Decoupling: Myth or Reality?

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Abstract:

When, in the mid-2000s, large parts of the global South experienced an impressive economic boom, the idea that a number of emerging market economies were "decoupling" from the industrialized economies in the North gained considerable prominence. The financial and economic crisis that originated in the US and the global recession that it entailed, however, put this idea into question. The present paper analyzes different channels of crisis transmission and crisis effects in emerging markets (and the BRIC countries in particular) to demonstrate that decoupling is a myth rather than reality.

Key Words: Decoupling, Emerging markets, Economic crisis, Transmission channels, Dependence

JEL codes: F1, F3, F44, O11, O19

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1. Introduction

"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 grow fast the developing grow fast, and when the developed slow down, the developing slow down. Is this linkage inevitable?" (Sir A. Lewis 1979)

For most of the time in the past, the economic development of developing countries has been considered to be highly dependent on the level and dynamism of economic activity in the industrialized world, particularly in the United States. External factors and external shocks were attributed a great importance in the determination of the economic fate of the countries in the global South. And they seemed to be more relevant than ever in an era of intensified global economic integration starting in the 1970s, usually labeled "globalization" and shaped by an ideological paradigm known as "neoliberalism". Also, the outstanding boom experienced by almost the entire developing world in the very recent past, i.e. in the years 2003 to 2007, was mainly driven by favorable external conditions (Griffith-Jones/Ocampo 2009: 4).

However, this time – according to a number of observers, columnists, economists, and (stock) market analysts – the nature and reach of the boom were different in the sense that it had led to a longer-term strengthening at least of the most dynamic and most potent economies in the developing world. In this interpretation, which gained considerable prominence in certain economic circles in the years 2007 and 2008, this last economic boom and the longer-term economic consolidation it apparently triggered for emerging economies and particularly for the BRIC countries (Brazil, Russia, India, and China) have allowed them to "decouple" from the economic developments in the industrialized hemisphere.[2] In view of the initial resilience of many developing countries against contagion from financial and economic turmoil in the US, the old proverb "when the US sneezes, the rest of the world catches a cold" was said to have lost its relevance. However, in the light of more

[2] With a view on the historical context, Kohn (2008) argues that "[p]art of the reason the hypothesis of decoupling has gained so much traction is that the economies of the world had appeared particularly 'coupled' during the last major downturn in the United States, the high-tech slowdown in 2001 and 2002".

recent events and developments in the global economy it can be claimed that this announcement of decoupling was premature. In fact, the still ongoing financial and economic crisis has had much more repercussions on the economies of the developing world than initially thought. This can be taken as indication that the myth of decoupling lacks substance.

Taking a descriptive approach and examining and interpreting recent data, the present paper aims at collecting evidence for dismantling the notion of decoupling. It starts with a brief sketch of what is commonly meant by the term “decoupling”. The next section analyses how the current economic crisis spread over the entire globe, highlighting various channels of transmission. This is taken as a first counterevidence against decoupling. Examining these spillover channels, it will be demonstrated that emerging economies have been harshly affected by this crisis that initially emerged in the industrialized world. Going one step further, the fourth section shows that key economic indicators of industrial countries on the one hand and emerging markets on the other hand have moved in tandem, undermining the notion of decoupling even more. The paper ends with some concluding remarks.

2. A brief sketch of “decoupling”

Even a long time after the end of the colonial era, the profound dependence of developing countries’ economic well-doing on the prosperity of industrial countries was reflected, inter alia, in more or less pronounced co-movements of economic activity in the global North and the global South[3]. This dependence also helped to explain the clustering in time of growth successes and collapses of developing countries during the 20th century (Ocampo/Ros 2008: Ch. 1, Ocampo et al. 2009: 29-30). Against this historical backdrop, to some optimistic observers and business analysts it looked like the world economic system had undergone a substantial transformation when (at least until mid-2008) most of the so-called emerging markets remained relatively unscathed from the economic turbulences occurring in the US and later also in Western Europe. This led some of them to bring up

[3] For the case of Latin America, see Izquierdo et al. (2008), for example.

the notion of "decoupling"[4], a term that was coined back in the year 2007 when the IMF asked in chapter 4 of its World Economic Outlook "Decoupling the train?" while referring to "spillovers and cycles in the global economy" (IMF 2007). Although the term gained considerable prominence in certain economic circle, no attempt has been made to come up with a coherent definition of what and who exactly is meant by "decoupling". In other words, there is no unique, agreed-upon definition which one could refer to. What is more, there is hardly any academic literature one could draw on. In fact, the term "decoupling" has been rather used by (stock) market analysts, columnists and commentators (see, for example, Goldman Sachs 2007 or JP Morgan 2009).

As a result, there are a number of slightly different and varyingly far-reaching definitions in use. While some focus specifically on stock markets, what is usually meant with "decoupling", though, is a shrinking relationship between the *economic activity* in industrial countries on the one hand and emerging market economies on the other hand. A narrower interpretation claims that a certain "divergence" or "de-synchronization" of *business cycles* has taken place (Kose et al. 2008: 4). Proponents of a more comprehensive definition of "decoupling", however, suggest that – thanks to a diversification in the sources of economic growth (i.e. strengthening of growth in domestic demand components while lowering the relative contribution of exports), structural changes and domestic policy improvements – emerging market economies have reduced external vulnerabilities and, thus, become more resilient to external and global shocks. The combination of these developments, in turn, has allegedly allowed emerging markets to *become more independent* of, i.e. to "decouple" from advanced economies in recent years (The Economist 2009a, Kohn 2008). At the extreme end, however, some even go as far as viewing emerging market economies, and in particular China, as "new engines" or "new locomotives of global growth" (Das 2006; Smith 2006; Financial Times 2009a).

Facing this lack of a consistent widespread definition of "decoupling", we have to come up with our own version. In fact, we will base our analysis on a rather broad definition and refer to the

[4] For a particularly enthusiastic account of promoting the idea of decoupling, see Bergsten (2008). Kose et al. (2008) and Kohn (2008), on the other hand, are examples for those who make a cautious case for decoupling.

"decoupling" of the aggregate of emerging market economies from the industrialized world as a whole, while paying special attention to the BRIC countries. Basically, our understanding of "decoupling" relates to the question whether there are actually *divergences in economic performance* among different regions of the world economy. In this perspective, "decoupling" refers to the degree of *sensitivity of economic activity* in emerging economies to external or global factors. In that sense, we stick to the latter of two definitions identified by Levy-Yeyati (2009), according to whom "decoupling" has "two distinct interpretations: business cycle synchronicity (in the sense of globally synchronised expansions and recessions) and sensitivity (closer to the cold metaphor)", with the "cold metaphor" saying that "whenever the world [catches] a cold, emerging markets [get] pneumonia" (ibid.). Examining both financial and real economy indicators, we will try to answer Sir Arthur Lewis' question quoted at the beginning of this paper, i.e. whether or to which extent the economic fate of emerging markets is still *dependent* on the economic activity in developed countries.

3. The spreading of the current crisis: channels of transmission

In the years before the crisis almost every developing and emerging economy experienced a veritable boom. Between 2003 and 2007, the developing world recorded average growth rates of 7% per year. The boom was based on an extraordinarily favorable international economic environment, characterized by at least three coinciding positive factors: 1) high commodity prices, 2) thriving international trade, and 3) high liquidity in international capital markets, implying exceptional financing opportunities especially for emerging market economies. However, all these factors reversed when what started as a subprime crisis in the US turned into a global economic crisis after the collapse of Lehman Brothers in September 2008. In other words, the external factors that fueled the previous boom started to operate in the opposite direction (Griffith-Jones/Ocampo 2009: 4). As a consequence, most developing and emerging economies found themselves in the middle of an economic crisis. This section is dedicated to the analysis of the different channels of transmission of the financial and economic calamities from rich countries to poorer countries.

