cycles in emerging markets from advanced country cycles.

XI.1. How Costly was the Crisis?

How costly was the global financial crisis? To answer this question, we focus on the depth of the global recession triggered by the crisis. In order to have a broader perspective about the implications of this episode, we need to consider previous global recessions. The global recession of 2009 is a true outlier as it is the deepest and the most synchronized one of the postwar period.[50]

We employ the same algorithm explained in the previous section to identify the dates of global recessions. Our measure of global economic activity is annual world real GDP per capita constructed using purchasing-power-parity (PPP) weights from 1960 to 2010. The estimates for 2010 are based on the latest IMF World Economic Outlook growth forecasts. We employ a per capita measure since this accounts for the vast differences in population growth rates across countries. EMEs and other developing countries tend to have faster GDP growth than advanced economies, but they also have higher population growth.

We identify four troughs in global economic activity over the past 50 years—1975, 1982, 1991, and 2009. These correspond to declines in world real GDP per capita (Figure XI.1.1). These episodes coincide with major disruptions in global economic activity. For example, the

[50] For an extensive discussion of the implications of the global recessions and recoveries, see Kose, Loungani and Terrones (2009, 2010).

global recession of 1975 followed a sharp increase in oil prices, which shot up four-fold in a short time period following the Arab oil embargo that began in 1973. This recession marked the beginning of a prolonged period of stagflation with low output growth and high inflation in the United States.

The recession in 1982 was associated with a number of events, including tight monetary policies in several advanced economies, the rapid increase in oil prices, and the debt crisis experienced by a number of Latin American countries. The 1991 recession reflected a host of problems in various corners of the world: difficulties in the U.S. saving and loan industry, banking crises in several Scandinavian economies, adverse effects of an exchange rate crisis on a large number of European countries, challenges faced by the east European transition economies, and the uncertainty stemming from the Gulf War and the subsequent increase in the price of oil.

There is little substantive impact on the analysis if market weights, which enhance the importance of advanced economies, are used rather than PPP weights. With market weights, the trough of the 1991 episode shifts to 1993 because of the downturns in many European countries during the exchange rate mechanism (ERM) crisis of 1992–93. These findings suggest that the 2009 global recession is by far the deepest recession in the last five decades. If total, rather than per capita, real GDP is used, 2009 would be the only year since 1960 in which there has been a contraction in the global economy (Figure XI.1.2).

While both advanced economies and other developing economies registered sharp declines during the latest global recession, the group of EMEs continued to grow (Figure XI.1.3 and Table XI.1.1). In fact, although the growth rate of output of this group of economies dropped below its historical average, EMEs as a group performed rather well during global recessions. These economies are also expected to rebound much more strongly to their high growth pattern in 2010 (based on the IMF's WEO forecasts). Advanced economies, by contrast, are expected to have a relatively tepid recovery in 2010, with growth rates not sufficient to make up much of the output losses experienced during 2009.

The fraction of countries experiencing recession went up sharply during the four global recessions (Figure XI.1.4). We measure the synchronization by yearly fluctuations in the GDP-weighted fraction of countries that have experienced a decline in real GDP per capita. Although the 1975 recession was driven largely by declines in advanced countries, emerging and developing countries have played a role in the other three episodes. In 1982, recessions in many Latin American countries contributed to the decline in global activity, whereas in 1991 declines in the transition economies played an important role. The 1991 recession was a multi-year episode in which the U.S. recession in 1990–91 was followed by recessions among European countries during the ERM crisis.

The period 2006–07 stands out as one in which the number of countries in recession was at a historical low. However, it has been followed by a sharp reversal in fortune. In 2009, all the advanced economies and roughly half the emerging market and developing countries were in recession. This degree of synchronicity of the last recession to date is the highest over the past half century.[51] Even though it is clearly driven by sharp declines in activity in the advanced economies, recessions in a number of emerging and developing countries contributed to the depth and synchronicity of the latest episode.

XI.2. How Did the Emerging Markets Fare During the Crisis?

Although the EMEs as a group performed well during the global recession, there were sharp differences across emerging economies in different regions. Table XI.2.1 provides a regional perspective on how the emerging markets fared during the crisis. The economies of emerging Asia had the most favorable outcome, experiencing relatively modest declines in growth rates. China and India, which are the two largest economies in Emerging Asia and maintained strong growth during the crisis, obviously play an important role in this result. Excluding these two countries (including Hong Kong SAR) from the Emerging Asia group

[51] This finding is consistent with the results reported by Imbs (2009). Using monthly data on industrial production to study the evolution of business cycle correlations since the 1980s, he concludes that the degree of cross-country business cycle correlations during the latest crisis is the highest in three decades.

leaves that group with a less impressive performance overall.

Emerging Europe had the sharpest fall in total output during 2009, followed by Latin America.[52] By contrast, and somewhat surprisingly, the economies of the Middle East and North Africa (MENA) region as well as those of Sub-Saharan Africa weathered the crisis better, with only small declines in output. For these two latter groups, their relatively modest exposure to trade and financial flows from advanced economies may have limited the extent of spillovers of the global shock. These countries also had improved their macroeconomic policies, giving them more space in responding to the global shock with countercyclical policy tools.[53]

Latin America, by contrast, is much closely integrated with advanced economies, especially the U.S., through trade and financial channels. Although Latin American EMEs did suffer growth contractions during the crisis, they are expected to bounce back relatively strongly. This is in contrast to previous episodes of global financial turbulence (1982, 1998, 2001), during which Latin American economies proved to be vulnerable to currency and debt crises.[54] Izquierdo and Talvi (2010) note the role played by strong macroeconomic fundamentals--low inflation, twin external and fiscal surpluses, a sound banking system, a large stock of international reserves and flexible exchange rate regimes--in ensuring the resilience of Latin American economies during the recent crisis. They argue, however, that strong fundamentals at a country level may not be sufficient in the event of a large global crisis. They present some empirical evidence suggesting that a more important factor accounting for the resilience of Latin American economies in this crisis was the readiness of the international financial community to act as international lender of last resort by providing

[52] Lane and Milesi-Ferretti (2010) also report that there are substantial differences in the impact of the crisis across regions. In particular, 12 of the "top 20" most adversely affected countries from the crisis are in Emerging Europe and the Commonwealth of Independent States (CIS).

[53] See IMF (2009a, 2009b), and Devarajan (2009) for economic and financial developments in Sub-Saharan Africa during the crisis.

[54] See IMF (2009c, 2009d), for economic and financial developments in Latin America during the crisis.

timely, unconditional and sizable financial assistance to EMEs, thereby preventing otherwise sound economies from experiencing financial distress due to the sharp withdrawal of global liquidity.[55]

These regional perspectives provide a broad overview of differences across regional groups of countries but mask considerable differences within the groups themselves. Hence, a more disaggregated analysis is necessary. To begin with, we review a burgeoning literature that has formally explored the reasons for the observed differences in the resilience of various groups of emerging markets to the crisis.

What Accounts for Differences in the Performance of EMEs?

There have been a number of studies attempting to evaluate the reasons for cross-country differences in the impact of the crisis. Berkmen et al. (2009) look at growth outcomes for a large group of emerging markets and developing countries. They find that countries with more leveraged domestic financial systems and faster credit growth suffered larger downward revisions to their growth forecasts. For emerging markets, such financial effects played a more important role than trade effects. Economies with inflexible exchange rates were more vulnerable and there is some weak evidence that a stronger pre-crisis fiscal position mitigated the impact of the crisis.

Blanchard, Faruqee, and Das (2010) attempt to explain the diverse pattern of growth among emerging markets during the crisis. They construct a model that predicts that an increase in home bias may decrease or increase output, an increase in perceived risk decreases output by affecting both net capital flows and domestic demand, and an adverse trade shock leads to output declines and exchange rate depreciation. The magnitudes of the latter two effects are larger at higher debt levels. Their empirical findings indicate that high levels of short-term

[55] Sanfrey (2010) argues that strong financial backing from international organizations helped the Balkan economies of South-Eastern Europe to weather the crisis better than would otherwise have been the case.

external debt had the largest adverse growth impact and, somewhat surprisingly, that high levels of reserves were not found to mitigate output declines.

Lane and Milesi-Ferretti (2010) use a much broader sample of countries and conclude that the pre-crisis level of development, high trade openness, fast private credit growth and high CA deficits are linked to declines in output growth and demand growth during the crisis. In a related paper, Giannone, Lenza, and Reichlin (2010) present empirical evidence indicating the importance of credit market regulation as a factor in explaining the differential impact of crises across countries.

Rose, Andrew and Mark Spiegel (2009a) present a more skeptical view of the explanatory power of the variables highlighted in the papers discussed above. They conduct robustness tests to evaluate the relevance of over sixty variables in explaining the causes of the crisis and why its severity varied across countries. They use different measures of crisis incidence (changes in real GDP, stock market index, exchange rate, and country credit ratings) and their list of potential causes includes variables relating to the regulatory framework, financial conditions, asset price appreciation, international imbalance, macroeconomic policies, institutional features, and geography. Their main conclusion is that few potential causes of the crisis show a statistically significant effect on crisis incidence, which suggests that measuring pre-crisis conditions had little link to the relative severity of crisis impact on countries. As a result, the authors are skeptical of the effectiveness of an early warning system for predicting crises.

In a follow-up paper, Rose and Spiegel (2009b) attempt to model the causes and cross-country incidence of the 2008 crisis by focusing on international linkages. They conclude that evidence for propagation of shocks, including contagion effects, through international

financial or trade linkages is weak at best. They also find that countries with more exposure to U.S. assets showed *smaller* crisis impacts once other factors are controlled for.[56]

Given the inconclusive nature of these broad empirical studies, we employ a case study approach to parse the impact of the crisis on two groups of emerging markets that had very different experiences. Prior to the crisis, average per capita GDP growth was highest in two groups of emerging markets—Asia and Europe. As discussed above, there is a stark contrast between the way in which these two groups of emerging markets experienced and responded to the crisis. Consequently, in 2009, Asian emerging markets posted the highest average rate of growth while European emerging markets had the lowest. These sharp contrasts lead us to investigate the experiences and policy responses of these two groups of EMEs in more detail. Our choice of variables to include in these case studies does draw to some extent upon the literature discussed above.

XI.3. Asian Emerging Markets

Asian emerging markets, particularly China and India, have been among the most resilient during the crisis. In this sub-section, we explore the reasons for this resilience by examining the structure of the emerging and developing economies in the region, particularly the extent of their reliance on foreign trade and finance.[57]

Growth Composition and Trade Linkages

We begin with a description of the evolution of the structure of GDP from a national accounts perspective, Table XI.3.1 shows the shares of different components of GDP for

[56] Boorman (2009) provides an early overview of the impact of the crisis on EMEs and the main transmission mechanisms. For the impact of the crisis on the emerging economies of Asia, see IMF (2009e, 2009f).

[57] The Asian emerging markets covered here are: China, Hong Kong, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines, Singapore, Sri Lanka, Taiwan and Thailand.

three years—2000, 2008 and 2009. The median share of private (household) consumption in Emerging Asian economies' GDP appears relatively stable during the 2000s, but had fallen from 66 percent in 1995 (not shown in the table) to 55 percent in 2008. The shares of government consumption and investment have remained relatively stable. The share of net exports rose from 5 percent in 2000 to 9 percent in 2008-09, suggesting an increase in the region's reliance on foreign demand.

Table XI.3.2 shows average GDP growth rates over the period 2000-09 for each country in the sample. The next five columns show the contributions of different components—total consumption (which is further broken down into private and government consumption), investment and net exports—to overall GDP growth. Consumption is typically the largest component of GDP, so it is usually the case that consumption growth tends to track overall GDP growth. On average, total consumption growth (private and public) contributes about 3.2 percentage points to GDP growth, relative to median GDP growth in the sample of about 4.6 percent per annum. In other words, consumption growth on average accounts for about three-quarters of GDP growth among the eleven countries in the sample.[58]

The penultimate column of Table XI.3.2 shows that, on average, net exports account for only a modest fraction (0.7 percentage points) of overall GDP growth among the countries in the region. But this conceals a wide disparity across the individual countries. For four of the eleven economies in the sample, net exports contributed one percentage point or more per annum to GDP growth. The average contribution of net exports to growth is negative in the case of India alone.

It is interesting to note that, despite the popular characterization of China as relying on export-led growth, the direct contribution of net exports to GDP growth has amounted to

[58] There are three economies for which the contribution of consumption growth amounts to 50 percent or less of GDP growth, well below the sample average—China, Hong Kong and Taiwan. In China, the contribution of private consumption growth to GDP growth is less than one third, lower than in any other economy in the sample.

only 1.1 percentage points per year over the period 2000-09, which is about one-tenth of overall GDP growth. The data in this table certainly do not look like prima facie evidence of export-led growth among the Asian economies in general, or China in particular. Of course, this is based on a narrow accounting perspective of how exports matter for economic growth

It is important to be careful about the use of the term "export-led growth." Even if a country has a very high level of exports relative to GDP, it could have a balanced trade account, which would mean that net exports were not contributing much to the bottom line in terms of GDP growth. The flip side of this argument is that exports have significant spillover effects on other parts of the economy, so a rapid increase in gross exports could contribute to growth even if the accounting contribution based on net exports is small. Hence, it is useful to look at the amount of trade relative to the size of the economy, rather than just net exports, to gauge an economy's exposure to volatility in trade flows.

The first three columns of Table XI.3.3 show, for 2000, the ratio of total trade (imports+exports of goods and nonfactor services), exports and the trade balance (exports-imports) to GDP. The next three columns show the same three ratios for 2009 for a smaller group of these countries.[59] The average ratio of exports to GDP was about 54 percent at the beginning of this decade, suggesting a high level of dependence on exports. But the average ratio of the trade balance (or net exports), which is of relevance to the GDP bottom line, was only about 3 percent of GDP.

What is the right way to look at a country's dependence on exports? This is a subtle issue. The average trade openness ratio of over 100 percent implies that Asian economies are in general very open and vulnerable to volatility in international trade. On the other hand, for a country with a small net trade surplus, the direct contribution of external trade to GDP growth is correspondingly small. In the case of China, for instance, processing trade—which involves only a modest amount of value added in China as it involves the use of imported

[59] Consistent trade data for 2009 are not yet available for all countries in this sample.

inputs and intermediate goods—is estimated to account for nearly half of overall exports. From this perspective, the reliance of Asian economies on foreign markets is relatively limited. Again, this is a narrow perspective that does not take into account growth spillovers from exports, which could be significantly larger than indicated by the level of net exports or just the direct value added contribution from the exporting sector. The overall exposure of Asian economies to trade, based on ratios of exports to GDP and the consequent spillover effects, is higher.

Financial Linkages

Next, we turn to an analysis of the dependence of the region on foreign finance. This is best captured by the current account, which represents the difference between national savings and national investment. More importantly, it provides a summary measure of all types of flows, private and official, along with unofficial flows. A current account surplus implies that a country is on net exporting capital to the rest of the world while a current account deficit implies that it is importing capital. While gross flows in both directions are important for understanding the importance of financial channels for cross-border transmission of shocks, current account deficits are useful for understanding vulnerability to crises as they indicate the degree of dependence on foreign finance. Phenomena such as sudden stops of inflows can be particularly painful for countries with large current account deficits.

Figure XI.3.1 shows aggregate savings and investment balances for Emerging Asia. The aggregate savings to GDP ratio is the sum of national savings across the countries in the sample divided by the sum of national GDP for those countries, with both variables expressed in a common currency, converted at market exchange rates from domestic currency. The aggregate investment and current account data are constructed in a similar manner.

The top panel of Figure XI.3.1 shows that aggregate savings and investment have been rising in Asia since the early 2000s. The rate of increase in savings has been higher than that of investment, leading to a rising current account surplus, which rose to 6.7 percent of aggregate

GDP by 2007, but then fell to 5.7 percent in 2008. The lower panel of Figure XI.3.1, which excludes China, shows that that country is a big driver of these patterns in the data (its current account balance to GDP ratio was 9.8 percent in 2008 but fell to 5.8 percent in 2009) The aggregates for the remaining countries show savings and investment remaining stable since early 2000. The regional current account balance to GDP ratio also remains relatively flat in the 3-5 percent range since early 2000 (except in 2003, when it spiked up to over 6 percent).

Figure XI.3.2 (top panel) shows the overall current account balance for Asia ex-Japan in billions of U.S. dollars. The numbers in this figure represent the excess of savings over investment for the region as a whole. The total excess savings of the region amounted to only about $100 billion in the early 2000s. Excluding China, this figure stays roughly constant in the rest of the 2000s, through 2007-08. The big surge in the region's excess savings clearly comes from China as the aggregate current account balance including China jumps to $500 billion by 2007-08, driven by massive Chinese current account surpluses that hit $440 billion in 2008. In 2009, the region's current account surplus fell significantly—but this was mostly because of a $142 billion decline in China's current account surplus from 2008 to 2009, the joint current account surplus of the remaining Asian emerging markets in fact went up by about $80 billion between these two years. The trajectory of the regional current account balance largely tracks the regional trade balance (see lower panel of Table XI.3.2), with China again playing an important role in driving the region's overall balance.

Figure XI.3.3 shows the savings-investment balances for individual countries in the sample, with national savings, national investment, and the current account balances all expressed as ratios to national GDP. The countries are sorted by decreasing order of the current account balance to GDP ratio in 2009 or the latest year for which data are available for a given country. The top panel of the figure contains data for the latest year for which data are available for each country and the lower panel shows the corresponding data for 2000. To facilitate comparison, the order of countries is the same in the lower panel as in the upper panel.

One feature that is immediately obvious is that national saving rates are quite high on average across all of the Asian economies. Even in this group, China is clearly in a league of its own among the relatively large economies, with a national saving rate in excess of 50 percent of GDP. For most countries in the sample, saving rates have either increased or stayed roughly constant during this decade. China experiences the sharpest jump in the national savings rate, nearly 20 percentage points in an eight-year period.

High domestic saving rates seem to be a key component of the story about why Asian economies do not seem to be greatly reliant on foreign finance. To understand these patterns better, we also look at the different components of national savings—savings by households, firms and the government.[60] Figure XI.3.4 shows the breakdown of aggregate savings (as a percent of aggregate GDP) for a composite of the five Asian economies for which data are available. Aggregate savings have risen from 31 percent of total GDP in 2000 to 45 percent in 2008. A striking development is that, by 2006-07, corporate savings have become the dominant source of savings in the region, accounting for nearly half of aggregate savings.

In Figure XI.3.5, we present data on the composition of savings in the three largest economies in non-Japan Asia—China, India and Korea—over the period 2000-2008. Together, these three economies account for about three-quarters of GDP in Asia ex-Japan. In China, the share of corporate saving has increased markedly in recent years, accounting for almost half of national savings in 2007 and a slightly lower share in 2008. Interestingly, in India, household saving has remained the dominant source of national savings, amounting to about 20 percent of GDP since the early 2000s. Corporate savings have become increasingly important in India over the last few years. In Korea, household savings as a ratio

[60] Household savings is generally defined as the difference between household disposable income and household consumption expenditures. Retained earnings (profits that are not paid out as dividends) are counted as corporate savings. These can of course be used to internally finance investment projects (if retained earnings of all firms in a country equaled domestic investment financed by those retained earnings, the effect on the current account would be nil). Government savings includes amounts that are used to finance public investment.

to GDP have fallen quite sharply since the late 1990s, driving down overall national savings slightly.

Table XI.3.4 presents data on a few key macroeconomic variables just before and during the crisis. The median general government budget deficit to GDP ratio in Emerging Asia was essentially zero in 2007, with only four countries (India, Indonesia, Malaysia, Pakistan) registering deficits higher than 1 percent of GDP. The median ratio of public debt to GDP in 2007 was around 35 percent, well below the level of 60 percent that is considered to be the threshold for a risky level of public debt (see Reinhart and Rogoff, 2010). Thus, fiscal policy was not severely constrained when the crisis hit. Monetary policy was also relatively under control, with median annual private credit growth at about 10 percent in 2008 and only two countries (India and Indonesia) registering credit growth of more than 20 percent in that year (the table does not show the data separately for 2008).

As a consequence of these relatively prudent macroeconomic policies before the crisis, countries in the region were able to use fiscal policy aggressively to counter the crisis, with the median government budget deficit rising by almost 3.5 percentage points from 2008 to 2009. This also helped buffer the decline in the growth of credit to the private sector. One notable exception to the pattern of declining credit growth is that of China, where credit growth exploded to 34 percent in 2009, from 14 percent in the previous year. In Malaysia and the Philippines, there was a modest increase in credit growth in 2009.

Notwithstanding the relatively favorable macroeconomic positions of economies in Emerging Asia, it is surprising that the collapse in global trade did not have a more devastating effect. In addition to the fall in demand from advanced economies, the sharp fall in the availability of trade credit hampered trade in many export-dependent EMEs. On this score, the resilience of financial systems in Asia proved to be a factor that contributed to resilience of exports, fueled by rising trade within the region. Freund (2009) and Chor and Manova (2010) find that countries that did not experience major financial market difficulties

had much better export performance during the crisis.[61] Mora and Powers (2009) note that liquidity provided by multilateral development banks, export credit agencies, and national governments also mitigated the decline in trade credit and supported trade flows.

The bottom-line from this descriptive analysis is that Emerging Asia may have been relatively insulated from the effects of the financial crisis because (i) the overall dependence of the region on exports to the rest of the world is limited; (ii) relatively insulated financial markets, especially the limited dependence of the region on foreign bank financing, narrowed the channels for financial contagion and also kept trade finance from collapsing; (iii) high and rising saving rates have more than kept pace with rising investment rates, insulating the region as a whole from the effects of a sudden stop in capital flows from advanced economies; and (iv) prudent macroeconomic policies practiced by a number of these countries created a lot more policy space for them to respond aggressively to the spillover effects of the crisis**.**

XI.4 Emerging Markets of Eastern Europe

We now examine a parallel set of stylized facts for the economies of Emerging Europe**.**[62] We begin with a description of the evolution of the structure of GDP from a national accounts perspective, Table XI.4.1 shows real GDP growth rates for these countries in the three most recent years—2007-09--as well as growth forecasts for 2010. These economies were posting high growth rates across the board in 2007, with a median growth rate of nearly 7 percent in that year. The global recession had begun to take a toll in 2008, with median growth dropping to 3.5 percent and two of the Baltic countries—Estonia and Latvia—recording

[61] The massive decline in global trade flows during the crisis has been an area of active research, see Levchenko, Lewis, and Tesar (2009), Alessandria, Kaboski, and Midrigan (2010), and Bems, Johnson, and Yi (2010).

[62] The countries included in this group are Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Serbia, Slovakia, Slovenia and Ukraine. For the impact of the crisis on the emerging economies of Eastern Europe, see IMF (2008, 2009g, and 2009h).

negative growth rates in 2008. 2009 was a difficult year, with median growth plunging to minus 6.5 percent and all but one economy (Poland) registering significantly negative growth rates. The prognosis is for a slight recovery in output in 2010, with an average growth rate of 0.6 percent among countries in this group, with growth turning positive for 10 of the 15 countries. Clearly, this group as a whole was highly vulnerable to the global crisis, although there are significant differences in outcomes even within this group. To understand these growth patterns better, we now turn to a more detailed exploration of the composition of growth and some policy indicators for these economies.

Table XI.4.2 shows the shares of different components of GDP for three years—2000, 2007 and 2009. The median share of private (household) consumption in Emerging European economies' GDP has been relatively stable at around 62 percent. One interesting contrast relative to the Asian EMEs studied in the previous section is that the median share of net exports in GDP for Emerging Europe was -7 percent in 2007, reflecting the high level of trade deficits in the region before the crisis. Figure XI.4.1, which shows the saving-investment balances in 2000, 2007 and 2009, indicates that these trade deficits were accompanied by large current account deficits. All of these countries except for Russia had current account deficits in 2007, the year before the crisis hit. A number of authors have pointed out that the effects of the global financial crisis fell particularly severely on Emerging European economies with current account deficits, as the availability of both global liquidity and private capital flows shrank sharply during the crisis (see Belka, 2009; IMF, 2009; and Griffith-Jones and Ocampo, 2009).[63]

Table XI.4.3 shows average GDP growth rates over the period 2000-08 for each country in this group. The next five columns show the contributions of different components—total consumption (which is further broken down into private and government consumption), investment and net exports—to overall GDP growth. On average, total consumption growth

[63] In an analysis that predates the crisis, Shelburne (2008) argues that current account deficits in some European emerging markets were already at unsustainable levels by 2007. In that year, the increase in credit spreads in the region was correlated with the size of countries' current account deficits.

(private and public) contributes about 4.8 percentage points to GDP growth, relative to median GDP growth in the sample of about 6.2 percent per annum. In other words, consumption growth on average accounts for about three-quarters of GDP growth among the 15 countries in the sample. This average is not very different from the average for the Asian EMEs. The major difference relative to that group, however, is that the average contribution of investment in Emerging Europe is much higher and net exports make a significant negative contribution to growth, unlike in Asia where they make a positive contribution. For nine of the fifteen economies in the sample, net exports pulled down GDP growth (in a pure accounting sense) by one percentage point or more per annum. Net exports do not contribute above one percentage point per annum to growth in any of these economies.

When we consider a different measure of the importance of exports to these economies—the ratio of exports to GDP—the picture is in fact quite similar to that of Asia, with the median value of that ratio in 2008 at about 54 percent (Table XI.4.4). In fact, in terms of overall trade openness ratios (the sum of exports and imports as a ratio to GDP), Emerging Europe was on average even more open to trade before the crisis than Asian EMEs. The combination of high export to GDP ratios, along with large trade and current account deficits, appears to have made these economies more vulnerable to the contraction in external demand and global trade during the worst of the recent crisis.

Along with high levels of trade openness, many of these economies are also characterized by large cross-border financial flows. Figure XI.4.2 shows that all of these economies experienced a significant increase in gross inflows (as ratios to GDP) from 2000 to 2007, followed by a drop in 2008. There is a crucial difference between the central European countries such as Bulgaria and Hungary and the Baltic countries such as Estonia, Latvia and Lithuania. For the former group, FDI inflows constituted the bulk of gross capital inflows in 2007, while in the case of the latter group it was largely bank loans that dominated the inflows. Consequently, the financial crisis hit the Baltics the hardest as bank financing dried up sharply as foreign banks based in the advanced economies pulled back capital to shore up their liquidity positions during the crisis.

What are the macroeconomic implications of surges in capital flows, such as the one emerging European countries experienced before the crisis? Using 109 episodes of large net private capital inflows to 52 countries over the 1987–2007 period, Cardarelli, Elekdag and Kose (2010) study this question. Their findings are consistent with the events in many emerging European economies. In particular, they report that episodes of large capital inflows are often associated with real exchange rate appreciations and deteriorating current account balances. More importantly, such episodes tend to be accompanied by a pickup in GDP growth, but afterwards growth has often dropped significantly.[64]

Figure XI.4.3 provides a different perspective on this issue by showing the stocks of gross foreign assets and liabilities, broken down by the same categories as inflows, as well as net foreign liabilities. This picture confirms the dependence of central European countries on FDI and of the Baltic countries to a greater extent on bank loans. For some economies in the region, even the high reliance on inward FDI proved to be a source of vulnerability because a large amount of this investment had been concentrated on sectors like autos that were hit by structural changes as a consequence of the crisis (Filippov and Kalman, 2009).

What was the role of foreign banks in exacerbating the crisis in Emerging Europe? A number of studies attempt to address this question. For example, Canales-Kriljenko et al. (2010) study how foreign bank lending unfolded differently in Latin America vs. Emerging Europe. In particular, they investigate why foreign bank lending continued to grow in Latin America during the crisis but showed lower and, later, negative growth in Emerging Europe. They conclude that global banks from advanced European economies were instrumental in fueling a credit boom in Emerging Europe by transferring large amounts of funds to their local subsidiaries, which then lent them out domestically. Latin America had less intensive credit growth, smaller presence of foreign banks, and lower reliance on external funding from

[64] Cardarelli, Elekdag, and Kose (2007) argue that stabilization challenges from large capital inflows are most serious for countries with substantial current account imbalances, especially many emerging European countries.

parent banks in developed economies. In Latin America, 60 percent of foreign bank lending was denominated in local currency. In Emerging Europe, by contrast, 60 percent of foreign bank lending was denominated in foreign currency. This made the latter group more vulnerable to exchange rate shocks. These factors may help explain why Latin America was more resilient to global deleveraging and foreign-bank lending withdrawals compared to past episodes of global financial turbulence that caused crises in these economies.

In a related paper, Berglof et al. (2009) test whether foreign bank ownership may have generated an element of stability by curbing outflows of bank lending. They conclude that economic integration with international banking groups and political/institutional integration with Western Europe made Emerging Europe more resilient. They argue that foreign bank ownership mitigated output declines, at least in 2008. They also find that, while the overall effect of financial integration on output declines during the crisis is mixed, levels of external debt do have a major explanatory role. However, since their analysis does not incorporate the sharp falls in output that took place in 2009, their conclusions should be interpreted with caution.

Cetorelli and Goldberg (2009) find that global banks played a significant role in the transmission of the crisis to EMEs. They find that supply of loans in EMEs was affected through three channels—a contraction in direct cross-border lending by foreign banks; a contraction in local lending by foreign banks' affiliates; and a contraction in lending by domestic banks as a result of the decline in cross-border interbank lending. Countries with greater dependence on foreign bank lending, especially in cases where those foreign banks were domiciled in countries whose financial systems were hit harder by the crisis, took a bigger hit.

There is a vigorous ongoing debate about whether greater integration into Europe through stronger trade and financial linkages has made the economies of Emerging Europe more resilient or increased their vulnerability to shocks emanating from the advanced economies in the region. Allard (2009), Belka (2009), Cihak and Fonteyne (2009) note that, while EU accession had many benefits for the concerned economies of Emerging Europe during less

turbulent times, it made them more vulnerable to shocks emanating from advanced economies in the EU and created more channels for the spread of contagion effects. Cihak and Mitra (2009) argue that EU integration may in fact have provided a cushioning effect by giving these countries potentially more access to financial support from the IMF and the EU.

International reserves in principle provide a degree of protection against sudden stops and reversals of capital flows. So it is interesting to examine the amount of self-insurance through reserve buildups that the Emerging European economies had before the crisis, in absolute terms as well as relative to economic size and the amount of external debt obligations. Figure XI.4.4 shows that Russia had by far the largest stock of foreign exchange reserves, and this holds true to a lesser extent even when those reserves are measured relative to its GDP or its level of external debt. By the latter criterion, all other economies had reserves just around or below 50 percent of their external debt levels, suggesting some degree of vulnerability to volatility of capital inflows. Interestingly, when the crisis hit, there was a general loss of reserves over the period from December 2007 to December 2008, but four countries—Bulgaria, the Czech Republic, Estonia and Hungary—continued to accumulate rather than lose reserves during this period (Figure XI.4.5).

Table XI.4.5 indicates that the median government budget deficit in Emerging Europe was about 1 percent in 2007, and the median ratio of public debt to GDP was 18 percent. Thus, fiscal policy was not severely constrained when the crisis hit.[65] By contrast, monetary policy seems to have been the bigger source of domestic vulnerability, with credit growth averaging 29 percent per annum in these economies during the period 2005-08. The absence of foreign financing drove average credit growth down to 8 percent in these economies in 2009, with three of them (Estonia, Hungary and Latvia) experiencing negative credit growth in that year.

[65] Griffith-Jones and Ocampo (2009) take a less benign view, arguing that Emerging European economies had relatively weak fiscal and public debt positions relative to other EMEs. Cardarelli, Elekdag, and Kose (2010) also report that there was a pickup in the growth of real government expenditure in response to the massive surge in capital inflows to Emerging Europe and CIS countries over the period 2005-2007.

Relating these numbers to the growth outcomes for 2009 and the projections for 2010 (Table XI.4.1), it appears that countries that were able to maintain better credit growth in 2009 have better outcomes and prospects. By contrast, countries with very high credit growth before the crisis and weak credit growth during the crisis appear to have been hit hardest.[66] This list includes Baltic countries such as Estonia, Latvia and Lithuania as well as countries like Hungary and Slovenia. The level of public debt before the crisis and the amount of fiscal stimulus, as measured by the rise in the budget balance from 2007 to 2009, do not appear to be critical determinants of these growth outcomes.

Poland and Lithuania provide interesting contrasts. Poland had credit growth of about 22 percent during 2005-08, well below the sample average of 29 percent, and experienced a drop to 9 percent in 2009, a smaller percentage drop than most other countries. Lithuania, by contrast, experienced a drop in credit growth from 40 percent per annum during 2005-08 to 1 percent during 2009. The fiscal positions were reversed, with Poland having a higher level of debt before the crisis (42.5 percent of GDP relative to 17 percent of GDP for Lithuania) and undertaking a much smaller fiscal expansion during the crisis. Yet, Poland had positive growth in 2009 and is expected to record stronger growth in 2010 while Lithuania is taking a massive hit in growth in both years.

The main message from this descriptive analysis is that Emerging Europe may have been particularly vulnerable to the aftershocks of the crisis for the following reasons: (i) a high level of dependence on external finance, as reflected in large current account deficits; (ii) significant exposure to foreign banks, which had many benefits but acted as a transmission channel for the crisis; and (iii) rapid credit expansion in the years before the crisis, which proved to be difficult to sustain once foreign bank financing dried up.

[66] Even before the crisis, Sirtaine and Skamnelos (2007) had foreshadowed the risks associated with high credit growth in Emerging Europe. Smith and Swain (2010) also emphasize the problems caused by high credit growth in the region.

XI.5. Summary: What Explains the Resilience of Emerging Markets?

Based on the comparative stylized analysis of the experiences of emerging Asian and Eastern European, as well as the analysis in the previous sections of the paper, we now provide a catalogue of reasons that appear to have underpinned the relative resilience of EMEs as a group during the global financial crisis, and could also help explain differences in resilience across different groups of EMEs.[67]

1. *Less dependence on foreign finance and shift away from foreign currency-denominated external debt.* As a group, the emerging markets have been net exporters of capital during the last decade. The Asian emerging markets, especially China but also others such as Russia and some of the Latin American economies, have been running significant current account surpluses in recent years. There are of course certain groups of EMEs, especially those in Emerging Europe, that have been running large current account deficits and financing their domestic investment using foreign savings. This group indeed proved most vulnerable to the crisis. The majority of emerging markets have become a lot less reliant on foreign finance, particularly external debt. Indeed, there has been a significant shift in gross capital flows to emerging markets away from debt towards FDI and portfolio equity flows, with FDI now becoming the dominant form of inflows (see Kose et al., 2009, and the figures in Section VI).

