New Forms of Government Intervention in the Era of Global Imbalances

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The paper illustrates how the Government role has recently evolved, specifically focusing on the 2008 financial crisis. First, we analyze the Government responsibilities in triggering the crisis, by bloating the supply of credit. We discuss emerging countries' expansionary monetary policy, in many cases aimed at defending their export, thereby directing huge savings flows towards developed countries. We then expound the role of the US housing and monetary policies, as well as other countries' policies, particularly regarding financial deregulation. Second, we deal with some critical aspects of Governments' intervention in the aftermath of the crisis. We show the negative impact of a number of policies, particularly in the accounting field, which contributed to exacerbating the tendency to an inefficient allocation of the available capital, where an excessive weight has been placed on low-risk assets, resulting in a slowdown of economic growth.
Finally, we use a simple game theoretic model to emphasize the need for an internationally coordinated financial regulation policy.

Governments, Financial Crisis, Credit Supply, Financial Regulation

1. Business cycles and Government interventions

A cross-countries historical analysis of the level of Government intervention in economic affairs emphasizes substantial oscillations. What distinguishes the various periods, however, is not merely, as one might think, the ideological platform of the leading political coalition in power, but shifts in the set of exogenous constraints faced by politicians, which triggers decisions often are in stark contrast with the more or less explicit ideological positions expressed by the political groups in power.

A comparative analysis of Government spending shows the well known difference between Europe, with a significant weight of Government, further scaled up by the recent crisis (in 2010, government spending in the Euro area is expected to lie around 50.2 percentage of GDP), and the United States, where the public sector, in spite of the recent expansion, remains lighter (with public expenditure currently projected to exceed 40% of GDP for 2010).

The role of Governments around the world is rapidly evolving, in response to the dramatic changes related to technological progress, emerging countries' growth and real and financial integration. National strategic policies, designed to drive or support the country's economic development, are getting less and less effective, as a result of the larger variety of options available to companies and to households, and to the massive interrelations among different geographical areas. This paper attempts to describe the direction of some of these changes. In particular, it discusses the various forms of

Government interventions before, during and after the global crisis of 2007. We illustrate how the emerging countries export-oriented monetary policies have contributed to the global imbalances that triggered the financial crisis. We then analyze the regulations enacted by developed countries that facilitated the transmission of the crisis to the real economy. We present the new actors of international industrial policy, the sovereign wealth funds, and we conclude by assessing the importance of a regulatory framework based on international coordination as a way to prevent future financial crises.

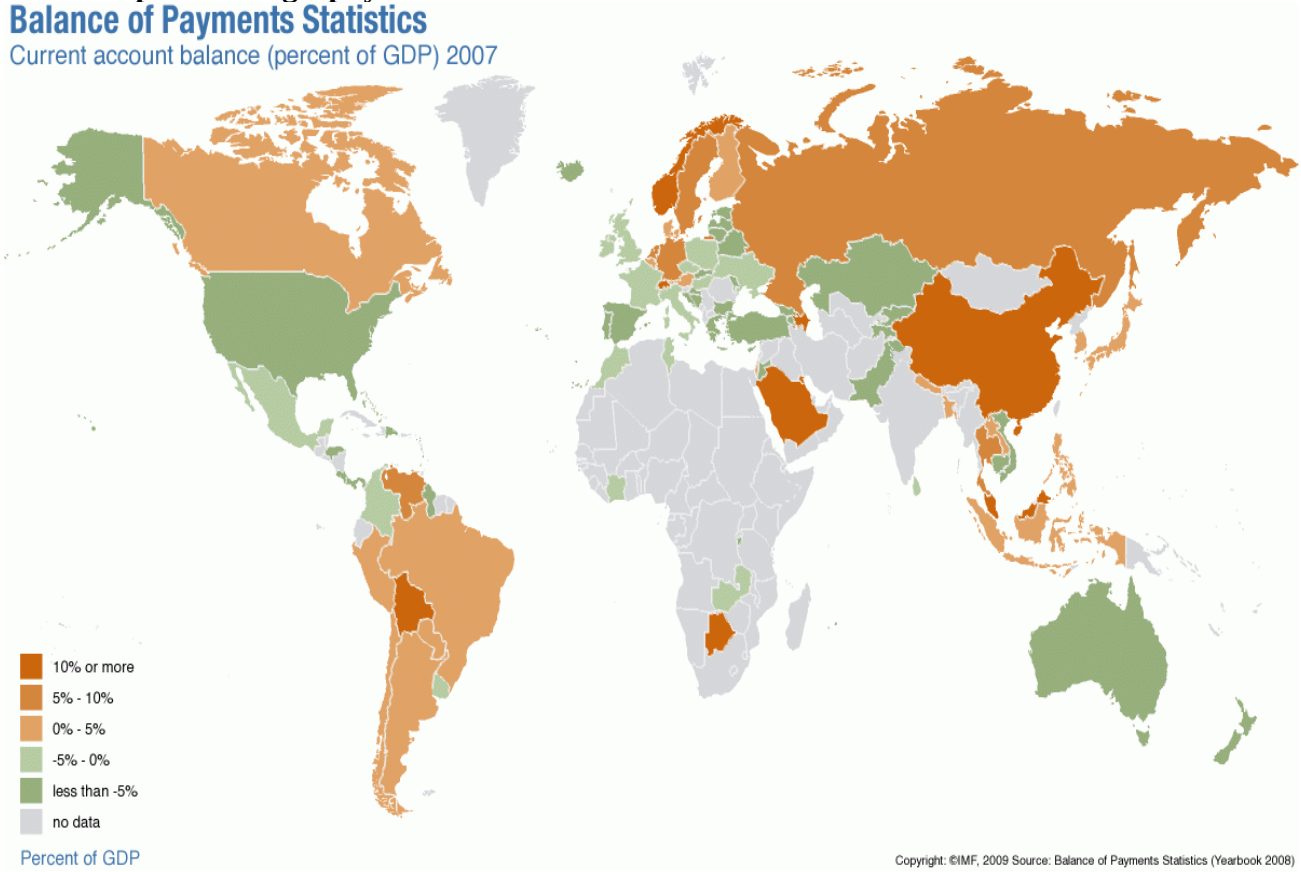
2. At the roots of the crisis: emerging countries monetary policy

This section illustrates the recent complex dynamics of financial markets, characterised by savings in emerging countries and accumulation of debt in the United States. The role of emerging countries' monetary policy in perpetuating such imbalances, which is at the roots of the explosion of the financial crisis, is highlighted.