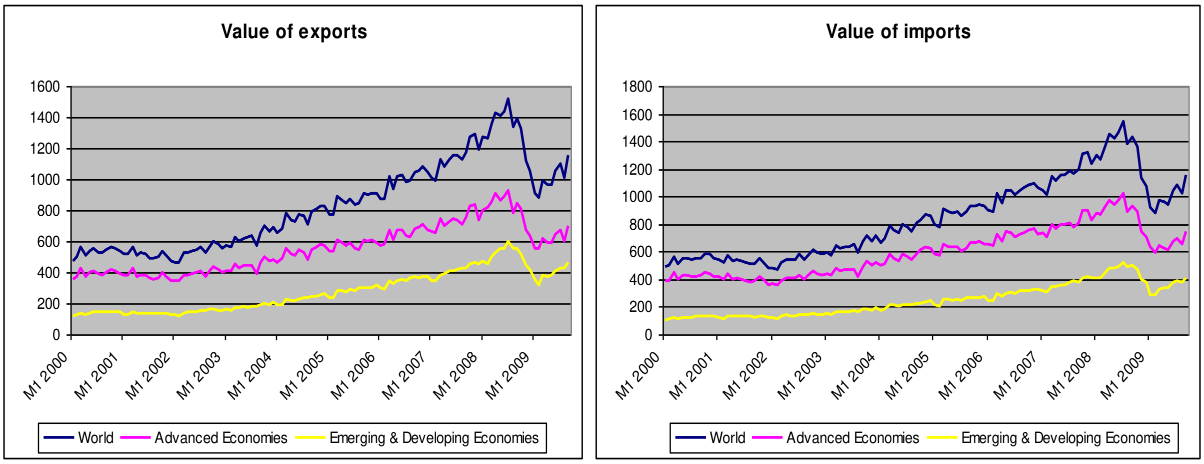
3.1 International trade as transmission channel

During the recent boom, international trade grew very dynamically, at an average annual rate of 9.3% between 2003 and 2006. With that, world trade has expanded at a rate more than twice the rate of world output growth (3.8% per year). Yet, international trade has shown a strong pro-cyclical pattern and has indeed been more volatile than world production (Ocampo 2009: 706). That's why the expansion of the volume of trade of developed countries started to decelerate rapidly since mid-2007 when the subprime crisis started to unfold. In contrast, developing and emerging economies were left relatively unscathed until the third quarter of 2008. The financial meltdown in September 2008, however, triggered a radical downturn in trade across the globe. International trade experienced a sharp contraction already in the last quarter of 2008 and declined by 19% on a year-to-year basis in the first quarter of 2009 (UNCTAD 2009a: 18). For the entire year of 2009, the volume of world trade in goods and services is forecast to contract between 9% and 12.2% (WTO 2009; UN 2009: 2; IMF 2009a: 2), highlighting how the crisis that originated in the US now impacts the whole world. However, not all developing countries are affected in the same way. For exporters of manufactures and services (especially tourism) the dominant transmission channel of the crisis is the fall in trade volumes whereas exporters of primary goods are particularly affected by commodity price trends (Griffith-Jones/Ocampo 2009: 7). In the following, these two transmission channels will be examined.

a) Declining export demand

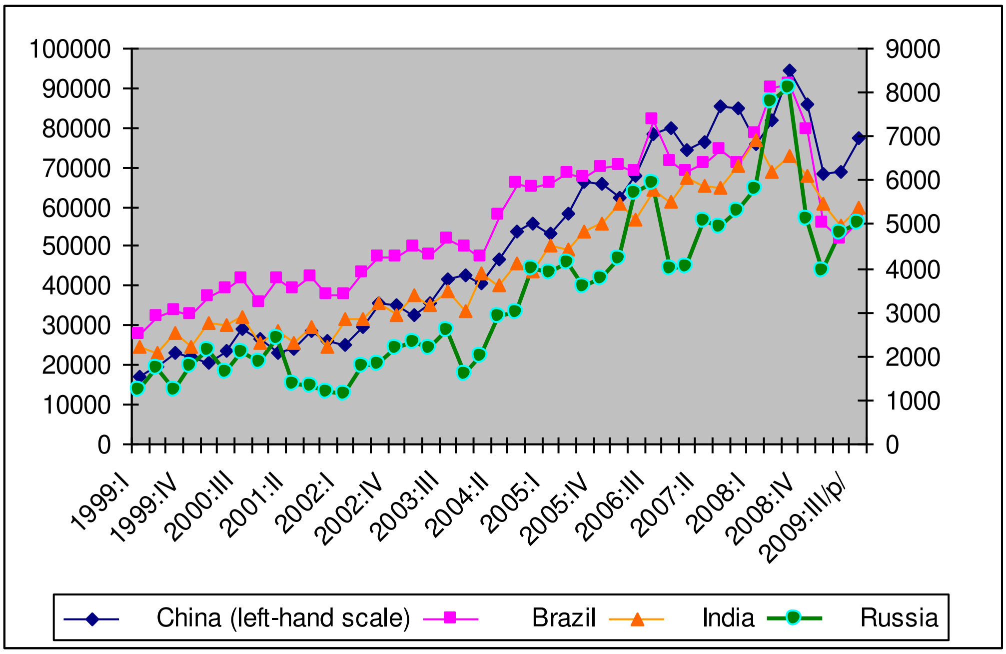
As can be seen in Figure 1, emerging market economies were particularly hard hit by the cutback in world trade. Both in terms of value and volume, their exports have fallen more pronouncedly than developed countries' exports. Among the countries that are most affected are those Asian exporters for which manufacturing exports take a sizeable share of GDP, e.g. Korea, Malaysia, Singapore, Taiwan and Thailand. They suffer from the fact that the purchase of investment and durable consumer goods is easier to defer than that of foods and basic services (UNCTAD 2009a: 19-20).

Fig. 1: World Trade, January 2000-September 2009 *(in billion US$)*



Source: IMF International Financial Statistics Database

Fig. 2: Quarterly US imports of goods from BRIC countries, 1999:I-2009:III *(in million US$)*



Source: Bureau of Economic Analysis, International Economic Accounts Database

On the recipient end, the evolving recession implied the advanced economies slashing import demand. Their import volume of goods and services grew by a meager 0.47% on a year-to-year basis in 2008 and is estimated by the IMF to plummet by 13.7% in 2009 – compared to an average annual growth of 5.8% in the time period between 2002 and 2007.[5, 6] For example, the US, the single most important importer on a world scale, reduced its imports dramatically. In the first three quarters of

[5] All data are from the IMF World Economic Outlook Database, October 2009.
[6] According to the same forecasts, emerging and developing economies will also be forced to cut their imports by 9.5% in 2009 – following an episode of tremendous expansion by an annual 10.8% between 2000 and 2008. This indicates how the economic slowdown has gained ground also in these countries.

2009, US imports of goods were 32% below their level of the previous year.[7] As Figure 2 shows, this also affected all the BRIC countries, who without exception suffered from decreasing US imports from mid-2008 on.

Looking at the other big importer in the developed world, the euro zone, gives the same picture. Its imports fell sharply in the second half of 2008 and since mid-2009 it even registers a current account surplus, i.e. it is a net exporter (EUROSTAT 2009: 6). Table 1 and Figure 3 highlight that this had major impacts on leading emerging economies, among them the BRIC countries. In the first 9 months of 2009, EU-27 imports from the BRIC countries declined by an unweighted average of 24% compared to the same time period in 2008 (see Table 1).

Table 1: EU-27 trade with emerging markets *(in billion euro)*

	EU-27 exports to			EU-27 imports from			Trade balance	
	Jan-Sep 08	Jan-Sep 09	Growth	Jan-Sep 08	Jan-Sep 09	Growth	Jan-Sep 08	Jan-Sep 09
Brazil	19.6	15.0	-23%	27.0	19.4	-28%	-7.5	-4.3
China	59.2	58.3	-1%	179.5	157.4	-12%	-120.4	-99.1
India	24.2	19.6	-19%	22.5	19.2	-15%	1.7	0.5
Russia	79.7	47.5	-40%	140.9	82.1	-42%	-61.2	-34.6
South Korea	19.8	15.4	-22%	29.3	24.2	-17%	-9.4	-8.8
Turkey	43.2	31.7	-27%	35.8	26.4	-26%	7.4	5.3