2. *Large buffers of foreign exchange reserves*. Following the Asian financial crisis of 1997-98, emerging markets around the world have built up large buffers of foreign exchange reserves, partly as a result of export-oriented growth strategies and partly as a form of self-insurance against crises associated with sudden stops or reversals of capital inflows. The total stock of international reserves held by emerging markets rose from about $0.5 trillion in 1990 to $5 trillion as of September 2009. Foreign exchange reserves account for the bulk of gross reserve holdings. In turn, China accounts for nearly $2.3 trillion of these foreign

[67] Our analysis does not focus on the policy options and responses employed by EMEs. For an analysis of these issues, see Ghosh et al. (2010).

exchange reserve holdings, but even excluding China foreign exchange reserves held by emerging markets now amount to about $2.5 trillion, a historically unprecedented level in either absolute terms or relative to economic indicators for these economies such as GDP, external debt or foreign liabilities. Reserve levels in Emerging Europe have increased in recent years but do not seem to have been large enough to protect these economies from sudden stops of capital inflows, particularly as they had become quite dependent on external finance. However, the benefits of large reserves stocks have to be carefully considered relative to the costs of accumulating them, both in terms of the quasi-fiscal costs as well as the more subtle costs in terms of the constraints on domestic policies.[68]

3. *Greater trade linkages among the EMEs* have increased their resilience as a group. In particular, commodity-exporting countries have been shielded to some extent from the slowdowns in the advanced economies by strong growth in the EMEs. For instance, China's continued rapid growth during the crisis, fueled by a surge in investment, has boosted the demand for commodities from emerging markets such as Brazil and Chile, has also increased the demand for other raw materials and intermediate inputs from other Asian emerging markets.

4. *Emerging markets have become more diversified in their production and export patterns,* although this has to a significant extent been offset by vertical specialization that has led to rising integration of some emerging markets, particularly those in Asia, through regional supply chains. Such diversification offers limited protection against large global shocks but, so long as the effects of shocks are not perfectly correlated across countries (export markets), it can serve to promote resilience in response to more normal types of shocks. Diversification of production, especially to reduce dependence on exports of commodities and raw materials that have long and volatile price cycles, can also increase resilience.

[68] Prasad and Rajan (2006) and Prasad (2009) discuss how China's currency policy that has resulted in rapid reserve accumulation has constrained domestic macroeconomic policies and hampered financial sector reforms, both of which could have long-term consequences for economic welfare.

5. *Broader divergence of EME business cycles from those of the advanced economies*. This has happened on account of the factors noted above, along with greater intra-group trade and financial linkages. As we have documented, there has been a proliferation of trade and financial flows within the group of emerging markets, both at the regional and inter-regional levels. This phenomenon is partly the natural result of geographical proximity boosting trade flows and of financial flows following trade. There have also been specific policy initiatives in certain regions to promote regional financial integration. Examples of this are the Chiang Mai and Asian Bond Fund initiatives that were set up as ways to encourage regional financial integration and financial market development among the participating Asian countries. However, the scope and scale of these initiatives have remained limited and, even for the Asian region as a whole, financial flows with the rest of the world still dwarf intra-Asian flows. Over the long run, initiatives to develop regional insurance mechanisms by pooling reserves and attempts to increase the use of major currencies such as the Chinese renminbi could serve to insulate the region better from global shocks.

6. *More stable macroeconomic policies, including flexible exchange rates in a number of emerging markets*. During the Great Moderation, most emerging markets succeeded in bringing inflation under control, through a combination of more disciplined fiscal policies and more credible monetary policies. Indeed, a large number of emerging markets have now adopted some form of inflation targeting--either explicit or implicit, soft or hard—along with flexible exchange rates, which act as shock absorbers for external shocks (Rose, 2008). This has led to moderate and less volatile inflation. In turn, stable macroeconomic policies have facilitated a shift towards more stable forms of financial inflows and also made international investors less concerned about the safety of their investment in emerging markets. Prudent fiscal policies that have resulted in low levels of fiscal deficits and public debt seem to have created room for EMEs to respond aggressively with countercyclical fiscal policies to offset the contractionary effects of the crisis. Economies with high credit growth rates seem to have fared worse, but only if credit expansion was largely financed through foreign capital (as in the case of many countries in Emerging Europe) rather than domestic savings (e.g., China and India).

7. *Rising per capita income levels and a burgeoning middle class* have increased the size and absorptive capacity of domestic markets, making emerging markets potentially less reliant on foreign trade to benefit from scale economies in their production structures and also less susceptible to export collapses. In Emerging Asia, for instance, the share of private consumption in GDP rose by nearly 4 percentage points from 2008 to 2009, helping to partially stave off the effects of a fall in export growth. Nevertheless, the high level of trade openness of emerging markets suggests that private consumption may not always be able to take up the slack in the face of adverse shocks to export growth. Furthermore, China is a special case in that the ratio of private consumption to GDP is very low by international standards and a rebalancing of growth towards private consumption-led growth is needed.

XII. Conclusions and Policy Implications

In this study, we have provided a detailed analysis of the implications of the rising prominence of emerging market economies. It is clear that, with their rapid growth, increasing size and rising integration into global trade and finance, EMEs have already attained a prominent role on the world economic stage. Their financial markets have become increasingly interconnected with financial markets in advanced economies; fluctuations in stock markets, in particular, have become more synchronized across the major EMEs and advanced economies. Interestingly, however, business cycle fluctuations—as reflected in fluctuations in GDP and other macroeconomic aggregates—reveal a rather different pattern. There has been a convergence of business cycles among EMEs and among advanced economies, but a slight divergence of cycles between these two economies.

On balance, these factors have made EMEs more resilient to shocks emanating from the advanced economies but they do not of course rule out the vulnerability of these economies to large global shocks, such as the recent financial crisis. Indeed, while the EMEs as a group were less adversely affected during the crisis than advanced economies, we have documented considerable differences among various groups of EMEs in how they were affected by the crisis. These differences appear to be related to a variety of factors including the degree and nature of openness to trade and financial flows, macroeconomic policy discipline and certain structural characteristics such as the depth and robustness of financial systems. The characteristics of growth processes in EMEs also seem to be relevant for determining the sustainability and stability of that growth and the extent of vulnerability to external shocks.

The rapid increase in trade and financial linkages between the advanced economies and EMEs has created many beneficial opportunities for efficient allocation of capital via international capital flows and gains from trade in goods and services. At the same time, these linkages constitute a double-edged sword as they can serve as channels for inter-country transmission of adverse shocks. Despite the long-term benefits of rising integration, the increased exposure to external shocks is a potential concern implying that stable

macroeconomic and structural policies are needed to manage these risks while attaining the long-term benefits.

In light of the lessons from our analysis, we first discuss the policy implications for EMEs. We then briefly set out some implications for how the advanced economies of Europe and the broader global economy should adapt to the rising prominence of emerging markets. We also summarize directions for future research that could build upon our study.

Implications for EMEs

What are the policy implications of our analysis for EMEs, particularly those in Emerging Europe? Our analysis has lessons for three interconnected categories of policies—macroeconomic, structural and financial sector.

First, during good times, policymakers should work to create more room for macroeconomic policy responses to adverse shocks. EMEs that had lower levels of public debt (as ratios to GDP) had more room for aggressive countercyclical fiscal policy responses to the global financial crisis and less concern about worsening their debt service obligations. As this crisis has shown, coordinated and pre-emptive domestic macroeconomic policies can substantially dampen the effects of major shocks. A well-functioning financial system can enhance the transmission of monetary policy and add to its potency as a countercyclical tool, so financial market development and reforms are an important priority in most EMEs.

Second, it is tempting for EMEs to increase self-insurance through reserve accumulation. This strategy certainly seems to have helped to stave off the worst of the crisis in many EMEs, but it comes at a significant cost in terms of the policy distortions needed to accumulate reserves. Regional insurance mechanisms can play a useful role in providing a buffer and better global insurance mechanisms are also needed, as discussed in more detail below.

Third, a growth strategy that is well balanced in terms of its dependence on domestic and external demand can lead to more stable outcomes. Reliance on external demand creates vulnerability to demand shocks originating in trade partners, although this has to be tempered by the reality that many emerging markets have attained their growth take-offs through export-led growth. However, this is increasingly becoming a risky growth strategy leaving EMEs more exposed to foreign demand shocks as those economies become larger. One way to balance the risks of greater trade openness is to create a more diversified export base that then translates into a more diversified exposure to world export markets.

Fourth, EMEs can derive significant benefits from openness to foreign capital but should be cautious about dependence on certain forms of capital, particularly short-term external debt. Dependence on foreign finance exposes a country to greater risks of sudden stops or reversals of capital inflows. There is evidence that short-term external debt is a particularly risky form of inflows but the experiences of some economies in Emerging Europe indicate that even relatively stable forms of inflows such as FDI can turn volatile at a time of global financial turmoil. Robust public sector and corporate governance as well as deep and well-regulated financial markets seem to tilt capital inflows towards more stable forms and also help countries cope better with the volatility of capital flows.

As a more general point, EMEs should maintain effective financial market regulation and rapidly counteract credit booms that can turn into busts, especially if these booms are fueled by foreign capital inflows and the associated busts can be compounded by spillover effects of external shocks. As financial markets in EMEs become increasingly sophisticated and complex, it is important to ensure enough regulatory capacity and nimble regulatory frameworks that can keep up with these developments.

Moreover, EMEs should manage the level and nature of exposure of their financial systems to foreign banks. Exposure to foreign banks, especially if lending by these institutions is not funded by domestic deposits, can create an additional source of vulnerability as foreign banks serve as a channel for financial contagion. To some extent, this explains the difference in outcomes between Latin American and European EMEs during the recent crisis.

Implications for the Advanced EU Countries

What are the specific implications of our findings for the advanced EU economies? First, although some EMEs have per capita incomes well below those of the advanced countries, the growing size of EMEs and their rapidly rising per capita incomes are expanding the size of their domestic markets, making them less reliant on demand in advanced economies. Since the emerging markets have high saving rates, they are also becoming less dependent on foreign finance, especially from advanced economies. This gradual process of structural divergence of EME business cycles from advanced economy cycles, along with the strong growth potential of the former group, suggests that EU economies should be looking to expand trade relationships with the EMEs in order to diversify their export base and benefit from the growth potential of the EMEs.

Second, the EU should also consider ways to promote greater financial integration with EMEs, particularly by creating more channels for two-way private capital flows that could be mutually beneficial. Given that EMEs have much stronger growth potential and can provide good opportunities for investors from advanced economies to diversify risks, there are good reasons to create stronger financial links with these economies, especially those that have deeper and more stable financial markets. But it does create some potential risks, as noted in the next point, that will need to be managed.

Cross-border bank exposure needs to be monitored carefully. This proved to be a channel through which financial systems in some advanced EU economies were vulnerable to growth collapses in Emerging Europe. Better coordination across national regulators in the supervision and regulation of large multinational banks has also become a priority; the G-20 proposal to institute “colleges of supervisors” is a good start before more formal mechanisms can be developed through the Financial Stability Board.

Third, the single currency has obviously provided enormous benefits to the euro zone. However, as recent events have clearly demonstrated, the single currency has also increased the need for sustainable and stable domestic macroeconomic policies--especially disciplined

fiscal policy, but also structural policies including labor market flexibility and sound financial markets-- so they can work as shock absorbers in response to both domestic and external shocks, including those originating in EMEs. Rising global integration will increase vulnerability to external shocks, including from the EMEs, making this an important priority.

In addition, given the degree of openness to trade among advanced EU economies, it is in their best interest to promote a more stable and transparent global trade regime. Rising protectionist tendencies in many parts of the world are likely to harm trade; the EU can take a more proactive role in managing these potential disputes through multilateral engagement.

Implications for the Global Economy

There are also policy implications at a global level, many of which are already being intensively debated by the G-20 and in other international forums, but their rapid and effective implementation remains a priority. First, mechanisms for better international policy coordination will be needed in response to regional and global shocks. As the recent financial crisis has shown, unilateral policies may prove less effective than coordinated policy actions across a group of countries. Indeed, lack of coordination can lead to “leakage” of certain types of policies and reduce overall effectiveness of those policies, especially in terms of building consumer and investor confidence.

Seconds, steps will have to be taken to improve the stability of the international monetary system. The major EMEs have already been incorporated into the global agenda-setting bodies through the G-20 process. It will be useful to strengthen the representations of these countries in international financial institutions. In the absence of such reforms, EMEs are likely to continue trying to self-insure against financial crises by building up foreign exchange reserves. This distorts their growth patterns and the resulting global imbalances contribute to macroeconomic instability.

Third, better regulation of financial institutions with cross-border operations, especially in terms of their leverage, will help to reduce contagion effects that could be spread through

these institutions. As EMEs become more integrated into global finance, it is important to ensure even regulatory standards across countries to obviate possibilities for regulatory arbitrage and the attendant risks.

Implications for Future Research

Finally, our analysis points to a number of interesting research avenues to explore. First, our findings indicate the importance of improving our understanding of linkages among emerging markets and also between emerging markets and advanced economies. Second, it will be useful to get a better understanding of the relative importance of trade and financial linkages, and the interactions between these channels, in transmitting shocks across national borders. For these two issues, the use of more disaggregated data on the composition of trade and financial flows, as well as bilateral linkages, would be helpful in complementing perspectives obtained using aggregate national-level data.

Third, changes in the relative importance of different factors (global, group-specific, national) in driving national business cycles may be relevant for assessing the likely spillover effects of domestic shocks and the design of stabilization policies to counter them. However, existing theories have yet to provide a clear guidance on these issues and a great deal of work remains to be done in this area on both the theoretical and empirical fronts. Fourth, there is a need for more formal empirical analyses accompanied by case studies of how different macroeconomic and structural policies, country characteristics and growth patterns influence resilience to different types of shocks. Even if this does not result in generalizable principles, there could be valuable insights to be gained from such exercises. This sampling of outstanding issues and questions is indicative of a fertile area for academic research, which is only now beginning to grapple with the implications of the spread of globalization and the rising prominence of EMEs for growth, stability and policy frameworks.

REFERENCES

Aghion, Philippe, and Abhijit Banerjee, 2005, *Volatility and Growth: Clarendon Lectures in Economics*, Oxford University Press, New York.

Akin, Cigdem, and Ayhan Kose, 2008, "Changing Nature of North-South Linkages: Stylized Facts and Explanations," *Journal of Asian Economics*, Vol. 19(1), pp. 1-28.

Ambler, Steven, Emmanuela Cardia, and Christian Zimmermann, 2004, International Business Cycles: What are the Facts?"*Journal of Monetary Economics*, Vol. 51(2), pp. 257-76.

Arora, Vivek, and Athanasios Vamvakidis, 2004, "How Much Do Trading Partners Matter for Economic Growth?" IMF Working Paper 04/26.

Artis, Michael J., Hans-Martin Krolzig, and Juan Toro, 2004, "The European Business Cycle," *Oxford Economic Papers*, Vol. 56(1), pp. 1–44.

Artis, Michael J., and Mathias Hoffmann, 2006, "Declining Home Bias and the Increase in International Risk Sharing: Lessons from European Integration," (unpublished; Manchester: University of Manchester).

Aizenman, Joshua, and Brian Pinto (eds.), 2006, Managing Economic Volatility and Crises. Cambridge University Press, New York.

Backus, David K., Patrick J. Kehoe, and Finn E. Kydland, 1992, International Real Business Cycles, *Journal of Political Economy*, Vol. 100, 745-775.

Backus, David K., Patrick J. Kehoe, Patrick. J. and Finn E. Kydland, 1995, "International Business Cycles: Theory and Evidence," in Thomas F. Cooley, ed., *Frontiers of Business Cycle Research*. Princeton, NJ: Princeton University Press, 1995, pp. 331-357.

Baldwin, Richard, 2003, "Openness and Growth: What Is the Empirical Relationship?," *NBER Working Paper 9578*, (Cambridge, Massachusetts: National Bureau of Economic Research).

Baxter, Marianne, and Michael Kouparitsas, 2005, "Determinants of Business Cycle Comovement: A Robust Analysis," *Journal of Monetary Economics*, Vol. 52(1), pp. 113–57.

Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad, 2006, "Does Financial Liberalization Spur Economic Growth?" *Journal of Financial Economics*, Vol. 77(1), pp. 3–55.

Berkmen, Pelin, Gaston Gelos, Robert REnnhack, and James P. Walsh, 2009, "The Global Financial Crisis: Explaining Cross-country Differences in the Output Impact," IMF working paper WP/09/280.

Berkmen, Pelin, Gaston Gelos, Robert Rennhack, and James P. Walsh, 2010, "Differential Impact," *Finance and Development*, Vol. 47(1), pp. 29-31.

Berg, Andrew and Anne Krueger, 2003, "Trade, Growth, and Poverty: A Selective Survey," IMF Working Paper 03/30, (Washington: International Monetary Fund).

Berglof, Erik, Yevgeniya Korniyenko, Alexander Plekhanov, and Jeromin Zettelmeyer, 2009, "Understanding the Crisis in Emerging Europe," EBRD Working Paper No. 109.

Blanchard, Olivier, and Danny Quah, 1989, "The Dynamic Effects of Aggregate Demand and Supply Disturbances," *American Economic Review*, Vol. 79(4), pp. 655–73.

Blanchard, Olivier and John Simon, 2001, "The Long and Large decline in U.S. Output Volatility," *Brookings Papers in Economic Activity*, Vol. 1, 135–174.

Blanchard, Olivier, Hamid Farueee, and Mitali Das, 2010, "The Initial Impact of the Crisis on Emerging Market Countries," manuscript, International Monetary Fund.

Bordo, Michael D., and Thomas Helbling, 2004, "Have National Business Cycles Become More Synchronized?" in Horst Siebert (ed.), *Macroeconomic Policies in the World* Economy, Springer Verlag, Berlin-Heidelberg.

Bry, Gerhard and Charlotte Boschan, 1971, Cyclical Analysis of Time Series: Selected Procedures and Computer Programs, New York: NBER.

Buch, Claudia M. & Doepke, Joerg & Pierdzioch, Christian, 2005, "Financial Openness and Business Cycle Volatitlity," *Journal of International Money and Finance*, Vol. 24(5), pp. 744-765.

Burns, A., and W. Mitchell, 1946, *Measuring Business Cycles*. New York: National Bureau of Economic Research.

Calvo, Guillermo, Alejandro Izquierdo, Luis-Fernando Mejía, 2004, "On the empirics of sudden stops: the relevance of balance-sheet effects," *Proceedings*, Federal Reserve Bank of San Francisco, June.

Calvo, Guillermo, and Ernesto Talvi, 2005, "Sudden stop, financial factors, and economic collapse in Latin America: learning from Argentina and Chile," NBER Working Papers No. 11153.

Canales-Kriljenko, Jorge Ivan, Brahima Coulibaly, and Herman Kamil, 2010, "A Tale of Two Regions," *Finance and Development*, Vol. 47, No. 1 (March), pp. 35-36.

Canova, Fabio, Matteo Ciccarelli, and Eva Ortega, 2007, "Similarities and Convergence in G-7 Cycles," *Journal of Monetary Economics*, Vol. 54, pp. 850–78.

Canova, Fabio and Morten O Ravn, 1996, "International Consumption Risk Sharing," *International Economic Review*, Vol. 37, No. 3, pp. 573-601.

Cavallo, Eduardo, 2007, "Output Volatility and Openness to Trade: A Reassessment," RES Working Papers 4518, Inter-American Development Bank, Research Department, Washington.

Cavallo, Eduardo, and Jeffrey Frankel, 2008, "Does Openness to Trade Make Countries More Vulnerable to Sudden Stops or Less? Using Gravity to Establish Causality," *Journal of International Money and Finance*, Vol. 27(8), pp. 1430-1452.

Chui, Michael, Paul Levine, S. Mansoob Murshed, and Joseph Pearlman, 2002, "North-South Models of Growth and Trade," *Journal of Economic Surveys*, Vol. 16, No. 2, pp. 123–65.

Claessens, Stijn, M. Ayhan Kose, and Marco Terrones, 2009a, "Recessions and Financial Disruptions in Emerging Markets," forthcoming IMF Working Paper.

Claessens, Stijn, M. Ayhan Kose, and Marco Terrones, 2009b, What Happens During Recessions, Crunches and Busts?" *Economic Policy,* Vol. 60, pp. 653-700.

Claessens, Stijn, M. Ayhan Kose, and Marco Terrones, 2010, "The Global Financial Crisis: How Similar? How Different? How Costly?" *Journal of Asian Economics*, Vol. 21(3), pp. 247-264.

Clark, Todd, and Eric van Wincoop, 2001, "Borders and Business Cycles," *Journal of International Economics*, Vol. 55, No. 1, pp. 59-85.

Currie, David, and David Vines, 1988, *Macroeconomic Interactions between North and South*, Cambridge University Press, New York.

Darvas, Zsolt, Andrew Rose, and György Szapáry, 2005, "Fiscal Divergence and Business Cycle Synchronization: Irresponsibility is Idiosyncratic," NBER Working Paper No. 11580.

Desai, Padma, and Pritha Mitra, 2004, "Why Do Some Countries Recover More Readily from Financial Crises?" Paper presented at the IMF Conference in honor of Guillermo A. Calvo, International Monetary Fund, Washington.

Dohring, Bjorn, and Heliodoro Temprano-Arroyo, 2008, "Implications of EMU for Global Macroeconomic and Financial Stability," European Commission Economic Papers No. 343.

Dollar, David, and Aart Kraay, 2003, "Institutions, Trade, and Growth," *Journal of Monetary Economics,* Vol. 50, pp. 133–162.

Dooley, Michael, and Michael M. Hutchison, 2009, "Transmission Of The U.S. Subprime Crisis To Emerging Markets: Evidence On The Decoupling-Recoupling Hypothesis," *Journal of International Money and Finance,* Vol. 28, No. 8, 1331-1349.

Doyle, Brian, and Jon Faust, 2005, "Breaks in the Variability and Comovement of G-7 Economic Growth," *Review of Economics and Statistics*, Vol. 87, No. 4, pp. 721–40.

Easterly, William, R. Islam, and Joseph E. Stiglitz, 2001, "Shaken and Stirred: Explaining Growth Volatility," Annual World Bank Conference on Development Economics, ed. by B. Pleskovic and N. Stern.

Edwards, Sebastian, 2004, "Financial Openness, Sudden Stops, and Current-Account Reversals," *American Economic Review*, Vol. 94(1), pp. 59-64.

Edwards, Sebastian, 2007, "Capital Controls, Sudden Stops, and Current Account Reversals," in Sebastian Edwards (ed.), *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences,* NBER Chapters, pp. 73-120, The University of Chicago Press.

Fidrmuc, Jarko, and Iikka Korhonen, 2009, "The Impact of the Global Financial Crisis on Business Cycles in Asian Emerging Economies," CESifo Working Paper Series CESifo Working Paper No. 2710, CESifo Group Munich.

Flood, Robert P. and Andrew K. Rose, 2009, "Inflation Targeting and Business Cycle Synchronization," CEPR Discussion Paper 7377.

Frankel, Jeffrey, and Andrew Rose, 1998, "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, Vol. 108, No. 449, pp. 1009-1025.

Frankel, Jeffrey A., and David Romer, 1999, "Does Trade Cause Growth?" *The American Economic Review*, Vol. 89, No. 3, pp. 379–399.

Giannone, Domenico, and Lucrezia Reichlin, 2006, "Trends and Cycles in the Euro Area: How Much Heterogeneity and Should we Worry About It?" ECB Working Paper No. 595 (London: European Central Bank).

Glick, Reuven, Xueyan Guo, and Michael Hutchison, 2006, "Currency Crises, Capital-Account Liberalization, and Selection Bias," *Review of Economics and Statistics*, Vol. 88(4), pp. 698-714.

Glick, Reuven, Michael Hutchison, 2001, "Banking and Currency Crises: How Common are Twins?," in Reuven Glick, Ramon Moreno, and Mark Maury Spiegel (eds.), *Financial Crises in Emerging Markets*, Cambridge University Press, New York.

Goldberg, Linda, 2004, Financial-Sector FDI and Host Countries: New and Old Lessons, NBER Working Paper No. 10441.

Guidotti, Pablo E., Federico Sturzenegger, and Agustin Villar, 2004, "On the Consequences of Sudden Stops," *Economia*, Vol. 4(2), pp. 171-214.

Harding, Don, and Adrian Pagan, 2002, "Dissecting the Cycle: A Methodological Investigation," *Journal of Monetary Economics*, Vol. 49, No. 2, pp. 365–81.

Head, Allen, 2002, "Aggregate Fluctuations with National and International Returns to Scale," *International Economic Review*, Vol. 43, pp. 1101–25.

Heathcote, Jonathan, and Fabrizio Perri, 2002, "Financial Autarky and International Business Cycles," *Journal of Monetary Economics*, Vol. 49, pp. 601–28.

Heathcote, Jonathan, and Fabrizio Perri, 2004, "Financial Globalization and Real Regionalization," *Journal of Economic Theory*, Vol. 119, No. 1, pp. 207–43.

Helbling, Thomas, Peter Berezin, M. Ayhan Kose, Michael Kumhof, Doug Laxton, and Nikola Spatafora, 2007, "Decoupling the Train? Spillovers and Cycles in the Global Economy," *World Economic Outlook* (April 2007), pp. 121–60.

Hoffmaister, Alexander, Mahmood Pradhan, and Hossein Samiei, 1998, "Have North-South Growth Linkages Changed?" *World Development*, Vol. 26, No. 5, pp. 791-808.

Hummels, David, Jun Ishii, and Kei-Mu Yi, 2001, "The Nature and Growth of Vertical Specialization in World Trade," *Journal of International Economics*, Vol. 54(1), pp. 75-96.

Imbs, Jean, 2004, "Why is the Link between Volatility and Growth Both Positive and Negative?" manuscript, London Business School and CEPR.

Imbs, Jean, 2009, "The First Global Recession in Decades," manuscript, HEC Lausanne, Swiss Finance Institute, and CEPR.

Jaimovich, Nir, and Sergio Robelo, 2008, "News and Business Cycles in Open Economies," *Journal of Money, Credit and Banking*, Vol. 40(8), pp. 1699-1711.

Kalemli-Ozcan, Sebnem, Bent Sorensen, and Oved Yosha, 2003, "Risk Sharing and Industrial Specialization: Regional and International Evidence," *American Economic Review*, Vol. 93, pp. 903–18.

King, Robert, Charles Plosser, James Stock, and Mark Watson, 1991, "Stochastic Trends and Economic Fluctuations," *American Economic Review*, Vol. 81, pp. 819–40.

Kose, M. Ayhan, Prakash Loungani, and Marco E. Terrones, 2009, "Out of the Ballpark," *Finance & Development*, Vol. 46(2), pp. 25-28.

Kose, M. Ayhan, Prakash Loungani, and Marco E. Terrones, 2010, "Global Recessions and Recoveries," forthcoming, IMF Working Paper.

Kose, M. Ayhan, Guy Meredith, and Christopher Towe, 2005, "How has NAFTA affected the Mexican Economy? Review and Evidence," in Rolf J. Langhammer and Lucio Vinhas de Souza (eds.), *Monetary Policy and Macroeconomic Stabilization in Latin America*, Springer, pp. 35-81.

Kose, M. Ayhan, Christopher Otrok, and Eswar Prasad, 2008, "Global Business Cycles: Convergence or Decoupling?" NBER Working Paper No. 14292.

Kose, M. Ayhan, Chris Otrok and Charles Whiteman, 2008, "Understanding the Evolution of World Business Cycles," *Journal of International Economics*, Vol. 75, pp. 110-130.

Kose, M. Ayhan, Christopher Otrok, and Charles Whiteman, 2003, "International Business Cycles: World, Region, and Country Specific Factors," *American Economic Review*, Vol. 93, pp. 1216–39.

Kose, M. Ayhan, Eswar Prasad, Kenneth Rogoff, and Shang-Jin Wei, 2009a, "Financial Globalization: A Reappraisal," *IMF Staff Papers*, Vol. 56, 8-62.

Kose, M. Ayhan, Eswar Prasad, Kenneth Rogoff, and Shang-Jin Wei, 2009b "Financial Globalization and Economic Policies" with Eswar Prasad, Kenneth Rogoff, and Shang-Jin Wei, in Dani Rodrik and Mark R. Rosenzweig eds., Elsevier. forthcoming in the *Handbook of Development Economics*, Vol. 5.

Kose, M. Ayhan, Eswar Prasad, and Ashley Taylor, 2010, "Thresholds in the Process of International Financial Integration," forthcoming, *Journal of International Money and Finance*.

Kose, M. Ayhan, Eswar Prasad and Marco Terrones, 2009, "Does Financial Globalization Promote Risk Sharing?," *Journal of Development Economics*, Vol. 89, pp. 258-270.

Kose, M. Ayhan, Eswar Prasad and Marco Terrones, 2009, "Does Openness to International Financial Flows Contribute to Productivity Growth?" *Journal of International Money and Finance*, Vol. 28, pp. 554-580.

Kose, M. Ayhan, Eswar Prasad, and Marco Terrones, 2007, "How Does Financial Globalization Affect Risk Sharing? Patterns and Channels," IMF Working Paper No. 07/238.

Kose, M. Ayhan, Eswar S. Prasad and Marco Terrones, 2006, "How do Trade and Financial Integration affect Relationship between Growth and Volatility?" *Journal of International Economies*, Vol. 69(1), pp. 176-202.

Kose, M. Ayhan, Eswar S. Prasad, and Marco Terrones, 2005, "Growth and Volatility in an Era of Globalization," *IMF Staff Papers*, Vol. 52, pp. 31-63.

Kose, M. Ayhan, Eswar Prasad, and Marco Terrones, 2004" Volatility and Comovement in a Globalized World Economy: An Exploration," in Horst Siebert (ed.), *Macroeconomic Policies in the World Economy*, Springer, pp. 89-122.

Kose, M. Ayhan, Eswar Prasad, and Marco Terrones, 2003a, "Financial Integration and Macroeconomic Volatility," *IMF Staff Papers* (Washington: International Monetary Fund), Vol. 50, pp. 119–42.

Kose, M. Ayhan., Eswar Prasad, and Marco Terrones, 2003b, "How Does Globalization Affect the Synchronization of Business Cycles?" *American Economic Review—Papers and Proceedings*, Vol. 93, pp. 57–62.

Kose, Ayhan, and Kei-Mu Yi, 2006, "Can the Standard International Business Cycle Model Explain the Relation Between Trade and Comovement?" *Journal of International Economics*, Vol. 68, No. 2, pp. 267-295.

Kouparitsas, Michael, 1998, "North-South Business Cycles," FRBC Working Paper Series, Macroeconomic Issues, WP-96-9.

Kouparitsas, Michael, 2001, "Evidence of the North-South Business Cycles," *Economic Perspectives*, Vol. 25, No. 1, pp. 46-59.

Krugman, Paul, 1993, "Lessons of Massachusetts for EMU", in F. Giavazzi and F. Torres (eds), *The Transition to Economic and Monetary Union in Europe*, Cambridge University Press, pp. 241–261.

Kumakura, Masanaga, 2006, "Trade and Business Cycle Co-Movements in Asia-Pacific," *Journal of Asian Economics*, Vol. 17, No. 4, pp. 622-645.

Lane, Philip R., and Gian Maria Milesi-Ferretti, 2007, "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004," *Journal of International Economics*, Vol. 73, No. 2, pp. 223-250.

Lane, Philip R., and Gian Maria Milesi-Ferretti, 2010, "The Cross-Country Incidence of the Global Crisis," prepared for the IMF/BOP/PSE Conference "Economic Linkages, Spillovers and the Financial Crisis," Paris, January, 2010.

Laeven, Luc, and Fabien Valencia, 2008, "Systemic Banking Crises: A New Database," IMFWorking Paper, No. 08/224.

Lewis, Karen K., 1999, "Trying to Explain Home Bias in Equities and Consumption," *Journal of Economic Literature*, Vol. 37 (June), pp. 571–608.

Lewis, Karen K., 1996, "What Can Explain the Apparent Lack of International Consumption Risksharing?" *Journal of Political Economy*, Vol. 104, No. 2, pp. 267–297.

Loayza, Norman, Humberto Lopez, and Angel Ubide, 2001, "Comovements and Sectoral Interdependence: Evidence for Latin America, East Asia, and Europe," *IMF Staff Papers*, Vol. 48, No. 2, pp. 367-396.

Mace, Barbara, 1991, "Full Insurance in the Presence of Aggregate Uncertainty," *Journal of Political Economy*, Vol. 99, pp. 928–56.

Mark Mink & Jan Jacobs & Jakob de Haan, 2007, "Measuring Synchronicity and Co-movement of Business Cycles with an Application to the Euro Area," CESifo Working Paper Series CESifo Working Paper No. 2112.

McConnell, M. and G. P. Quiros, 2000, "Output fluctuations in the United States: what has changed since the early 1980s?" *American Economic* Review, Vol. 90, pp. 1464–1476.

Monfort, Alain, Jean-Paul Renne, Rasmus Rüffer, and Guillermo Vitale, 2003, "Is Economic Activity in the G7 Synchronized? Common Shocks versus Spillover Effects," CEPR Discussion Paper No. 4119.

Moser, Gabriel, Wolfgang Pointer, and Johann Scharler, 2004, "International Risk Sharing in Europe: Has Anything Changed?" in *The Economic Potential of a Larger Europe*, ed. by K. Liebscher, J Christl, P. Mooslechner, and D. Ritzberger-Grünwald (Northampton: Edward Elgar Publishing), pp. 260–75.

Obstfeld, Maurice and Kenneth Rogoff, 2004, *Foundations of International Macroeconomics* MIT Press, Cambridge, Massachusetts,.

Obstfeld, Maurice, 1995, "International Capital Mobility in the 1990s," in *Understanding Interdependence*, ed. by P.B. Kenen (Princeton: Princeton University Press), pp. 201–261.

Pakko, M.R., 1998, "Characterizing Cross-Country Consumption Correlations," *Review of Economics and Statistics*, Vol. 80, No. 1, pp. 169–174.

Pallage, Stephane and Michel Robe, 2003, "On The Welfare Cost of Economic Fluctuations in Developing Countries," *International Economic Review*, 44 (2), May 2003, pp. 677-98.

Prasad, Eswar, 2009, "Rebalancing Growth in Asia," NBER Working Paper No. 15169.

Prasad, Eswar, 2009, "Is the Chinese Growth Miracle Built to Last?" *China Economic Review*, Vol. 20, No. 3, pp. 103-23.

Prasad, Eswar, and Raghuram Rajan, 2006, "Modernizing China's Growth Paradigm," *American Economic Review*, Vol. 96, No. 2, pp. 331-36.

Prasad, Eswar S., Kenneth Rogoff, Shang-Jin Wei, and M. Ayhan Kose, 2003b, "Effects of Financial Globalization on Developing Countries: Some Empirical Evidence," IMF Occasional Paper No. 220 (Washington: International Monetary Fund).

Ramey, Garey, and Valerie A. Ramey, 1995, "Cross-Country Evidence on the Link between Volatility and Growth," *American Economic Review*, Vol. 85(5), pp. 1138-1151.