2.1. The geography of savings

Significant trade imbalances have developed well before the outbreak of the financial crisis. Figure 3 shows the geography of the real flows for the year 2007 - paradigmatic of a situation that has been ongoing for several years.

Graph 3 – Geography of real trade flows in 2007



Source: International Monetary Fund Data Mapper

Red areas indicate a trade surplus, green areas a trade deficit. In both cases, more intense colours indicate a more sizeable balance.

The map immediately shows the direction of flows, by delineating two macro-areas. Trade surpluses originate from countries exporting goods and services, predominantly low-cost goods (e.g., China) and raw materials (e.g., Latin America and Russia). Trade deficits concern the U.S. and several European countries, particularly Eastern Europe.

This situation is rooted well before the turn of the century, as shown in Table 1, in which national accounts data are used to assess the phenomenon in a medium-run perspective.

Table 1.

	Current account balance			Net capital inflows[2]			Reserves			
							Change			Stock
	1990–93	1995–96	2000–05	1990–93	1995–96	2000–05	1990–93	1995–96	2000–05	July 2006[7]
Asia	6	–64	899	160	230	211	119	110	1,178	2,025
China	20	9	347	35	79	291	4	53	664	941
India	–17	–12	–5	20	16	95	7	0	99	156
Korea	–14	–32	82	20	41	51	5	8	136	225
Taiwan, China	39	16	117	–29	–21	30	10	–4	147	260
Other Asia[3]	–22	–45	358	114	115	–239	93	53	132	442
Latin America[4]	–85	–68	–26	138	105	106	71	49	83	244
Central Europe[5]	–2	–11	–102	6	34	134	16	21	39	99
Russia	1	18	290	9	–26	–31	10	7	167	243
Middle East[6]	–90	6	383	111	9	–302	–3	8	50	89
Total	–170	–119	1,445	423	351	117	214	195	1,517	2,701

Source: IMF, World Economic Outlook 2008

Data on the use of surpluses highlight the growing role of foreign exchange reserves. In China alone, in the 2000-2005 period, the reserves increased by 664 billion dollars, while over the 2002-2007 period, the overall increase was 140% (Butt et al, 2008). The Chinese reserves in dollars have topped 3 trillions in the first months of 2011. This issue deserves a thorough analysis aimed at capturing both the motivation behind reserves accumulation, and its impact on the persistence and the distribution of savings in emerging countries between the private and the public sector, as well as the new opportunities for the countries that hold them.
The reasons why developing countries accumulate reserves can be roughly classified into two broad categories: precautionary and strategic, that is, related to exchange rates. Precautionary reasons involve the need to own a resource – foreign currency, or, traditionally, gold – tradable to shield the national currency from currency crises that may threaten to quickly reduce its value. The reserves are essential in cases of speculative attacks against currencies – a common occurrence, as in the case of the South-East Asian crisis of 1996. Furthermore, countries that export raw materials whose prices are denominated in dollars, and whose exchange rate is in turn pegged to the U.S. dollar, hold a large amount of dollars to hedge against currency fluctuations.

More interesting for the purposes of our paper are the strategic reasons related to the objective of maintaining the value of national currency artificially low so as to increase export competitiveness. When a country accumulates foreign reserves for strategic reasons, its primary objective is not their immediate use for the defense of its currency; the use of foreign reserves, partly locked up, and managed according to profit-maximizing criteria by the so-called sovereign wealth funds (SWF), seems to indicate the prevalence of the strategic motivation behind the recent wave of foreign reserves accumulation. It is well known that, in the absence of monetary policy actions, a surplus

in the balance of payments (with exports exceeding imports) is expected to increase demand for the domestic currency, thereby increasing its value. In turn, the increase in value would raise the price of exports abroad (making the imported goods cheaper as well), thus contributing to the restoration of trade balance.
A monetary policy of accumulating foreign currency, on the contrary, slows down (or even cancels out) the automatic re-balancing. The increase in demand for national currency, triggered by the exports' surge, is countervailed by the increase in demand for foreign currency operated by the central bank. This ensures the persistence of exports. From the perspective of financial accounts, persisting trade surpluses are reflected into persisting financial surpluses: Citizens of developing countries (hereafter, DC), are net providers of funds abroad. The monetary policy of reserve accumulation, however, requires the prior issue of local currency, to be immediately converted into foreign currency. The resulting increases in the monetary base of the country lead to inflationary pressures (or alternatively, under sterilisation policies, increases in domestic interest rates, which depress investment). Monetary policy, therefore, through the inflation channel (or through its effects on interest rates under sterilisation policies) triggers a displacement of resources from the private to the public sector, by reducing private savings and transferring it to the public sector.

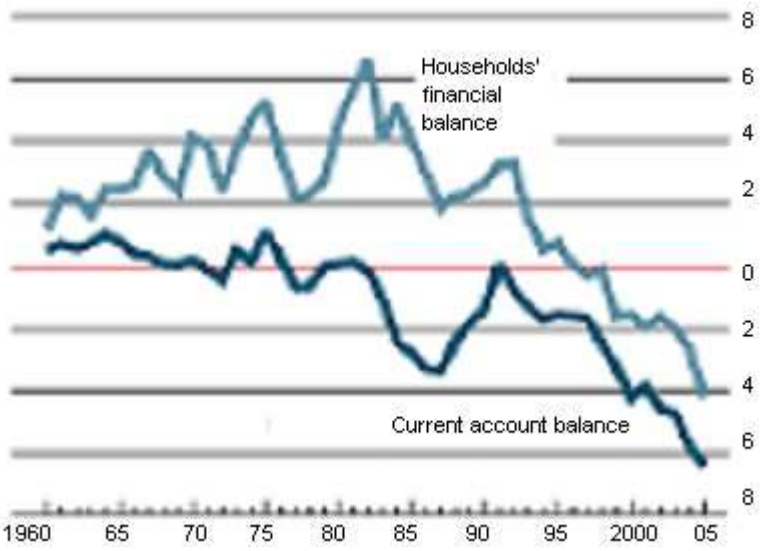
These policy measures are coupled, in the current historical circumstances, with households' strong incentives to save in DC, partly linked to the willingness to insure against future risks in an era of uncertainty such as that of globalisation (Rajan, 2006). Globalisation can indeed contribute to increase private savings through a variety of reasons, including high labour mobility, lack of social protection, and the demographic trend of population ageing.
The combination of the natural tendency to save within DC with a monetary policy of reserves accumulation has generated, in stark financial contradiction with the canonical neoclassical model of international trade[1], financial flows originating from poor countries and ending up in rich ones.