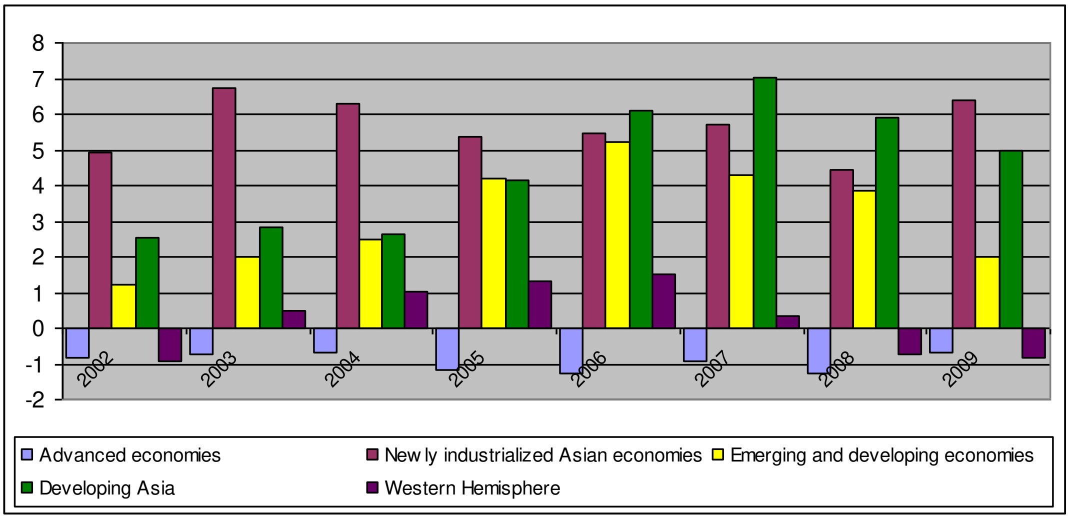
Source: EUROSTAT (2009: 4)

As a consequence of slipping import demand from the US and the EU, the current account surpluses of developing Asia (including China and India), the newly industrialized Asian economies[8], and the developing and emerging economies in general have shrunk while the trade balances of Western Hemisphere countries have turned negative (see Fig. 3). In the latter case and particularly in the case of the South American exporters of primary goods, however, this deterioration is not only related to falling demand but also to declining commodity prices.

[7] They fell from 1,648 billion US$ in 2008 to 1,131 billion US$ in 2009. Data from Bureau of Economic Analysis, International Economic Accounts, http://www.bea.gov/international/

[8] According to IMF classification: Hong Kong, Singapore, South Korea, and Taiwan.

Fig. 3: Current account balance of selected regions, 2002-2009* *(in % of GDP)*



** Figures for 2009 are estimates*
Source: IMF World Economic Outlook Database, October 2009

b) Worsening Terms of Trade (ToT)

For the large number of commodity-exporting developing and emerging economies, the spreading crisis affected them primarily via a drastic worsening of their Terms of Trade (ToT). One of the main characteristics of the economic boom preceding the crisis was the unprecedented boom in commodity prices. Between 2004 and mid-2008 the world economy witnessed the most impressive commodity boom in over a century in terms of duration, magnitude and product coverage, although the boom was more pronounced for mining and energy products than for agricultural goods (World Bank 2009a: Ch. 2, see also Table 2). However, the boom came to an abrupt end in mid-2008 with "the downturn in commodity prices (…) first triggered by a reorientation of speculative influences" (UNCTAD 2009a: 7) and then exacerbated by the deterioration of both global economic prospects and global demand. Between mid-2008 and December 2008, commodity prices fell by almost 42% (Ocampo 2009: 707) and for 2009 the World Bank (2009a: 40) predicts the prices of energy products and non-energy products to decline by a further 25% and 23.2%, respectively. According to the IMF[9], Terms of Trade will worsen by 6.3% in 2009 (compared to 2008) for the entirety of emerging and developing economies, particularly hitting commodity-exporting countries in the Middle East and the Western Hemisphere, while developing Asia will experience only a modest improvement of 2.2%. Among the

[9] Data from the IMF World Economic Outlook Database, October 2009.

BRIC countries, Russia is the most affected by these trends, owing to its dependence on oil exports. Overall, commodity price volatility has been a key channel of crisis transmission from the advanced to all developing and emerging economies (Bhushan 2009: 4).

Table 2: World primary commodity prices, 2002-2008 *(% change over previous year)*

Commodity group	2003	2004	2005	2006	2007	2008	2002-2008*	Jan.-Dec. 2008**
*All commodities****	8.1	19.9	11.7	30.4	12.9	23.8	164.0	-22.5
All food	4.1	13.2	6.3	16.3	13.3	39.2	129.8	-11.8
Agricultural raw materials	19.8	13.4	4.0	15.0	11.2	19.4	115.6	-25.6
Minerals, ores and metals	12.4	40.7	26.2	60.3	12.8	6.2	283.0	-37.0
Crude petroleum	15.8	30.7	41.3	20.4	10.7	36.4	288.9	-54.3

** Percentage change between 2002 and 2008*
*** Percentage change between January 2008 and December 2008*
**** Excluding crude petroleum*
Source: UNCTAD (2009: 8)

3.2 Financial transmission channels

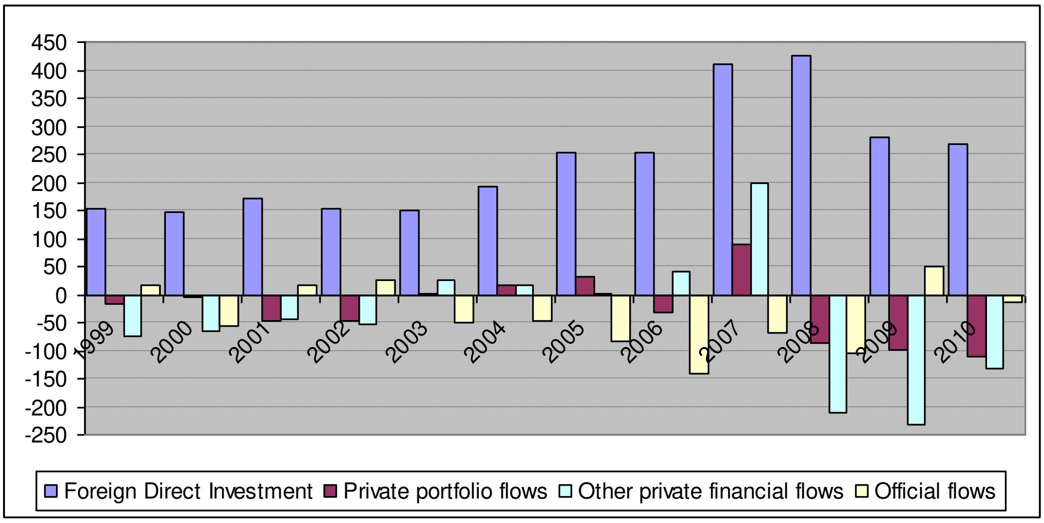
The bursting of the US house price bubble in mid-2007 roiled international financial markets but the collapse of Lehman Brothers in September 2008 was the decisive turning point, "replacing financial exuberance by financial fear" (Palley 2008) not only in the US but on the entire globe. Financial contagion spread quickly across regions and asset classes, with private capital flows being among the key channels of crisis transmission.

a) Foreign capital flows

In reaction to the mid-September 2008 meltdown, credit to emerging markets banks and businesses was frozen and capital outflows were registered through two channels: investors' typical "flight to quality" (in particular to US Treasury bonds) and "the sale of assets throughout the world to finance the withdrawal of resources from mutual and hedge funds in the USA" (Ocampo 2009: 713). As a result, overall private capital flows to emerging market economies have fallen sharply. They dropped by about 50% to 466 billion US$ in 2008 and are forecast to further decline to 165 billion

US$ in 2009, down from a record level of 929 billion US$ in 2007 (UN 2009: 11). As a consequence, *net* capital flows are expected to turn negative in 2009 (see Fig. 4). The category of private capital inflows that experienced the sharpest cutback was bank lending to emerging markets[10], reversing inflows of 410 billion US$ in 2007 and 167 billion US$ in 2008 into a projected outflow of 60 billion US$ in 2009 (Griffith-Jones/Ocampo 2009: 6). Among the countries that suffered most from this turnaround of international bank lending were Russia and several economies in Central and Eastern Europe. Increasing risk aversion among international investors became also manifest in the reversal of private portfolio investments from inflows of 88 billion US$ in 2007 to outflows of 85 billion US$ in 2008. In contrast, foreign direct investment (FDI) inflows have remained relatively stable. However, their upward trend was halted and they declined considerably in the first quarter of 2009. In fact, they are projected to further decrease in 2009 for all regions (see Fig. 4, UNCTAD 2009b: 3, UNCTAD 2009c: 8-11).