Rana, Pradumna, 2006, "Economic Integration in East Asia:Trends, Prospects, and a Possible Roadmap," ADB Working Paper Series on Regional Economic Integration No. 2.

Rana, Pradumna, 2007, "Economic Integration and Synchronization of Business Cycles in East Asia," *Journal of Asian Economics*, Vol. 18, No. 5, pp. 711-725.

Razin, Assaf and Andrew Rose, 1994, "Business-cycle volatility and openness: an exploratory cross-sectional analysis," in Leonardo Leiderman and Assaf Razin (eds.), *Capital Mobility: The Impact on Consumption, Investment, and Growth*, Cambridge University Press. Cambridge, 48–76.

Reinhart, Carmen and Kenneth Rogoff, 2009, "The Aftermath of Financial Crises," *American Economic Review Papers and Proceedings*, Vol. 99, pp.466-472.

Rodriguez ,Francisco, and Dani Rodrik and, 2000, "Trade Policy and Economic Growth: A Skeptics Guide to the Cross-National Evidence," in Ben Bernanke and Kenneth Rogoff, eds., *NBER Macroeconomics Annual 2000*, Cambridge (MA): MIT Press.

Rose, Andrew and Mark Spiegel, 2009a, "Cross-Country Causes and Consequences of the 2008 Crisis: Early Warning," NBER Working Paper No. 15357.

Rose, Andrew and Mark Spiegel, 2009b, "Cross-Country Causes and Consequences of the 2008 Crisis: International Linkages and American Exposure," NBER Working Paper No. 15358.

Rossi, Vanessa, 2009, "Decoupling Debate Will Return: Emergers Dominate in Long Run," Briefing Note IEP EN 08/01, Chatham House.

Schindler, Martin, 2009, "Measuring Financial Integration: A New Data Set," *IMF Staff Paper*, Vol. 56, No. 1, pp. 222-238.

Shin, Kwanho, and Yunjong Wang, 2004, "Trade Integration and Business Cycle Co-Movements: The Case of Korea with Other Asian Countries," *Japan and the World Economy*, Vol. 16, No. 2, pp. 213-230.

Stock, James H., and Mark W. Watson, 2007, "Forecasting in Dynamic Factor Models Subject to Structural Instability," mimeo, Harvard and Princeton Universities.

Stock, James H., and Mark W. Watson, 2005, "Understanding Changes in International Business Cycles," *Journal of the European Economic Association*, Vol. 3, No. 5, pp. 968–1006.

Stock, James H. and Mark W. Watson, 2003, "Has the Business Cycle Changed? Evidence and Explanations," FRB Kansas City symposium Volume.

Stock, James H. and Mark W. Watson, 1999, "Business Cycle Fluctuations in U Macroeconomic Time Series." In *Handbook of Macroeconomics*, Volume 1. Ed. by J.B. Taylor and M. Woodford. Elsevier Science B.V.

Sorensen, Bent E., Yi-Tsung Wu, and Yu Zhu , 2007, "Home Bias and International Risk Sharing: Twin Puzzles Separated at Birth," *Journal of International Money and Finance*, Vol. 26, No. 4, pp. 587–605.

Van Wincoop, Eric, 1999, "How Big are Potential Welfare Gains from International Risk Sharing?" *Journal of International Economics*, Vol. 47, No. 1, pp. 109–35.

Wacziarg, Romain, and Karen Horn Welch, 2008, "Trade Liberalization and Growth: New Evidence", *The World Bank Economic Review*, Vol. 22(2), pp. 187-231.

Wälti, Sebastien, 2009, "The Myth of Decoupling," manuscript, Swiss National Bank.

Winters, L. Alan, 2004, "Trade Liberalization and Economic Performance: an Overview," *The Economic Journal*, Vol. 114, pp. 4-21.

Yi, Kei-Mu, 2003, "Can Vertical Specialization Explain the Growth of World Trade?" *Journal of Political Economy*, Vol. 111(1), pp. 52-102.

Zarnowitz, Victor, 1992, *Business cycles: theory, history, indicators, and forecasting*. Chicago: The University of Chicago Press.

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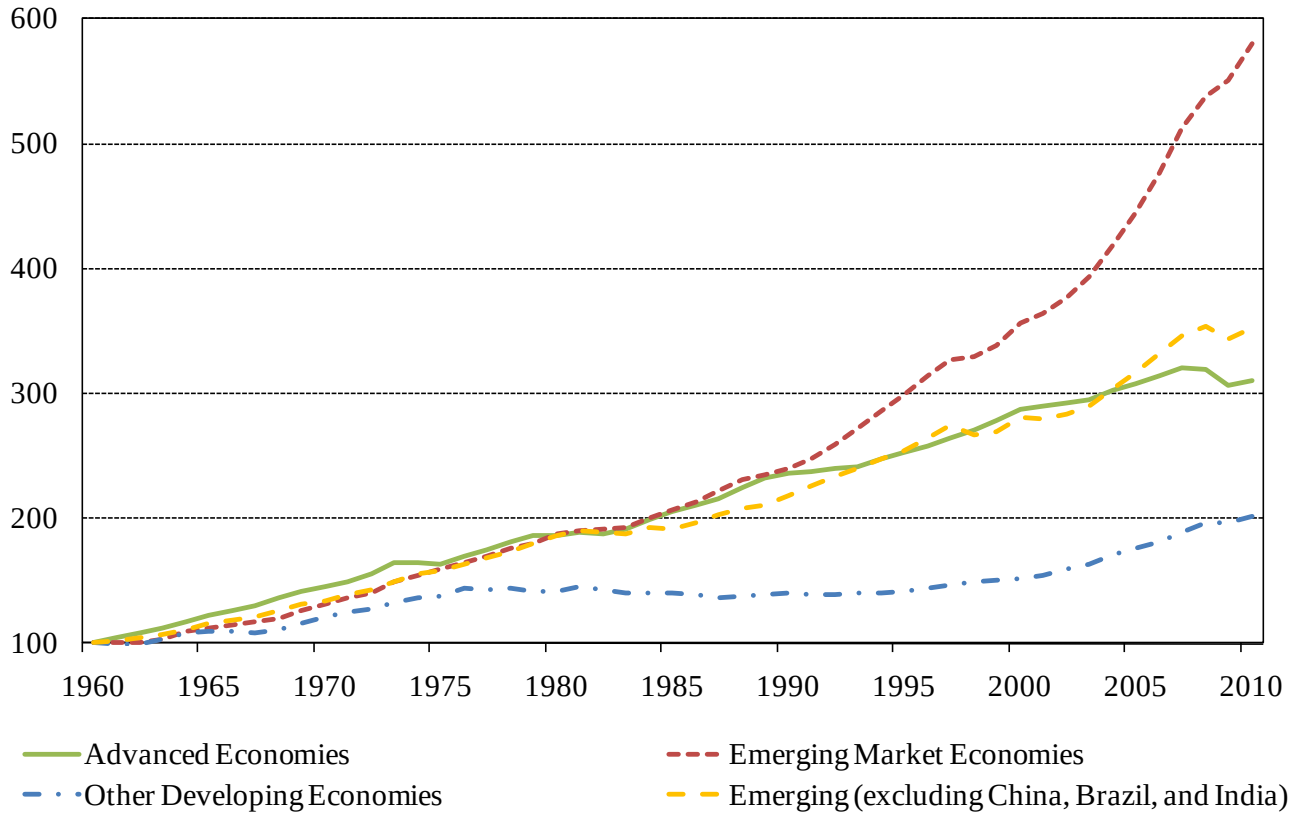
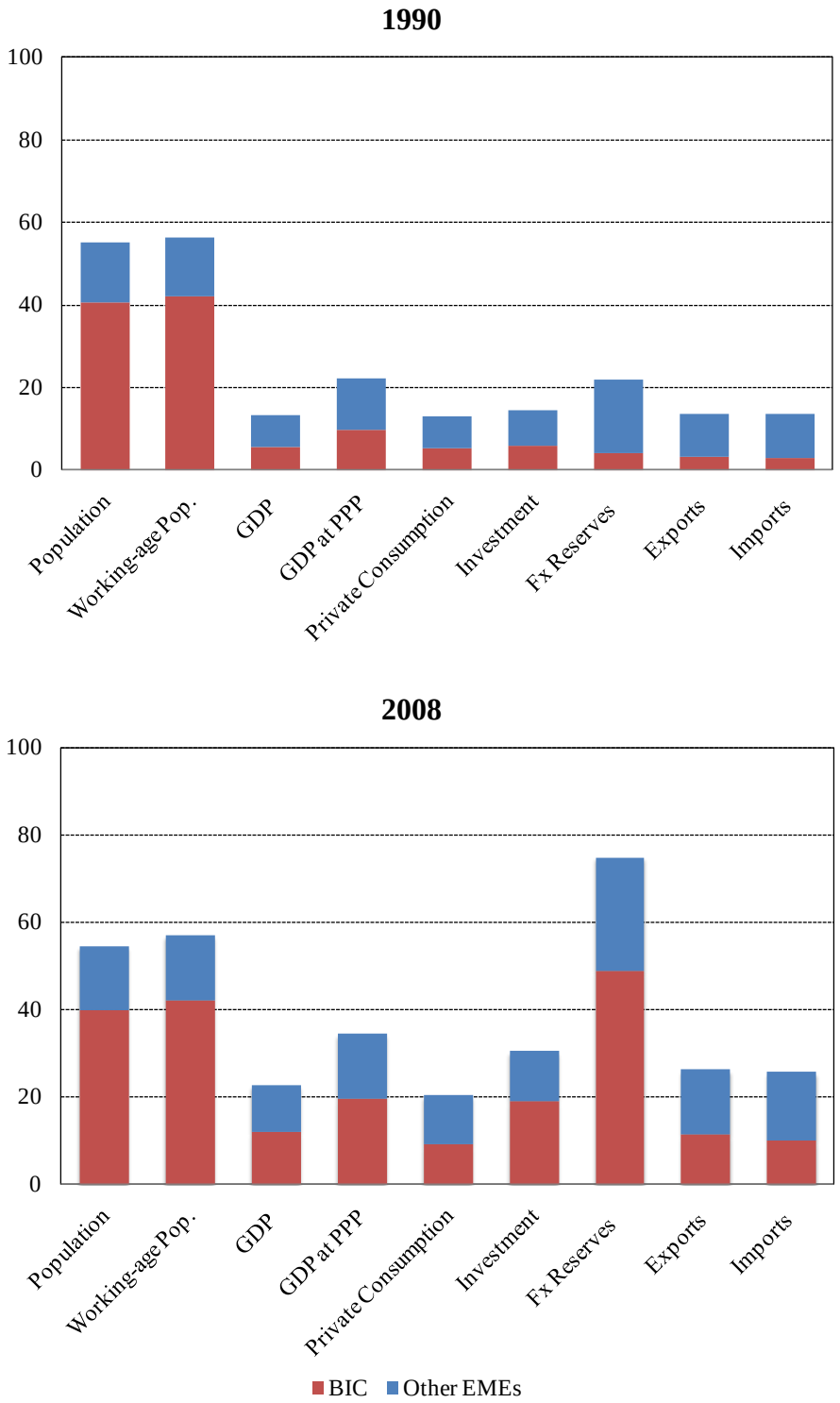
Figure I.1. Evolution of GDP of Different Groups: 1960-2010
(per capita, PPP weighted)



Notes: This figure shows cumulative changes in indexes of per capita GDP for each group of countries, computed using growth rates of real GDP for each country and weighting by PPP-GDP. The indexes are set to 100 in the base period.

Figure I.2. Emerging Market Shares in the Global Economy: 1990 and 2008
(in percent of world total)



Notes: This figure shows the share of world totals of different variables accounted for by the BIC (Brazil, India, China) and other Emerging Market Economies.

Table IV.1. Size Distribution of Groups / Regions
(in percent)

Group	1960-1972	1973-1985	1986-2009	2008-2009
Advanced Economies	80.30	73.21	65.71	56.98
Emerging Market Economies	16.60	22.86	30.69	39.06
Other Developing Economies	3.09	3.93	3.60	3.95
US	32.64	27.08	25.88	23.58
Japan	7.77	9.40	9.06	7.03
G-7	70.19	61.19	55.29	47.46
EU-15	34.41	31.10	25.74	21.77
Major Emerging Market Economies	6.30	9.04	15.09	22.57

Notes: The values correspond to the period averages of GDP as a share of total world GDP computed using PPP exchange rates. EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK. Major emerging markets include Brazil, China and India.

Table IV.2. Contributions to Global Growth (in percent)

	1960-1972	1973-1985	1986-2008
World			
GDP	11.60	10.22	6.11
Consumption	5.01	3.17	3.03
Investment	6.74	2.43	3.77
Exports	7.77	5.24	6.39
Advanced Economies			
GDP	7.18	7.16	3.44
Consumption	4.34	2.50	2.32
Investment	5.93	1.70	2.46
Exports	6.62	4.26	3.93
Emerging Market Economies			
GDP	3.71	2.66	2.46
Consumption	0.60	0.62	0.58
Investment	0.73	0.65	1.39
Exports	0.90	0.87	2.34
Other Developing Economies			
GDP	0.70	0.40	0.22
Consumption	0.07	0.05	0.05
Investment	0.07	0.08	0.04
Exports	0.25	0.11	0.12
US			
GDP	2.40	2.69	1.44
Consumption	1.58	1.11	1.11
Investment	1.31	0.88	0.98
Exports	0.92	0.71	0.97
Japan			
GDP	0.99	1.03	0.44
Consumption	1.06	0.57	0.32
Investment	2.26	0.52	0.42
Exports	0.84	0.80	0.36
G-7			
GDP	5.61	6.03	2.87
Consumption	3.77	2.26	2.08
Investment	5.04	1.60	2.05
Exports	4.59	3.20	2.83
EU-15			
GDP	3.17	2.88	1.29
Consumption	1.44	0.68	0.63
Investment	2.04	0.17	0.78
Exports	3.91	2.32	2.19
Major Emerging Market Economies			
GDP	1.48	1.11	1.40
Consumption	0.16	0.24	0.39
Investment	0.27	0.27	0.92
Exports	0.18	0.23	0.92

Notes: The values correspond to the period averages of growth for each group calculated using the sum of PPP-based output weighted constant local currency growth rates of GDP, exports and sectoral value added of each country in the corresponding group. EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK. Major emerging market economies include Brazil, China and India.

Table IV.3. Changes in the Sectoral Composition of Output (in percent)

	1960-1972	1973-1985	1986-2008
World			
Agriculture	5.67	4.41	3.93
Industry	32.98	31.86	29.45
Services	61.39	63.73	66.63
Advanced Economies			
Agriculture	3.50	2.43	1.90
Industry	33.60	32.11	28.14
Services	62.90	65.46	66.63
Emerging Market Economies			
Agriculture	21.59	15.72	11.78
Industry	27.93	29.74	34.19
Services	50.48	54.54	54.03
Other Developing Economies			
Agriculture	28.96	20.97	19.93
Industry	29.91	33.90	32.12
Services	44.61	45.13	48.47

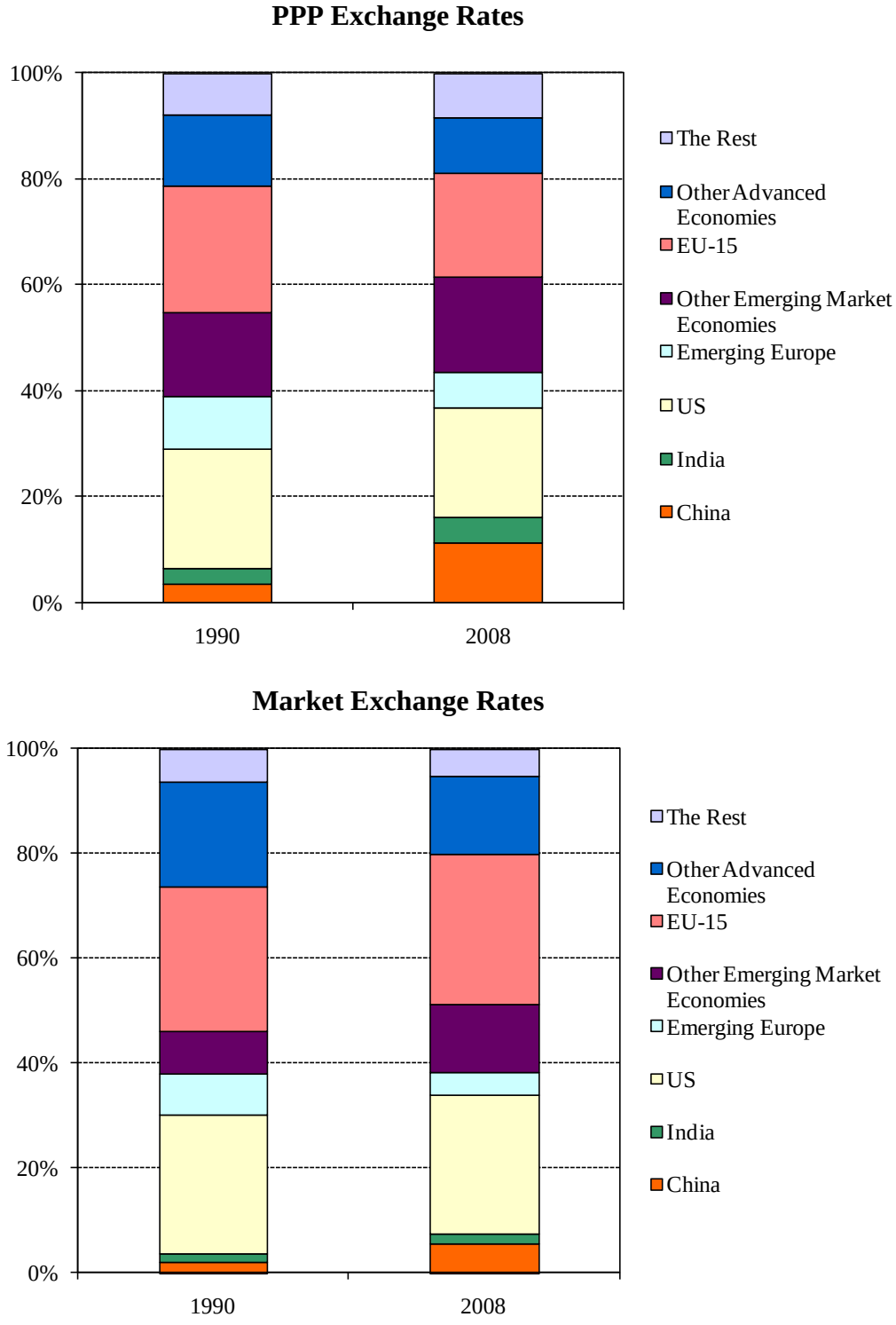
Notes: The values correspond to the period averages of sectoral value added as a share of total value added computed using the constant 2000 U.S. dollars sectoral value added series. GDP missing data adjusted.

Table IV.4. Growth of Macroeconomic and Sectoral Aggregates (in percent)

	1960-1972	1973-1985	1986-2008
Advanced Economies			
GDP	4.89	2.82	2.52
Agriculture	1.26	2.04	1.20
Industry	5.41	1.65	1.78
Services	4.67	3.21	2.55
Exports	7.95	5.47	5.72
Emerging Market Economies			
GDP	5.15	5.00	5.95
Agriculture	3.19	3.40	2.77
Industry	6.47	5.54	6.67
Services	4.96	5.94	6.29
Exports	5.17	7.76	11.72
Other Developing Economies			
GDP	4.11	3.14	3.52
Agriculture	1.94	2.29	3.24
Industry	6.89	3.81	3.51
Services	2.46	4.49	3.87
Exports	4.67	4.80	5.87
US			
GDP	4.30	3.05	2.91
Agriculture	0.91	2.87	3.06
Industry	3.90	1.63	2.61
Services	3.92	3.17	3.25
Exports	5.82	5.07	6.92
Japan			
GDP	9.84	3.73	2.27
Agriculture	0.86	-0.06	-2.25
Industry	12.91	2.99	1.83
Services	9.89	3.02	2.87
Exports	15.06	10.03	5.09
G-7			
GDP	4.76	2.90	2.49
Agriculture	1.15	2.01	1.28
Industry	5.30	1.63	1.78
Services	4.66	3.29	2.62
Exports	7.68	5.52	5.77
EU-15			
GDP	4.59	2.32	2.25
Agriculture	1.65	2.00	0.81
Industry	5.27	1.34	1.49
Services	4.50	2.97	2.48
Exports	8.25	5.04	5.14
Major Emerging Market Economies			
GDP	4.68	5.80	7.29
Agriculture	3.38	4.04	3.35
Industry	6.43	6.56	8.46
Services	4.53	6.72	7.80
Exports	3.65	8.80	14.28

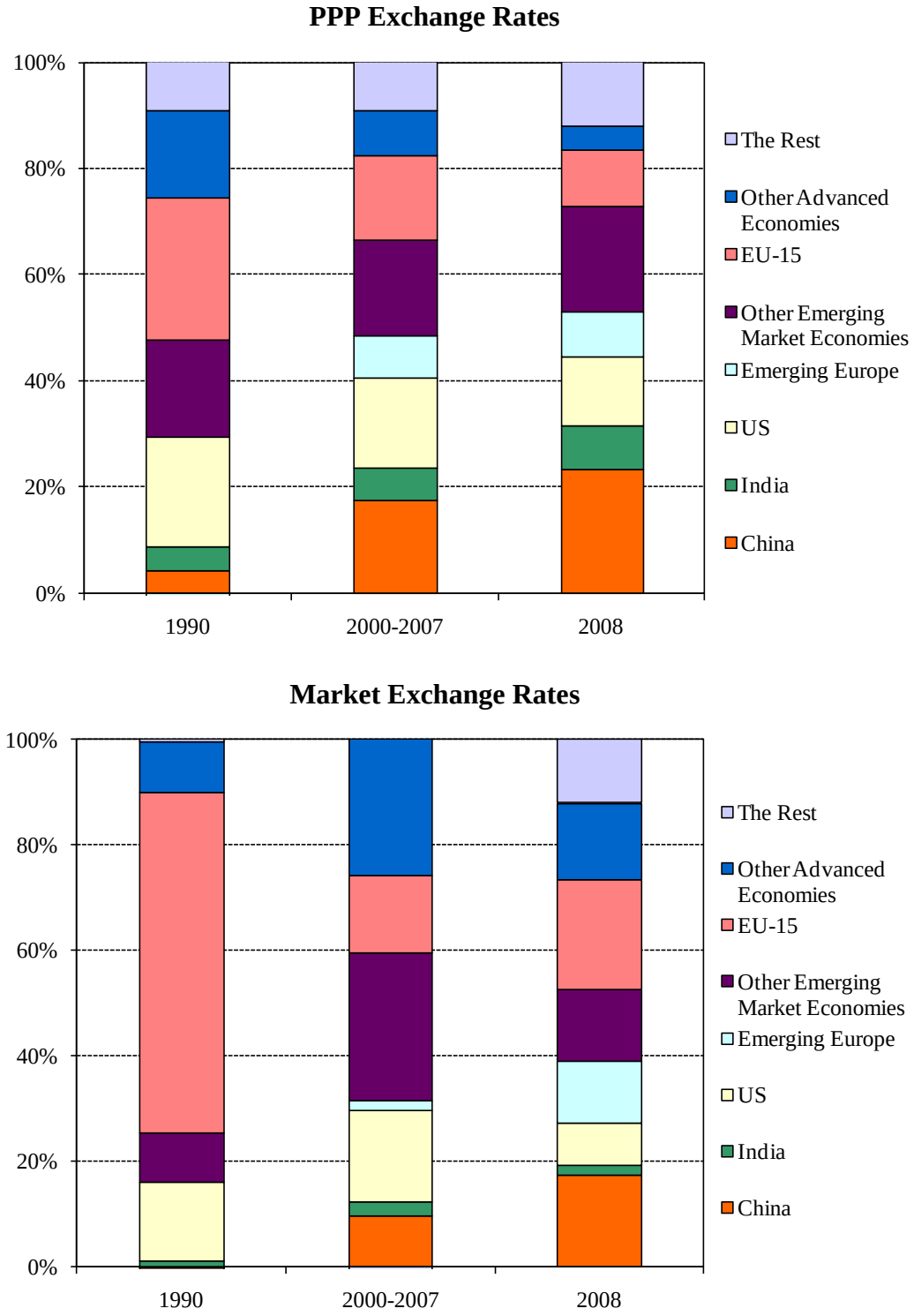
Notes: The values correspond to the period averages of growth for each group calculated using the sum of PPP-based output weighted constant local currency growth rates of GDP, exports, and sectoral value added of each country in the corresponding group. EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK. Major emerging market economies include Brazil, China and India.

Figure IV.1. Distribution of Global GDP: 1990 and 2008
(in percent)



Notes: This figure shows the share of global GDP accounted for by different countries or country groups (there are no overlaps – countries identified individually are not also included in broader groups to which they may belong).

Figure IV.2. Contributions to Global Growth
(in percent)



Notes: This figure shows the share of global GDP growth accounted for by different countries or country groups (there are no overlaps—countries identified individually are not also included in broader groups to which they may belong). The first and third bars in each panel show these growth contributions for the years 1990 and 2008, respectively. The middle bars in each panel show the corresponding average contributions to global growth over the period 2000-2007 (the period of the Great Moderation).

Table V.1. Contributions to Global Export Growth
(in percent)

	1960-1972	1973-1985	1986-2009	2008-2009
World Export Growth	7.56	3.57	6.63	-6.36
Contributions				
Advanced Economies	0.80	0.58	0.22	-1.05
Emerging Market Economies	6.06	3.03	6.23	-5.40
Other Developing Economies	0.71	-0.05	0.17	0.09
US	0.01	0.00	0.01	0.00
Japan	0.72	0.55	0.19	-1.03
EU-15	0.05	0.02	0.02	-0.02
Major Emerging Market Economies	0.02	0.01	0.05	0.02

Notes: This table shows average annual export growth over the indicated periods and the average contributions of different countries or groups of countries to global export growth. Export data were all used in nominal dollar terms, calculated at market exchange rates. EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK. Major emerging market economies include Brazil, China and India.

Table V.2. Changes in the Composition of Trade

Exports	1960-1972	1973-1985	1986-2007
Advanced Economies			
Primary Non-fuels	24.92	19.48	14.11
Primary Fuels	3.79	6.37	4.65
Manufacturing	71.37	74.22	81.24
Emerging Market Economies			
Primary Non-fuels	60.80	37.76	16.51
Primary Fuels	16.78	23.65	8.94
Manufacturing	23.33	38.59	74.55
Other Developing Economies			
Primary Non-fuels	81.53	35.64	31.08
Primary Fuels	14.96	56.80	40.46
Manufacturing	7.33	9.43	31.02

Imports	1960-1972	1973-1985	1986-2007
Advanced Economies			
Primary Non-fuels	35.74	22.21	17.75
Primary Fuels	11.59	22.69	13.46
Manufacturing	52.66	55.11	68.79
Emerging Market Economies			
Primary Non-fuels	26.60	19.71	16.31
Primary Fuels	7.38	17.00	13.40
Manufacturing	66.02	63.29	70.29
Other Developing Economies			
Primary Non-fuels	20.98	19.61	23.58
Primary Fuels	7.85	13.31	12.90
Manufacturing	71.17	67.12	63.55

Notes: The values correspond to the period averages of sectoral shares of merchandise exports and imports data. Primary non-fuels are defined as the sum of agricultural raw materials, food, ores, and metals.

Table V.3. Export Orientation by Region
(Merchandise exports to indicated destinations as a percent of GDP)

	Destination															
	United States				Euro Area				Japan				Intraregional			
Export from	1981-1985	1991-1995	2001-2005	2006-2008	1981-1985	1991-1995	2001-2005	2006-2008	1981-1985	1991-1995	2001-2005	2006-2008	1981-1985	1991-1995	2001-2005	2006-2008
Advanced Economies																
United States	--	--	--	--	1.0	1.0	1.1	1.3	0.6	0.8	0.5	0.5	--	--	--	--
Euro area	1.6	1.2	2.3	2.2	--	--	--	--	0.2	0.4	0.4	0.4	8.9	9.0	15.1	16.3
Japan	4.0	2.5	2.9	3.2	1.1	1.0	1.3	1.7	--	--	--	--	--	--	--	--
Other Advanced Economies	6.0	5.8	7.7	6.8	5.9	6.9	7.5	7.7	1.0	1.1	0.9	0.9	3.5	3.0	3.1	3.5
Emerging Market Economies and Other Developing Economies																
Emerging Asia	3.6	6.0	6.9	6.4	1.5	3.2	4.4	4.9	3.2	3.8	3.9	3.3	4.3	10.2	13.8	15.7
China	0.6	2.8	5.9	6.9	0.6	1.7	3.7	5.2	1.7	3.1	3.6	3.0	2.7	7.6	8.1	9.9
NIEs and ASEAN-4	8.3	9.3	10.3	7.9	3.0	4.6	6.2	5.9	6.6	5.3	5.8	5.3	8.5	14.9	25.7	30.5
Latin America	4.4	5.1	10.9	9.3	2.3	1.5	1.9	2.6	0.7	0.5	0.4	0.5	1.4	1.6	2.6	3.2
Argentina	0.8	0.6	2.1	1.8	1.6	1.5	3.0	3.3	0.3	0.2	0.2	0.2	0.9	1.2	4.5	4.6
Brazil	2.9	1.4	2.8	2.0	2.8	1.6	2.4	2.5	0.7	0.5	0.4	0.4	1.6	1.6	2.8	3.0
Mexico	6.3	12.3	21.0	20.7	1.7	0.7	0.7	1.2	0.8	0.2	0.2	0.2	0.5	0.6	0.8	1.4
Sub-Saharan Africa	4.5	5.7	5.6	7.4	9.7	8.9	6.4	7.0	0.4	0.6	1.1	1.3	1.4	2.4	3.5	4.2
Nigeria	8.4	17.9	16.5	17.9	16.7	15.1	7.8	8.3	0.1	0.1	1.1	0.4	1.6	3.9	6.0	6.8
South Africa	--	--	2.1	2.8	--	--	4.8	5.8	--	--	1.8	2.6	--	--	2.2	2.5
Emerging Europe	0.7	0.9	1.5	1.1	4.6	12.3	24.3	21.6	0.1	0.3	0.2	0.2	1.9	5.9	6.9	10.9
Hungary	0.8	1.0	1.8	1.7	7.8	14.9	34.0	36.2	0.1	0.3	0.3	0.3	2.8	6.1	8.9	18.0

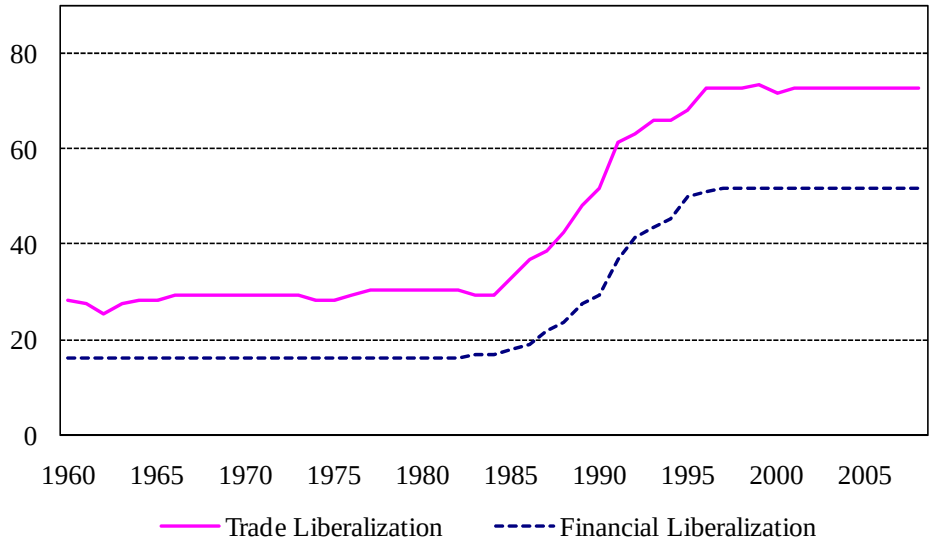
Notes: Exports are expressed as a share of exporting country's or country group's GDP. Data series are from IMF's Direction of Trade Statistics and World Economic Outlook, and authors' calculations. Data covers 86 countries as trade origins and 105 countries as trade destinations.

Table V.4. Export Orientation by Region
(Merchandise exports to indicated destinations as a percent of total exports)

	Destination															
	United States				Euro Area				Japan				Intraregional			
Export from	1981-1985	1991-1995	2001-2005	2006-2008	1981-1985	1991-1995	2001-2005	2006-2008	1981-1985	1991-1995	2001-2005	2006-2008	1981-1985	1991-1995	2001-2005	2006-2008
Advanced Economies																
United States	--	--	--	--	18.6	15.7	16.3	16.5	11.8	11.8	7.4	5.8	--	--	--	--
Euro area	8.9	7.1	8.2	6.9	--	--	--	--	1.4	2.2	1.5	1.2	49.9	51.6	52.7	51.6
Japan	37.8	32.7	28.5	22.8	10.6	13.8	13.0	12.0	--	--	--	--	--	--	--	--
Other Advanced Economi	31.1	29.4	34.1	29.1	31.0	34.7	33.1	33.1	5.3	5.5	3.8	3.9	18.1	15.1	13.8	15.0
Emerging Market Economies and Other Developing Economies																
Emerging Asia	23.7	21.8	20.2	17.0	9.9	11.7	12.7	13.1	21.3	13.9	11.3	8.9	28.3	37.6	40.2	41.6
China	9.2	16.1	22.8	21.3	8.6	9.7	14.5	16.2	24.2	18.1	14.0	9.4	38.2	43.8	31.5	30.7
NIEs and ASEAN-4	26.7	23.2	18.6	13.5	9.6	11.6	11.2	10.0	21.0	13.2	10.5	9.0	27.4	37.3	46.2	51.7
Latin America	40.7	49.2	58.2	46.7	21.3	14.6	10.1	12.8	6.1	4.6	2.1	2.6	12.6	15.3	13.8	15.8
Argentina	16.0	10.5	11.6	8.4	32.0	25.6	16.6	15.6	5.1	3.2	1.2	1.0	17.4	21.5	24.7	21.8
Brazil	27.5	22.1	24.7	17.3	26.1	23.9	20.7	22.0	6.8	7.2	3.5	3.5	14.8	24.5	24.0	25.8
Mexico	58.6	84.4	88.7	81.0	15.8	4.5	3.0	4.8	7.2	1.7	0.6	0.9	4.7	3.9	3.2	5.3
Sub-Saharan Africa	24.6	26.2	24.6	27.5	52.8	40.7	28.5	25.9	2.2	2.8	5.1	5.0	7.9	11.1	15.4	15.5
Nigeria	28.9	41.0	45.1	49.3	57.1	34.6	21.2	22.9	0.5	0.3	2.9	1.0	5.5	8.9	16.4	18.9
South Africa	--	--	12.4	12.5	--	--	28.3	26.0	--	--	10.3	11.7	--	--	12.9	11.3
Emerging Europe	6.8	3.5	3.6	2.6	42.5	50.1	60.1	52.2	1.3	1.1	0.5	0.4	17.9	24.2	17.0	26.2
Hungary	5.1	3.8	3.5	2.5	49.6	59.0	64.9	55.1	0.8	1.1	0.6	0.5	17.8	24.3	16.9	27.5

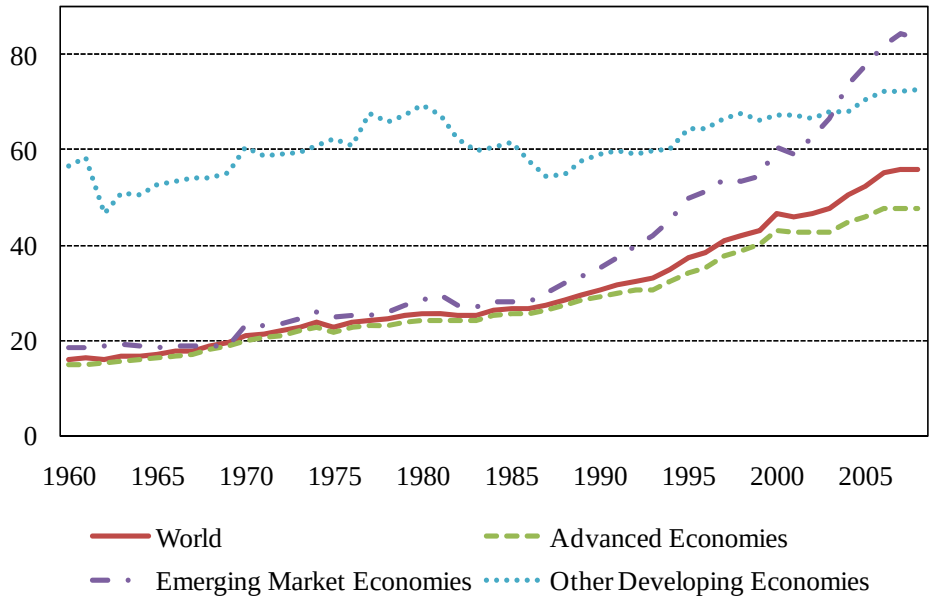
Notes: Exports are expressed as a share of exporting country's or country group's exports. Data series are from IMF's Direction of Trade Statistics and World Economic Outlook, and authors' calculations. Data covers 86 countries as trade origins and 105 countries as trade destinations.