2.2. The reduction in interest rate

The propensity to save and the holding of foreign exchange by developing countries, particularly Asia, is coupled with the propensity to borrow from advanced countries, in particular the United States, as it is clear from Figure 4, which is the counterpart of the real financial flows identified in Figure 3.

Figure 4: the United States deficit

[1] According to the neoclassical model, flows should converge towards emerging countries, where returns tend to be higher, thanks to the better development prospects. The empirical evidence shows instead that, in the current economic environment, flows tend to originate in emerging countries and reach developed countries. The phenomenon (see, for instance, Bini Smaghi, 2007), can be related to financial markets imperfections in developing countries, among which China, that increase the acutal cost of granting credit to companies of that region.



Source: Goldman Sachs

The chart, published in 2005, highlights that over the last forty years the U.S. has consistently maintained a passive trade balance. While, however, until the mid-nineties the imbalance was largely used to finance investments, from that moment on, the situation has changed.

As American households' savings have turned negative in recent years, the imbalance has gradually extended up to support a portion of this private debt which is largely financed, as already noted, by developing countries. The United States has thus experienced a strong growth in private consumption, which can be argued to be largely financed by the large Chinese savings and not absorbed by the local economy.

American households incurred debts at very favourable conditions, not only thanks to the aforementioned large supply of savings, but also because of another peculiarity of the current economic situation: the extensively documented investment stagnation. The resulting weak credit demand by businesses, up to the period immediately preceding the crisis, entailed the dual effect of reducing the long-run equilibrium interest rate, and of channelling savings to households who have thus benefited (particularly in the U.S.) from very cheap liquidity.

The simultaneous occurrence of sustained growth, low interest rates and little inflation is a new and remarkable phenomenon, which questions the traditionally posited positive relationship between interest rates and economic growth.

3. The impact of western policies: regulation and housing policies

Asian savings, made persistent by the developing countries' monetary policies, along with the high propensity to consume, to import and to incur debt in Western countries, have laid the groundwork for the subsequent crisis. However, a number of political and technological factors that occurred in the developed world also significantly contributed. At least four of them are of particular interest for the purposes of this study: the regulatory changes occurring in the global financial system, technological progress, US monetary policy (clearly illustrated by Domenico Siniscalco, 2008), and – last but

not least – the guarantees and incentives granted by the American government to house buyers.

Each of these four aspects, originated mainly in the United States, helped to further facilitate the provision of credit, increasing supply, thereby reducing the interest rate. Households worsened their debt position, with a resulting increase in the default probability. This generated the surge in the systemic risk of the Western financial world, and the United States in particular.

We now examine in greater detail each of these factors, starting from the financial deregulation extensively discussed in the economic and political debate, perhaps to the detriment of other structural issues (global imbalances already mentioned in section 2) and economic policy (public policies to provide financial incentives to house buyers) that would have deserved much attention.

The wave of liberalisation has probably been much more comprehensive in the financial sector that in any other sectors. Two implicit assumptions lie at the basis of this process: the relative efficiency of financial markets and the inefficiencies of the regulatory authority. Such assumptions may be replicated for a variety of other sectors; however, financial deregulation is likely to have encountered less resistance from the public opinion than deregulation in other sectors. Citizens indeed do not immediately perceive the consequences of the liberalisation policies; in addition, there were few economic interest groups hostile to it.

The main points of deregulation have consisted in the progressive removal of barriers to capital flows and in the removal of regulatory barriers among various classes of intermediaries, who have been given the opportunity to diversify in various sectors of financial services. The 1999 Gramm-Leach-Bliley Act, by repealing the more restrictive Glass-Steagall Act, allowed financial institutions to integrate in the activities of commercial banking, investment banking and insurance.

At the same time, private banks have been allowed to hold risky assets, including hard- to-evaluate financial derivatives, resulting from complex financial operations: banks operated according to the principle, confirmed by the Basel II and Basel III rules, according to which the banks themselves are better able to assess their own risk attitude than regulatory authorities. The derivatives have exacerbated the problem of asymmetric information in the aftermath of the outbreak of the crisis, leading various financial institutions to bankruptcy or to the verge of that.

Deregulation has favoured the emergence of a wave of financial innovation. In particular, the combination of the two elements has allowed banks to collect an increasing amount of information on potential borrowers, thereby expanding the market of potential underwriters of mortgages and favouring new financial products that, while in some cases have enhanced the potential for value creation, and therefore profits, have also usually increased the overall systemic risk. The new tools available to banks required changes in management strategies. The attempt to achieve an increased efficiency in the distribution of risk has triggered the phenomenon of securitisation in risky assets, a banking practice that has increased steadily since the early 90's and up to the time preceding the outbreak of the crisis. At the end of 2007, the amount of securitised assets stood at 2.4 trillion dollars, and the amount of total asset-backed bonds[2] (collateralised debt obligations, CDOs) had reached 502 billion dollars (see

[2] Before securitisation (or alternative forms of credit risk transfer) took place, a bank's decision of whether or not to grant a credit had to consider jointly the emission of the loan, its maintenance among the bank's assets, and its funding using internal resources (deposits, shares or securities). Opportunities

Jiangli and Pritsker, 2008). Securitisation has generated a significant blow in the profits of banking institutions, bound to abruptly stop as the crisis hit, that is, at the end of 2007, when the secondary market for debt securities got disrupted. The practice of securitisation, generated by financial innovation and the opportunities arising from deregulation, has helped risk allocation in a way deemed to be effective back then, resulting in a further increase in loan supply. Alongside, it reduced the market transparency, thereby increasing vulnerability of the securities' buyers (including banks) to sudden negative shifts in expectations, and therefore particularly exposed to the crisis.

Many observers (Siniscalco, 2008) have attributed to the expansionary monetary policy pursued by the U.S. Federal Reserve, then chaired by Alan Greenspan, a significant role in maintaining low interest rates and, consequently, in the outbreak of the crisis. While ex post many, including Greenspan himself, believe monetary tightening would have been useful to relax the stress on financial markets, it should be noted that the Fed's monetary policy was based on the criterion of letting the discount rate approach the market value of long-run interest rate (which, as discussed above, was very low), as determined by the intersection between supply and demand for credit. The responsibility of the U.S. central bank to lower interest rates can therefore be considered only partial.