Fig. 4: Net capital flows to emerging and developing economies, 1999-2010 *(in bn. US$)*[*]



** Figures for 2009 and 2010 are estimates*
Source: IMF World Economic Outlook Database, October 2009

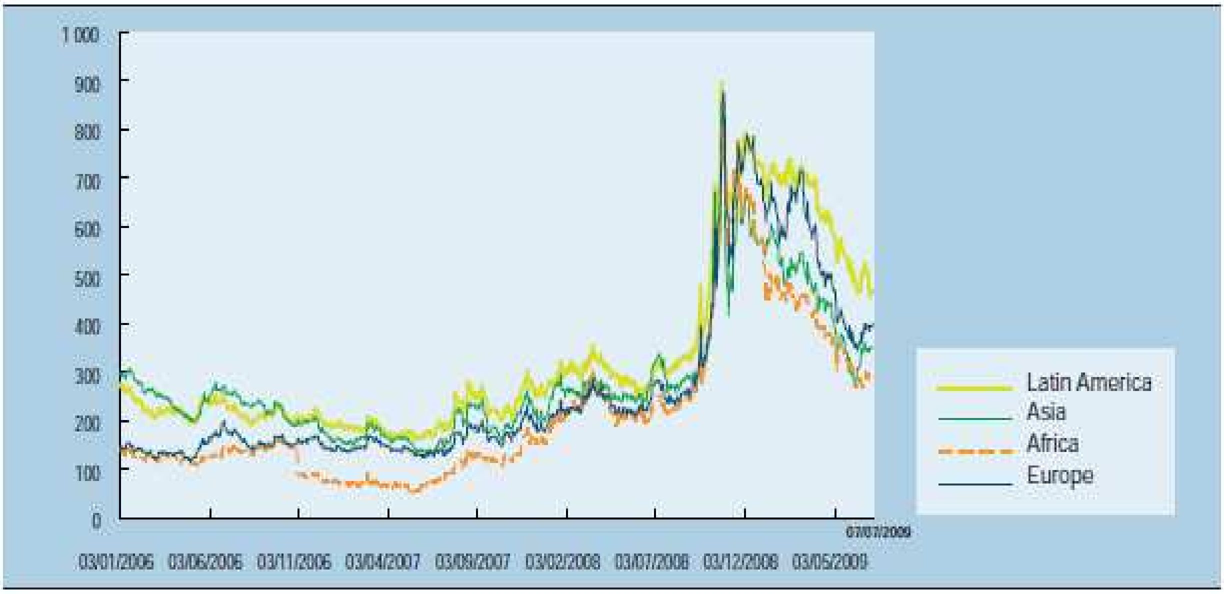
b) Rising costs of external financing and declining bond issuance

The crisis spilled over not only through volumes but also through the associated costs of private capital flows, with these costs largely determined by sentiments in international financial markets and

[10] This item is included in the “other private financial flows” in Figure 4.

international investors' risk perception. In fact, one central feature of such flows is their pro-cyclicality. In the early phase of the boom, from mid-2004 to early 2006, risk spreads on emerging market bonds (and thus also the cost of emerging markets' external financing) fell substantially and stabilized at low historical levels afterwards (Ocampo 2009: 711). With turmoil starting in US financial markets in mid-2007, first signs of contagion became visible as spreads on emerging market bonds began to increase. This trend culminated in a drastic jump of risk spreads and yields with the global financial meltdown of mid-September 2008 (see Fig. 5), when risk evaluation was revised dramatically by international investors and rating agencies, leading to a "flight to safety". At this point, exuberance was replaced by panic, and widespread risk appetite turned into general risk aversion. In combination with the rising costs of external financing, this change in sentiments – reflected in private capital withdrawals – had severe negative impacts on the issuance of both sovereign and corporate bonds. Emerging economies were affected more severely than developing countries since the latter are less integrated into international private capital markets. Emissions in bond markets virtually came to a halt in many emerging economies during the last quarter of 2008, with the key problem being the interruption of bond issues in international capital markets (IMF 2009b: 204).

Fig. 5: Yield spreads on emerging market bonds, January 2006-July 2009



Source: UNCTAD (2009a: 17)

In short, far from being isolated from the turmoil in advanced economies, the financial markets of developing and particularly of emerging economies were hit hard, confirming "the strong correlation between markets that are not fundamentally related to each other but are subject to the same kind of global portfolio management decisions." (UNCTAD 2009a: 17)

4. Co-movement of key economic indicators: Is this really "decoupling"?

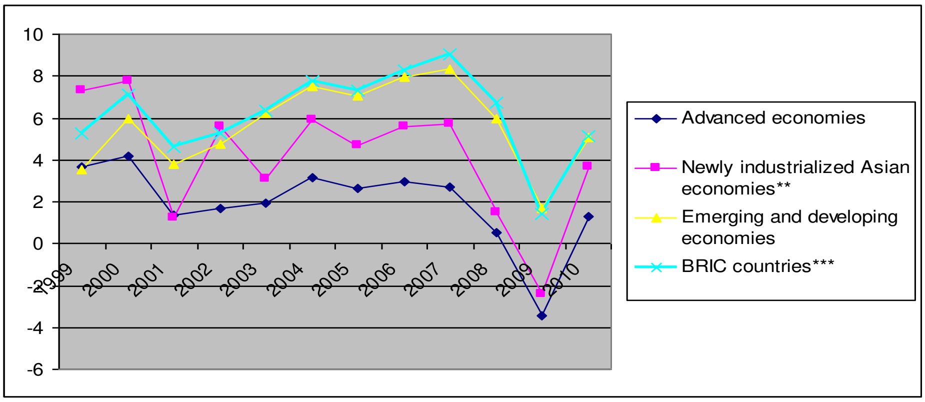
As has been shown, the crisis that originated in the US spread across the globe within a bit more than a year, taking different channels of transmission to different countries and regions. In a lot of these countries, contagion was severe and the effects of these spillovers dramatic, both on the real economy and on financial markets. These will be analyzed in the following, before taking a specific look at the BRIC countries and, finally, discussing "decoupling".

4.1 Real economy effects of the spreading of the crisis

Almost all developed countries slipped into recession in the course of 2008. In 2009, advanced economies as a group registered a negative growth rate of 3.4%. Meanwhile, although developing and emerging economies do not slide into a downright recession, they follow suit, experiencing a considerable growth slowdown (see Fig. 6). After expanding at an average annual rate of 6.4% between 2000 and 2008, they grew by a meager 1.7% in 2009.[11]

[11] Of course, this average covers regional differences. Some regions registered negative output growth in 2009 (CEE: -5%, CIS including Russia: -6.7%, Western Hemisphere: -2.5% vs. annual +5.2% from 2004 - 2008) while others still expand (Africa: +1.7%, Middle East: +2%, Developing Asia incl. China and India: +6.2%, however down from an annual 8.2% from 2000 - 2008). All data are from the IMF World Economic Outlook Database, October 2009.

Fig. 6: Real GDP growth, selected regions and BRIC countries, 1999-2010 *(in %)**

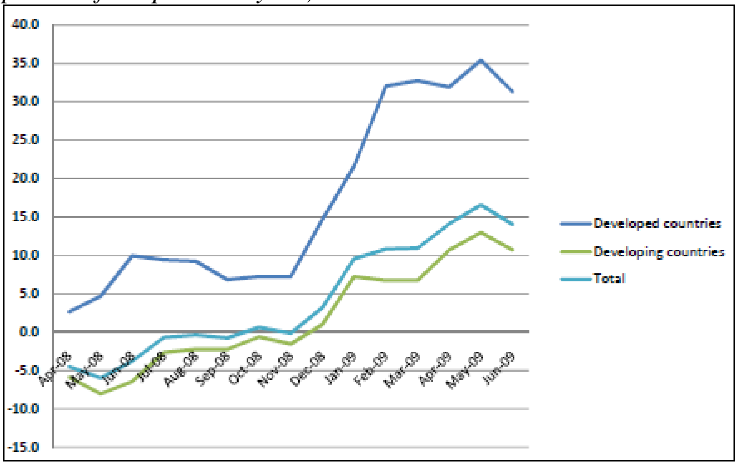


** Figures for 2009 and 2010 are estimates*
*** Composed of 4 countries: Hong Kong SAR, Korea, Singapore, and Taiwan Province of China.*
**** Unweighted average*
Source: IMF World Economic Outlook Database, October 2009

As we have seen in the previous section, developing and emerging economies have suffered from sliding export demand since mid-2008. Moreover, except for China, India and South Africa, all major emerging markets experienced falling investment demand in the first quarter of 2009 – in part due to declining FDI inflows, which account for about 13% of gross fixed capital formation in these countries (UNCTAD 2009a: 20). Correspondingly, on the supply side, industrial production slumped in the second half of 2008, following similar trends in advanced economies. Unsurprisingly, this also affected the labor market. In view of an increase of global unemployment by 10.7 million people – the largest year-on-year rise since 1998 – to a global number of unemployed at around 190 million in 2008, the International Labor Organization (ILO) argues that the motto for 2008 was: "From financial crisis in developed countries to a global economic and jobs crisis" (ILO 2009a: 9). In fact, in 2008, unemployment measured in absolute terms rose not only in the developed world, where the crisis originated, but in all world regions, including Africa, CEE, Latin America as well as East, South and Southeast Asia (ILO 2009a: Annex 3). As Figure 7 shows, this trend was continued in 2009, with unemployment in developing countries following the upward trend in developed countries, although at a slower pace and with the typical time lag with regard to the business cycle. Likewise, employment in manufacturing and in non-agricultural activities has been decreasing since January 2009 (ILO 2009b). In any case, an estimated 10.7 million jobs have been lost in selected emerging economies (for which data was available)[12] during the last quarter of 2008 and the first quarter of 2009 (ILO 2009c: 4).[13]

[12] Argentina, Brazil, Chile, China, Colombia, Ecuador, Egypt, Jamaica, Mauritius, Mexico, Morocco, other EU, Peru, the Philippines, the Russian Federation, South Africa, Sri Lanka, Thailand, Turkey and Venezuela.