Figure V.1. Intensity of Trade and Financial Liberalization
(fraction of liberalized countries, in percent)



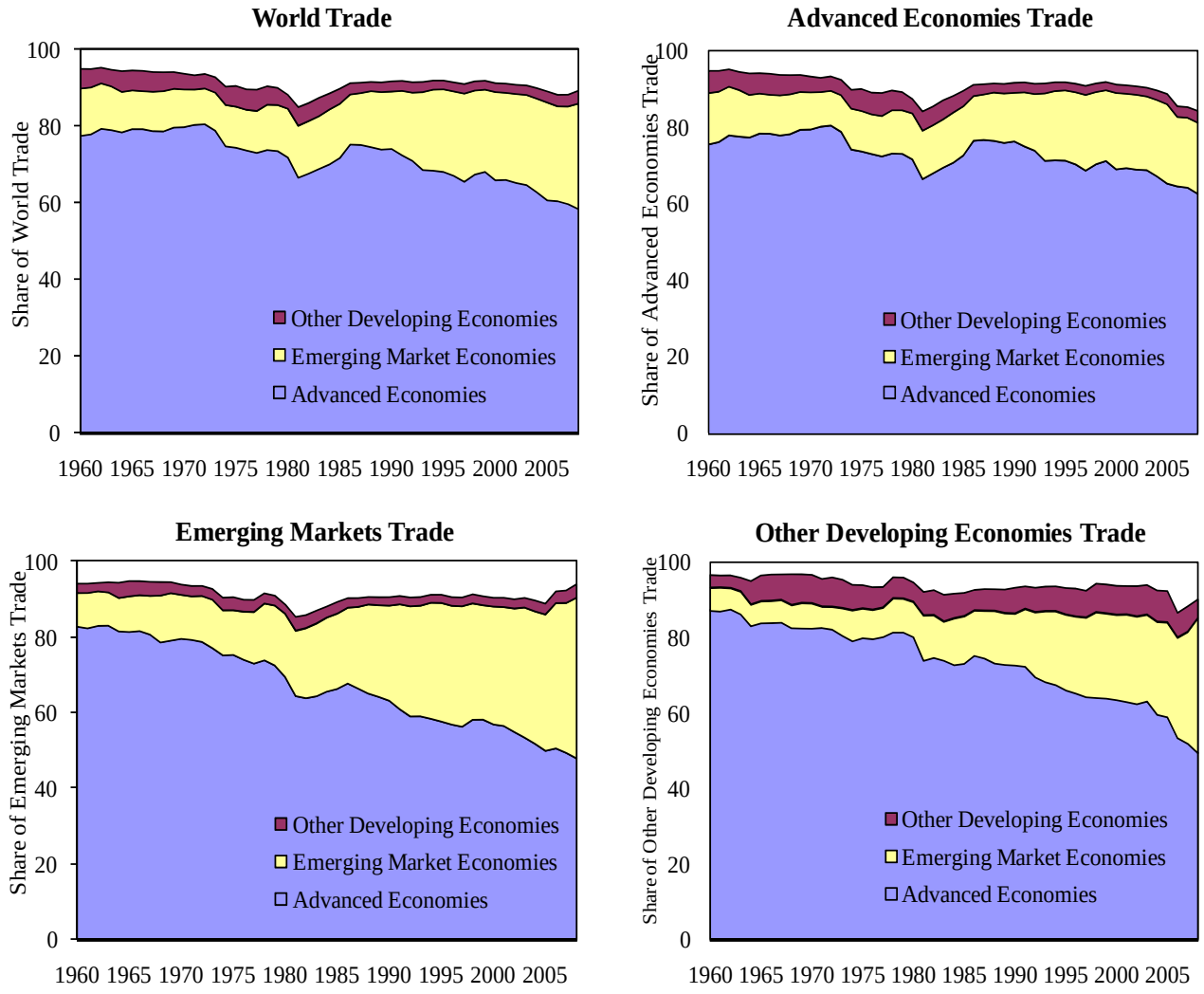
Notes: Trade liberalization measure indicates the fraction of countries with a fully liberalized trade regime. The dates of trade liberalization are determined on the basis of the Sachs and Warner (1995) and Wacziarg and Welch (2003). Financial liberalization measure indicates the fraction of countries with a liberalized financial system. The dates of official liberalization are determined on the basis of stock market liberalization and removal of restrictions on foreign investment based on the Bekaert, Harvey, and Lundblad (2005).

Figure V.2. Evolution of Trade Openness
(Exports + Imports / GDP, in percent)



Notes: This figure shows the ratio of constant 2000 U.S. dollar values of the sum of exports and imports of goods and services over combined GDP of the world and each group.

Figure V.3. Direction of Trade Flows
(in percent)



Notes: These figures show the fraction of the total export and import flows directed towards each group. Trade flows are calculated by aggregating the bilateral export and import data of countries in each group. The breakdown of the total world trade is calculated by aggregating the total merchandise exports and imports of each country in the sample and then calculating the fraction of group-wide export and import volumes in the total trade. The sum of the shares for Advanced Economies, Emerging Market Economies, and Other Developing Economies does not add up to 100 because of the presence of other countries that are not included in the sample of 106 countries. Trades with those countries, however, are included in the total merchandise trade.

Table VI.1. External Portfolio Assets and Liabilities by Region (in percent of GDP)

	Destination (Assets) and Origin (Liabilities)							
	United States		Euro Area		Japan		Intraregional	
	2004	2007	2004	2007	2004	2007	2004	2007
				Assets				
Advanced Economies								
United States	--	--	8.0	12.7	3.1	4.1	--	--
Euro area	13.9	17.7	--	--	2.5	2.9	57.3	72.9
Japan	15.1	18.6	12.9	16.3	--	--	--	--
Other Advanced Economi	37.3	46.3	53.9	59.3	7.2	8.5	17.2	23.0
Emerging Market Economies and Other Developing Economies								
Emerging Asia	4.5	4.6	3.6	4.3	0.8	0.9	4.4	10.3
China								
NIEs and ASEAN-4	6.6	6.9	5.2	6.4	1.2	1.4	6.4	15.5
Latin America	1.8	3.0	0.9	1.6	0.0	0.1	0.3	0.4
Sub-Saharan Africa	3.2	5.2	3.0	5.2	0.3	0.3	0.8	2.0
Emerging Europe	0.6	0.6	0.8	1.6	0.0	0.0	0.1	0.2
				Liabilities				
Advanced Economies								
United States	--	--	11.3	15.3	5.9	5.8	--	--
Euro area	9.8	14.7	--	--	6.2	5.9	57.3	72.9
Japan	8.0	13.3	5.2	8.1	--	--	--	--
Other Advanced Economi	49.1	61.0	46.5	57.7	8.8	9.1	17.2	23.0
Emerging Market Economies and Other Developing Economies								
Emerging Asia	4.8	8.3	2.5	5.5	0.7	1.0	2.4	5.3
China								
NIEs and ASEAN-4	10.5	16.5	5.5	10.5	1.4	2.1	4.3	6.7
Latin America	9.1	10.4	4.1	4.6	0.4	0.5	0.2	0.3
Sub-Saharan Africa	7.3	8.8	4.3	4.8	0.4	0.5	0.5	0.9
Emerging Europe	3.1	5.0	7.8	8.6	0.3	0.6	0.1	0.2

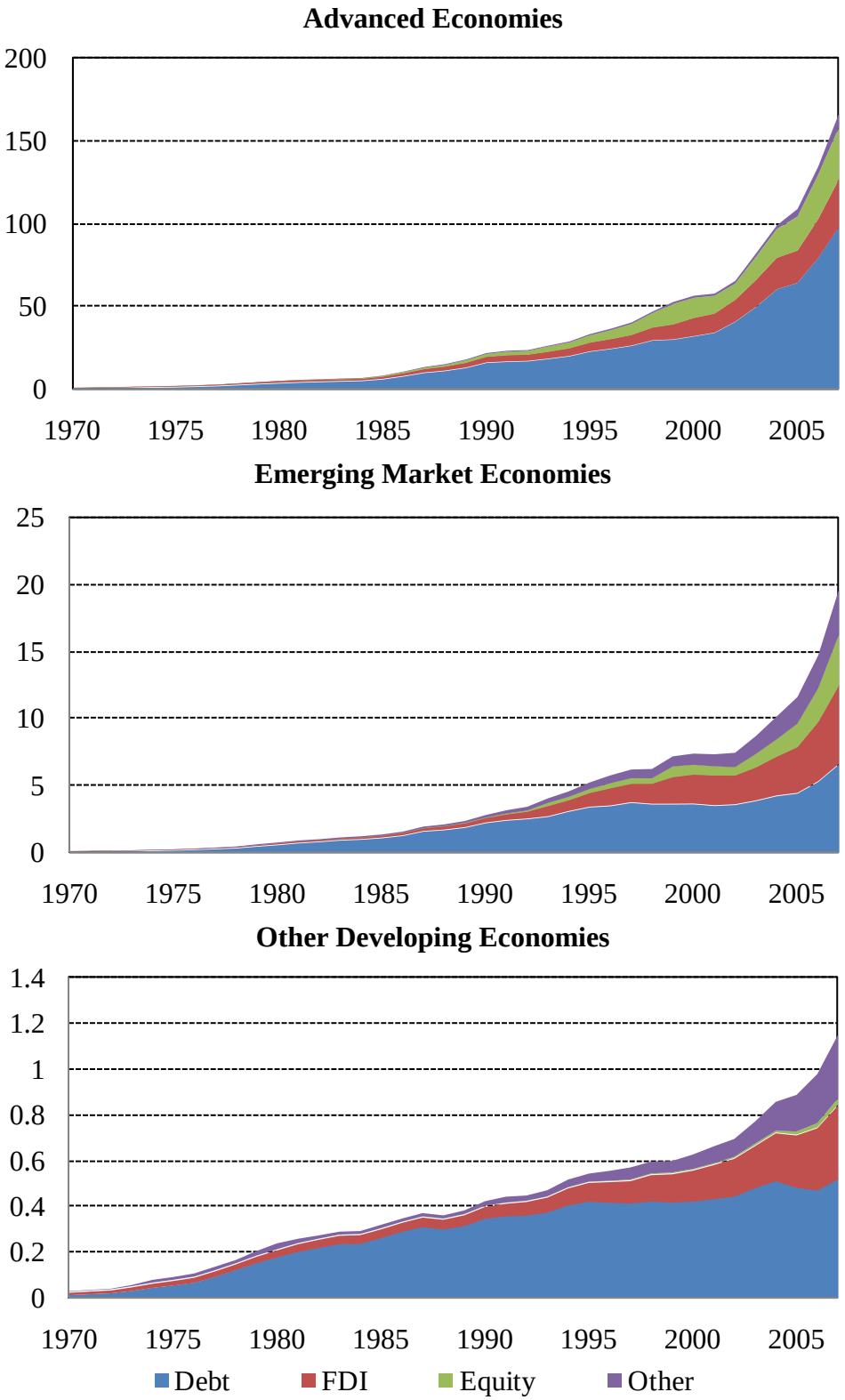
Notes: Stock data on holdings of external assets and liabilities, respectively, are expressed as a ratio of the GDP of country or country group indicated in the left column. Data series are from IMF's Coordinated Portfolio Investment Survey and World Economic Outlook, and authors' calculations. Data covers 48 countries as trade origins and 95 countries as trade destinations.

Table VI.2. External Portfolio Assets and Liabilities by Region (in percent of total assets or liabilities)

	Destination (Assets) and Origin (Liabilities)							
	United States		Euro Area		Japan		Intraregional	
	2004	2007	2004	2007	2004	2007	2004	2007
				Assets				
Advanced Economies								
United States	--	--	28.9	29.5	11.3	9.6	--	--
Euro area	15.3	14.8	--	--	2.7	2.4	62.7	61.0
Japan	43.5	40.5	37.3	35.5	--	--	--	--
Other Advanced Economi	30.3	30.9	43.8	39.6	5.8	5.7	14.0	15.4
Emerging Market Economies and Other Developing Economies								
Emerging Asia	22.1	17.2	17.6	16.0	4.0	3.5	21.6	38.4
China								
NIEs and ASEAN-4	22.1	17.2	17.6	15.9	4.0	3.5	21.6	38.5
Latin America	55.2	53.9	28.2	28.7	0.2	1.1	7.6	6.9
Sub-Saharan Africa	8.8	7.1	8.2	7.1	1.0	0.4	2.1	2.7
Emerging Europe	38.5	19.7	45.9	57.5	0.1	0.1	4.1	6.5
				Liabilities				
Advanced Economies								
United States	--	--	40.6	41.7	20.9	15.7	--	--
Euro area	10.7	12.7	--	--	6.8	5.1	62.9	63.2
Japan	43.7	44.1	28.6	26.8	--	--	--	--
Other Advanced Economi	38.2	38.6	36.2	36.5	6.9	5.8	13.4	14.6
Emerging Market Economies and Other Developing Economies								
Emerging Asia	34.2	31.7	18.2	21.0	4.7	4.0	17.3	20.4
China								
NIEs and ASEAN-4	36.6	36.2	19.0	23.2	4.9	4.7	14.8	14.7
Latin America	57.0	55.0	25.8	24.6	2.3	2.6	1.5	1.8
Sub-Saharan Africa	43.1	46.8	25.6	25.3	2.4	2.5	2.9	4.8
Emerging Europe	21.4	28.0	53.7	47.6	2.4	3.2	0.5	1.0

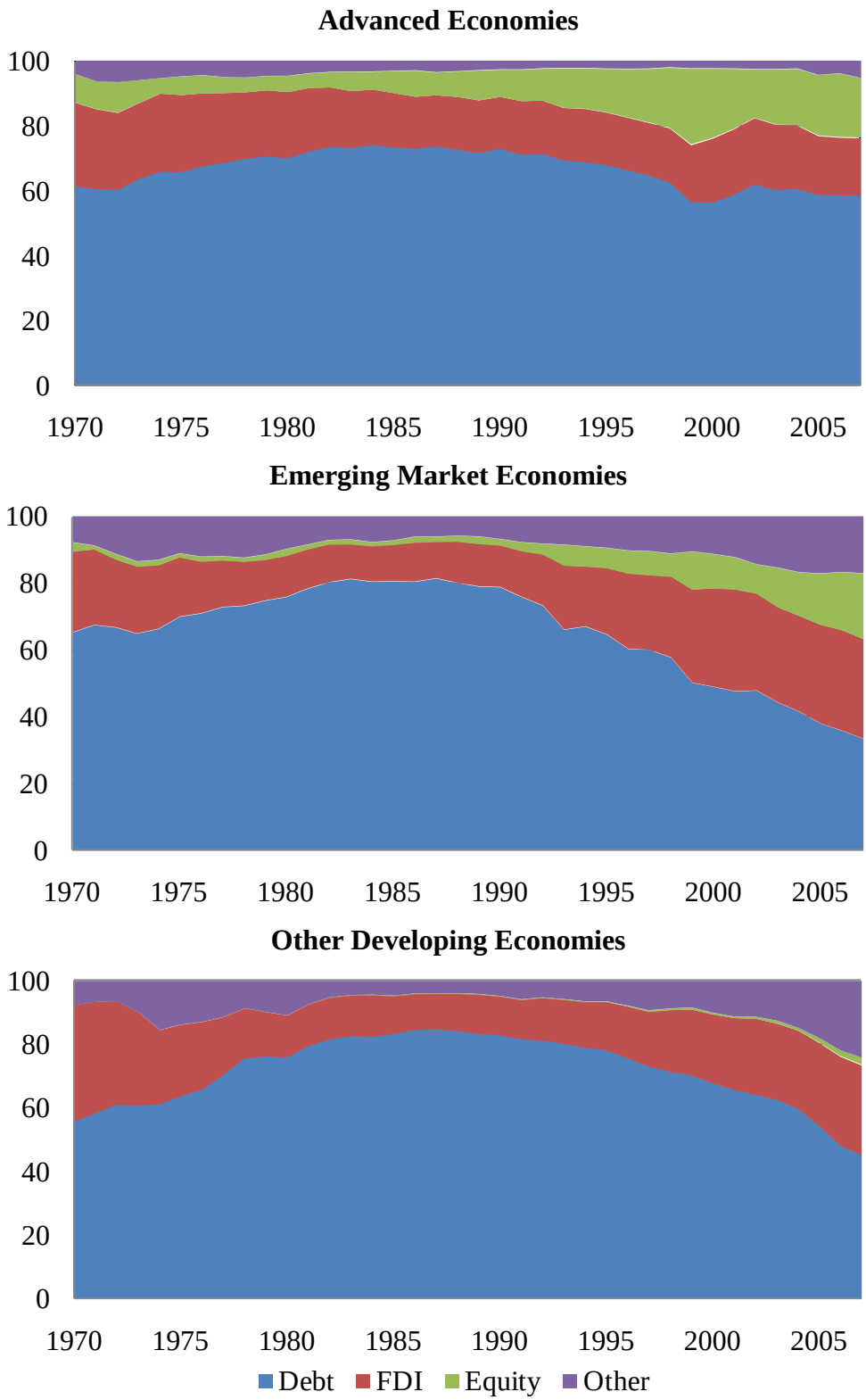
Notes: Stock data on holdings of external assets and liabilities, respectively, are expressed as a ratio of total assets or liabilities of country or country group indicated in the left column. Data series are from IMF's Coordinated Portfolio Investment Survey and World Economic Outlook, and authors' calculations. Data covers 48 countries as trade origins and 95 countries as trade destinations.

Figure VI.1. Financial Integration: Level and Composition
(Gross Financial Assets and Liabilities, trillions of U.S. dollars)



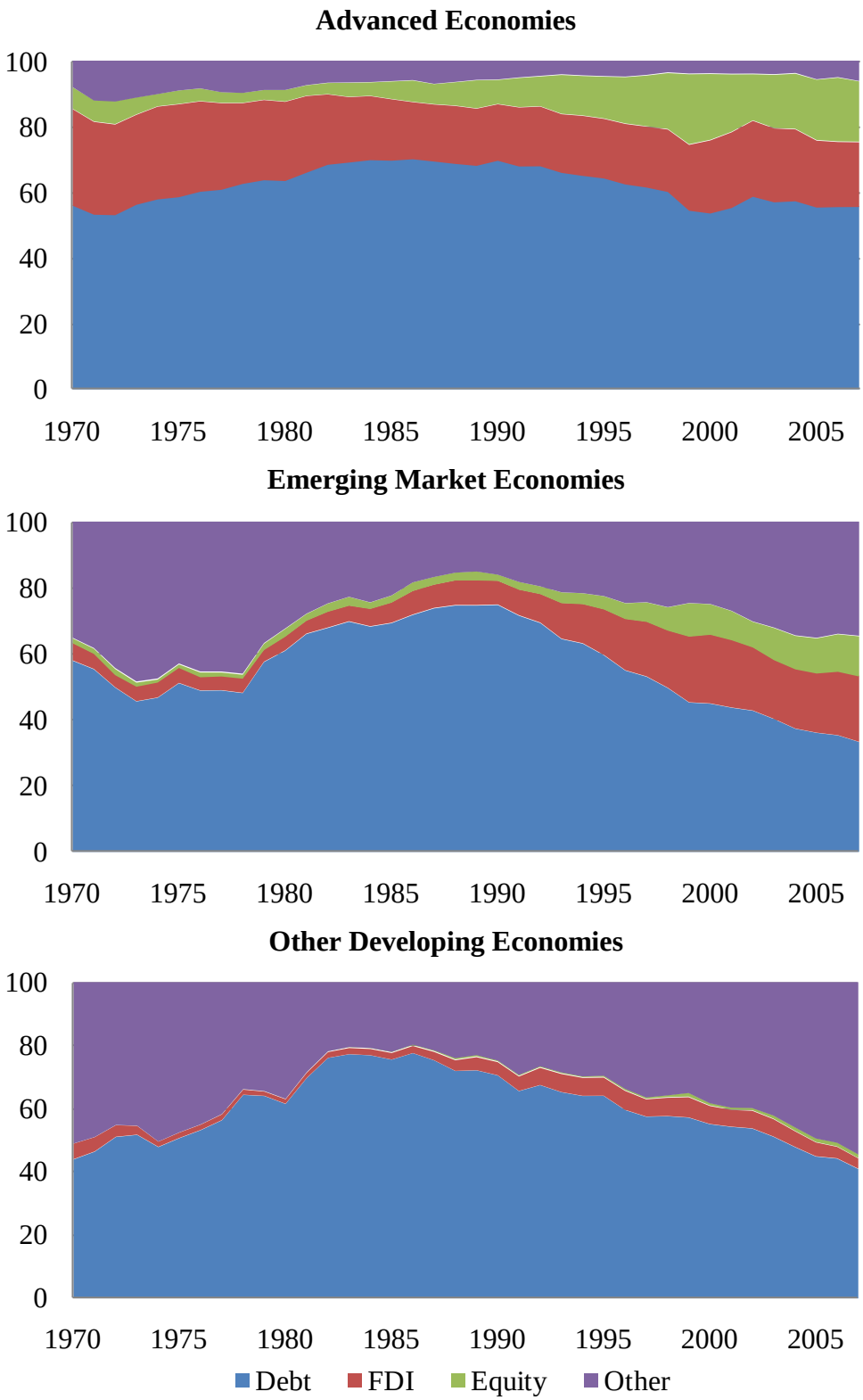
Notes: These figures show how the different components of total financial assets and liabilities evolve over time. Debt includes both official and unofficial debt. The category "Other" includes financial derivatives and total reserves minus gold. Based on data from Lane and Milesi-Ferretti (2009).

Figure VI.2. Composition of Financial Assets and Liabilities (in percent)



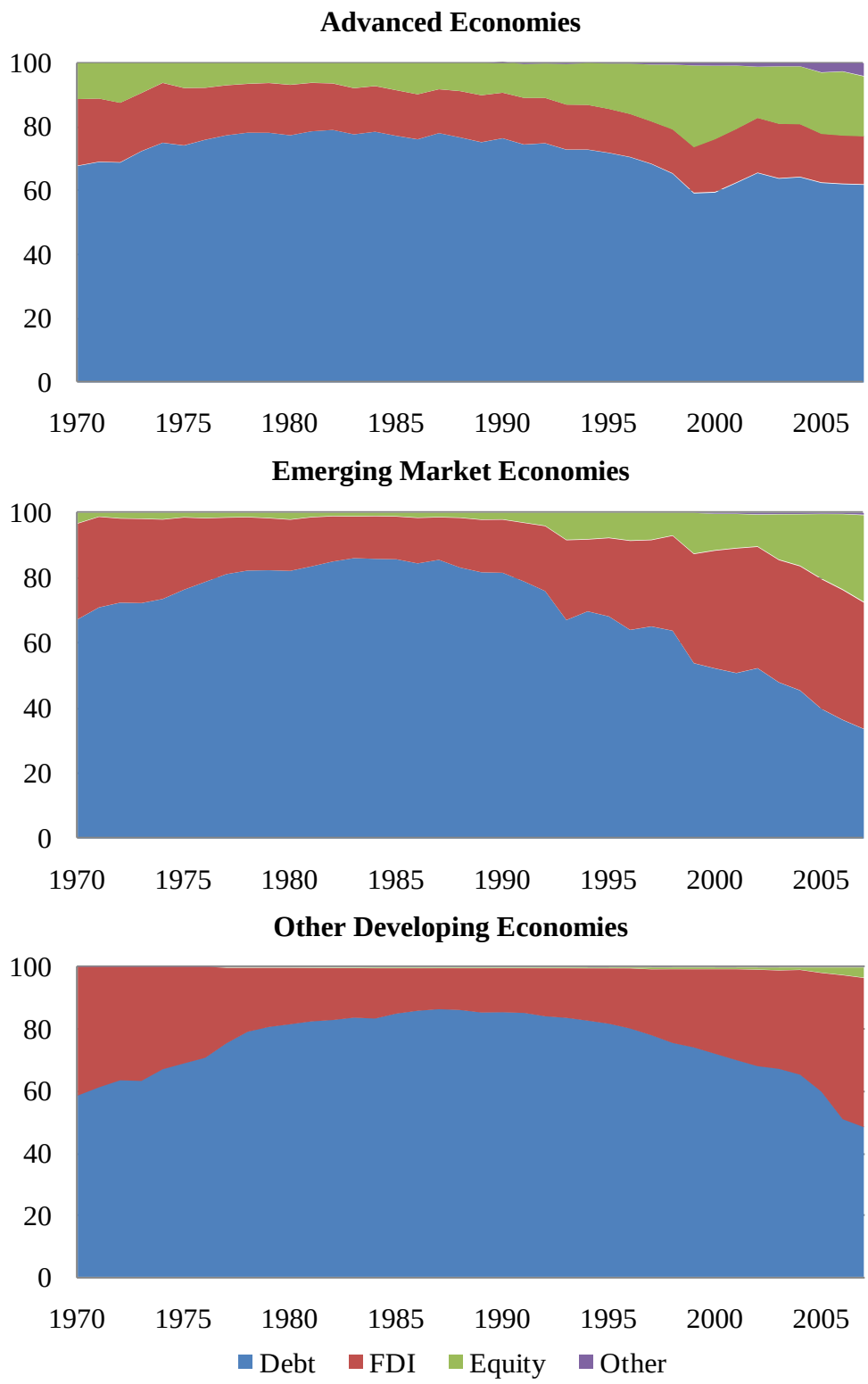
Notes: These figures show the composition of total financial assets and liabilities. Debt includes both official and unofficial debt. The category "Other" includes financial derivatives and total reserves minus gold. Based on data from Lane and Milesi-Ferretti (2009).

Figure VI.3. Composition of External Financial Assets
(in percent)



Notes: These figures show the composition of total external financial assets. Debt includes both official and unofficial debt. The category "Other" includes financial derivatives and total reserves minus gold. Based on data from Lane and Milesi-Ferretti (2009).

Figure VI.4. Composition of External Financial Liabilities (in percent)



Notes: These figures show the composition of total external financial liabilities. Debt includes both official and unofficial debt. The category "Other" includes financial derivatives and total reserves minus gold. Based on data from Lane and Milesi-Ferretti (2009).

Table VII.1. Evolution of Volatility across Groups

	1960-2008	1960-1972	1973-1985	1986-2008
World				
GDP	4.90	3.59	4.99	3.18
Consumption	5.87	4.99	5.94	5.10
Investment	15.51	15.71	15.08	11.51
Advanced Economies				
GDP	3.10	2.41	3.10	1.88
Consumption	2.62	2.10	2.39	1.78
Investment	6.52	7.88	6.25	5.41
Emerging Market Economies				
GDP	4.87	3.82	4.66	4.31
Consumption	5.31	4.75	5.05	4.84
Investment	13.40	13.34	10.39	10.37
Other Developing Economies				
GDP	5.76	4.64	5.68	4.02
Consumption	7.81	7.02	8.07	7.37
Investment	22.59	21.23	19.55	15.65
G-7				
GDP	3.03	2.07	2.51	1.73
Consumption	1.99	1.59	2.26	1.52
Investment	5.75	6.64	4.92	4.68
EU-15				
GDP	3.05	2.40	3.01	1.92
Consumption	2.57	2.50	2.26	1.90
Investment	6.52	8.04	5.51	5.41

Notes: The EU-15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK. Major emerging markets include Brazil, China and India. Volatility as measured by the percentage standard deviation of the annual growth rate of each variable over the indicated period. The numbers in each cell show the cross-sectional medians of the volatility measures for all countries in the relevant country group.

Table VIII.1A. Cross Group / Regional Correlations

	1960-1972	1973-1985	1960-1985	1986-2008
Advanced-Emerging Market Economies				
GDP	0.27	0.48	0.49	0.25
Agriculture	-0.15	0.44	0.17	-0.07
Industry	0.50	0.67	0.67	0.14
Services	-0.37	0.55	0.00	-0.51
Advanced-Other Developing Economies				
GDP	-0.05	0.17	0.32	0.12
Agriculture	-0.01	-0.03	-0.04	0.01
Industry	0.33	0.72	0.63	0.31
Services	-0.21	-0.22	-0.25	-0.71
Emerging Market-Other Developing Economies				
GDP	0.23	0.46	0.43	0.47
Agriculture	0.44	0.36	0.38	0.35
Industry	0.34	0.70	0.58	0.07
Services	-0.23	0.41	0.02	0.50
EU 15-Emerging Market Economies				
GDP	0.79	0.52	0.63	0.17
Agriculture	-0.08	0.03	-0.02	0.07
Industry	0.56	0.62	0.67	-0.10
Services	-0.01	0.62	0.17	-0.22

Notes: The values correspond to the correlations between the PPP-based output weighted GDP and sectoral indices of the Advanced Economies, Emerging Market Economies, and Other Developing Economies.

Table VIII.1B. Correlations with Emerging Market Economies

	1960-1972	1973-1985	1960-1985	1986-2008
Advanced Economies				
GDP	0.24	0.40	0.41	0.18
Agriculture	0.20	0.04	0.10	0.02
Industry	0.26	0.45	0.48	-0.01
Services	-0.04	0.38	0.12	-0.11
EU-15				
GDP	0.13	0.23	0.25	0.24
Agriculture	0.09	0.02	0.03	0.04
Industry	0.13	0.25	0.31	0.07
Services	0.11	0.20	0.18	-0.03

Notes: The values correspond to the cross-country averages of bilateral correlations of GDP and sectoral growth rates of Advanced Economies with the output weighted Emerging Market Economies indices for each period.

Table VIII.2. Intra-Group Correlations

	1960-1972	1973-1985	1986-2008
Advanced Economies			
GDP	0.21	0.53	0.71
Agriculture	0.14	0.22	0.09
Industry	0.31	0.56	0.45
Services	0.22	0.49	0.43
Emerging Market Economies			
GDP	0.14	0.27	0.46
Agriculture	-0.01	0.08	0.20
Industry	0.09	0.31	0.37
Services	0.10	0.23	0.33
EU-15			
GDP	0.37	0.65	0.80
Agriculture	0.25	0.48	0.31
Industry	0.48	0.64	0.63
Services	0.34	0.69	0.59

Notes: The values correspond to the cross-country averages of bilateral correlations of GDP and sectoral growth rates of Advanced Economies with the trade weighted Emerging Market Economies indices for each period.

Table VIII.3. Cross-Country Correlations of Industrial Production

Panel I: Cross-Regional Correlations (Output Weighted Regional Indices)

	1960-1972	1973-1985	1986-2009	**1986-2007**
Advanced Economies	0.17	0.51	0.76	0.45
EU-15	0.37	0.30	0.66	0.24

Notes: The values correspond to the correlations between the PPP-based output weighted IP growth of all Advanced Economies and the EU-15, respectively, with Emerging Market Economies.

Panel II: Correlations between Advanced Economies and Emerging Market Economies (Correlations with Output Weighted Emerging Market Index)

	1960-1972	1973-1985	1986-2009	**1986-2007**
Australia	0.72	0.42		
Austria	0.04	0.33	0.35	0.15
Belgium	0.14	0.29	0.50	0.20
Canada	0.21	0.65	0.50	0.49
Switzerland			0.52	0.52
Germany	0.26	0.47	0.56	0.16
Denmark		-0.09	0.21	0.34
Spain	0.44	0.53	0.58	0.05
Finland	0.40	0.21	0.75	0.55
France	0.01	0.72	0.51	-0.03
United Kingdom	0.43	-0.15	0.73	0.45
Greece			0.62	0.41
Ireland		0.40	0.37	0.00
Italy	-0.17	0.24	0.54	0.24
Japan	-0.08	0.43	0.73	0.43
Luxembourg	0.60	0.27	0.62	0.20
Netherlands	0.36	0.56	0.40	-0.12
Norway	0.21	-0.02	-0.08	-0.05
Portugal	0.54	-0.34	0.12	-0.27
Sweden	0.56	0.08	0.54	0.30
United States	0.00	0.63	0.72	0.46
Advanced Economies (median)	0.26	0.33	0.53	0.22
EU-15 (median)	0.38	0.28	0.54	0.20

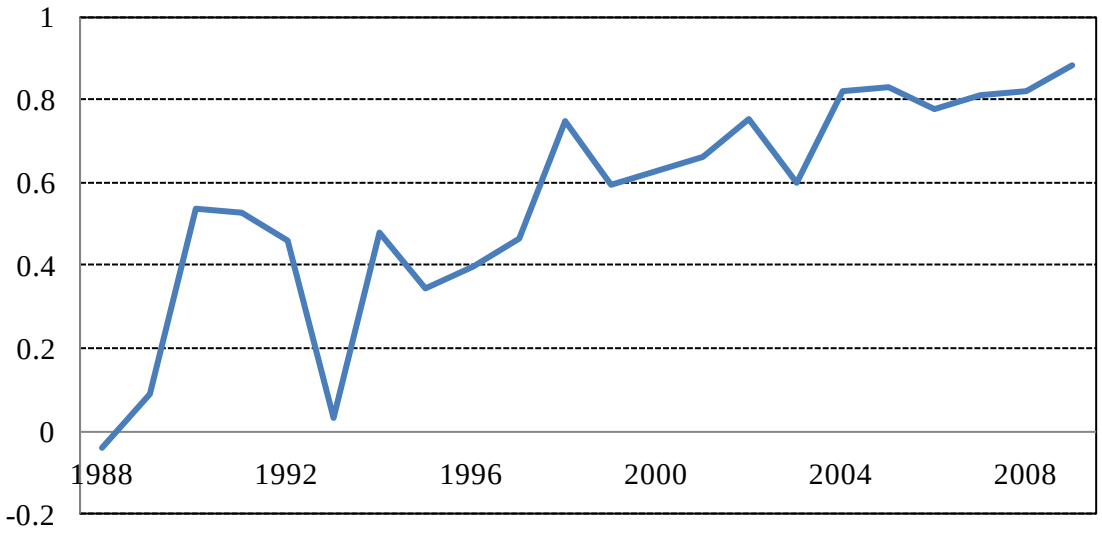
Notes: The values correspond to the bilateral correlations of IP growth rates of Advanced Economies with the PPP-based output weighted Emerging Market Economies IP growth.