Finally, a special American social policy designed to encourage home purchases, and indirectly, of course, the entire construction industry, involved two very large government sponsored entities: the "Federal National Mortgage Association (Fannie Mae) and the "Federal Home Loan Mortgage Corporation" (Freddie Mac). Fannie Mae and Freddie Mac, whose massive liabilities in 2007 reached 40% of U.S. GDP, were in charge, on the basis of a political mandate, to refinance mortgages and to buy a portion of them. As Frame and White (2005) point out, this is the major American housing public policy[3]. The two companies were implicitly financially backed by the government, through the guarantee of the use of federal funds for their activities. The size of the two companies, together with guarantees provided by government participation, helped to reduce interest rates on loans in those categories, according to their statutes, where they were involved: reliable estimates (see Frame and White, 2005) indicate in 0,25% the impact of Fannie and Freddie on the reduction of interest rates on the loans they back.

4. The outbreak of the financial crisis and its transmission to the real economy

The combination of low interest rates and significant debts incurred by the private sector, especially by American households, with emerging countries generated the

generated by securitisation allow financial institutions to disjoint the decision of granting credit to that of maintaining it within the bank's perimeter. Banks can indeed sell credits to specific financial institutions, called *special purpose vehicle* (SPVS). SPVs fund the credit purchases by issuing Securities, whose redemption is funded by the credit services. Securities are structured according to various risk classes. In a relatively opaque market, with relevant informational asymmetries as that of securitised debts, banks must provide SPVs with adequate signals, in order to persuade them both on the intrinsic high quality of debtors (adverse selection), and on the bank's effort to adequately monitor them (moral hazard). Banks signalling activities are twofold: ex ante, they maintain the riskier within the banks' perimeter; ex post, they buy part of the Securities issued by the SPVs.

[3] We thank a referee for pointing out this fact.

conditions for the outbreak of the crisis. Indeed, the availability of abundant liquidity at a low price in the United States has triggered a significant use of leverage on the part of household, but also on credit institutions. They have used these resources thus accumulated for loans (so-called subprime) also to households that would be unable to provide adequate guarantees, thereby getting exposed to significant risk of insolvency in accordance with the well known transmission mechanism involving financial institutions.

A decline in collaterals prices, i.e. housing, has provided an incentive for borrowers to default on their loan (as the cost of redeeming the mortgage was higher than the value of the underlying house). The resulting string of defaults has filled the banks' assets with low-value houses, thereby leading to devaluations that deteriorated their balance sheet. In addition, the difficulty in valuing the complex mortgage-backed securities exacerbated the issue of asymmetric information, and, through the channel of negative expectations spreading out, contaminated even solid institutions that did not carry "toxic" assets. As a result of this turmoil, some of the financial institutions around the world were ultimately bailed out by their governments; others collapsed. Mario Deaglio (2008) estimates the costs of bankruptcy in 2 million jobs lost only in the United Kingdom.

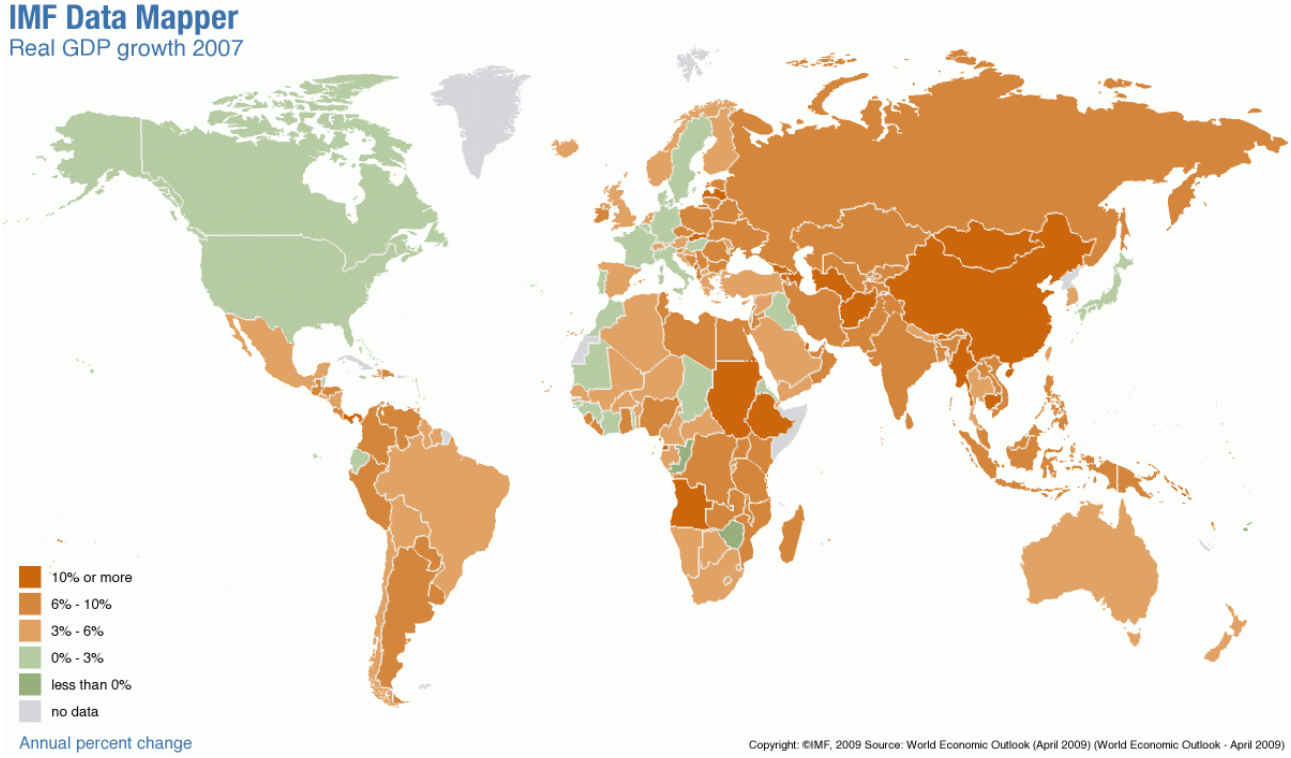
4.1. The "contagion" to the real economy

The crisis quickly spread out to the real economy. This resulted in a significant drop in the growth rate, that turned negative in 2008 in almost all developed countries, and decreased although remaining positive, in the developing countries.