Fig. 7: Recent trends in unemployment, April 2008-June 2009 *(Percentage change over the same period of the previous year)*

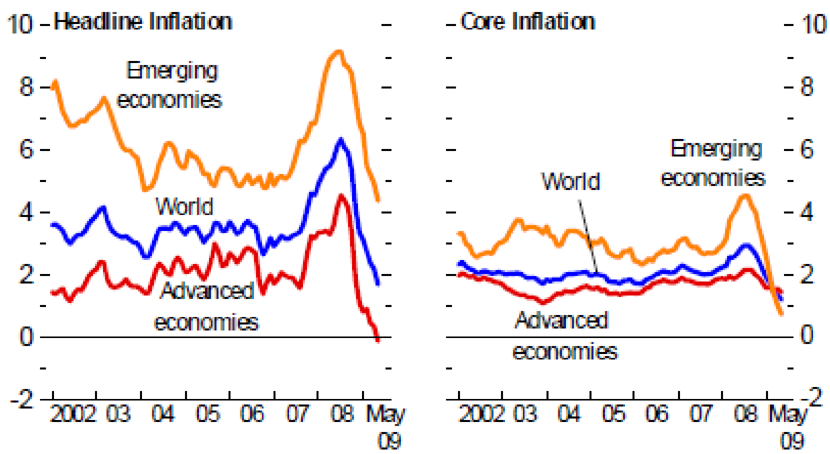


Source: ILO (2009b: 1)

4.2 Effects on financial markets

With economic growth down and unemployment up, inflation decreased not only in industrial countries but also in emerging economies, signaling a global rather than a regional downturn of economic activity (see Fig. 8). In view of this, national authorities had to adapt their monetary policy. While several central banks in emerging economies initially raised their key interest rate in an attempt to halt capital outflows, all of them have now followed the US Federal Reserve's downward move at least since the beginning of 2009 (UNCTAD 2009a: 27).

Fig. 8: Global Inflation *(12-month change in consumer price index unless otherwise noted)*



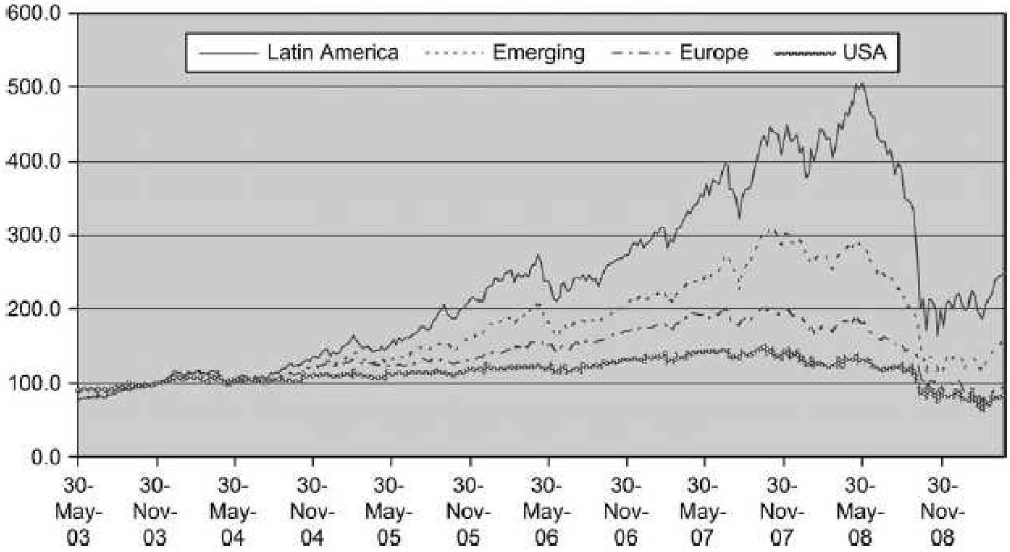
Source: IMF (2009a: 3)

[13] However, this data seems to be indeed very fragmentary. Other sources report that in China alone 41 million jobs have been lost due to the crisis. Additionally, job losses were estimated at 580,000 in South Korea and more than one million in Thailand (Financial Times 2009b).

In international financial markets, as was shown above, sentiments deteriorated radically in September 2008, with capital outflows and rising risk premia hitting emerging economies severely. The effects of this were manifold. Not only did risk spreads skyrocket in the initial panic, they also remained higher (see Fig. 5) and much more volatile than in the years prior to the shock. With the unwinding of carry trade and mutual and hedge funds withdrawing capital from July 2008 on, there was also a massive reversal of currency positions out of high-yielding emerging markets assets into advanced countries' currencies (Griffith-Jones/Ocampo 2009: 2). This had a significant negative impact on the exchange rates of emerging economies, generating volatility and depreciation. Indeed, with the notable exception of China whose authorities de facto re-pegged the Renminbi to the US dollar when the financial turmoil escalated (Financial Times 2009c, 2009d), most emerging market currencies depreciated against the US dollar in the second half or at least in the forth quarter of 2008 (IMF 2009b: 196). All this made attracting external financing more difficult. As a result, bond and equity issuance began to stagnate and finally came to a standstill at the end of 2008. According to the IMF (2009b: 204), bond issuance of developing and emerging economies fell from 186 billion US$ in 2007 to 106 billion US$ in 2008, while equity issuance dropped from 207 billion US$ to 54 billion US$.[14] This latter figure highlights that, in the second half of 2008, most emerging markets experienced major stress not only in their foreign exchange and sovereign debt markets but also in their stock markets where share prices collapsed and Initial Public Offers (IPOs) decreased substantially (Kannan/Koehler-Geib 2009). On average, contraction in emerging economies' stock markets was more pronounced than in industrial countries' stock markets (see Fig. 9).

[14] This affected also the BRIC countries. For example, there was no bond issuance in China during the last quarter 2008 and the first quarter 2009 and none in India during the second half of 2008 and the first half of 2009. In Russia, bond issuance plummeted from 6.3 billion US$ in the third quarter to 0.3 billion US$ in the fourth quarter of 2008 with a slight rebound in the first half of 2009. In Brazil, bond issuance dropped from 6.3 billion US$ in the first to 0.4 billion US$ in the second half of 2008, with a rebound in 2009.

Fig. 9: Stock market indices, May 2003-Nov. 2008 *(Index: July 2003-June 2004 = 100)*



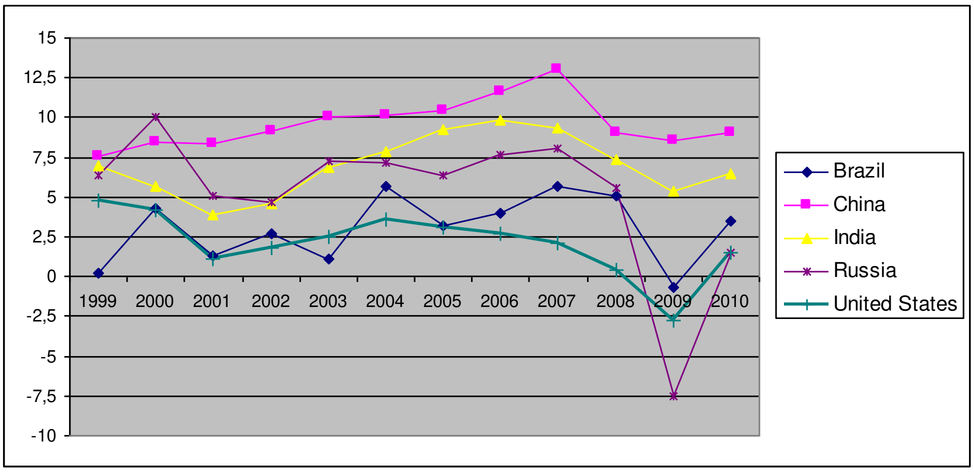
Source: Ocampo (2009: 713)

In summary, there have been clear co-movements in all of the main economic indicators of the aggregate of industrial countries on the one hand and the aggregate of emerging economies on the other hand. In the cases of capital (out)flows and emerging market risk spreads, in turn, the reversals were induced by events in the industrialized hemisphere. Let us now take a closer look at those emerging markets that have been said to be the strongest, the most dynamic and the most promising cases for "decoupling", namely the BRIC countries.