Panel III: Intra-Group Correlations (Output Weighted Indices)

	1960-1972	1973-1985	1986-2009	**1986-2007**
Advanced Economies	0.44	0.65	0.68	0.57
EU-15	0.58	0.60	0.73	0.61
Emerging Market Economies	0.26	0.45	0.48	0.36

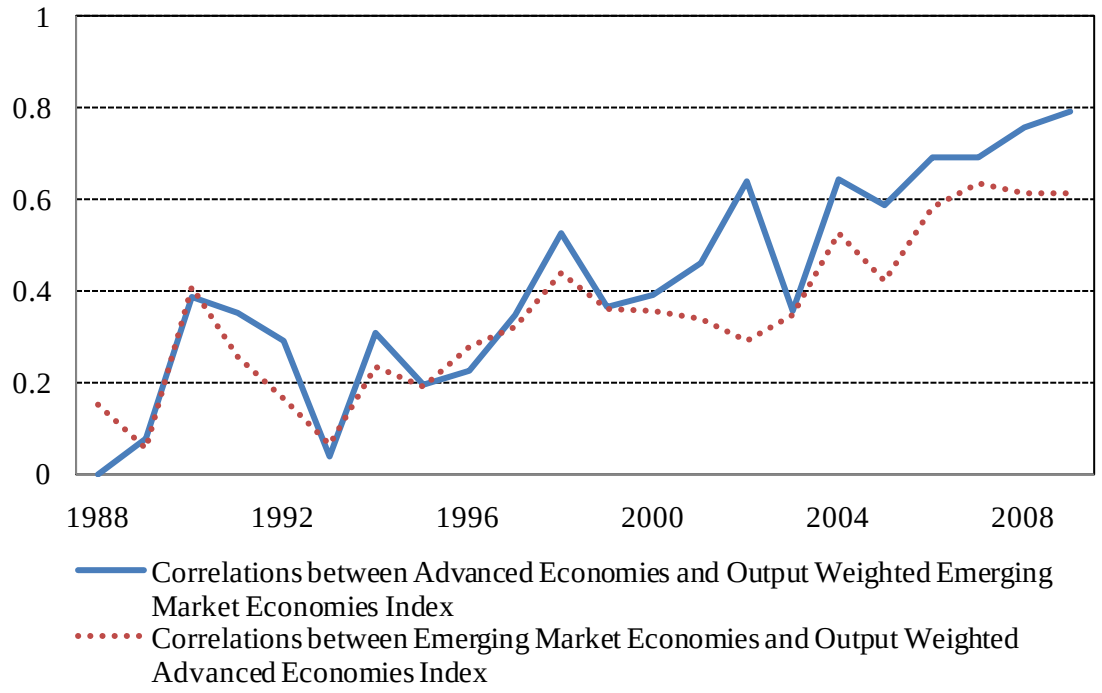
Notes: The values correspond to the cross-country averages of bilateral correlations of IP growth rates of Advanced Economies, the EU-15, and Emerging Market Economies with the respective PPP-based output weighted group indices for each period.

Figure VIII.1. Cross-Group Correlations of Stock Returns - A



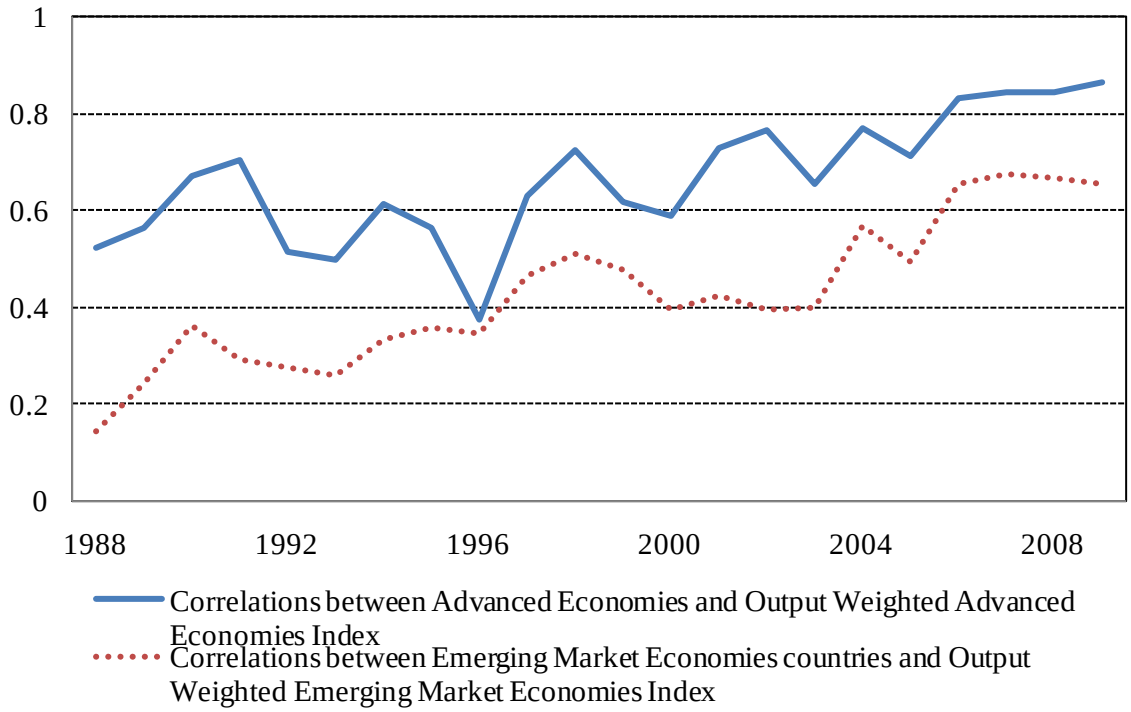
Notes: The figure shows the evolution of the correlations between the PPP-based output weighted weekly stock returns on Advanced Economies and Emerging Market Economies for each year from 1988 to 2009. Stock returns are calculated based on the Morgan Stanley Capital International (MSCI) stock market indices complied from Datastream.

Figure VIII.2. Cross-Group Correlations of Stock Returns - B



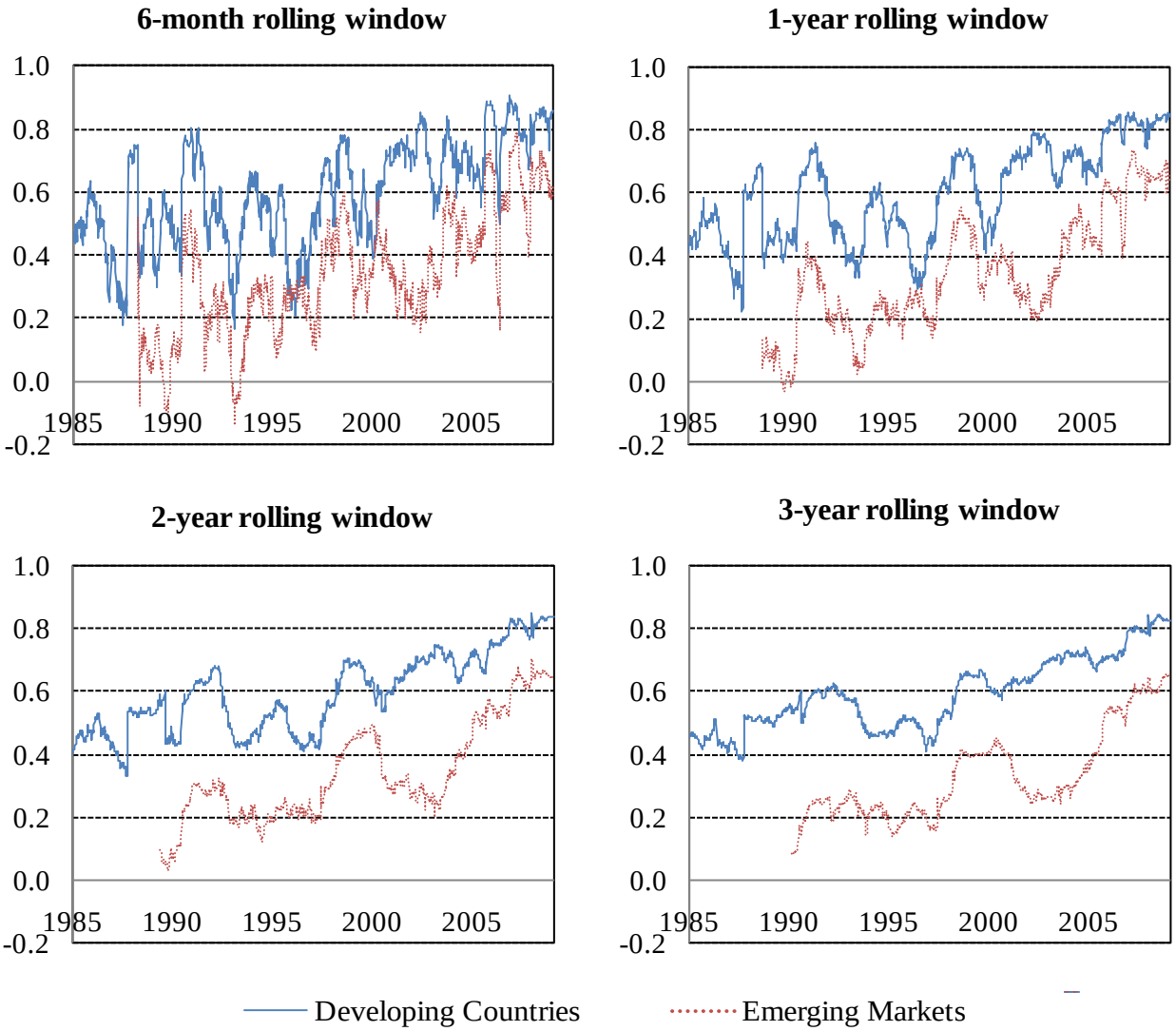
Notes: The figure shows the evolution of the averages of bilateral correlations of weekly stock returns of Advanced Economies (Emerging Market Economies) with the output weighted Emerging Market Economies (Advanced Economies) stork returns for each year from 1988 to 2009. Stock returns are calculated based on the Morgan Stanley Capital International (MSCI) stock market indices complied from Datastream.

Figure VIII.3. Intra-Group Correlations of Stock Returns



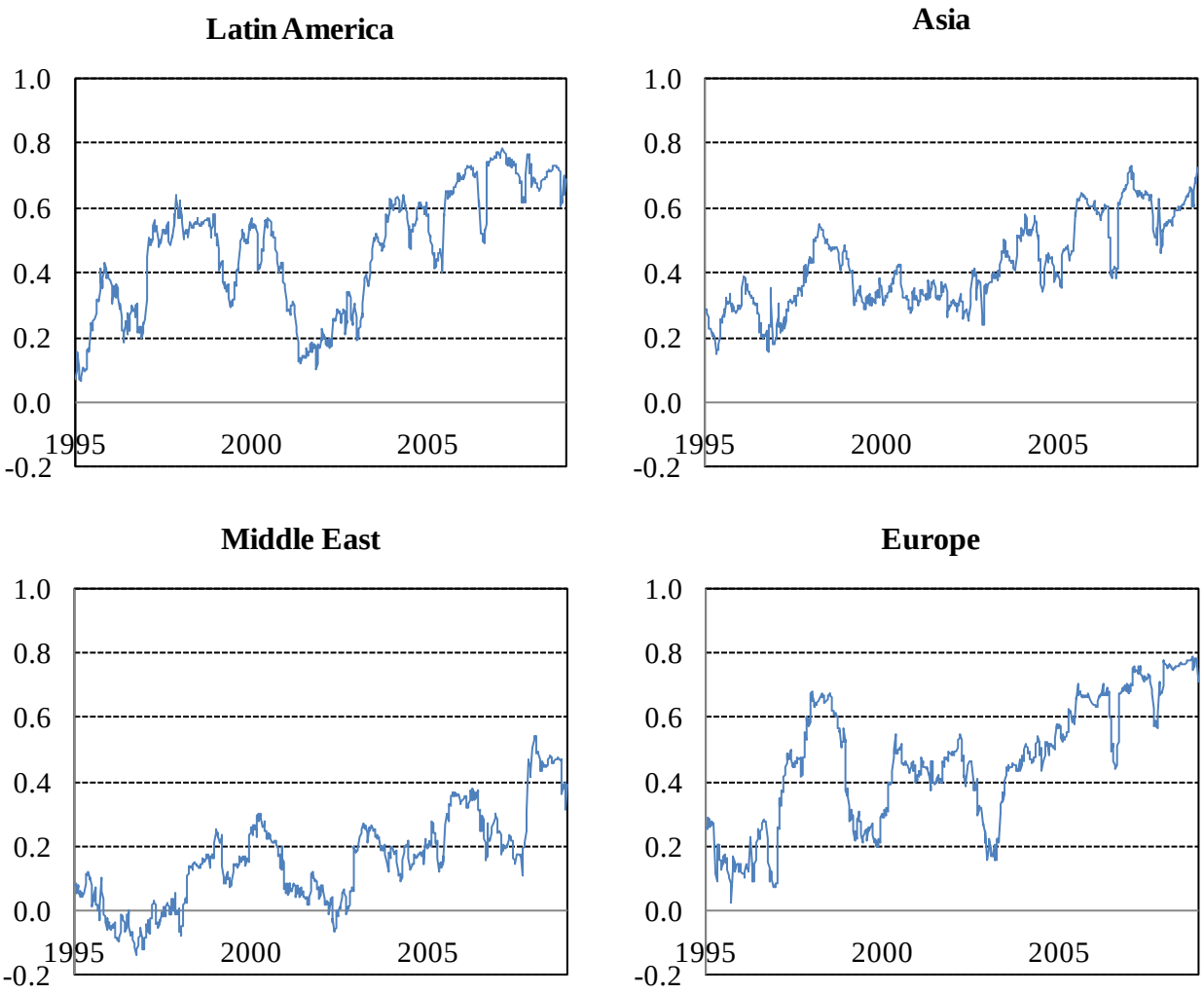
Notes: The figure shows the evolution of the cross-country averages of bilateral correlations of weekly stock returns of Advanced Economies (Emerging Market Economies) with the output weighted Advanced Economies (Emerging Market Economies) stork returns for each year from 1988 to 2009. Stock returns are calculated based on the Morgan Stanley Capital International (MSCI) stock market indices complied from Datastream.

Figure VIII.4. Correlations of Stock Returns:
Advanced Economies and Emerging Market Economies



Notes: The figure shows the evolution of the median values of bilateral correlations of weekly domestic stock returns of Advanced Economies (Emerging Market Economies) with the world stock returns over each rolling window from 1985 (1988) to 2009. The world stock returns are calculated based on the MSCI world index. Stock returns are calculated based on the Morgan Stanley Capital International (MSCI) stock market indices complied from Datastream.

Figure VIII.5. Correlations of Stock Returns:
Regional Groups of Emerging Market Economies



Notes: The figure shows the evolution of the median values of bilateral correlations of weekly domestic stock returns of regional groups of Emerging Market Economies with the world stock returns over a one-year rolling window from 1995 to 2009. The world stock returns are calculated based on the MSCI world index. Stock returns are calculated based on the Morgan Stanley Capital International (MSCI) stock market indices complied from Datastream.

Table IX.1. Variance Decompositions: All Groups (1960-2008)

Group	Factor	Output	Consumption	Investment
World	Global	11.82	8.86	5.73
	Group	4.55	2.30	5.02
	Global+Group	16.37	11.16	10.75
	Country	47.24	39.35	30.94
	Idiosyncratic	35.26	48.43	57.25
Advanced Economies	Global	30.59	26.40	14.58
	Group	9.99	3.89	14.14
	Global+Group	40.58	30.29	28.72
	Country	38.78	34.78	40.27
	Idiosyncratic	20.05	34.20	30.36
Emerging Market Economies	Global	7.63	4.80	3.70
	Group	6.65	3.49	4.94
	Global+Group	14.28	8.30	8.64
	Country	60.56	40.34	46.96
	Idiosyncratic	24.23	50.53	43.54
Other Developing Countries	Global	6.21	3.68	3.10
	Group	1.57	1.19	1.49
	Global+Group	7.78	4.86	4.60
	Country	45.11	40.73	20.79
	Idiosyncratic	45.68	53.13	73.31

Notes: We estimate the model over the full sample period (1960-2008) and compute the variance decompositions for each country and, within each country, for output, consumption and investment. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Table IX.2. Variance Decompositions: Advanced Economy Subsamples (1960-2008)

Group	Factor	Output	Consumption	Investment
Advanced Economies	Global	30.59	26.40	14.58
	Group	9.99	3.89	14.14
	Global+Group	40.58	30.29	28.72
	Country	38.78	34.78	40.27
	Idiosyncratic	20.05	34.20	30.36
G-7	Global	39.71	35.35	20.18
	Group	6.98	2.82	14.03
	Global+Group	46.69	38.17	34.22
	Country	37.88	36.58	45.62
	Idiosyncratic	14.81	24.56	19.51
US-Canada	Global	24.31	24.51	6.65
	Group	3.34	1.17	2.18
	Global+Group	27.65	25.68	8.83
	Country	52.20	51.21	68.97
	Idiosyncratic	19.39	22.38	21.47
EU 15	Global	37.60	31.02	17.79
	Group	11.69	4.00	18.18
	Global+Group	49.30	35.02	35.97
	Country	32.26	28.34	35.07
	Idiosyncratic	17.85	35.87	28.26

Notes: We estimate the model over the full sample period (1960-2008) and compute the variance decompositions for each country and, within each country, for output, consumption and investment. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Table IX.3. Variance Decompositions: Emerging Market Economy Subsamples (1960-2008)

		Full Period		
Region	**Factor**	**Output**	**Consumption**	**Investment**
Emerging Market Economies	Global	6.77	4.14	3.18
	Group	5.12	2.47	3.54
	Global+Group	11.89	6.61	6.73
	Country	56.39	37.04	43.06
	Idiosyncratic	20.70	47.32	39.93
Emerging Asia	Global	7.72	5.18	4.05
	Group	7.84	3.17	4.25
	Global+Group	15.56	8.35	8.30
	Country	52.02	29.43	42.90
	Idiosyncratic	20.20	53.27	37.63
Emerging Asia 10	Global	9.24	7.45	5.10
	Group	12.32	5.08	6.64
	Global+Group	21.56	12.54	11.75
	Country	55.06	35.28	47.63
	Idiosyncratic	22.40	51.37	39.75
Emerging Latin America	Global	7.46	3.87	2.67
	Group	2.85	2.42	3.36
	Global+Group	10.31	6.29	6.03
	Country	67.80	44.80	57.74
	Idiosyncratic	13.29	40.81	26.83
Emerging Africa	Global	2.47	1.23	1.26
	Group	0.26	0.28	1.58
	Global+Group	2.73	1.52	2.84
	Country	50.62	48.18	17.87
	Idiosyncratic	35.29	39.41	70.33

Notes: We estimate the model over the full sample period (1960-2008) and compute the variance decompositions for each country and, within each country, for output, consumption and investment. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Table IX.4. Variance Decompositions: Other Developing Economy Subsamples (1960-2008)

		Full Period		
Region	**Factor**	**Output**	**Consumption**	**Investment**
Other Developing Economies	Global	5.47	3.16	2.61
	Group	0.73	0.53	0.71
	Global+Group	6.21	3.69	3.32
	Country	39.21	35.08	17.17
	Idiosyncratic	39.12	46.71	69.05
Developing Asia	Global	3.34	2.79	0.71
	Group	0.30	0.42	0.44
	Global+Group	3.88	3.13	1.26
	Country	56.48	43.85	23.43
	Idiosyncratic	27.15	41.18	65.38
Developing Latin America	Global	8.22	4.71	2.48
	Group	0.83	0.37	0.73
	Global+Group	9.05	5.09	3.21
	Country	42.05	41.08	26.64
	Idiosyncratic	35.39	40.09	58.58
Developing Africa	Global	4.56	2.56	2.90
	Group	0.75	0.61	0.73
	Global+Group	5.34	3.17	3.71
	Country	35.75	31.40	12.35
	Idiosyncratic	42.27	50.23	73.94

Notes: We estimate the model over the full sample period (1960-2008) and compute the variance decompositions for each country and, within each country, for output, consumption and investment. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Table IX.5. Variance Decompositions: All Groups (Sub Periods)

		1960-1984			1985-2008		
Group	**Factor**	**Output**	**Consumption**	**Investment**	**Output**	**Consumption**	**Investment**
World	Global	14.67	10.94	7.14	7.80	5.77	7.38
	Group	5.66	4.33	5.62	9.04	7.78	8.85
	Global+Group	20.33	15.27	12.76	16.84	13.55	16.23
	Country	43.99	39.14	28.60	41.48	35.04	32.12
	Idiosyncratic	33.31	43.09	56.21	37.67	47.93	48.26
Advanced Economies	Global	27.68	25.27	12.06	14.04	13.52	14.37
	Group	17.16	9.39	15.29	30.03	23.67	24.68
	Global+Group	44.84	34.66	27.35	44.07	37.19	39.05
	Country	33.34	32.13	39.25	27.78	22.20	30.09
	Idiosyncratic	20.66	31.72	31.88	25.18	37.36	28.39
Emerging Market Economies	Global	13.28	7.22	6.38	4.53	3.19	3.72
	Group	2.65	3.84	3.13	7.09	4.91	7.92
	Global+Group	15.93	11.06	9.52	11.62	8.11	11.63
	Country	53.40	36.38	39.57	62.02	47.07	50.12
	Idiosyncratic	28.56	50.50	48.63	22.43	40.91	34.67
Other Developing Countries	Global	10.16	6.86	5.53	6.69	3.80	6.14
	Group	2.40	2.56	2.86	1.66	2.76	3.06
	Global+Group	12.56	9.42	8.40	8.35	6.55	9.20
	Country	44.32	43.00	19.99	38.47	35.16	25.59
	Idiosyncratic	40.17	44.50	68.79	48.74	54.91	61.54

Notes: We estimate the model separately over the two periods, 1960-1984 and 1985-2008. We then compute the variance decompositions for each country and, within each country, for output, consumption and investment in each of these two periods. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Table IX.6. Variance Decompositions: Advanced Economy Subsamples (Sub Periods)

		1960-1984			1985-2008		
Group	**Factor**	**Output**	**Consumption**	**Investment**	**Output**	**Consumption**	**Investment**
Advanced Economies	Global	27.68	25.27	12.06	14.04	13.52	14.37
	Group	17.16	9.39	15.29	30.03	23.67	24.68
	Global+Group	44.84	34.66	27.35	44.07	37.19	39.05
	Country	33.34	32.13	39.25	27.78	22.20	30.09
	Idiosyncratic	20.66	31.72	31.88	25.18	37.36	28.39
G-7	Global	36.87	36.20	16.14	18.36	19.56	16.92
	Group	14.42	9.27	17.03	31.61	22.14	30.25
	Global+Group	51.29	45.47	33.17	49.97	41.70	47.17
	Country	32.02	30.05	42.78	27.80	27.36	33.38
	Idiosyncratic	15.57	23.01	22.43	19.33	27.45	17.15
US-Canada	Global	35.17	39.99	12.90	26.14	33.93	22.00
	Group	1.93	1.20	0.97	6.99	4.03	4.26
	Global+Group	37.10	41.19	13.87	33.12	37.96	26.26
	Country	43.50	37.15	65.85	40.63	33.15	55.69
	Idiosyncratic	18.42	20.18	18.63	23.44	26.29	15.41
EU 15	Global	32.03	28.07	14.15	13.52	12.93	14.81
	Group	19.97	8.85	18.70	38.91	31.13	29.93
	Global+Group	52.00	36.92	32.84	52.43	44.07	44.74
	Country	28.41	28.23	33.89	22.76	17.03	24.62
	Idiosyncratic	18.48	33.30	31.66	21.94	35.82	28.67

Notes: We estimate the model separately over the two periods, 1960-1984 and 1985-2008. We then compute the variance decompositions for each country and, within each country, for output, consumption and investment in each of these two periods. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Table IX.7. Variance Decompositions of Output: EU 15 Subsamples

		Full period	Sub periods	
Group	**Factor**	**1960-2008**	**1960-1984**	**1985-2008**
Austria	Global	41.87	35.06	1.99
	Group	11.29	18.10	55.29
	Country	26.84	28.83	6.39
Belgium	Global	57.80	47.81	8.02
	Group	21.92	31.87	64.34
	Country	2.12	3.57	2.16
Denmark	Global	28.50	27.28	13.24
	Group	13.14	30.43	3.77
	Country	47.60	34.00	57.22
Finland	Global	11.20	5.39	39.29
	Group	29.15	38.11	16.93
	Country	43.36	39.57	24.24
France	Global	66.87	53.45	10.95
	Group	14.66	28.48	69.18
	Country	8.39	7.15	6.48
Germany	Global	41.16	43.75	2.93
	Group	6.47	16.29	49.33
	Country	35.10	24.52	20.09
Greece	Global	33.13	41.15	3.45
	Group	1.99	6.09	3.79
	Country	39.67	33.15	41.60
Ireland	Global	3.14	5.06	2.02
	Group	2.37	0.65	18.66
	Country	68.80	64.89	58.58
Italy	Global	51.80	36.18	13.47
	Group	4.24	12.17	57.71
	Country	26.27	27.37	3.43
Luxembourg	Global	26.50	16.65	6.27
	Group	15.86	35.10	34.65
	Country	20.27	2.39	32.95
Netherlands	Global	44.26	50.73	3.05
	Group	10.50	11.71	47.26
	Country	31.04	22.08	22.94
Portugal	Global	55.36	45.38	7.31
	Group	2.04	7.03	61.63
	Country	23.35	26.24	17.96
Spain	Global	56.69	37.09	16.29
	Group	4.82	15.98	66.53
	Country	30.78	38.19	7.08
Sweden	Global	19.52	12.22	31.83
	Group	30.36	36.45	29.13
	Country	31.89	32.43	13.76
United Kingdom	Global	26.23	23.31	42.71
	Group	6.60	11.05	5.42
	Country	48.36	41.84	26.54

Notes: We estimate the model over the full sample period (1960-2008) and then separately over the two periods, 1960-1984 and 1985-2008. We compute the variance decompositions for each EU 15 country and, within each country, for output, consumption and investment. In each cell, we then report the variance share attributable of output to the relevant factor.

Table IX.8. Variance Decompositions: Emerging Market Economy Subsamples (Sub Periods)

		1960-1984			1985-2008		
Group	**Factor**	**Output**	**Consumption**	**Investment**	**Output**	**Consumption**	**Investment**
Emerging Market Economies	Global	13.28	7.22	6.38	4.53	3.19	3.72
	Group	2.65	3.84	3.13	7.09	4.91	7.92
	Global+Group	15.93	11.06	9.52	11.62	8.11	11.63
	Country	53.40	36.38	39.57	62.02	47.07	50.12
	Idiosyncratic	28.56	50.50	48.63	22.43	40.91	34.67
Emerging Asia	Global	11.29	7.05	6.13	3.94	3.29	4.58
	Group	3.69	3.76	4.41	7.43	4.87	6.98
	Global+Group	14.97	10.81	10.53	11.37	8.16	11.56
	Country	49.90	29.75	37.49	61.96	45.20	52.54
	Idiosyncratic	32.94	57.41	49.50	23.04	42.90	32.37
Emerging Asia 10	Global	12.31	9.05	6.41	4.55	3.28	3.75
	Group	3.88	3.95	4.46	8.70	5.61	7.65
	Global+Group	16.19	13.00	10.87	13.24	8.89	11.40
	Country	53.48	31.90	39.91	62.97	48.13	54.93
	Idiosyncratic	28.24	53.08	46.74	19.81	38.89	29.95
Emerging Latin America	Global	22.97	11.11	9.15	4.16	2.70	2.38
	Group	1.24	4.52	1.43	7.80	7.08	9.78
	Global+Group	24.21	15.63	10.58	11.95	9.78	12.16
	Country	57.68	42.10	50.09	72.97	52.51	61.70
	Idiosyncratic	16.18	40.33	37.29	11.87	34.71	24.10
Emerging Africa	Global	2.84	1.01	2.39	7.11	3.75	3.28
	Group	1.73	2.89	1.96	4.71	1.25	7.68
	Global+Group	4.56	3.90	4.35	11.82	5.00	10.96
	Country	57.27	47.90	27.95	43.07	43.59	21.99
	Idiosyncratic	35.99	45.85	65.67	38.97	45.29	60.66

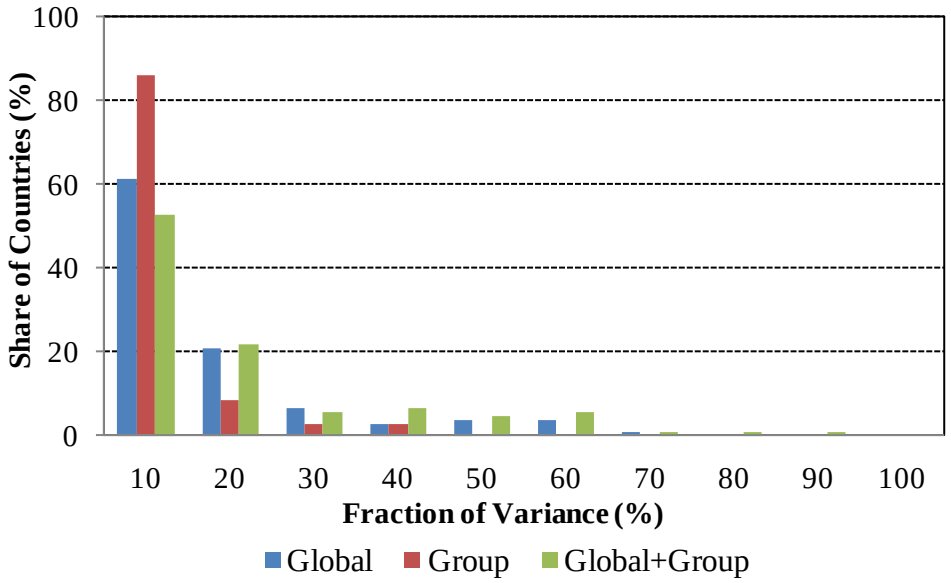
Notes: We estimate the model separately over the two periods, 1960-1984 and 1985-2008. We then compute the variance decompositions for each country and, within each country, for output, consumption and investment in each of these two periods. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Table IX.9. Variance Decompositions: Other Developing Economy Subsamples (Sub Periods)

		1960-1984			1985-2008		
Group	**Factor**	**Output**	**Consumption**	**Investment**	**Output**	**Consumption**	**Investment**
Other Developing Economies	Global	10.16	6.86	5.53	6.69	3.80	6.14
	Group	2.40	2.56	2.86	1.66	2.76	3.06
	Global+Group	12.56	9.42	8.40	8.35	6.55	9.20
	Country	44.32	43.00	19.99	38.47	35.16	25.59
	Idiosyncratic	40.17	44.50	68.79	48.74	54.91	61.54
Developing Asia	Global	4.15	3.34	0.50	8.02	3.44	12.19
	Group	1.69	3.07	1.88	0.88	2.64	2.62
	Global+Group	6.37	6.44	2.38	9.74	6.55	14.39
	Country	60.83	59.63	20.69	44.57	28.82	35.29
	Idiosyncratic	30.53	31.15	74.55	40.96	61.30	45.83
Developing Latin America	Global	18.25	12.74	7.94	7.54	3.74	5.70
	Group	2.61	2.05	3.36	1.40	1.25	1.39
	Global+Group	20.86	14.79	11.30	8.94	4.99	7.09
	Country	44.45	46.41	29.15	38.58	34.40	30.22
	Idiosyncratic	31.79	35.95	56.48	47.97	57.27	59.50
Developing Africa	Global	7.47	4.84	5.18	6.05	3.81	5.58
	Group	2.40	2.70	2.79	1.86	3.41	3.82
	Global+Group	10.09	7.66	8.11	8.00	7.30	9.49
	Country	42.09	39.38	16.05	37.62	36.31	22.37
	Idiosyncratic	44.97	49.86	73.21	50.09	53.07	64.46

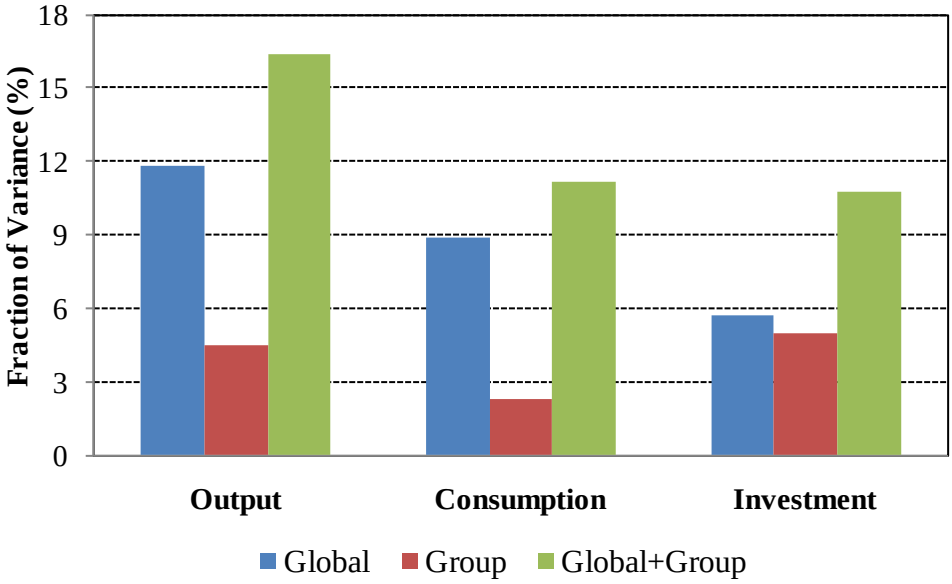
Notes: We estimate the model separately over the two periods, 1960-1984 and 1985-2008. We then compute the variance decompositions for each country and, within each country, for output, consumption and investment in each of these two periods. In each cell, we then report the cross-sectional mean of the variance share attributable to the relevant factor. The cross-sectional means are calculated for the relevant cluster of countries indicated in the first column. The rows marked (Global+Group) are just the sums of the average variance shares of the global and group-specific factors.