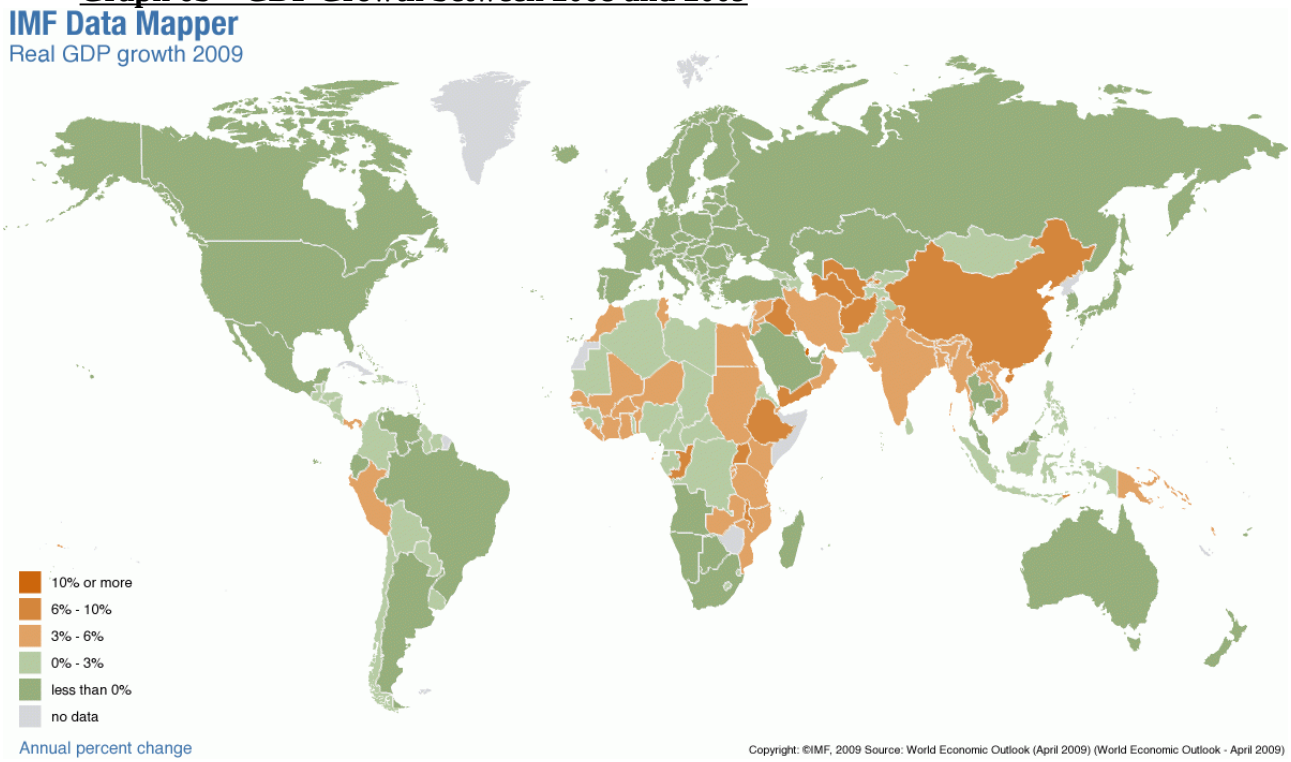
The United States also experienced a decline in the growth rate: the fall in the housing market was both intense and widespread throughout the country. Similar drops in prices had never been recorded since World War II. Signs of a trend reversal for the year 2010 were registered in the end of 2009. Figure 5 shows the pattern of house prices, covering not only the generally more modest subprime-funded houses, but other housing types backed by primes issued to financially sound individuals.

The following graphs 6a, 6b, and 6c, referring respectively to the years 2007, 2009 and 2010, show a significant slowdown of growth.

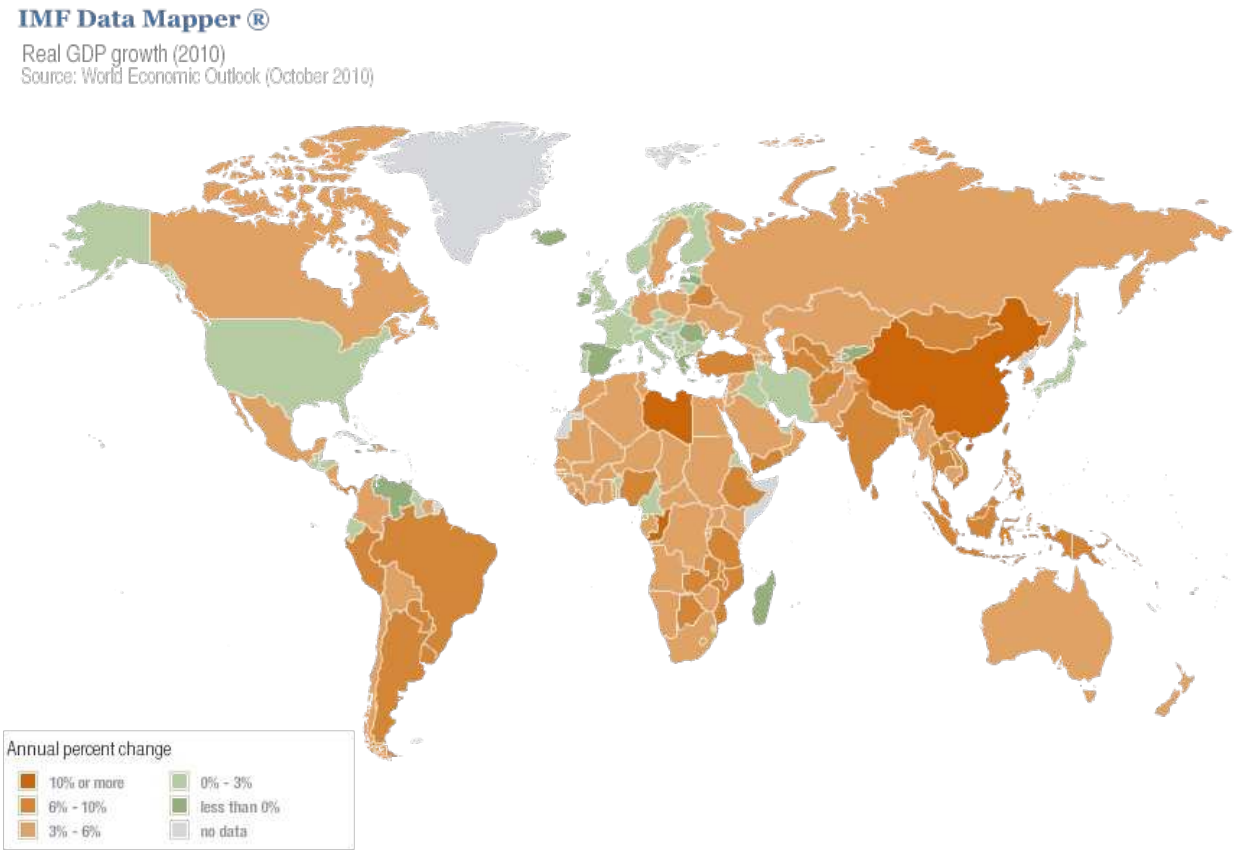
Graph 6a – GDP Growth between 2006 and 2007