4.3 The BRIC countries

So, as has been shown, *on the aggregate,* developing countries and emerging market economies remain to a considerable degree coupled to the industrialized world. A first glance at real GDP growth rates suggests continuing coupling also for the BRIC countries, at least to a certain degree. As depicted in Figure 10, all the BRIC countries experience a trough at the same time the US does. Although the degree of contagion varies and although only two of them (Brazil and Russia) undergo a recession in 2009, none of them has remained unaffected. In the following, some arguments will be presented for each of the four countries that shed doubts on their "decoupling".

Fig. 10: Real GDP growth, BRIC countries and US, 1999-2010 *(in %)**



** Figures for 2009 and 2010 are estimates*
Source: IMF World Economic Outlook Database, October 2009

China is arguably the country that comes closest to decoupling with its powerful growth performance. But also China has suffered from a growth *slowdown*. As Figure 10 shows, the steady increase in GDP growth rates that began in 1999 and peaked in 2007 was interrupted in 2008, with slower growth rates also expected for at least two more years. The effects of this become visible, inter alia, in labor market statistics. Although Chinese job figures are not very reliable, anecdotal evidence confirms that unemployment went up significantly, with millions of migrant workers being laid off particularly in the battered export sector (The Economist 2009b).[15] The key factor behind this is the downturn in exports that started in November 2008 and continued in 2009, with exports being down by 19% (on a year-on-year basis) in the first quarter 2009 (World Bank 2009b: 3). Overall, China is still heavily dependent on exports, particularly to the US. During the last decade, Chinese export growth has exceeded GDP growth in every single year. In fact, Chinese exports expanded at an annual average of 17.6% from 1999 to 2008, while GDP growth averaged only at 9.8% during the same period. Meanwhile, private consumption grew at an average annual rate of 7.9%.[16] So exports clearly have been the main driver of Chinese economic growth during the last 10 years. The US remains by far the single most important export market, absorbing almost a quarter of China's total exports in 2008.[17] This also explains China's persistent reluctance to let its currency appreciate against the US

[15] According to estimations, 41 million Chinese laborers lost their jobs due to the crisis, with 23 million of them still out of work (Financial Times 2009b).
[16] All data are from the UN National Accounts Main Aggregates Database, http://unstats.un.org/unsd/snaama.
[17] Data from http://www.uschina.org/statistics/tradetable.html.

dollar.[18] Still, it has suffered considerably from plummeting US import demand since the onset of the subprime crisis and the recession it entailed in the US. During the first three quarters 2009 US imports of Chinese goods dropped by 15% compared to the first three quarters 2008.[19] At the same time, China is tied to the US also via its enormous holdings of US treasury bills as part of its foreign exchange reserves that make it fear a sharp depreciation of the dollar as this would imply a devaluation of its assets (Financial Times 2009e).

The flipside of the importance of exports for the Chinese economy is that the domestic market's contribution to economic growth is underdeveloped, particularly that of private consumption. China still lacks a broadly-based middle class with purchasing power.[20] In fact, only 37% of aggregate demand is household consumption[21]; exports make up the same share, namely 38%. During the last decade, these two components of aggregate demand have experienced inverse developments: while the share of private consumption has fallen by 9 percentage points (from 46% in 1999), exports have almost doubled their share in aggregate demand from 20% in 1999 to 38% in 2008. In other words, the domestic market is still too weak to be a sustainable "locomotive of growth" for China, let alone for the world economy. This is also true for the current growth acceleration which is primarily due not to private sector activity but to the authorities' countercyclical policies consisting of a massive fiscal stimulus package (amounting to almost 600 million US$ or 6.2% of GDP[22]), loose monetary policy and a credit boom fueled by lending from state-controlled banks that were ordered by the government to extend new loans (Financial Times 2009f, 2009g, 2009h, The Economist 2009b, UN 2009: 9). In view of all this, China's economy clearly still remains "coupled" to the industrialized world's economies.

[18] Yet, China's exchange rate policy has also a secondary objective: With its policy of anxiously maintaining the Renminbi's peg to the dollar, China also tries to hold its ground against competition from other emerging markets (Financial Times 2009c).
[19] Data from the US Bureau of Economic Analysis (BEA), International Economic Accounts Database.
[20] According to recent estimates, China's middle class population, defined as those with annual income of at least US$5,000, now numbers between 100 and 150 million people (The Economist 2009c, Chang 2008). This is about 10% of the total population.
[21] By comparison, in 2008 household consumption accounted for, respectively, 71% of US GDP, 61% of Brazil's GDP, 55% of India's GDP, 66% of Mexico's GDP, 54% of Korea's GDP, and 49% of Russia's GDP.
[22] In terms of percent of GDP, this is more than any developed country government is spending, including the US with a fiscal stimulus package of 5.5% of GDP (UNCTAD 2009a: 32).

There are some who argue that Asia, and China in particular, is not as dependent on exports to advanced countries as is usually believed because regional trade has intensified a lot (The Economist 2009b). Yet, "Asian countries can trade parts and components amongst themselves all they like (…) but they still need someone to buy their final products" (Eichengreen 2008) – and final demand for Asian goods still comes mainly from the world's major industrial countries. In fact, more than 60% of Asian exports are ultimately headed for G-3 economies, i.e. the US, euro zone, and Japan (Park 2009). With its ample current account surpluses, Asia's contribution to global demand falls short of its actual income. In contrast to the G-3 economies where consumption is only slightly below production, Asia consumes a mere 70% of what it produces (Park 2009).

Considerable hope has also been set on India as potential shock absorber in the global economic system, even though India is not as integrated into world economy as China. Still, as Ghosh and Chandrasekhar (2009: 725) assert, "[t]he view that the Indian economy would be less adversely affected by the global economic crisis because of limited integration and other inherent strengths has proved to be wrong." Rather, they argue, the economic boom that preceded the current downturn was crucially nourished by three external factors: first, increasing reliance on exports (in particular of services); second, rising dependence on inflows of foreign capital; and third, the role these inflows played in promoting a domestic credit-fueled consumption and investment boom (ibid.). Indeed, the importance of foreign trade for the Indian economy has soared in recent years. The trade-to-GDP ratio has more than doubled between 1995 and 2006, reaching 23% in the latter year. Correspondingly, India's trade collapsed parallel to world trade during the crisis. Exports started to contract in October 2008 and dropped by about 20% until September 2009. This stands in stark contrast to the dynamism they had exhibited before the crisis, growing robustly at an annual 28% from September 2003 to August 2008 (Alex/Kumar 2009). What is more, India has become increasingly reliant on inflows of foreign capital in recent years. On the one hand, the contribution of FDI to gross fixed capital formation has risen from 1.9% (annual average in the period 1990-2000) to 9.6% in 2008 (UNCTAD 2009b). On the other hand, many capital inflows have been of speculative nature, encouraged by financial liberalization, tax concessions to international investors and opportunities for carry trade. In

2007-08, when its current account recorded a deficit of 1.5% of GDP, India received capital inflows amounting to over 9% of GDP, thus exceeding by far its current account financing needs (Subbarao 2009: 387). Among the capital inflows was also foreign bank credit, which sparked a retail credit boom that played an important role in financing recent private expenditure expansion. Essentially, the principal stimulus for growth in the recent boom episode was credit-financed housing investment and private consumption of the elite and burgeoning middle class, while sluggish employment generation reduced kept mass consumption demand low. This is not a very sustainable but rather uneven and vulnerable growth paradigm. Indeed, by mid-2008, this growth process reached its limits and adverse external shocks caused a slowdown. Thus, “recent events have exposed the fallacy of ‘decoupling’ [for India]” (Ghosh/Chandrasekhar 2009: 726).