Figure IX.1. Average Variance Explained by Global and Group Factors (1960-2008)



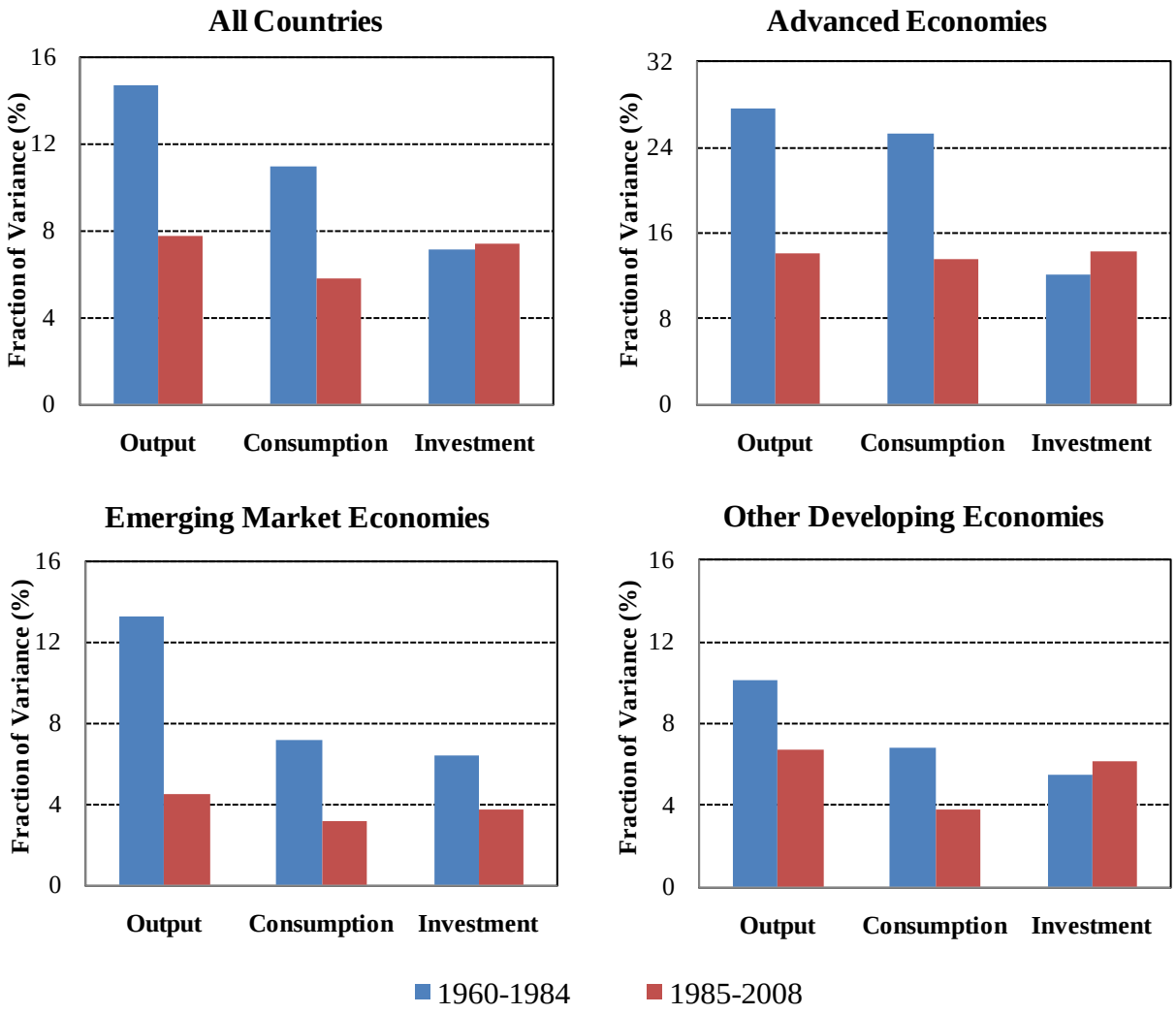
Notes: We estimate the model over the full sample period and then compute the variance shares of the two common factors in our model (global and group-specific) for each country. This plot shows the frequency distribution of countries for which the total contribution share of the two common factors is in the range of 0-10 percent, 10-20 percent etc.

Figure IX.2. Average Variance Explained by Global and Group Factors for Each Macro Aggregate (1960-2008)



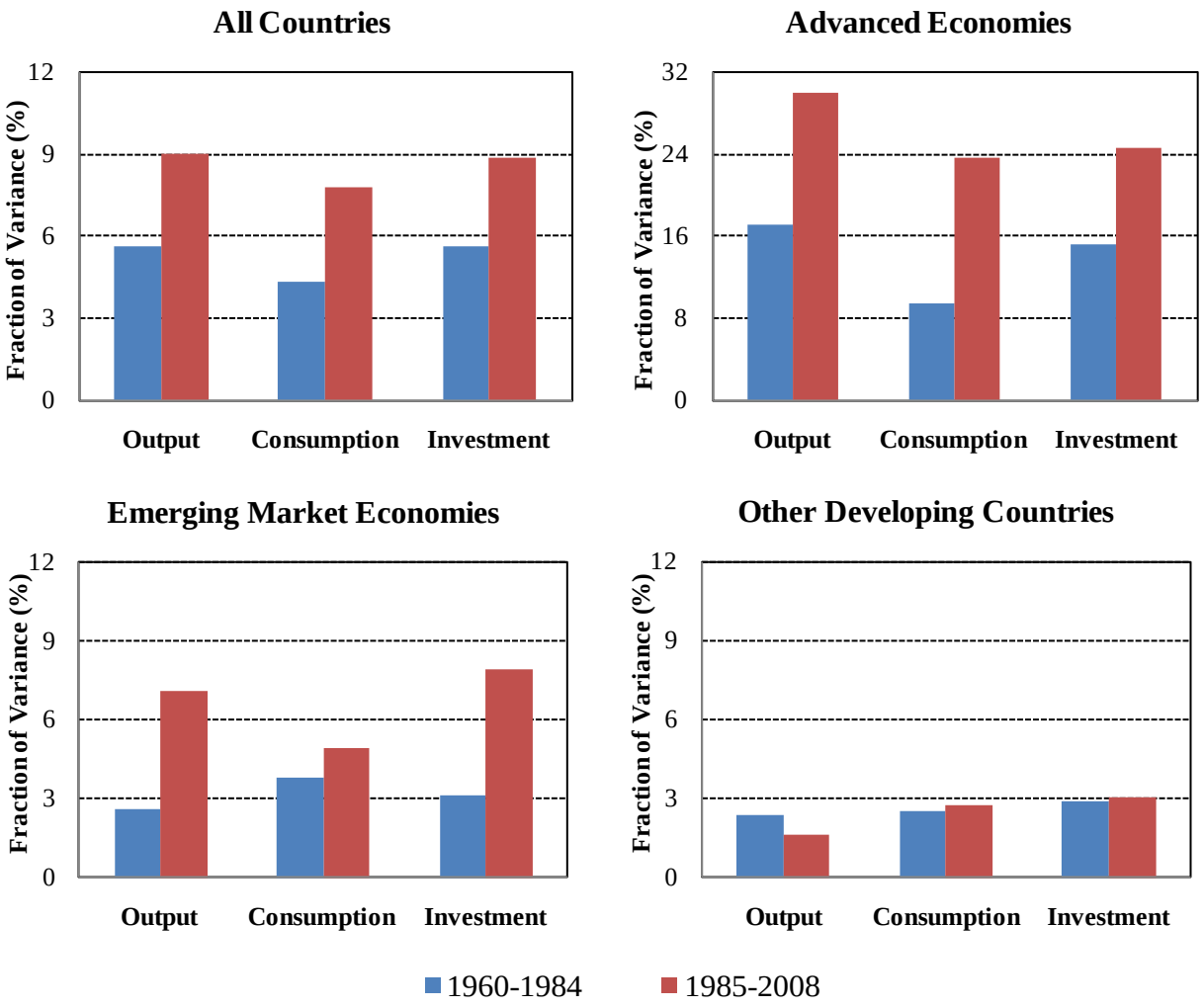
Notes: We estimate the model over the full sample period (1960-2008) and compute the variance decompositions for each country and, within each country, separately for output, consumption and investment. Each bar then represents the cross-sectional mean of the variance share attributable to the relevant factor for that particular variable. The cross-sectional means are calculated over the full sample of countries. The bar marked (Global+Group) represents the sum of the average variance shares of the global and group-specific factors for each variable.

Figure IX.3. Average Variance Explained by Global Factor



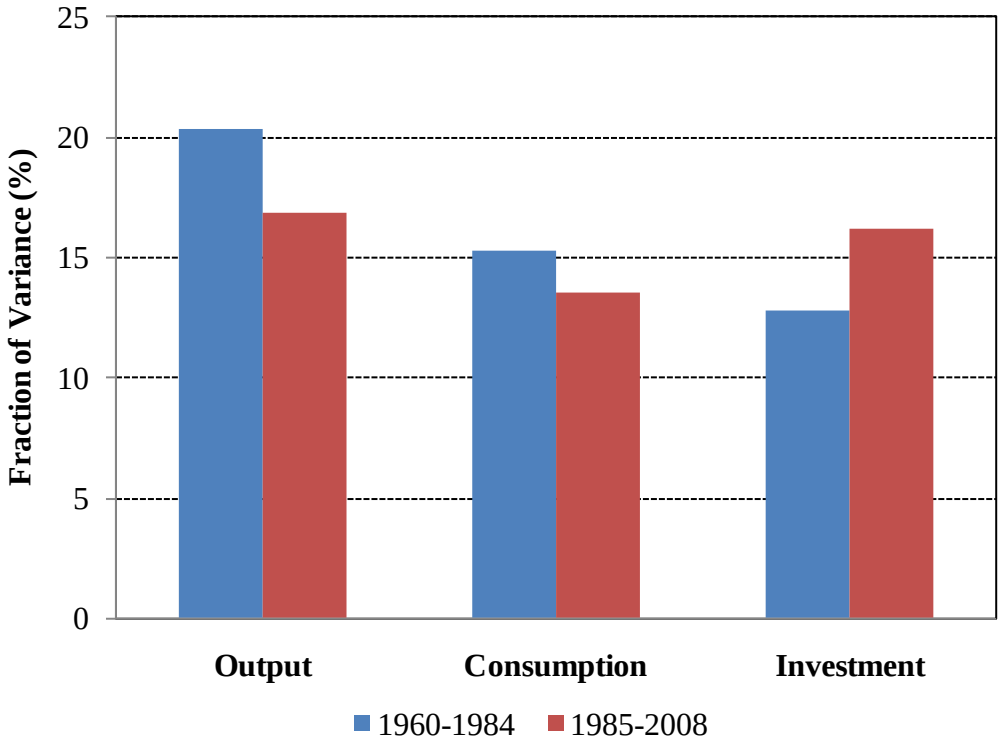
Notes: We estimate the model separately over the two periods, 1960-1984 and 1985-2008. We then compute the variance decompositions for each country and, within each country, for output, consumption and investment in each of these two periods. Each bar then represents the cross-sectional mean of the variance share attributable to the global factor for that particular variable in a given period. The cross-sectional means are calculated over the relevant group of countries.

Figure IX.4. Average Variance Explained by Group-Specific Factors



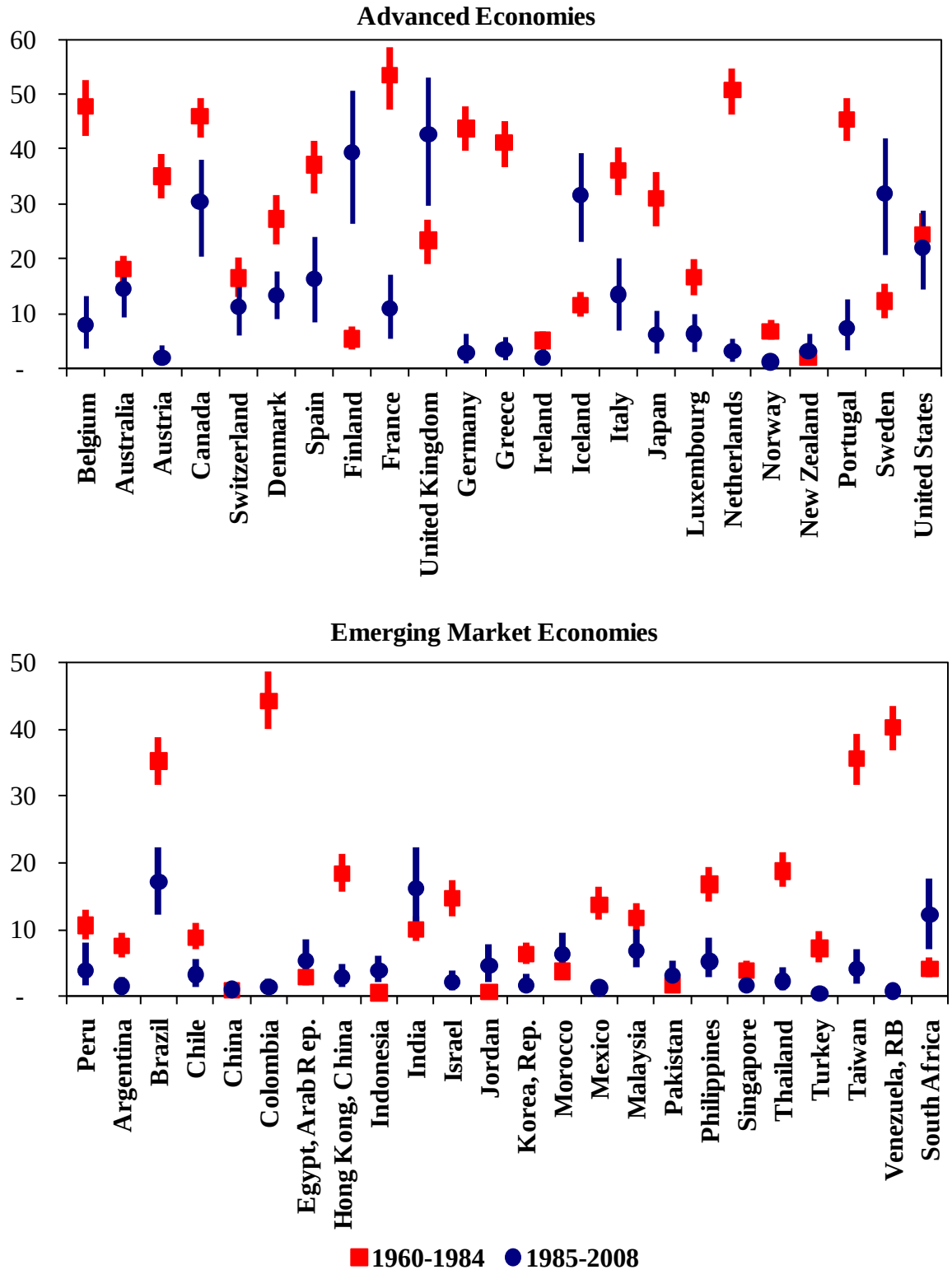
Notes: See Notes to Figure VIII.3.

Figure IX.5. Average Variance Explained by Global and Group-Specific Factors



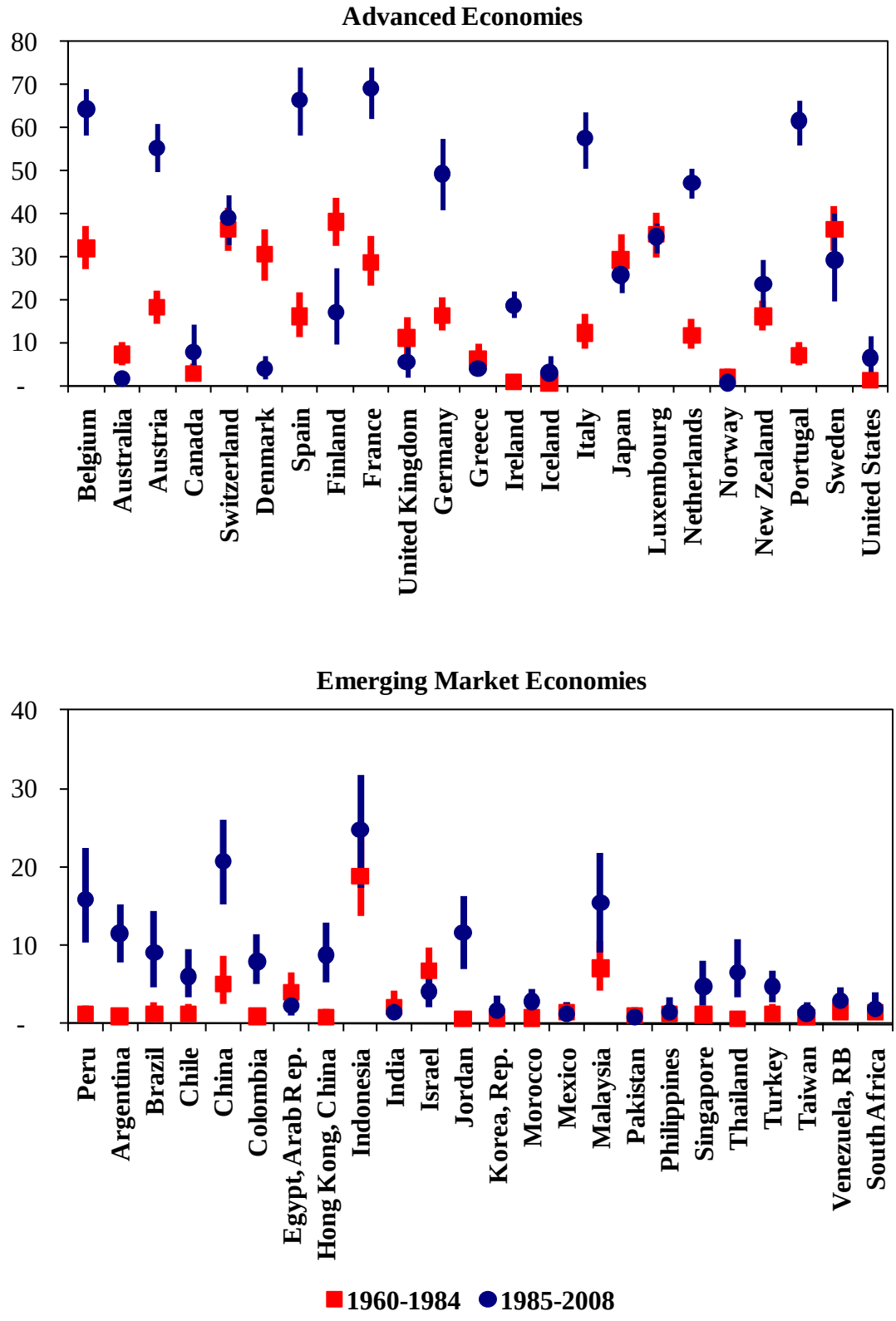
Notes: We estimate the model separately over the two periods, 1960-1984 and 1985-2008. We then compute the variance decompositions for each country and, within each country, for output, consumption and investment in each of these two periods. Each bar then represents the cross-sectional mean of the variance share attributable to the sum of global and group-specific factors for that particular variable in a given period. The cross-sectional means are calculated over the full set of countries in our sample.

Figure IX.6. Output Variance Explained by Global Factor



Notes: We estimate the model separately over the two periods, 1960-1984 and 1985-2008. For each country, we then show the posterior means of the share of the variance of output growth fluctuations accounted for by the relevant factor in each panel. We also show the corresponding posterior coverage intervals of length two standard deviations (%).

Figure IX.7. Output Variance Explained by Group Factor



Notes: See notes to Figure VIII.6.

Table X.1. Recessions in Emerging Market Economies: Basic Features
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	All Recessions	**Severe Recessions**	**Other Recessions**	**All Recessions**	**Severe Recessions**	**Other Recessions**
A. Output						
Duration [1/]	3.00	5***	3.00	3.92	4.86**	3.60
Amplitude	-4.81	-12.73***	-3.11	-6.54	-15.64***	-3.50
Slope	-1.24	-3.7***	-1.07	-1.69	-3.67***	-1.03
Cumulative Loss	-8.93	-27.16***	-4.34	-17.08	-46.67***	-7.22
B. Components of Output						
Consumption	-2.78	-11.61***	-0.92	-2.80	-5.62	-1.98
Investment	-13.13	-44.99***	-9.87	-17.09	-39.42***	-11.12
Exports	0.56	3.83	0.22	-0.27	0.03	-0.36
Imports	-10.18	-25.13***	-7.98	-11.91	-24.59***	-8.29
Net Export (% of GDP)[2/]	1.63	5.65***	1.01	3.88	9.34**	2.32
Current Account (% of GDP)[2/]	2.42	6.15***	0.97	3.60	8.61**	2.13
C. Other Macroeconomic Variables						
Industrial Production	-8.21	-13.68***	-5.47	-6.94	-14.09**	-4.47
Unemployment Rate[2/]	1.06	3**	0.84	1.53	2.63*	1.20
Inflation Rate[2/]	0.62	20.18***	0.13	271.83	1218.53	-10.53
D. Financial Variables						
Equity Prices	-17.53	-45.54***	-12.04	-11.00	-39.7***	-2.50
Credit	-1.93	-18.53***	0.02	-4.10	-16.14**	0.05

Notes: Severe recessions are those in which the peak-to-trough decline in output is in the top 25 percent of all recession-related output declines. Other recessions refer to episodes that are not severe recessions. In each cell, the mean (median) change in the respective variable from peak to trough of recessions is reported, unless otherwise indicated. The symbols *, **, and *** indicate that the difference between means (medians) of severe recessions and other recessions is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.
1/ Number of quarters.
2/ Change in levels.

Table X.2. Recessions in Advanced Economics: Basic Features

(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	All Recessions	Severe Recessions	Other Recessions	All Recessions	Severe Recessions	Other Recessions
A. Output						
Duration [1/]	3.00	5***	3.00	3.73	5.45***	3.16
Amplitude	-1.72	-4.54***	-1.02	-2.22	-5.19***	-1.25
Slope	-0.43	-0.98***	-0.35	-0.60	-1.22***	-0.40
Cumulative Loss	-2.74	-11.07***	-1.81	-6.12	-17.65**	-2.34
B. Components of Output						
Consumption	-0.22	-1.26**	-0.02	-0.60	-1.50	-0.30
Investment	-4.15	-10.63*	-3.98	-6.34	-10.91*	-4.84
Exports	-0.89	-1.11	-0.80	-0.85	-3.53	0.03
Imports	-3.15	-8.43***	-1.35	-3.82	-8.9**	-2.16
Net Export (% of GDP)[2/]	0.55	2.02*	0.45	0.83	1.38	0.65
Current Account (% of GDP)[2/]	0.48	1.05	0.45	0.65	1.06	0.51
C. Other Macroeconomic Variables						
Industrial Production	-4.03	-5.92***	-2.89	-3.66	-6.11***	-2.86
Unemployment Rate[2/]	0.66	1.44***	0.51	1.28	2.83**	0.82
Inflation Rate[2/]	-0.32	-1.67	-0.31	-0.49	-0.78	-0.40
D. Financial Variables						
Equity Prices	-3.29	-10.49	-1.30	-3.04	-5.83	-2.30
Credit	0.34	-0.30	0.50	0.32	0.54	0.24

Notes: Severe recessions are those in which the peak-to-trough decline in output is in the top 25 percent of all recession-related output declines. Other recessions refer to episodes that are not severe recessions. In each cell, the mean (median) change in the respective variable from peak to trough of recessions is reported, unless otherwise indicated. The symbols *, **, and *** indicate that the difference between means (medians) of severe recessions and other recessions is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

1/ Number of quarters.

2/ Change in levels.

Table X.3. Recessions Associated with Financial Crisis

(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	Without Crisis	With Crisis	With Severe Crisis	Without Crisis	With Crisis	With Severe Crisis
A. Output						
Duration [1/]	3.00	4.00	4.00	3.86	4.10	4.60
Amplitude	-4.33	-8.27***	-12.51***	-5.70	-9.22**	-13.51***
Slope	-1.08	-1.85***	-3.33***	-1.48	-2.37**	-3.24***
Cumulative Loss	-7.03	-16.55***	-30.12***	-14.98	-23.79	-38.04**
B. Components of Output						
Consumption	-1.13	-7.04**	-10.93*	-3.47	-0.08	4.34
Investment	-10.21	-36.27***	-44.99***	-12.97	-33.88***	-42***
Exports	0.22	3.32	4.54	-0.61	1.11	0.53
Imports	-7.60	-23.38***	-25.34***	-8.33	-26.72***	-27.43**
Net Export (% of GDP)[2/]	1.47	6.34**	6.69***	3.33	6.19	7.61*
Current Account (% of GDP)[2/]	0.97	6.33***	6.63***	2.29	8.05***	9.2**
C. Other Macroeconomic Variables						
Industrial Production	-5.50	-10.33*	-11.52*	-6.66	-7.84	-6.73
Unemployment Rate[2/]	0.84	2.24	3.24	1.34	2.34	2.72
Inflation Rate[2/]	0.29	6.75**	8.95***	134.61	769.21	1419.91
D. Financial Variables						
Equity Prices	-16.20	-20.5*	-47.68***	-5.03	-29.62**	-47.07***
Credit	-0.60	-7.33*	-18.78	-1.55	-12*	-13.48

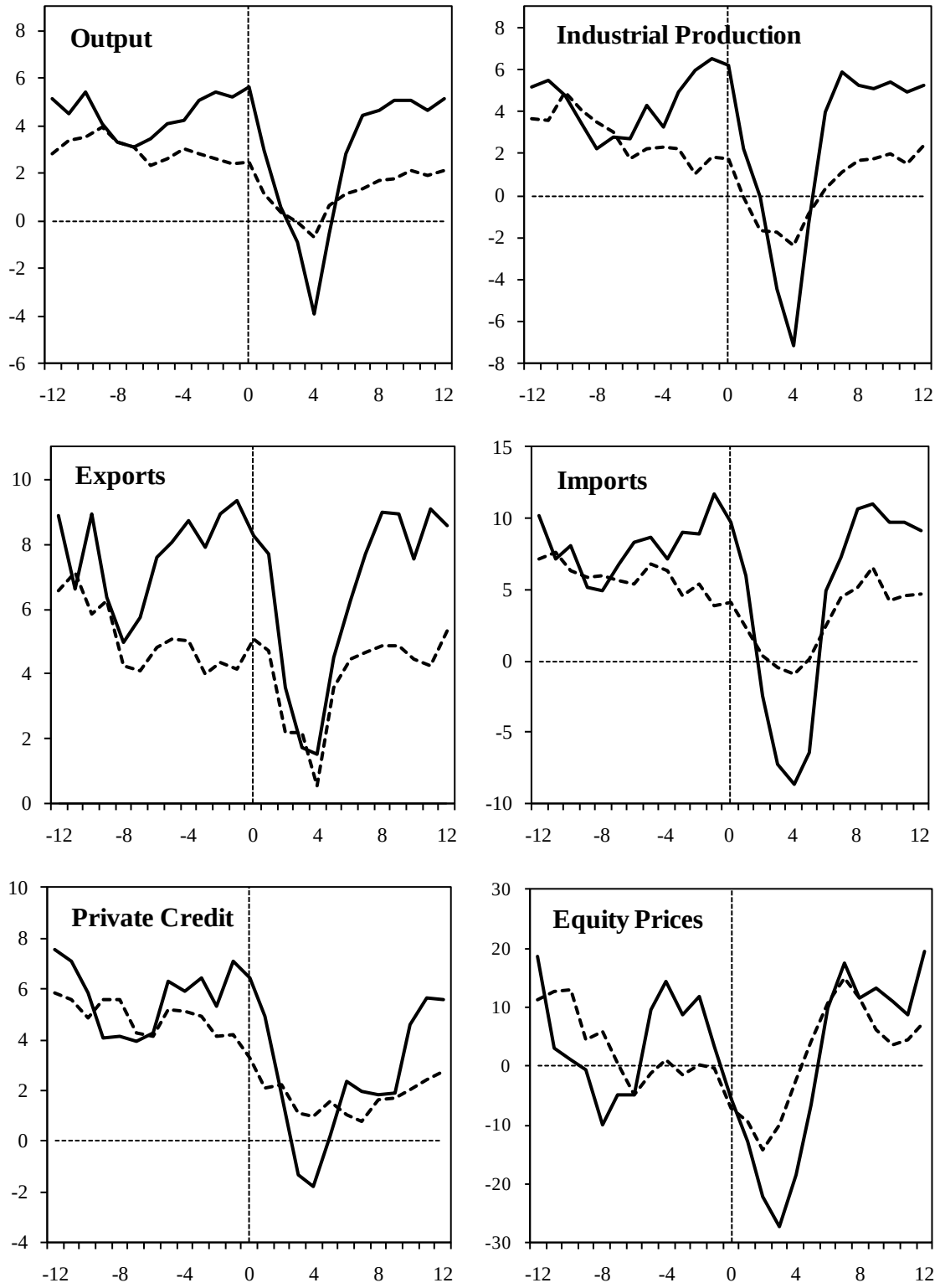
Notes: Number of recessions with financial crises is 20, and with severe financial crises is 10. Number of recessions without financial crises is 64. Severe financial crises are those that are in the top half of all recession. In each cell, the mean (median) change in the output from peak to trough of recessions associated with (severe) financial crisis is reported, unless otherwise indicated. The symbols *, **, and *** indicate that the difference between means (medians) of recessions with (severe) financial crises and recessions without financial crises is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

1/ Number of quarters.

2/ Change in level.

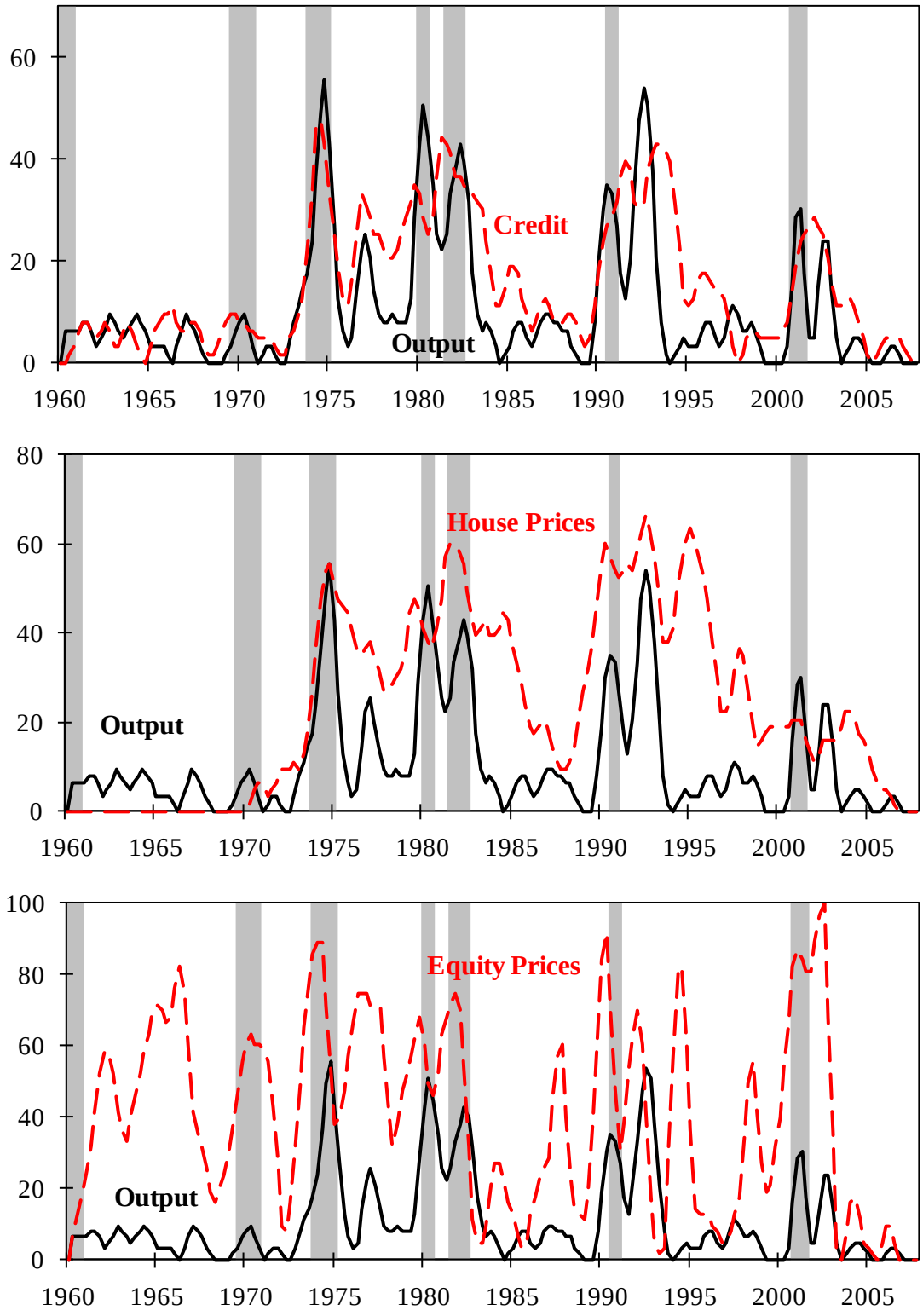
Figure X.1. Dynamics of Recessions

(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations of emerging countries while the dotted line corresponds to the median of all observations of advanced countries. Zero is the quarter after which a recession begins (peak in the level of output). Inflation rate, unemployment rate, net exports/GDP, and current account balance are the levels of the respective variables in percentages.