Graph 6b – GDP Growth between 2008 and 2009



Graph 6C – Estimated GDP Growth between 2009 and 2010



The red areas indicate a positive real GDP growth, with darker red indicating higher growth; green areas indicate moderately positive growth (dark green), or negative growth (light green).

A comparison between the 2007, the 2009 and the 2010 data clearly reveals the 2009 crisis, that displayed the worst negative growth rates since World War II in advanced countries, followed by a rebound in 2010.

According to preliminary estimates by the International Monetary Fund, the 2010 bounce has been less pronounced for Italy (1%) than it has been for the other major European countries (France, 1,6%, Germany, 3,3%), as well as for the United Kingdom (1,7%), the United States (2,6%) and Japan (2,8%). While data seem to converge in indicating that the worst point of the crisis is over, data on Italy confirm the Italian productivity stagnation.

5. Transmission channels of the crisis to the real economy

The financial crisis propagated from the financial to the real world roughly through two channels: the households credit on the one hand, and the bank credit on the other. Indeed, the financial crisis acts on the capital market by modifying credit supply and saving use, both directly invested by households, and those intermediated by credit intermediaries.

This section separately analyzes each of the two transmission channels and focuses both on the policy choices over the regulation of financial intermediaries that have favoured the propagation (as a possible example, in the United States, the rule that

shifted banks' supervision on certain financial intermediaries away from the Federal Reserve), and the various government's action to contrast it.

5.1. The channel of households' credit

Businesses, notably the riskier ones, suffer from a more significant capital shortage in times of crisis, as a result of the reduction in the savings flow from households.

Investors' cautious attitude and funding restrictions to firms are partly motivated, even in an environment of perfect information, by business less satisfactory performance prospects due to shrinking demand. However, imperfect information plays an important role here, and, in a recessionary state, further exacerbates the tendency to direct credit to safe institutions.

As an illustration of how the savings drainage works, consider a market in a regular (i.e., not in a recessive) state. The various credit demanders are assessed by the credit suppliers, each of whom chooses the best between risks and returns, given his specific risk profile. In this context, efficient financial institutions are needed to guide consumers towards appropriate investments, consistently with each individual's appetite for risk. In an efficient and fluid market, business activities generating the greatest value and therefore higher welfare are those leading to maximum yields: thus, in a fluid system, savings are allocated to activities capable of generating the highest value added, consistently with the risk attitude, thereby ensuring a satisfactory standard of economic growth (spurred by riskier investment).

In a time of financial crisis, exacerbated by issues of asymmetric information, households have more limited information on the performance – and, as a consequence, on the riskiness – both of the companies demanding credit and on the intermediaries that might support them in their choices. Adding to this a generalised loss of confidence, typical in times of crisis, households reduce the range of activities they are willing to consider for a potential investment. In this uncertainty, many tend to prefer relatively safe investments, with a low yield; investors consider riskier companies only if they are "close" to them, that is, only if they have direct knowledge of them. As a result, risky companies' investors have little direct knowledge (which they possibly would have obtained from a financial intermediary in a time of economic expansion), and are penalised as a result.

Overall, the uncertainty that is predominant in a recession shifts the investment composition, in favour low-risk activities, associated to lower returns, and to prospects of lower growth as well (e.g., public expenditure of "safe" countries, on the financing of which a large amount of savings is conveyed at a time of crisis, thereby reducing the interest rate on the debt), to the detriment of risky, and usually innovative sector/firms, capable of generating growth.

5.2. The bank lending channel

It is well-known that banks reduce the total amount of lending during a recession. This is in part motivated by the straightforward reason that an economic downturn, by reducing the expected returns on firms' investments, also leads to a shrinkage of the set of loans potentially profitable for the bank. The decision over the amount and the type of projects funded by banks can indeed be conceptualised as depending on the shadow value of bank capital, which measures the scarcity of capital relative to positive-NPV lending opportunities. In other words, under the simplifying assumption that all financial projects are equally risky, the shadow value of bank capital measures the

marginal net present value, that is, the cut-off value above which projects are financed, and below which they are rejected. A higher shadow value of bank capital points to a greater relative scarcity, and, as a consequence, more severe problems of underinvestment (see Kashyap and Stein, 2004).

Changes in the shadow value of bank capital result from the interplay of the prevailing stage of the business cycle, individual choices and regulatory policies. In a recession, this value varies for two countervailing orders of reasons. It tends to decrease as a result of the decline in the average expected value of the projects, holding the amount of credit incurred constant; it tends to increase because of the reduction in the supply of deposits for the bank, which increases the cost of (or even restricts the) capital available to the bank, ultimately reducing the amount of credit incurred by the banks.

Which of the two effects prevails is controversial, and has been the object of a wide empirical research. However, the empirical literature does not provide a conclusive answer, as the results cannot isolate the impact of regulation on the shadow value in a recession.

The regulatory policy indeed plays a primary role in affecting the shadow value.

An effective regulation should probably preserve some stability in the shadow value, so as to mitigate (or, at least, not to further exacerbate) the credit crunch during a recession. However, recent shifts in the capital market regulation was affected by the combination of two factors which, according to many observers (see Kashyap and Stein, 2004) contributed to a stronger pro-cyclicality of the shadow value, and, therefore, of investment. They consist on the one hand on the transition to the stricter capital requirements imposed by the Basel II rules (and by the recent Basel III rules, which should, however, be fully effective only in 2019), and, on the other hand, to the transition from an asset evaluation based on historical cost (integrated with possible devaluation or re-evaluation) to a mark-to-market based accounting scheme, in which assets are evaluated according to their market (“fair”) value.