Brazil has been hit hard by the crisis too. After two years with growth rates above 5%, it has now gone through a crisis-induced recession and is projected to record negative growth in 2009 (see Fig. 10). During the first quarter 2009, manufacturing output decreased by 12.6%, exports by 19.4% and gross fixed capital formation by 14% (UNCTAD 2009a: 20). The latter was partly due to the fact that Brazil was severely affected by heavy fluctuations of foreign capital flows, among them FDI.[23] However, after suffering from net outflows in late 2008 and early 2009, it experienced a veritable flood of capital inflows in the course of 2009, among them a lot of hot money. By November, the real had appreciated by 31% against the US dollar compared to its bottom value in end 2008, harming Brazil’s exports (Financial Times 2009i). In fact, Brazil is one of the world’s biggest commodity exporters. In this regard, Brazil has become increasingly dependent on China during the last years. It has benefitted directly from thriving Chinese demand for its commodities but also from the commodity price boom 2004-2008 which was decisively driven by Chinese purchases (UNCTAD 2009a: 11). Likewise, Brazil’s rebound in recent months has been facilitated by strong growth in China (Financial Times 2009i). All this shows that, far from decoupling, Brazil has remained tightly tied to the global economy. For Russia, “the weakest of the four” BRIC countries (Oakley 2009), hopes of decoupling have been smashed by the intensity of the crisis impact, with the credit crunch

[23] In fact, inward FDI flows accounted for 15.1% of Brazilian gross fixed capital formation in 2008, up from just 10.8% between 1990 and 2000 (UNCTAD 2009b). Their decrease at the turn of the year hurt capital formation.

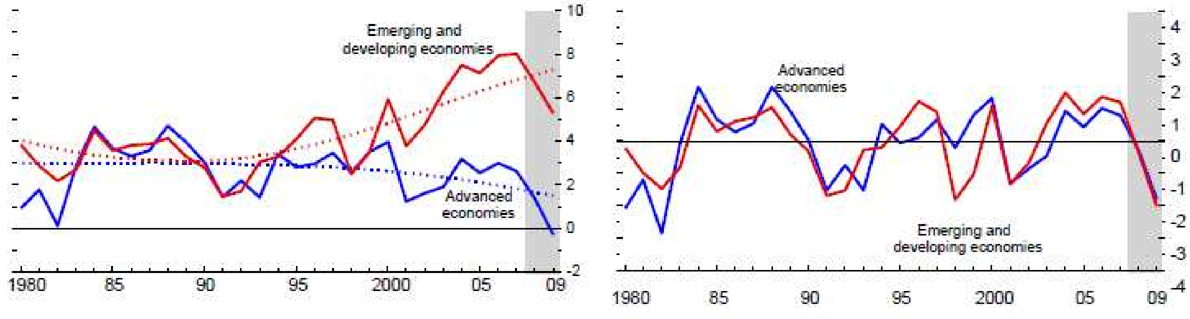
and sliding commodity prices triggering a growth collapse in 2009 after ten years of rapid expansion (see Fig. 10). To be sure, Russia's economy shrank 10.1 per cent in the first half of 2009 (Financial Times 2009j). Other indicators do not raise hope either: the first quarter 2009 witnessed manufacturing output declining by 19.6%, investment by 16.3%, and exports by 47.7% (all data on a year-to-year basis, see UNCTAD 2009a: 20). The key problem is that Russia's economy is very little diversified. Russia is still an energy-based economy that heavily depends on oil and gas and their exportation, particularly to the EU but increasingly also to China (Financial Times 2009k). With exports amounting to 31% of GDP, foreign trade plays an important role for the Russian economy. So do international financial markets, not only as a source of capital but also as a source of volatility. In a sharp reversal of depreciation pressures caused by falling oil prices and ruble sell-offs a year ago, the value of the ruble currently shows a strong tendency to go up, following the rise in oil prices (Financial Times 2009l). In other words, Russia's economy is still closely tied to the international economy, particularly via the oil price.

4.4 Some initial discussion of "decoupling": fact or fiction?

During the boom years prior to the crisis, a number of analysts fervently advocated the idea of "decoupling" emergent market economies. When the crisis started to spread over the entire globe, affecting also all emerging economies, however, the belief in decoupling faded quickly. But while the proponents of decoupling were muted by the diffusion of the crisis, they reappeared when the recovery of emerging markets preceded the recovery of the industrialized countries. Improving stock market and real economy data were interpreted as proof of their increasing strength – and of decoupling (Palit 2009). Indeed, many emerging economies have already rebound (see above) and among the best-performing stock markets in 2009 are almost only those in emerging economies (Financial Times 2009m). However, this interpretation overlooks the fact that the stabilization of the economy in advanced countries and the return of "appetite for risk" among international investors (and the improvement of market sentiments in general) were prerequisites for the recovery in emerging markets.

In any case, discussion on decoupling has revived recently, with both proponents and opponents declaring victory. The proponents of decoupling usually refer to an empirical study by Kose et al. (2008) who make a cautious case for decoupling. According to their findings, the importance of global factors for emerging markets' economic activity has waned over time and their business cycles have increasingly desynchronized from those of industrial countries. In contrast, Rose (2009), Levy-Yeyati (2009) and Wälti (2009a) all conclude that there is little evidence for decoupling. Wälti (2009a) argues that as emerging markets saw a tremendous take-off in economic growth during the last two decades, their trend growth rates have diverged significantly from those of industrial countries (see Fig. 11). In order to avoid misleading conclusions when assessing the "decoupling" hypothesis, he suggests that instead of looking at real GDP growth figures one has to focus on the deviation of actual growth rates from trend growth rates. He illustrates his point with the following hypothetical example: "*Saying that China has decoupled from the US because China grows at 5% while the US experience an output decline of 2% is wrong. If the trend growth rate is 9% in China and 2% in the US, both countries are 4 percentage points below trend and their business cycles are therefore perfectly in tune.*" (Wälti 2009b) Looking at the deviations of the actual from the trend growth rates for both advanced and emerging economies, they seem to be very similar and move in tandem (see Fig. 11). On the basis of this analysis, Wälti (2009b) concludes that "decoupling was always a myth". This is in line with what we have found above. Our empirical analysis has shown that there are still pronounced co-movements in key economic indicators.

Fig. 11: Real GDP growth & trend *(% change)* **Real GDP growth–deviation from trend**



Source: IMF (2008: 1)

4. Concluding remarks:

There is no doubt that in the recent past a number of emerging economies, above all the so-called BRIC countries, have considerably strengthened their (macro)economic position and gained resilience against external shocks. However, many of the circumstances on which this invigoration was based were exceptional and they revealed rather than refuted the importance that external and global factors still have for the developing world. It must not be forgotten that it was the combination of a global economic boom, high liquidity in international financial markets and a historical commodity price boom that enabled many developing and emerging economies to run current account surpluses which allowed them to reduce external debts and build up foreign exchange reserves. Yet, global economic prosperity is elusive and international capital flows are (in)famous for their volatility. Relying to much on them creates economic vulnerability.

Even so, compared to most other historical periods, many emerging economies have indeed become slightly less sensitive to economic developments in the industrialized world. However, to talk about "decoupling" means to throw out the baby with the bath water. The current financial and economic crisis has demonstrated that even the bigger and stronger emerging markets remain closely tied to the fate of the developed world and thus vulnerable to external shocks. Despite the new strengths described above, all developing and emerging economies experienced either a recession or a considerable slowdown. Behind this lies the fact that – because of globalization – national economies have become more integrated. On the real economy side, it is obvious that international trade has gained importance for almost any country, thus making economic growth more reliant on export demand. At the same time, global business networks and cross-border production chains have made economies increasingly characterized by vertical specialization which has resulted in a major expansion of intra-industry trade, thereby amplifying contagion during times of crisis. On the financial markets side, emerging markets have successively opened up to international capital flows (mostly originating from developed countries), exposing themselves to the sentiments of foreign investors. All this has perpetuated or even reinforced economic linkages among countries in general and between emerging and advanced economies in particular. Even the most potent of all emerging markets, China, with its huge (potential) domestic market and its large FX reserves, remains heavily sensitive to developments in the world economy and its exports markets. Now some argue that many commodity exporters (like Brazil) and Asian economies are loosening their ties to rich countries and actually coupling to China. Apart from the fact that this would not really be "decoupling" either, these economies are, in essence, not decoupling from the developed world because this is where most of the final demand comes from. So, after all, emerging economies remain tightly linked to the world economy and its dominant players. Thus, decoupling – defined as decreasing sensitivity of economic activity in emerging economies to external and global factors – has so far been rather a myth than part of reality.