Figure X.2. Synchronization of Recessions and Financial Disruptions
(in percent)



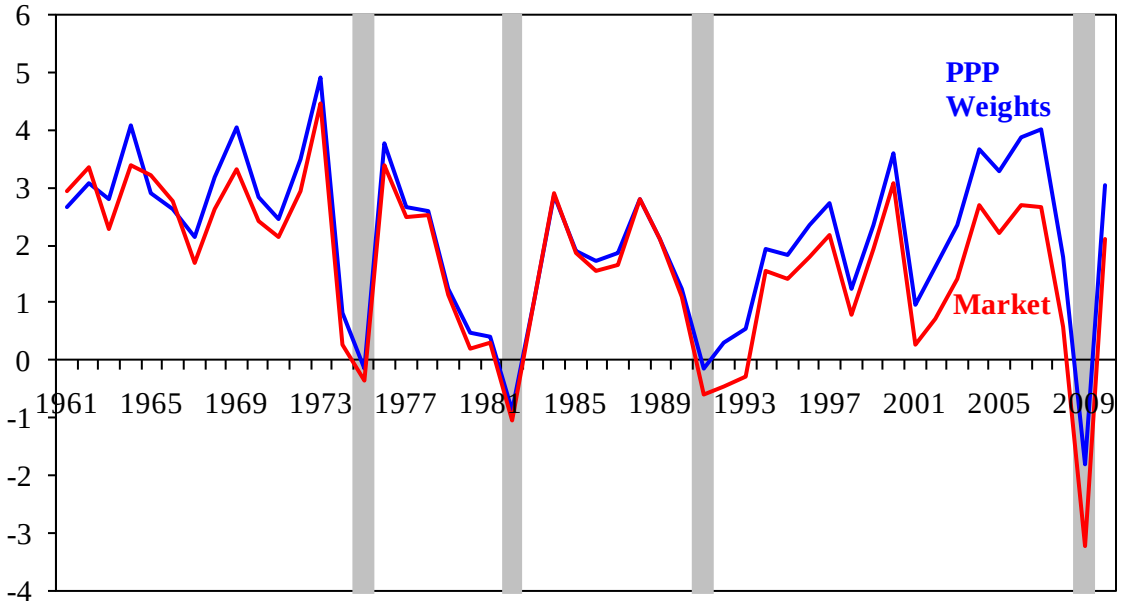
Notes: Output refers to the share of countries experiencing recessions. House price declines/credit contractions/equity price declines refer to the share of countries experiencing the respective event.

Table XI.1.1. Growth Rate of Output
(in percent)

	2007	2008	2009	Projected 2010
Advanced Economies				
Total Output	2.47	0.34	-3.35	1.87
Per Capita Output	1.78	-0.26	-3.92	1.23
Emerging Market Economies				
Total Output	8.42	5.89	1.96	6.30
Per Capita Output	7.40	4.87	0.96	4.99
Other Developing Economies				
Total Output	6.99	5.20	0.79	4.02
Per Capita Output	4.97	3.21	-1.22	2.03

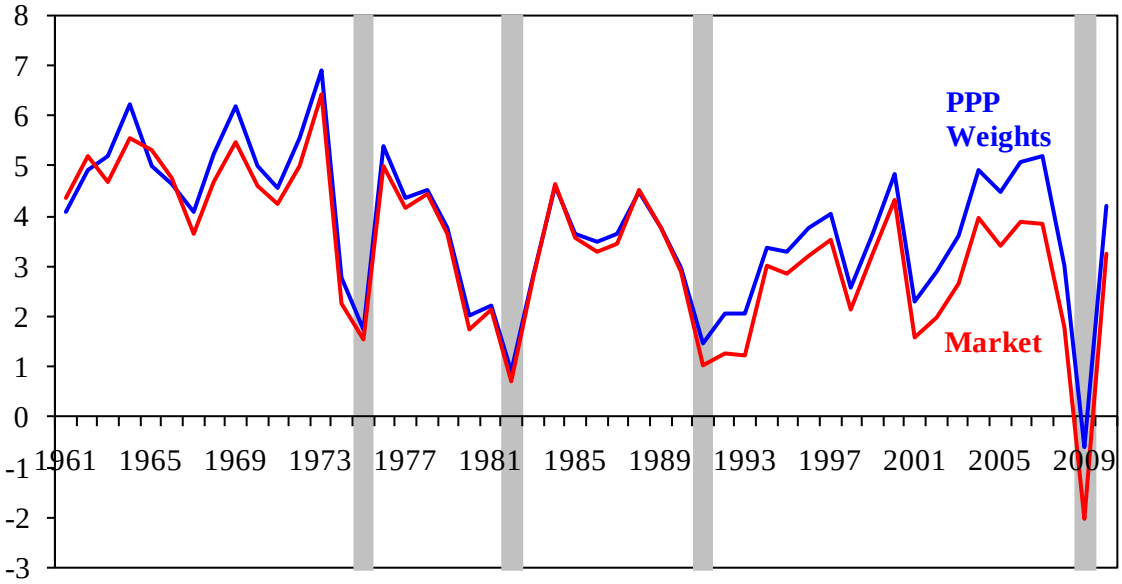
Notes: Percent change of GDP growth from a year earlier for each group. Group GDP is computed using growth rates of real GDP for each country and weighting by PPP-GDP. Data for 2010 are based on the WEO forecast.

Figure XI.1.1. Growth of per Capita Global Output
(in percent)



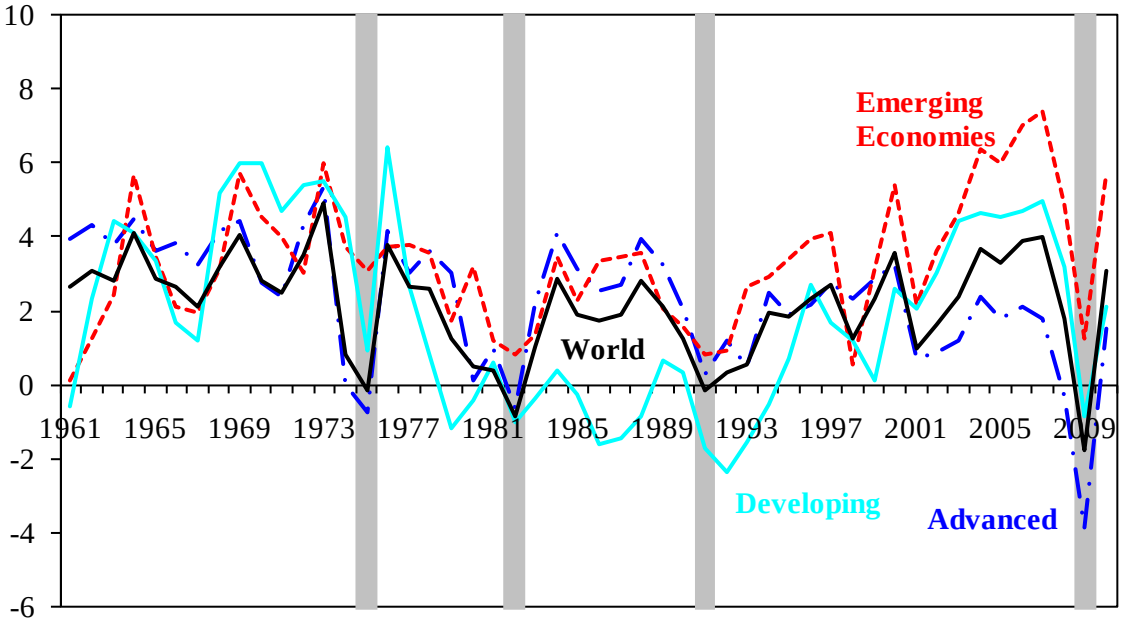
Notes: Percent change of per capita GDP growth from a year earlier. Global per Capita GDP is computed using growth rates of real per Capita GDP for each country and weighting by PPP-GDP or Market-GDP. Contractions in PPP-weighted global per capita GDP are shaded. Data for 2010 are based on the WEO forecast.

Figure X.1.2. Growth of Global Output
(in percent)



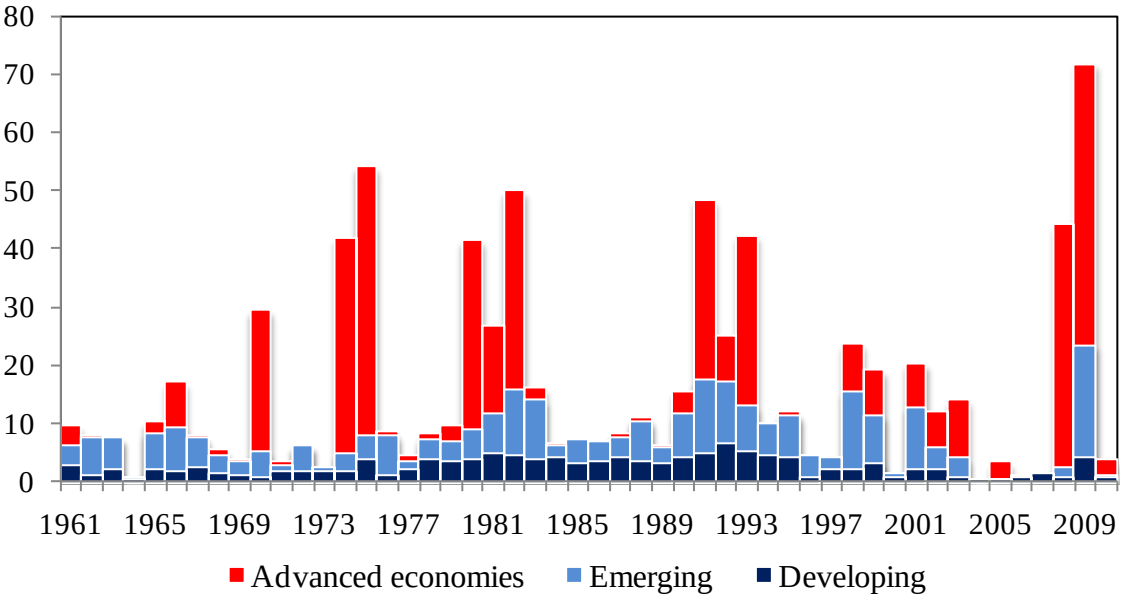
Notes: Percent change of GDP growth from a year earlier. Global GDP is computed using growth rates of real GDP for each country and weighting by PPP-GDP or Market-GDP. Contractions in PPP-weighted global per capita GDP are shaded. Data for 2010 are based on the WEO forecast.

Figure XI.1.3. Growth of per Capita Output of Different Groups
(in percent)



Notes: Percent change of per capita GDP growth from a year earlier. Per Capita GDP for each group of countries is computed using growth rates of real per Capita GDP for each country and weighting by PPP-GDP. Contractions in PPP-weighted global per capita GDP are shaded. Data for 2010 are based on the WEO forecast.

Figure XI.1.4. Fraction of Countries in Recession over Time
(in percent)



Notes: Each bar corresponds to the PPP-GDP weighted percent of countries in each year. Data for 2010 are based on the WEO forecast.

Table XI.2.1. Growth of Output of Different Regions
(percent changes)

	2007	2008	2009	Projected 2010
Emerging Asia				
Total Output	9.94	7.02	5.48	7.98
Per Capita Output	8.90	5.97	4.44	6.54
Emerging Asia except China, India, and Hong Kong				
Total Output	5.82	2.98	0.12	4.54
Per Capita Output	4.46	1.57	-1.28	3.15
Emerging Europe				
Total Output	7.33	4.85	-6.89	2.60
Per Capita Output	7.72	5.27	-6.47	3.02
Latin America				
Total Output	5.85	4.21	-2.30	3.71
Per Capita Output	4.45	2.83	-3.67	2.35
Middle East and North Africa				
Total Output	5.28	5.50	3.87	4.55
Per Capita Output	3.39	3.91	2.21	2.88
Sub-Saharan Africa				
Total Output	6.15	5.11	1.56	4.10
Per Capita Output	3.69	2.62	-0.88	1.69

Notes: Percent change of GDP growth from a year earlier for each group. Regional GDP is computed using growth rates of real GDP for each country and weighting by PPP-GDP. Data for 2010 are based on the WEO forecast.

Table XI.3.1. Shares of Real GDP, Emerging Asia
(in percent)

	2000				2008				2009			
	Consumption				Consumption				Consumption			
Country	Pvt.	Govt.	Invst.	Net X	Pvt.	Govt.	Invst.	Net X	Pvt.	Govt.	Invst.	Net X
China	46.4	15.9	35.3	2.4	35.3	13.3	43.5	7.9	--	--	--	--
Hong Kong	66.0	10.1	25.4	-1.5	59.6	8.0	20.2	12.2	61.7	8.4	20.0	8.2
India	64.2	12.9	25.9	-1.9	57.2	9.8	36.2	-4.3	59.5	11.5	34.9	-6.1
Indonesia	61.7	6.5	22.2	10.5	57.2	8.1	23.9	9.6	57.4	9.0	23.4	10.3
Korea	54.0	12.1	31.0	3.2	52.9	14.4	28.6	4.4	53.0	15.1	24.1	7.5
Malaysia	43.8	10.2	26.9	19.2	52.4	13.7	20.8	13.1	53.7	14.5	17.4	14.4
Pakistan	75.4	8.6	17.2	-1.2	68.6	13.2	19.4	-1.2	69.6	11.0	16.0	1.9
Philippines	77.3	8.2	24.6	-4.6	78.1	6.6	18.1	1.4	80.3	7.1	16.1	-2.6
Singapore	42.2	10.8	33.3	13.6	39.2	10.5	31.4	20.4	39.7	11.4	28.1	22.6
Taiwan	60.4	13.9	23.1	2.7	54.4	11.3	17.0	17.3	58.2	12.2	16.8	14.1
Thailand	54.0	9.2	20.7	14.9	51.8	8.9	23.4	15.4	52.7	10.0	20.5	18.4
Unweighted medians:												
All Countries	60.4	10.2	25.4	2.7	54.4	10.5	23.4	9.6	57.8	11.2	20.3	9.2
All excl. China	61.0	10.1	25.0	2.9	55.8	10.1	22.1	10.9	57.8	11.2	20.3	9.2
Unweighted means:												
All Countries	58.7	10.8	26.0	5.2	55.1	10.7	25.7	8.7	58.6	11.0	21.7	8.9
All excl. China	59.9	10.3	25.0	5.5	57.1	10.4	23.9	8.8	58.6	11.0	21.7	8.9
International Comparisons:												
Germany	58.9	19.0	21.8	0.4	54.7	18.4	20.3	6.8	58.0	20.0	17.9	3.9
Japan	56.2	16.9	25.5	1.5	55.5	17.6	23.2	4.9	--	--	--	--
U.S.	68.7	14.4	20.8	-3.9	71.0	14.5	17.5	-3.3	71.1	16.4	15.2	-2.7

Source: CEIC, IMF's WEO, and authors' calculations.
Notes: The unweighted medians are the cross-sectional medians of the data in respective columns.

Table XI.3.2. Contributions to GDP Growth, Emerging Asia (in percent)

		GDP Growth Contributions				
	GDP	Consumption				
Country	Growth	Total	Pvt.	Govt.	Invst.	Net X
China	10.2	4.1	2.8	1.3	5.0	1.1
Hong Kong	4.2	2.1	1.9	0.2	0.5	1.2
India	8.4	6.0	5.0	1.0	3.6	-1.4
Indonesia	5.1	3.2	2.6	0.7	1.5	0.5
Korea	4.4	2.8	2.2	0.6	0.7	0.8
Malaysia	4.3	4.2	3.1	1.0	-0.1	0.2
Pakistan	4.7	3.5	2.8	0.7	0.8	0.4
Philippines	4.6	3.9	3.7	0.2	0.4	0.5
Singapore	4.9	2.6	1.9	0.6	0.9	1.6
Taiwan	3.4	1.7	1.5	0.1	-0.4	2.3
Thailand	4.1	2.5	2.1	0.4	1.0	0.7
Unweighted medians:						
All Countries	4.6	3.2	2.6	0.6	0.8	0.7
All excl. China	4.5	3.0	2.4	0.6	0.7	0.6
Unweighted means:						
All Countries	5.3	3.3	2.7	0.6	1.3	0.7
All excl. China	4.8	3.2	2.7	0.6	0.9	0.7
International Comparisons:						
Germany	0.8	0.5	0.3	0.2	-0.2	0.5
Japan	1.5	1.0	0.6	0.4	0.2	0.5
U.S.	1.9	2.0	1.7	0.3	-0.1	0.0

Source: CEIC, IMF's WEO, ADB, and authors' calculations.
Notes: GDP growth rates (in percent) are annual averages over the period 2000-09. GDP growth contributions (in percentage points) are averages over the same period, except for China (2000-08) and Japan (2000-2008). Contributions may not sum exactly to GDP growth because of rounding error or, in the case of some countries like the Philippines, because the statistical discrepancy is large. Investment includes private and public investment. The unweighted medians are the cross-sectional medians of the data in respective columns.

Table XI.3.3. Openness to Trade, Emerging Asia
(in percent of GDP)

	2000			2009		
Country	Total Trade	Exports	Trade Balance	Total Trade	Exports	Trade Balance
China	39.6	20.8	2.0	--	--	--
Hong Kong	282.1	143.3	4.4	380.3	193.7	7.2
India	27.4	13.2	-0.9	41.1	18.6	-4.0
Indonesia	71.4	41.0	10.5	--	--	--
Korea	74.3	38.6	2.9	--	--	--
Malaysia	220.4	119.8	19.2	172.3	96.9	21.5
Pakistan	28.1	13.4	-1.2	38.1	14.1	-9.8
Philippines	108.9	55.4	1.9	61.8	31.3	0.8
Singapore	377.7	195.6	13.6	384.8	202.6	20.4
Taiwan	105.3	53.8	2.2	--	--	--
Thailand	124.9	66.8	8.6	126.4	68.5	10.6
Unweighted medians:						
All Countries	105.3	53.8	2.9	126.4	68.5	7.2
All excl. China	107.1	54.6	3.7	126.4	68.5	7.2
Unweighted means:						
All Countries	132.7	69.2	5.7	172.1	89.4	6.7
All excl. China	142.1	74.1	6.1	193.9	101.2	8.4
International Comparisons:						
Germany	66.4	33.5	0.5	61.0	33.3	5.6
Japan	21.2	11.3	1.5	--	--	--
U.S.	25.7	10.9	-3.8	18.7	7.4	-3.8

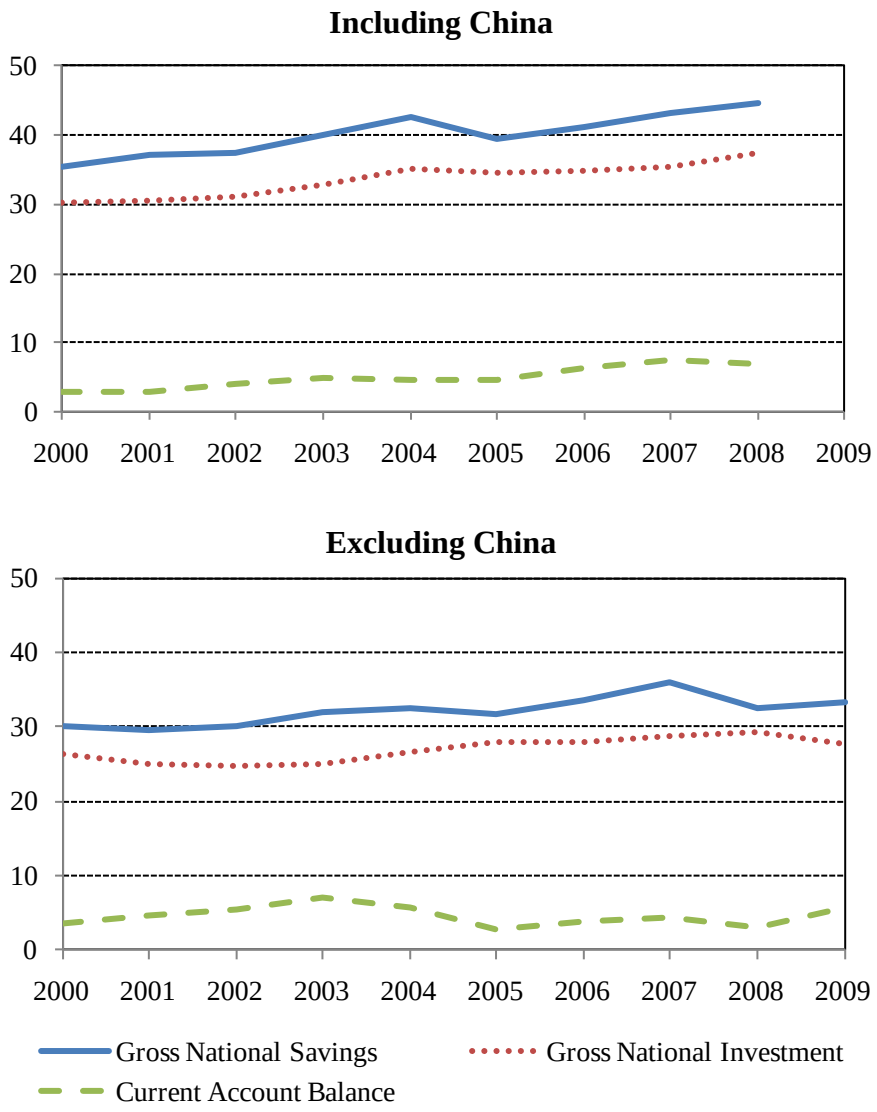
Source: CEIC, Asian Development Bank's Statistical Database System (SDBS), and authors' calculations.
Notes: Exports include both goods and services. Total trade refers to the sum of exports and imports of goods and services. The unweighted medians are the cross-sectional medians of the data in respective columns.

Table XI.3.4. Budget Balances, Debt, and Credit Growth, Emerging Asia

	Budget Balance (% GDP)			Public Debt (% GDP)			Annual Credit Growth (%)	
Country	2007	2008	2009	2007	2008	2009	2005-08 Avg.	2009
China	0.9	-0.1	-2.0	20.2	17.7	20.2	14.1	34.2
Hong Kong	7.7	0.1	-3.4	1.3	1.2	1.0	2.3	7.7
India	-4.4	-7.9	-10.4	80.5	80.2	84.7	20.8	12.6
Indonesia	-1.2	0.0	-2.6	35.1	33.2	31.5	21.7	7.2
Korea	3.5	1.2	-2.8	29.6	29.1	34.9	12.6	7.5
Malaysia	-2.8	-4.4	-4.8	30.0	30.7	39.5	6.4	7.7
Pakistan	-4.0	-7.3	-4.9	54.6	58.4	55.9	17.0	12.9
Philippines	-0.7	-0.1	-2.4	47.8	48.7	51.0	3.1	3.6
Singapore	11.1	6.3	2.5	86.0	87.5	93.5	6.9	2.0
Taiwan	-0.2	-0.8	-4.3	34.1	36.8	41.8	4.6	2.3
Thailand	-0.9	0.1	-4.1	37.6	38.0	49.1	4.1	0.4
Unweighted medians:								
All Countries	-0.7	-0.1	-3.4	35.1	36.8	41.8	6.9	7.5
All excl. China	-0.8	-0.1	-3.7	36.3	37.4	45.5	6.7	7.4
Unweighted means:								
All Countries	0.8	-1.2	-3.6	41.5	42.0	45.8	10.3	8.9
All excl. China	0.8	-1.3	-3.7	43.7	44.4	48.3	9.9	6.4
International Comparisons:								
Germany	-0.5	-0.1	-4.2	63.4	67.1	78.7	0.7	0.9
Japan	-2.5	-5.8	-10.5	187.7	196.6	218.6	-5.9	0.7
U.S.	-2.8	-5.9	-12.5	61.9	70.4	84.8	7.7	-2.1

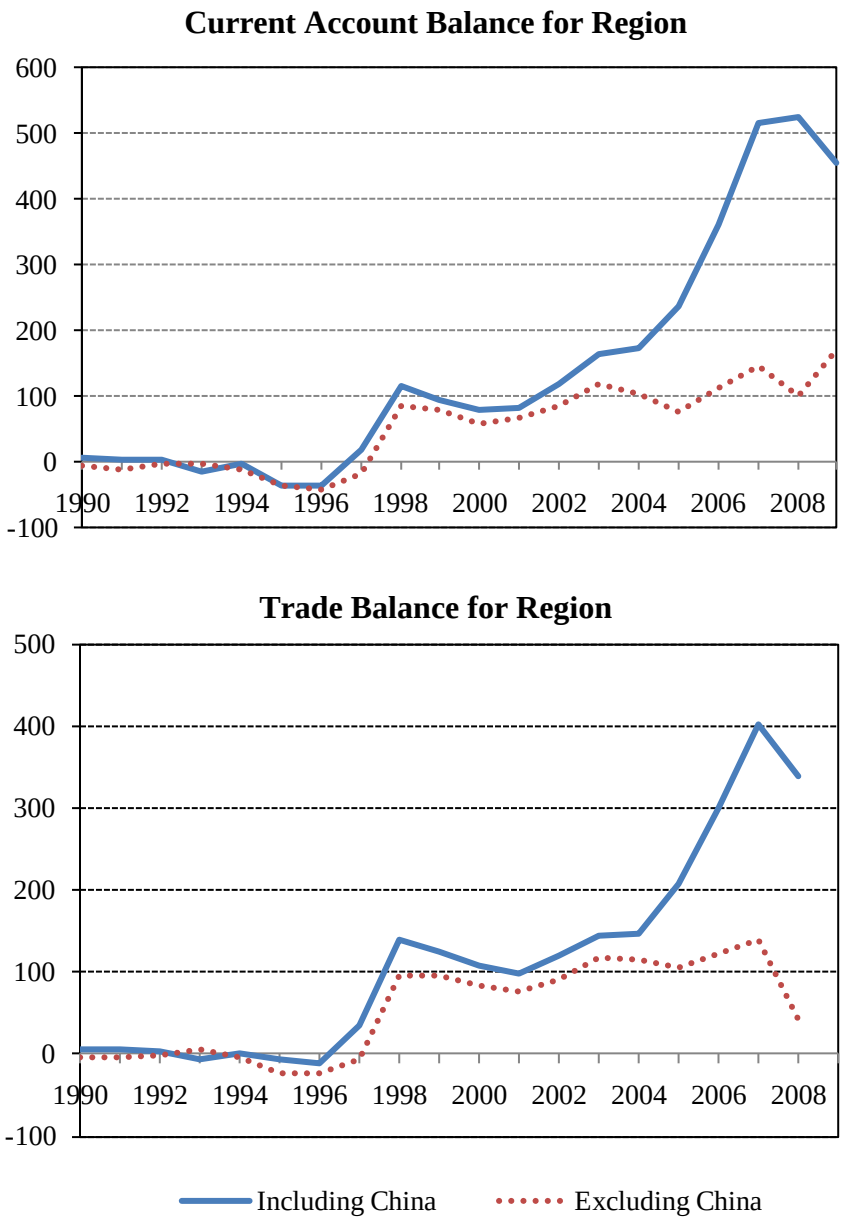
Source: IFS, WEO, EIU CountryData, and authors' calculations.
Notes: Budget balance is general government balance. Public debt is general government gross debt. Credit growth is growth in credit to private sector, except for Taiwan and Germany (2005-2008 Avg.) and Indonesia, Korea, Malaysia, Pakistan, Philippines, Taiwan, Thailand, Germany, Japan, U.S. (2009) it is bank lending to private and public sectors plus bank lending in domestic currency overseas.

Figure XI.3.1. Aggregate Saving-Investment Balance for Emerging Asia (in percent of GDP)



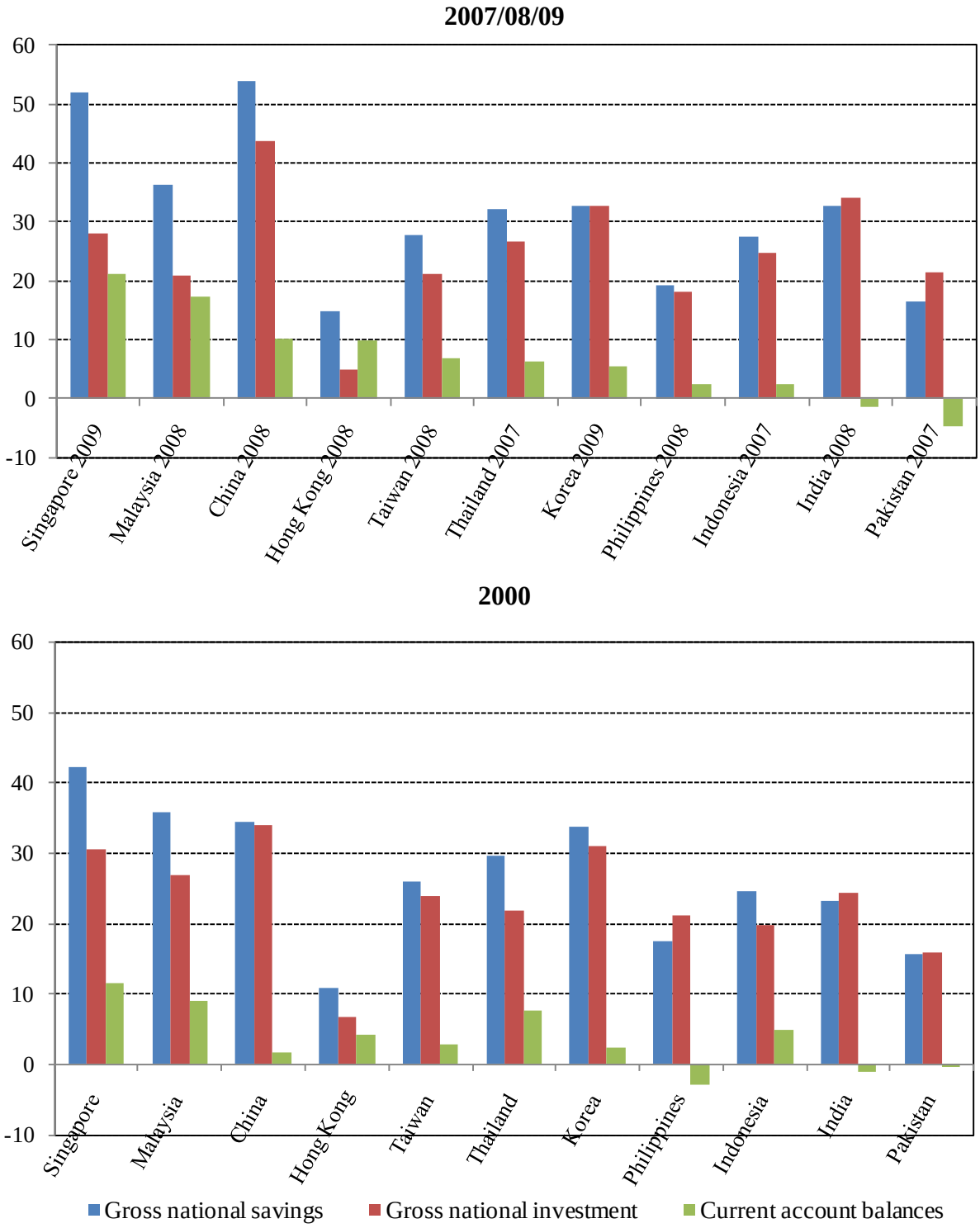
Source: CEIC and authors' calculations.
Notes: This figure shows aggregate savings, investment and current account balances for emerging Asian economies, expressed as ratios of the aggregate nominal GDP (in a common currency, at market exchange rates) for that group of economies. The countries are as follows: China, Hong Kong, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Singapore, Taiwan, and Thailand. Gross national saving for Indonesia, Pakistan and 2008 China is calculated as a sum, based on current account and gross national investment data.

Figure XI.3.2. Aggregate Current Account and Trade Balances for Emerging Asia (billions of US dollars)



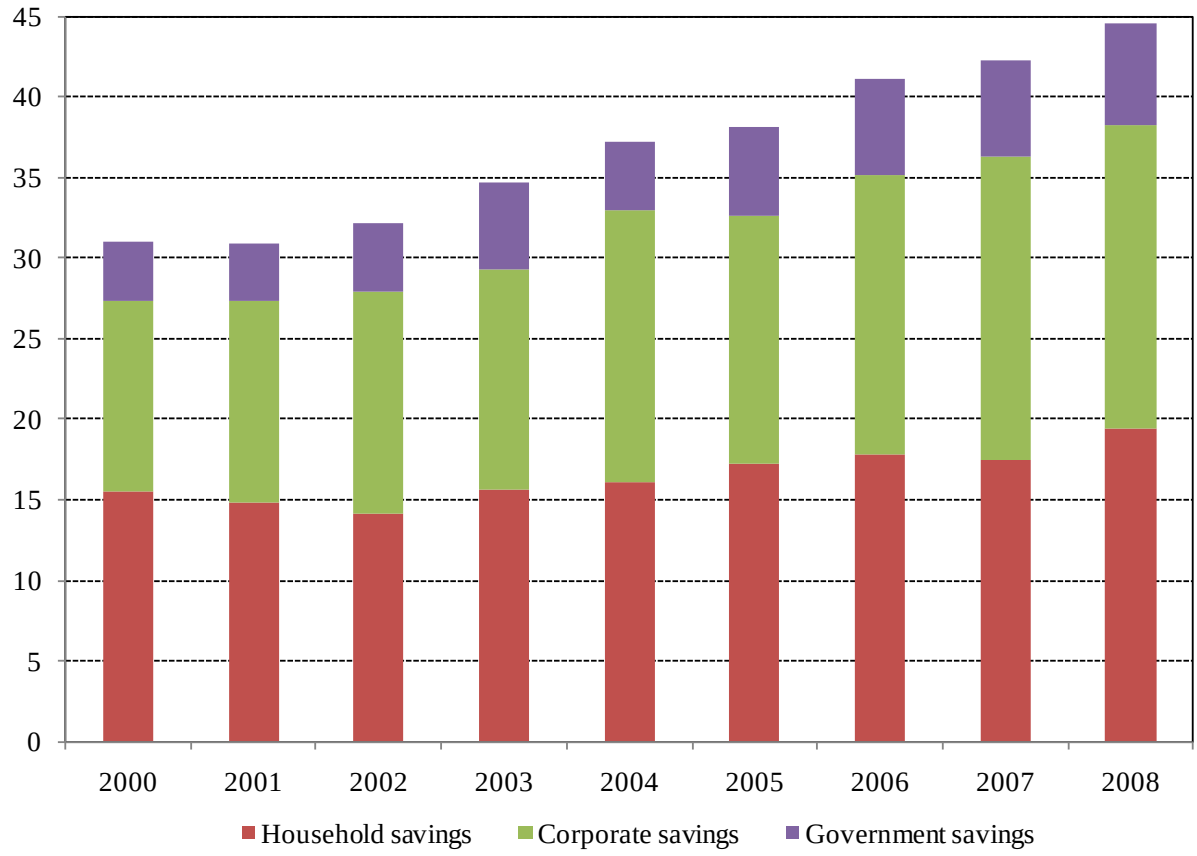
Source: IMF's WEO, CEIC and authors' calculations.
Notes: Emerging Asia includes China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Singapore, Taiwan Province of China, and Thailand.

Figure XI.3.3. Savings-Investment Balances, Emerging Asia
(in percent of GDP)



Source: CEIC and authors' calculations.
Notes: In both panels, the countries are sorted by decreasing order of latest current account balances (as a percent of GDP).