During a crisis, the shift to the fair value approach tends to reduce the banks’ capital, by inducing more significant assets devaluations than does a historic cost approach, and, therefore, massive economic losses. While the mark-to-market criterion may be thought of as better reflecting the banks’ financial position, it may also force banks to curtail credit supply beyond the level they would choose in the absence of Basel rules, or under the historic cost accounting rules (less strict on asset devaluations, and, as a result, triggering less severe capital restrictions in a recession), if it is combined with strict capital requirements.

An open issue is whether or not regulation-induced capital requirements are in fact a binding constraint in banks credit supply decisions. This empirical issue has not been investigated yet.

Kashyap and Stein (2004) conclude that the literature supports the result that the shadow value of capital increases during recessions.

After having analysed how the uses of capital change during a recession, it is important to understand where capital lies and which entities are in charge of its management.

5.3. The Sovereign Wealth Funds (SWFs)

We pointed out in the previous sections that one of the main drivers of a real crisis has consisted in the allocation of an excessively high portion of savings to low-risk activities. This generally scales down the resources available to risky enterprises, often

innovative and capable of feeding growth. However, it remains true that the use of financial resources primarily depends on the decision of those who manage them. Hence the need to determine the investors, or the class of investors, who, at different points in time, manage substantial financial resources, and the criteria they follow.

An analysis of the weight of various classes of investors highlights the growing role of sovereign wealth funds, which will be treated in this paragraph both because of their essential function in the current global paradigm, and because they represent a new form of government intervention in economic affairs.

SWFs (sovereign wealth funds) originate from the foreign reserves of developing countries (DCs), mostly Chinese. A portion of these accumulations, as discussed in Section 2, is intended to tackle sudden currency devaluations, while another relates to the political/strategic design to enhance export competitiveness.

This second group has been managed according to a profit-maximisation principle through the SWFs. According to recent estimates, SWFs control between 2 and 3 trillion dollars (Beck and Fidora, 2008)[4], highlighting a constant – and consistent – growth.

Sovereign wealth funds are paradigmatic of some of the consequences of the financial crisis on the mainstream views over various classes of investors. Before the 2007-2008 crisis, SWFs were generally accused of a lack of transparency, a low level of efficiency because of government ownership, and the generation of market distortions as a result of a strategy possibly not consistent with profit-maximisation. Following recent changes on the financial scene, SWFs are increasingly being tipped as examples of virtuous finance, with a minimal resort to financial leverage and focused on the long-run rather than on short-term speculation (Siniscalco, 2008).

SWFs have played a crucial role in mitigating the negative consequences of the crisis, by bailing out, through recapitalisations and other means, several financial institutions, including Morgan Stanley (recapitalised by the China Investment Company) and UBS.

Sovereign wealth funds, despite the concerns motivated by their peculiar status, including government-ownership (see, on this aspect, the discussion in Quadrio Curzio and Miceli, 2009), appear to have favoured a fluid and efficient financial market. At a time when many groups of investors seemed to focus on short-term speculation, sovereign wealth funds have contributed to providing financial markets with a long-term vision, motivated by the long-term goals of governments funding them. Secondly, SWFs managers are generally competent and, as a result of their massive portfolio, SWFs can devote substantial resources to information acquisition. This mitigates the asymmetric information problems on financial markets, and has contributed, during the current crisis, to a less distorted allocation of funds than would otherwise have occurred, in favour of reasonably risky financial activities.

In conclusion, government intervention through SWFs may be regarded as bringing two orders of beneficial effects: a reduction in asymmetric information, and therefore a reduction in distortions related to imperfect information, together with longer-term horizon.

[4] The limited amount of information on SWFs does not allow for a precise computation. Furthermore, the definition of which investors are to be included among SWFs is a disputed issue.

6. A formal model

The scenario outlined above highlights the need for an international regulatory framework. Using a formal model, this section shows why an efficient outcome might not be achieved in the absence of international coordination.

In particular, the simplified game theory model presented in this paragraph illustrates the profile of incentives to undertake regulatory actions, both by each individual State and by a group of countries coordinated by a supra-national organisation. We show that coordination is essential to reach a regulated equilibrium. Individual countries do not have an incentive to unilaterally regulate: regulation reduces the capital inflow in the country, and the benefits of its adoption are always lower than its costs.

Assume that Country A has huge savings and decides to forego current consumption in favour of future consumption: referring to a current example, this is the situation that China is experiencing. The decisions on consumption and savings may be attributable to private choices, such as those mentioned in Section 3 for the Chinese case (high labour mobility and lack of social protection, and the demographic trend of population ageing). Alternatively, they can be guided by public policies aimed at defending exports, which may contribute to reduced consumption, as it is occurring in the current Chinese economic situation. Country A induces an increase in credit supply that reduces the long-term interest rate in the absence of policy interventions.

Faced with savings originating in country A and the subsequent downward interest rate trend, other countries can choose among two possible reactions: “accommodate” the positive economic situation, holding the interest rate close to the equilibrium level, without monetary policy actions, or “resist” the situation, using the available monetary policy instruments to increase the short-term interest rate. The choice of resisting leads to an interest rate increase above the market equilibrium level.

Consider two countries, B and C, which have to decide how to react to the increase in the supply of funds occurring in country A. The decision to “accommodate” increases the probability of a financial crisis: indeed, the widespread use of loans, fuelled by very low rates, boosts the imbalances that can lead to the crisis through the channels outlined in the previous sections.

In particular, our model prescribes that the crisis explodes if either country B or country C, or both decide to “accommodate”. Therefore, the crisis cannot be circumscribed: the prevalence of low interest rates in one of the two countries is sufficient to trigger a contagion that spreads out to the other country as well. This assumption is justified if we consider the current high level of financial integration, as a result of both real and financial integration: if the widespread use of loans, stimulated by low interest rates, contributes to a crisis in the country that has accommodated – let us say B –, it entails a devaluation of the assets in B. But even firms located in country C that had invested in country B will suffer losses, which will reduce their assets, and determine economic losses that end up reducing their financing prospects. As a result, the crisis affects C as well.

An accommodating policy in a country generates a negative externality in the other country, if the latter resists the market trend towards low interest rates.