References:

Alex, D. and Kumar, R. (2009): The Great Recession and India's trade collapse, Column on voxeu.org on 29 November 2009, http://www.voxeu.org/index.php?q=node/4302 (retrieved on 12/14/2009).

Bergsten, F. (2008): Trade has saved America from recession, Blog entry on 1 July 2008, http://blogs.ft.com/economistsforum/2008/07/trade-has-saved-america-from-recession/ (retrieved on 10/31/2009).

Bhushan, A. (2009): Impact of the Global Economic Crisis on Low Income Countries, *Report on the Second Workshop of the Policy Responses to Unfettered Finance project*, North-South Institute, June 2009.

Chang, L. T. (2008): China's Middle Class, In: *National Geographic*, May 2008.

Das, D. K. (2006): The Chinese and Indian Economies: Comparing the Comparables, *Journal of Chinese Economic and Business Studies*, Vol. 4, Issue 1, February 2006, pp. 77 – 89.

Eichengreen, B. (2008): Asia and Global Stagflation, Column on voxeu.org on 19 June 2008, http://vox.cepr.org/index.php?q=node/1246 (retrieved on 11/23/2009).

EUROSTAT (2009): October 2009: Euro area external trade surplus 8.8 bn euro; 3.8 bn euro deficit for EU27, Euro indicators news release, http://europa.eu/rapid/pressReleasesAction.do?reference=STAT/09/187&format=HTML&aged=0&language=EN&guiLanguage=en (retrieved on 12/23/2009).

Financial Times (2009a): Interview with Robert Zoellick, 2 December 2009.

Financial Times (2009b): Concerns temper positive jobs data, 31 October/1 November 2009.

Financial Times (2009c): China dismisses currency pressure, 28 December 2009.

Financial Times (2009d): Renminbi at heart of world trade imbalances, 3 November 2009.

Financial Times (2009e): China considers extra $200bn for CIC sovereign wealth fund, 21 December 2009.

Financial Times (2009f): China's banks see rise in net profits, 30 October 2009.

Financial Times (2009g): China's external surplus set to halve, 5 November 2009.

Financial Times (2009h): Chinese banks aim to boost capital, 22 December 2009.

Financial Times (2009i): Big shift benefits emerging markets, 24/25 October 2009.

Financial Times (2009j): Russian economy plummets 10.1%, 15 July 2009.

Financial Times (2009k): Kremlin looks for a way to come in from the cold, 18 December 2009.

Financial Times (2009l): Russia aims to cool passion for the rouble as oil prices rise, 11 November 2009.

Financial Times (2009m): Betting on emerging markets, 17 December 2009.

Ghosh, J. and Chandrasekhar, C. P. (2009): The costs of 'coupling': the global crisis and the Indian economy, In: *Cambridge Journal of Economics*, Vol. 33, No. 4, pp. 725-739.

Goldman Sachs (2007): Asia Economics Flash, 24 September 2007, http://www2.goldmansachs.com/china/ideas/chinese-observations/research-docs/res-9.pdf (re-trieved on 10/24/2009)

Griffith-Jones, S. and Ocampo, J. A. (2009): The financial crisis and its impact on developing countries, International Policy Centre for Inclusive Growth, Working Paper No. 53.

ILO (International Labor Organization) (2009a): Global Employment Trends, January 2009, Geneva.

ILO (International Labor Organization) (2009b): Global Trends, December 2009, http://www.ilo.org/public/libdoc/jobcrisis/download/statistics/2009-12/0-global_trends_dec09 .pdf (retrieved on 12/26/2009).

ILO (International Labor Organization) (2009c): World of Work Report 2009, Geneva.

IMF (International Monetary Fund) (2007): World Economic Outlook 2007, Washington DC.

IMF (International Monetary Fund) (2008): World Economic Outlook Update, 6 November 2008, Washington DC.

IMF (International Monetary Fund) (2009a): World Economic Outlook Update, 8 July 2009, Washington DC.

IMF (International Monetary Fund) (2009b): Global Financial Stability Report 2009, Washington DC.

Izquierdo, A., Romero, R. and Talvi, E. (2008): Booms and Busts in Latin America. The Role of External Factors, Inter-American Development Bank, Working Paper No. 631.

JP Morgan (2009): Pillars of a New Paradigm. Emerging Asia infrastructure, www.jpmorgan.com/directdoc/pillars.pdf (retrieved on 12/09/2009).

Kannan, P. and Koehler-Geib, F. (2009): Finding contagion, Column on voxeu.org on 3 December 2009, http://voxeu.org/index.php?q=node/4318 (retrieved on 12/09/2009).

Kohn, D. L. (2008): Global Economic Integration and Decoupling, Speech at the International Research Forum on Monetary Policy, Frankfurt, Germany, 26 June 2008, http://www.federalreserve.gov/newsevents/speech/kohn20080626a.htm (retrieved on 10/29/2009).

Kose, A., Otrok, C. and Prasad, E. (2008): Global Business Cycles: Convergence or Decoupling?, IMF Working Paper No. 08/143, June 2008.

Levy-Yeyati, E. (2009): On emerging markets decoupling and growth convergence, Column on voxeu.org on 7 November 2009, http://www.voxeu.org/index.php?q=node/4172 (retrieved on 12/09/2009).

Lewis, A. (1979): The Slowing Down of the Engine of Growth, Nobel Prize Lecture, 8 Dec-ember 1979, http://nobelprize.org/nobel_prizes/economics/laureates/1979/lewis-lecture.html (retrieved on 11/29/2009).

Oakley, D. (2009): Building Success, In: *Financial Times*, Supplement on the Future of Finance, Part four: the global economy, 9 November 2009.

Ocampo, J. A. (2009): Latin America and the global financial crisis, In: *Cambridge Journal of Economics*, Vol. 33, No. 4, pp. 703-724.

Ocampo, J. A., Rada, C. and Taylor, L. (2009): Growth and Policy in Developing Countries: A Structuralist Approach, New York: Columbia University Press.

Ocampo, J. A. and J. Ros (2008): Uneven Economic Development, London: Zed Books.

Palit, A. (2009): Are we decoupling yet again? Column on 22 September 2009 on www.financialexpress.com/news/column-are-we-decoupling-yet-again/519779/2 (retrieved on 10/31/2009).

Palley, T. (2008): Decoupling vs. the Concertina Effect, Blog entry on 8 September 2008, http://www.thomaspalley.com/?p=125 (retrieved on 12/28/2009).

Park, C.-Y. (2009): Asia: No Safe Haven in Financial Panic, Column on voxeu.org on 3 February 2009, www.voxeu.org/index.php?q=node/2980 (retrieved on 12/09/2009).

Rose, A. (2009), Debunking ’decoupling’, Column on voxeu.org on 1 August 2009, http://www.voxeu.org/index.php?q=node/3829 (retrieved on 12/09/2009).

Smith, D. (2006): A new locomotive for global growth, Blog entry on 26 November 2006, http://www.economicsuk.com/blog/000409.html (retrieved on 10/31/2009).

Subbarao, D. (2009): Impact of the Global Financial Crisis on India: Collateral Damage and Response, In: *Reserve Bank of India Bulletin*, March 2009, pp. 385-391.

The Economist (2009a): Decoupling 2.0, 21 May 2009.

The Economist (2009b): Round and round it goes, 22 October 2009.

The Economist (2009c): Burgeoning bourgeoisie, 12 February 2009.

UN (United Nations) (2009): World Economic Situation and Prospects 2009. Update as of mid-2009, New York.

UNCTAD (2009a): Trade and Development Report 2009, Geneva.

UNCTAD (2009b): World Investment Report 2009, Geneva.

UNCTAD (2009c): Assessing the impact of the current financial and economic crisis on global FDI flows, April 2009, Geneva.

UNCTAD (2009d): Impact of Global slowdown on India's exports and employment, Draft report by the UNCTAD India Team, May 2009.

Wälti, S. (2009a), The myth of decoupling, manuscript, Swiss National Bank, Zurich.

Wälti, S. (2009b), The myth of decoupling, Column on voxeu.org on 27 July 2009, http://www.voxeu.org/index.php?q=node/3814 (retrieved on 10/31/2009).

World Bank (2009a): Global Economic Prospects 2009: Commodities at the Crossroads, Washington DC.

World Bank (2009b): China Quarterly Update, March 2009, World Bank Office Beijing.

WTO (World Trade Organization) (2009): WTO sees 9% global trade decline in 2009 as recession strikes, WTO press release 554/2009, 23 March 2009, http://www.wto.org/english/news_e/pres09_e/pr554_e.htm (retrieved on 10/30/2009).