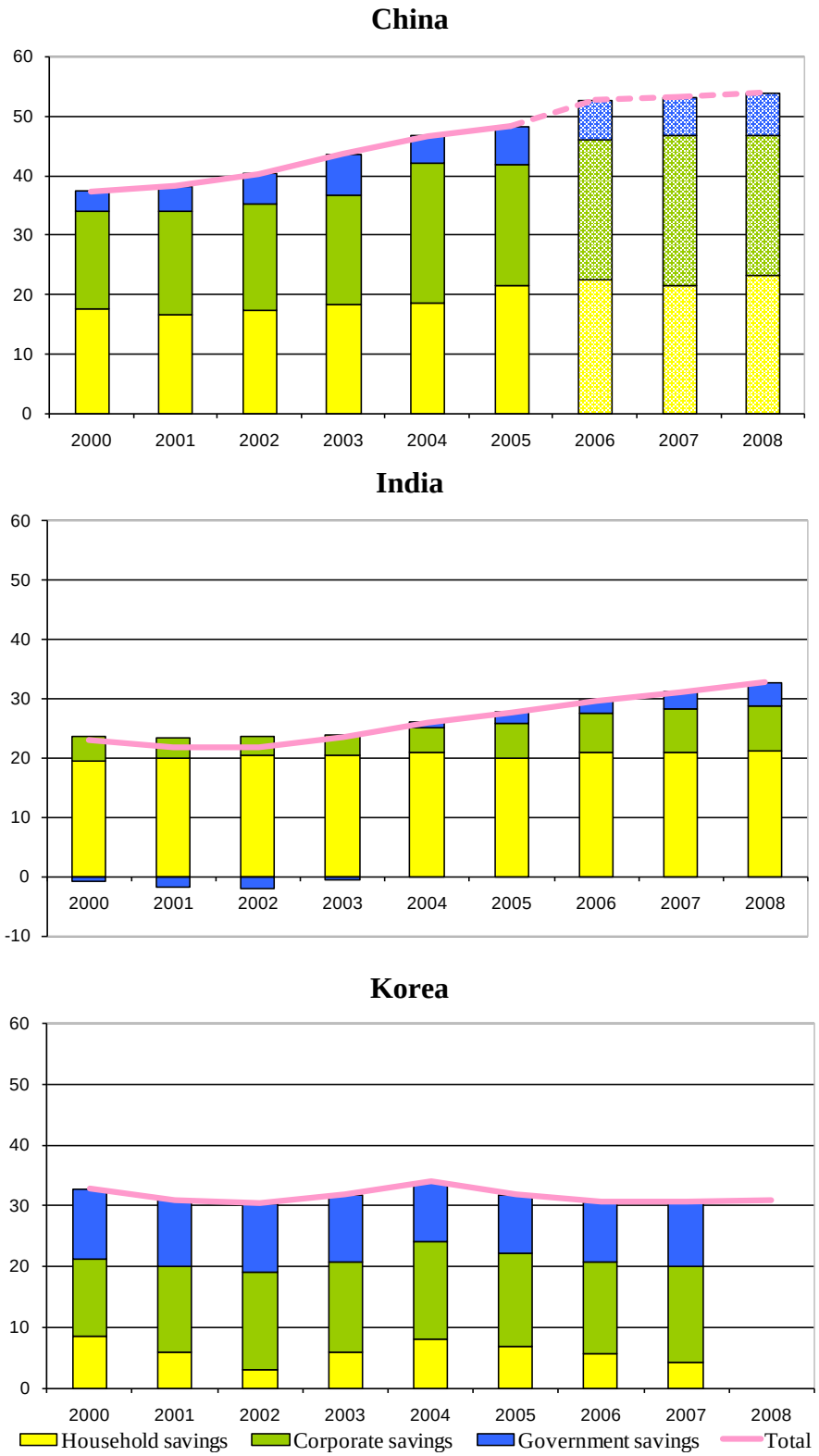
Figure XI.3.4. Composition of Savings in Selected Asian Economies (in percent of GDP)



Source: CEIC, ADB and authors' calculations.

Notes: This figure shows the composition of aggregate savings among a group of five Asian emerging economies for which this breakdown was available on a consistent basis. The five economies are China, India, Korea, Philippines, and Taiwan. Savings in each category were expressed in a common currency (converted at market exchange rates), added up across the five economies, and then expressed as a ratio of aggregate nominal GDP in the five economies (also in the same common currency, converted at market exchange rates). The composition of China's savings for 2006-08 is based on the author's estimates. Korea's household savings and Taiwan's savings in 2008 are kept at the same levels they were at in 2007.

Figure XI.3.5. Composition of National Saving
(in percent of GDP)



Source: CEIC, ADB and authors' calculations.

Table XI.4.1. Real GDP Growth Rate, Emerging Europe (in percent)

Country	2007	2008	2009	2010
Belarus	8.6	10.0	-1.2	1.8
Bulgaria	6.2	6.0	-6.5	-2.5
Croatia	5.5	2.4	-5.2	0.4
Czech Republic	6.1	2.7	-4.3	1.3
Estonia	7.2	-3.6	-14.0	-2.6
Hungary	1.2	0.6	-6.7	-0.9
Latvia	10.0	-4.6	-18.0	-4.0
Lithuania	8.9	3.0	-18.5	-4.0
Poland	6.8	4.9	1.0	2.2
Romania	6.2	7.1	-8.5	0.5
Russia	8.1	5.6	-7.5	1.5
Serbia	6.9	5.4	-4.0	1.5
Slovakia	10.4	6.4	-4.7	3.7
Slovenia	6.8	3.5	-4.7	0.6
Ukraine	7.9	2.1	-14.0	2.7
Unweighted				
Medians	6.9	3.5	-6.5	0.6
Means	7.1	3.4	-7.8	0.1

Source: WEO and authors' calculations.
Notes: 2010 growth rates are based on the WEO forecast. The unweighted medians are the cross-sectional medians of the data in respective columns.

Table XI.4.2. Shares of Real GDP, Emerging Europe
(in percent)

	2000				2007				2009			
	Consumption				Consumption				Consumption			
Country	Pvt.	Govt.	Invst.	Net X	Pvt.	Govt.	Invst.	Net X	Pvt.	Govt.	Invst.	Net X
Belarus	58.6	19.5	25.4	-3.5	57.6	13.8	35.8	-7.3	58.7	11.8	36.2	-6.7
Bulgaria	69.2	17.9	18.3	-5.4	72.2	15.0	39.4	-27.0	70.7	15.0	28.3	-14.4
Croatia	61.7	22.9	18.7	-3.2	63.6	18.0	29.7	-11.7	61.1	19.2	28.1	-8.3
Czech Republi	51.8	21.1	29.3	-3.0	49.0	18.5	30.8	0.8	52.5	19.9	25.8	0.8
Estonia	55.5	19.8	28.4	-3.6	61.0	13.3	43.7	-25.9	56.8	16.2	21.8	-4.5
Hungary	63.9	10.3	27.5	-3.7	66.6	8.9	23.1	3.5	65.3	9.2	21.8	3.7
Latvia	62.5	20.8	23.7	-7.0	72.4	13.9	38.0	-24.2	67.0	16.8	22.9	-6.7
Lithuania	64.6	22.8	18.9	-6.3	71.1	17.1	29.8	-19.2	69.2	20.8	14.2	-5.9
Poland	61.7	16.2	27.3	-4.0	59.5	16.1	28.8	-1.1	60.3	16.5	24.7	1.0
Romania	77.0	6.3	20.0	-4.6	89.2	5.7	33.0	-31.4	85.0	6.1	30.4	-21.4
Russia	47.0	20.0	19.1	14.5	59.8	14.6	27.6	-3.6	62.5	15.7	20.5	3.1
Serbia	76.6	19.8	8.3	-4.7	85.2	17.6	22.4	-25.2	85.5	17.5	20.2	-23.1
Slovakia	56.3	20.2	25.9	-2.5	52.9	16.6	28.7	3.1	55.2	17.6	25.0	4.0
Slovenia	57.4	18.8	27.3	-3.5	53.3	17.0	27.2	-2.9	55.4	19.7	24.6	1.5
Ukraine	44.9	26.1	16.4	17.2	59.6	17.9	28.2	-5.7	65.6	20.0	15.3	-1.0
Unweighted:												
Medians	61.7	19.8	23.7	-3.6	61.0	16.1	29.7	-7.3	62.5	16.8	24.6	-4.5
Means	60.6	18.8	22.3	-1.5	64.9	14.9	31.1	-11.9	64.7	16.1	24.0	-5.2

Source: EIU Country Data, WDI, and authors' calculations.
Notes: Shares may not add up to exactly 100% due to statistical discrepancies. The unweighted medians are the cross-sectional medians of the data in respective columns.

Table XI.4.3. Contributions to GDP Growth, Emerging Europe (in percent)

		GDP Growth Contributions				
		Consumption				
Country	GDP Growth	Total	Pvt.	Govt.	Invst.	Net X
Belarus	8.2	4.8	3.7	1.1	3.2	0.0
Bulgaria	5.8	5.1	4.8	0.3	4.5	-3.5
Croatia	4.4	3.0	2.7	0.3	2.8	-1.3
Czech Republic	4.3	2.3	1.8	0.5	1.1	0.9
Estonia	6.6	4.7	4.2	0.5	2.7	-1.9
Hungary	3.3	2.5	2.3	0.1	0.2	0.7
Latvia	7.2	6.4	5.9	0.5	2.7	-2.1
Lithuania	7.4	6.5	5.7	0.9	2.9	-2.0
Poland	4.2	3.2	2.4	0.8	1.1	0.0
Romania	6.2	6.9	6.5	0.4	3.7	-3.8
Russia	6.5	5.4	5.1	0.4	2.6	-1.5
Serbia	5.6	5.5	5.3	0.3	2.7	-2.6
Slovakia	6.2	3.6	3.0	0.7	1.8	0.5
Slovenia	4.3	2.3	1.7	0.6	1.5	0.0
Ukraine	7.0	8.8	8.6	0.1	3.5	-4.7
Unweighted:						
Medians	6.2	4.8	4.2	0.5	2.7	-1.5
Means	5.8	4.7	4.3	0.5	2.5	-1.4

Source: EIU Country Data, IFS, CEIC, and authors' calculations.
Notes: GDP and employment growth rates (in percent) are annual averages over period 2000-2008. Contributions may not sum exactly to GDP growth due to rounding errors or statistical discrepancies. The unweighted medians are the cross-sectional medians of the data in respective columns.

Table XI.4.4. Openness to Trade, Emerging Europe
(in percent of GDP)

	2000			2007			2009		
Country	Total Trade	Exports	Trade Balance	Total Trade	Exports	Trade Balance	Total Trade	Exports	Trade Balance
Belarus	151.0	73.3	-4.3	129.7	61.7	-6.3	133.3	61.7	-10.0
Bulgaria	116.1	55.4	-5.3	147.6	63.0	-21.6	112.7	52.4	-7.9
Croatia	86.5	41.0	-4.5	103.2	47.5	-8.3	73.9	35.1	-3.7
Czech Republic	129.3	63.2	-3.0	155.5	80.1	4.8	135.9	71.3	6.8
Estonia	171.5	84.2	-3.2	156.6	72.4	-11.7	133.1	69.7	6.3
Hungary	150.4	73.3	-3.8	159.0	80.1	1.2	153.0	79.0	5.1
Latvia	89.9	41.2	-7.5	103.4	41.5	-20.5	83.0	41.4	-0.2
Lithuania	95.7	44.7	-6.3	121.8	54.2	-13.4	100.4	49.8	-0.9
Poland	60.4	27.0	-6.4	84.9	41.0	-2.9	71.4	35.8	0.1
Romania	70.1	32.4	-5.2	73.9	29.9	-14.1	65.1	29.7	-5.7
Russia	67.6	44.1	20.6	52.3	30.4	8.6	48.9	28.1	7.4
Serbia	23.8	8.8	-6.2	80.1	28.7	-22.8	67.3	26.2	-14.9
Slovakia	199.4	98.1	-3.2	193.0	96.2	-0.5	120.3	60.1	-0.1
Slovenia	129.3	62.6	-4.0	140.5	69.3	-1.9	116.6	59.4	2.1
Ukraine	119.9	62.4	5.0	95.4	44.8	-5.7	99.6	48.6	-2.4
Unweighted:									
Medians	116.1	55.4	-4.3	121.8	54.2	-6.3	100.4	49.8	-0.2
Means	110.7	54.1	-2.5	119.8	56.1	-7.7	101.0	49.9	-1.2

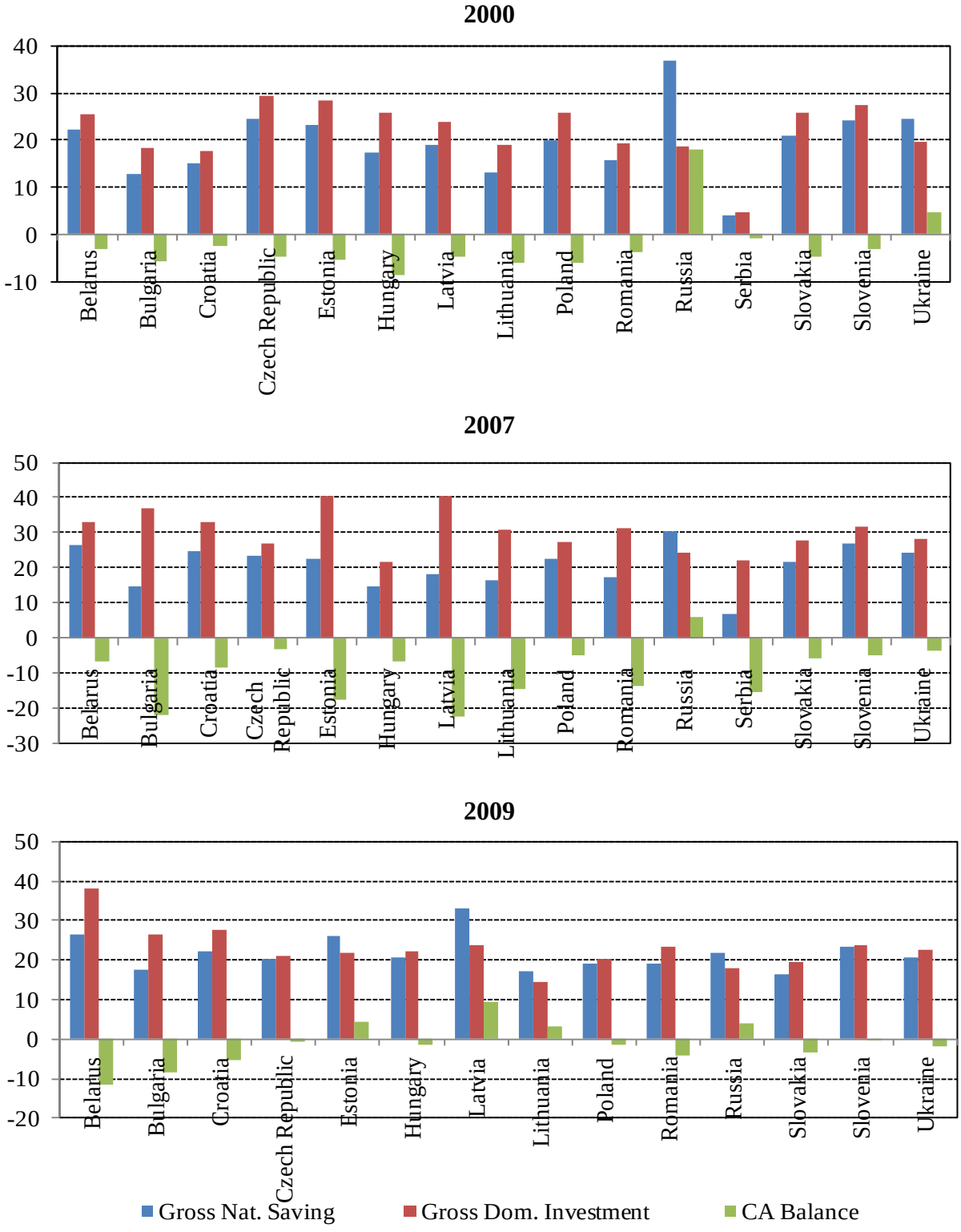
Source: EIU Country Data.
Notes: Trade figures include both goods and services. The unweighted medians are the cross-sectional medians of the data in respective columns.

Table XI.4.5. Budget Balances, Debt, and Credit Growth, Emerging Europe

	Budget Balance (% GDP)			Public Debt (% GDP)	Annual Credit Growth (%)	
Country	2007	2008	2009	2007	2005-2008	2009
Belarus	-0.3	-1.4	-1.0	11.5	40.5	12.5
Bulgaria	3.5	3.0	-0.8	18.2	35.0	8.0
Croatia	-2.6	-1.8	-3.2	49.7	15.9	2.0
Czech Republic	-1.7	-1.0	-6.6	26.2	14.4	1.3
Estonia	2.6	-2.7	-3.0	3.4	28.6	-4.0
Hungary	-5.6	-3.3	-4.0	66.0	15.7	-3.0
Latvia	-0.3	-4.1	-7.6	9.0	38.9	-9.5
Lithuania	-1.0	-3.3	-9.1	16.9	39.9	0.7
Poland	-1.4	-1.9	-2.0	42.5	22.4	9.4
Romania	-3.1	-4.8	-7.3	13.2	49.8	19.9
Russia	5.4	4.1	-6.0	5.3	27.0	18.0
Serbia	-1.9	-2.2	-4.3	33.7	33.8	13.0
Slovakia	-1.9	-2.3	-5.8	29.5	14.1	15.5
Slovenia	0.3	-0.3	-6.5	22.9	24.5	2.4
Ukraine	-1.1	-1.5	-6.0	11.6	64.4	15.6
Unweighted:						
Medians	-1.1	-1.9	-5.8	18.2	28.6	8.0
Means	-0.6	-1.6	-4.9	24.0	31.0	6.8

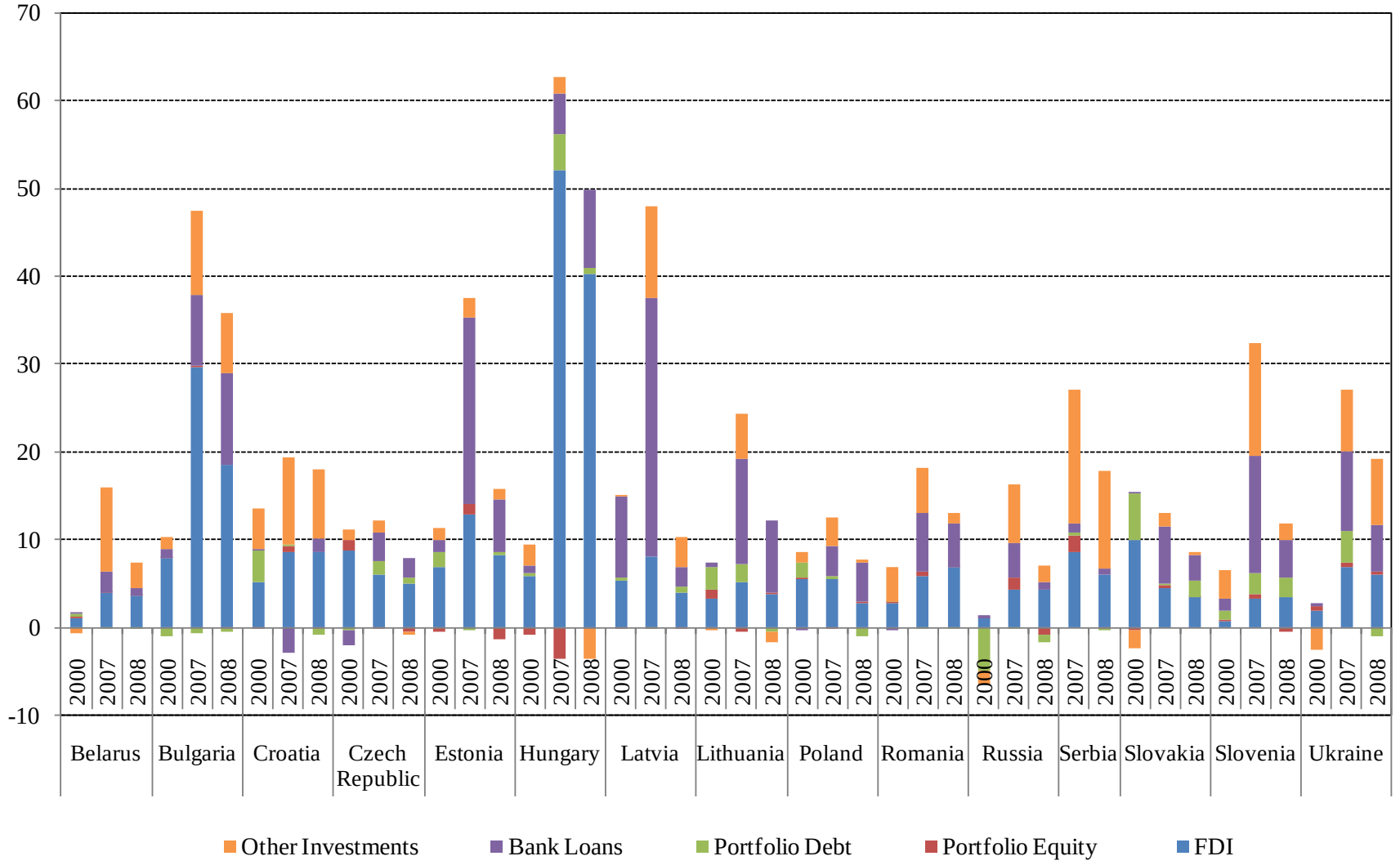
Source: EIUCountry Data, EBRD Transition Report 2009, WDI, and authors' calculations.
Notes: The unweighted medians are the cross-sectional medians of the data in respective columns.

Figure XI.4.1. Savings-Investment Balances, Emerging Europe
(in percent of GDP)



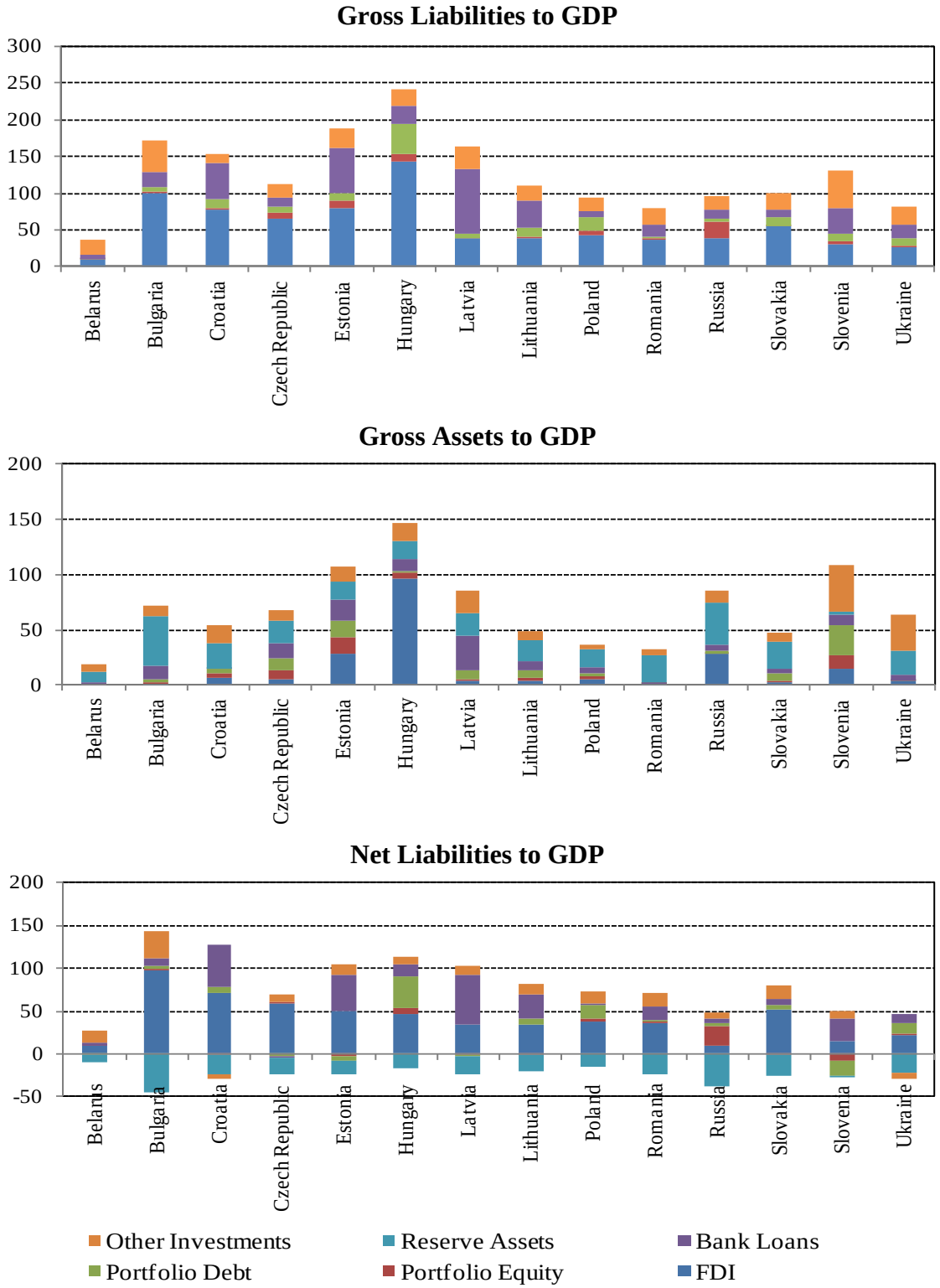
Source: EIU CountryData, WDI, and authors' calculations.
Notes: Data for Serbia in 2009 not available.

Figure XI.4.2. Gross Capital Inflows, Emerging Europe
(in percent of GDP)



Source: IFS, CEIC, GDP data from WEO, and authors' calculations.
Notes: Data for Serbia in 2000 not available.

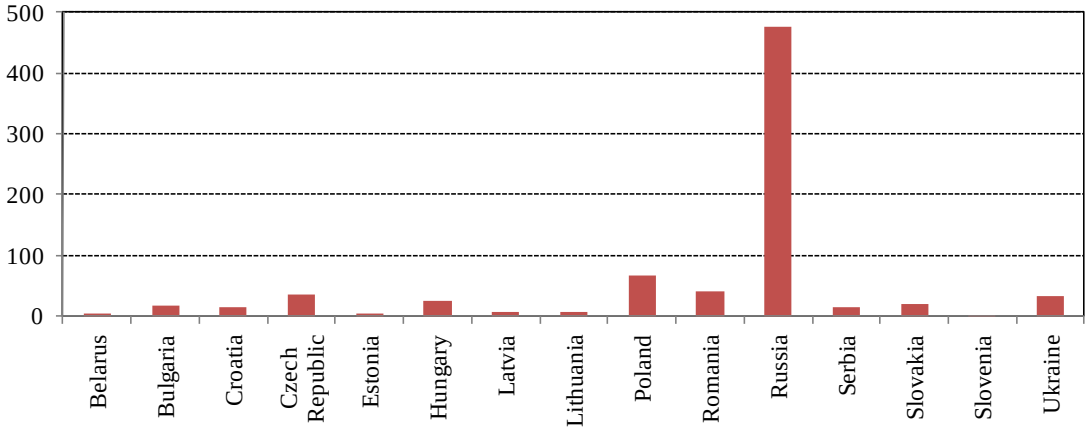
Figure XI.4.3. Gross and Net Stocks of Foreign Assets and Liabilities, Emerging Europe, 2007 (in percent of GDP)



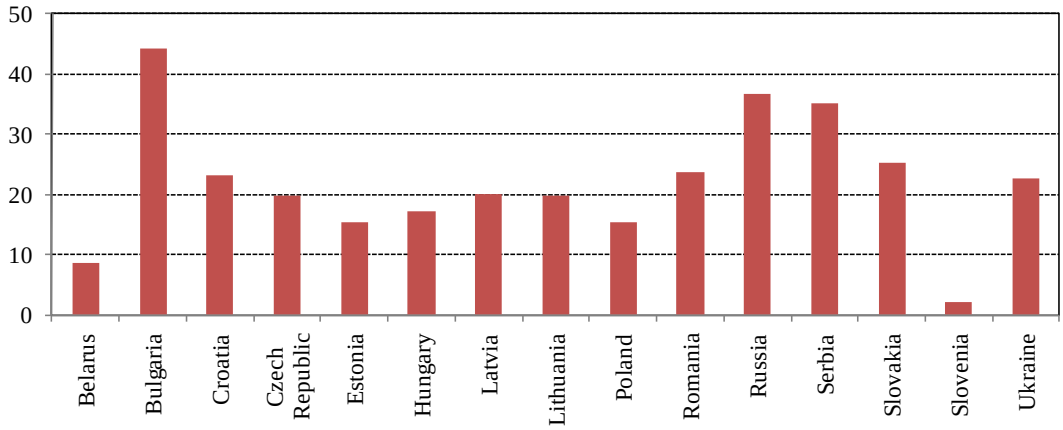
Source: IFS, Croatian National Bank, Bank of Slovakia, Bank of Slovenia, GDP data from WEO, and authors' calculations.
Notes: Data for Serbia not available.

Figure XI.4.4. Reserves in Emerging Europe before the Crisis, 2007

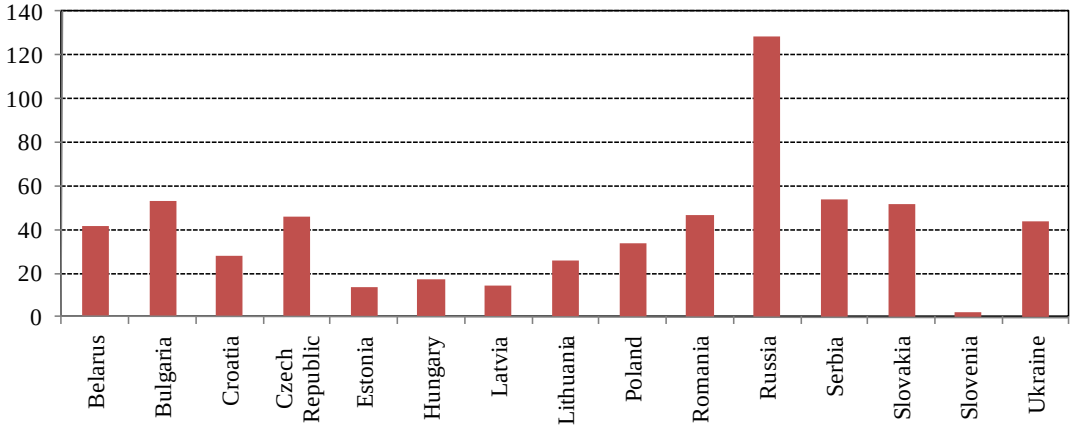
Reserves (in billions of dollars)



Reserves as a ratio to GDP

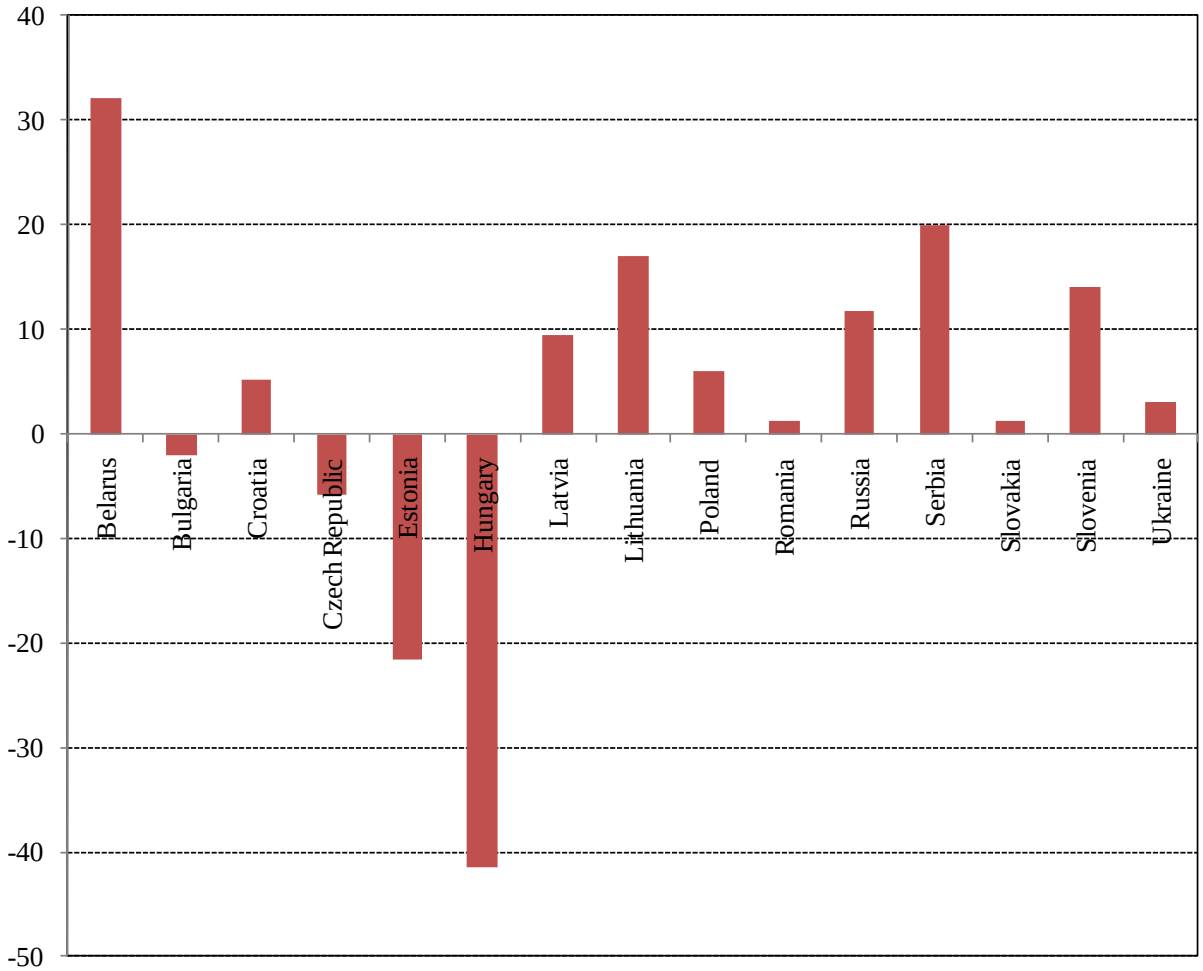


Reserves as ratio to external debt



Source: International reserves data from EIU Country Data, Bank of Slovenia, GDP data from WEO, and authors' calculations.

Figure XI.4.5. Reserve Losses During the Crisis, 2007-2008
(in percent)



Source: IFS, CEIC, and authors' calculations.
Notes: This chart shows the loss of foreign exchange reserves, in percentage terms, from December 2007 to December 2008. A negative number indicates reserve accumulation during this period.