Moving to the payoff analysis as a function of the adopted monetary policy, the accommodation strategy is beneficial in the short run. In fact, it allows households and businesses to pay a cheap credit service, thereby taking advantage of the financial resources originated in country A. On the contrary, if the country raises the interest rate,

it does not exploit the opportunities offered by country A. In the short term, therefore, the payoff for a country that "accommodates" is given by Π^1, while for a country that "resists", it is given by π^1, with $\Pi^1 > \pi^1$.

Moreover, in the short term profit for the accommodating country is greater if the other country resists: in this scenario, country A's resources will massively turn to the country that accommodates. If one country accommodates, while the other resists, its payoff is denoted by Π^{1*}, with $\Pi^{1*} > \Pi^1 > \pi^1$.

In the long run, however, the very low interest rates increase the probability of a crisis in one country, and, consequently, through the above described contagion mechanism, in the whole economy. In the event that at least one of the countries has "resisted", the long-run profit (here denoted as period 2) is given by Π^2, while if at least one of the two countries has accommodated, the profit is given by π^2, where $\Pi^2 > \pi^2$, since, if one of the countries accommodates, the crisis breaks out. The stylised payoff matrix payoff for countries B and C (the country is indicated by the subscript) is the following:

TABLE 2: PAYOFF MATRIX

	Accommodate	Resist
Accommodate	$(\prod_B{}^1+\pi_B{}^2;\prod_C{}^1+\pi_C{}^2)$	$(\prod_B{}^{1*}+\pi_B{}^2;\pi_C{}^1+\pi_C{}^2)$
Resist	$(\pi_B{}^1+\pi_B{}^2;\prod_C{}^{1*}+\pi_C{}^2)$	$(\pi_B{}^1+\prod_B{}^2;\pi_C{}^1+\prod_C{}^2)$

Let us start by assuming that the aggregate welfare maximizing strategy of both countries B and C prescribes resisting the increase in credit supply through a restrictive monetary policy. This strategy avoids the onset of the crisis in the second period, provided, however, that the strategy is shared by both countries. If this were the equilibrium strategy, the benefit for both countries (B and C) is represented by $\pi^1+\prod^2$.

In order for the globally optimal strategy to be an equilibrium solution, we need $\pi^1+\prod^2 > \prod^{1*}+\pi^2$. The previous inequality does not hold when the accommodating country gets a significant short term benefit by keeping the interest rate close to market levels, obtaining a large amount of resources. When such inequality does not hold, we have a situation similar to that of the traditional prisoner's dilemma: countries are unable to coordinate their strategies on the aggregate welfare maximizing outcome of the game.

A coordinated monetary policy would thus avoid the emergence of these problems. A centralised decision could prevent the emergence of the contagion-related externality and the diffusion of the crisis, and could lead to a welfare maximizing result. The assumptions on the payoff and the subsequent analysis we carried out implies that efficiency prescribes to resist the reduction of interest rates: aggregate welfare maximisation therefore requires to avoid the crisis, even at the cost of not exploiting the benefits from low interest rates.

Of course, when, on the contrary, the exploitation of the opportunity from the low price of credit generates benefits exceeding the costs of the subsequent crisis (i.e., $\prod^1+\pi^2 > \pi^1+\prod^2$), the welfare-maximizing strategy is for both countries to accommodate and face the costs of the crisis in the subsequent period. In this scenario, the equilibrium is efficient even without coordination among the monetary authorities. Under this particular assumption, results under coordination would in fact replicate those emerging in its absence.

7. Conclusion: a new industrial policy addressing unbalances

This paper has analysed how the role of governments has been changing in recent years, as a result in part of the complex dynamics induced by globalisation, in part, especially over the last three years, of the pressing need to respond to the financial crisis.

7.1. Governments and Globalisation

The role of governments around the world during the financial crisis can best be described differentiating between developing countries and advanced economies.

Governments in emerging countries have primarily aimed at ensuring their country's development, through both export-boosting monetary policy and management of the vast resources accumulated by SWFs, thanks to persistent trade surpluses. Trade surpluses have laid the foundation for the outbreak of the crisis, while SWFs have contributed to alleviating its perverse effects.

Advanced economies reacted in an uncoordinated way to the significant changes that occurred. This is in part motivated by the increasing difficulty in carrying out strategic policies in the context of the increasing real and financial interactions among various geographical areas.

Furthermore, the crisis has reiterated a traditional economic policy dilemma. Innovations in the financial sector have substantially contributed to global growth; even the low interest rates in the period ahead of the crisis have provided Western countries' investors with significant opportunities for cheap credit. The tradeoff between growth and financial stability must therefore be reassessed.

The crisis has also shown that, within the current international decision framework, it is impossible to adopt coordinated decisions – something we discussed in Section 6. Some super-national institutions would be required to solve this problem.

Recent developments also call for a new government role to react to the activities carried out by the SWFs. The size and the complex nature of such funds, combined with their specific characterisation as government-owned institutions, have indeed raised a number of concerns in Western countries. The main one consisted in the fear that these funds would be able to generate coordinated, and therefore significant, movements on the financial markets. These movements would be worrying because these funds are potentially motivated by political strategies that have little or nothing to do with the market. In particular, the idea that the funds could use the economic leverage on Western countries to also place on them a political lever was quite widespread.

While the experience gained so far seems to support the hypothesis that these fears were poorly founded, and although the benefits that SWFs have provided to the

financial markets are now well recognised, it is recommendable that governments set the tools to prevent (and, if necessary, confront) undesired action by the SWFs.

To this end, using the traditional policy response to market failures does not appear to be advisable: the government involvement in these funds may suggest to envision diplomatic channels (Siniscalco, 2008), thereby modifying the nature of responses in case of abuses perpetrated by such institutions.

Finally, globalisation in the real economy, along with the financial interactions mirroring it, requires a careful and, more importantly, internationally coordinated regulatory policy: the recent crisis has indeed shown that global imbalances may trigger a crisis that extends beyond the countries that caused it. This free-rider problem can be solved only through a proper coordination of policy responses on the International level. This statement applies to policies pertaining to Sovereign Wealth Funds as well. If some constraints on their actions (in the form of tax adjustment, or alternatively the form of codes of conduct) have to be placed, they should be internationally coordinated; otherwise, countries with stricter standards would be able to exploit the SWFs funding opportunities to a lesser extent, with the effect of reducing opportunities of access to capital for companies operating on their territory (and, possibly, of relocating mobile businesses away), without reducing the likelihood of being exposed to the crisis (which could easily arise in countries with fewer rules and spread).

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