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## National Monetary Policy, Internatinal Economic Instability and Feedback Effects - An Overinvestment View

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# Working Papers on Global Financial Markets

No.19

## National Monetary Policy, In- ternational Economic Instability and Feedback Effects – An Overinvestment View

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# National Monetary Policy, International Economic Instability and Feedback Effects

## – An Overinvestment View

### Abstract

The paper explains internationally transmitted boom-and-bust cycles as the outcome of excessive liquidity supply based on the credit boom theories of Hayek (1929; 1937), Mises (1912) and Minsky (1986). We show how too expansionary monetary policies cause distortions in the economic structure and boom-and-bust cycles on both a national and an international level. Feedback effects of crises in periphery countries on center countries are shown to trigger a new round of monetary expansion in large countries, which provide international currencies to an asymmetric world monetary system. Crisis and contagion in globalized goods and financial markets indicate the limits of purely national monetary policies, which solely focus on domestic consumer prices and output. This makes the case for monetary policies in large countries, which take responsibility for the long-term effects of monetary policy on goods and financial markets in both home and foreign as put forward by Hayek (1937).

### 1 Introduction

The global recession of 2007-9 led to decisive interest rate cuts and quantitative easing in the advanced economies. The banking systems were provided with ample liquidity to counteract the threat of a global credit crunch. Interest cuts and devaluations were expected to speed up the economic recovery by generating export momentum and growth. Yet given liberalized international capital markets, purely domestically oriented policies hold severe risks of fuelling bubbles abroad and causing international economic instability. Therefore, a discussion about a new global monetary regime, e.g. a new fixed exchange rate regime or gold standard, emerged to put a constraint on purely domestically oriented monetary policies of large countries (UNCTAD, 2010; Financial Times, 2010).

In a similar vein, Hayek (1937) called for an internationalization of monetary policy in the aftermath of the Great Depression when global monetary expansion and beggar-thy-neighbor policies rendered the international economic system fragile: *“The desirable behavior of the total quantity of money [...] can never legitimately be applied to the situation of a single country which is part of an international economic system, and*

*that any attempt to do so is likely in the long run and for the world as a whole to be an additional source of instability*" (Hayek, 1937, p. 93).

We aim to address the limits and risks of – what Hayek calls – “monetary nationalism” – in a financially globalized world. Building upon Hoffmann and Schnabl (2008, 2011), we use the credit boom theories of Hayek (1929; 1935), Mises (1912) and Minsky (1986) to show how monetary expansion in major advanced (what we call) center economies such as Japan, euro area or United States have caused and threaten to cause unintended credit booms in the financially closely linked small open (what we call) periphery economies. Destabilizing feedback effects on center countries follow with a lag from crisis in periphery countries. They indicate the limits of purely domestically oriented monetary policies and the self-interest of large countries for a timely exit from near-to zero interest rate policies and quantitative easing.

## 2 Economic and Financial Instability in a Closed Economy

We explain the emergence of credit cycles based on the endogenous business cycle theories of Mises (1912), Hayek (1929; 1935) and Minsky (1986; 1992). To illustrate the credit cycle and economic distortions following expansionary monetary policies we introduce a closed economy concept in a Mises-Hayek framework. We integrate Minsky's (1986) theory of financial instability to account for risk-taking aspects and illustrate panics in financial markets that restricts credit during the bust.

### 2.1 Model Set-up

Based on the endogenous cycle business theories we distinguish between four types of interest rates to explain the emergence of credit cycles: First, the *internal interest rate*  $i_i$  reflects the (expected) returns of (planned) investment projects. Second, the *natural interest rate*  $i_n$  is defined as the interest rate which balances supply (saving) and demand (investment) on domestic capital markets ( $I_1 = S_1$  in Figure 1). Third, the *central bank interest rate*  $i_{cb}$  is the policy rate set by the central bank. It represents the interest rate, which commercial banks are charged by the central bank for refinancing operations. Fourth, the *capital market interest rate*  $i_c$  is defined as the interest rate set by the private banking (financial) sector for credit provided to private enterprises (Hoffmann and Schnabl, 2011).

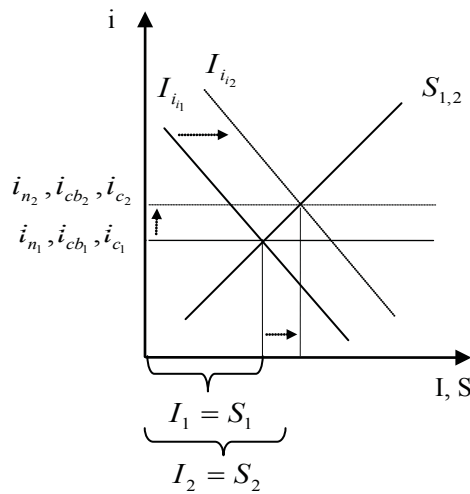
Following the interest rate concept of Mises (1912) and Hayek (1929; 1935), the saving-investment decisions in an economy are in equilibrium, when the *natural rate of interest*, which balances saving and investment, is equal to the *capital market interest rate*. In our framework the capital market rate is not an interest rate that is

solely determined by the market. Instead, it is assumed that the central bank influences capital market rates via central bank rates as long as monetary policy and capital markets work smoothly.

## 2.2 Equilibrium

An upswing in a closed economy starts for instance, because positive expectations due to real or financial innovation (Hayek, 1929; Minsky, 1986) increase the internal interest rate of investment and lead to a right shift of the investment curve from  $I_{i_1}$  to  $I_{i_2}$  (Figure 1). The natural rate of interest increases from  $i_{n_1}$  to  $i_{n_2}$ . Following Mises (1912) and Hayek (1929), the interest rate set by the banking sector  $i_{c_1}$  has to increase to  $i_{c_2}$  to keep the economy in equilibrium. If the central bank raises the policy rate from  $i_{cb_1}$  to  $i_{cb_2}$ , assuming a perfect interest rate transmission, this ensures that banks will charge and pay higher rates on credit and deposits. Saving and investment are in a new equilibrium ( $S_2 = I_2$ ) as illustrated in Figure 1.

Figure 1: Closed Economy Equilibrium



## 2.3 The Credit Cycle and Distorted Production Structure

In the endogenous business cycle models of Mises (1912) and Hayek (1929; 1935) a credit cycle emerges if the central bank keeps the policy rate constant during the upswing and allows for easy refinancing conditions as shown in Figure 2 ( $i_{n_1} = i_{cb_1} = i_{c_2} < i_{n_2}$ ). Because of competition for market shares, banks hold capital market rates low ( $i_{c_1} = i_{c_2}$ ) by expanding credit lines (Hayek, 1929; Minsky, 1986). The savings (capital supply) curve – which now represents private savings  $S_1$  plus the

additional credit supply  $\Delta C_1$  – shifts to  $S_2 (= S_1 + \Delta C_1)$ . In Figure 2  $S_2$  represents the ex-ante private saving at  $i_{c_2}$ .<sup>1</sup> As the interest rate remains low, additional investment projects with lower marginal efficiency can be financed that are not backed by respective saving ( $S_2$ ). This constitutes an unsustainable disequilibrium between ex-ante saving and investment  $S_2 < I_2$  at  $i_{c_2} < i_{n_2}$  (Figure 2a).

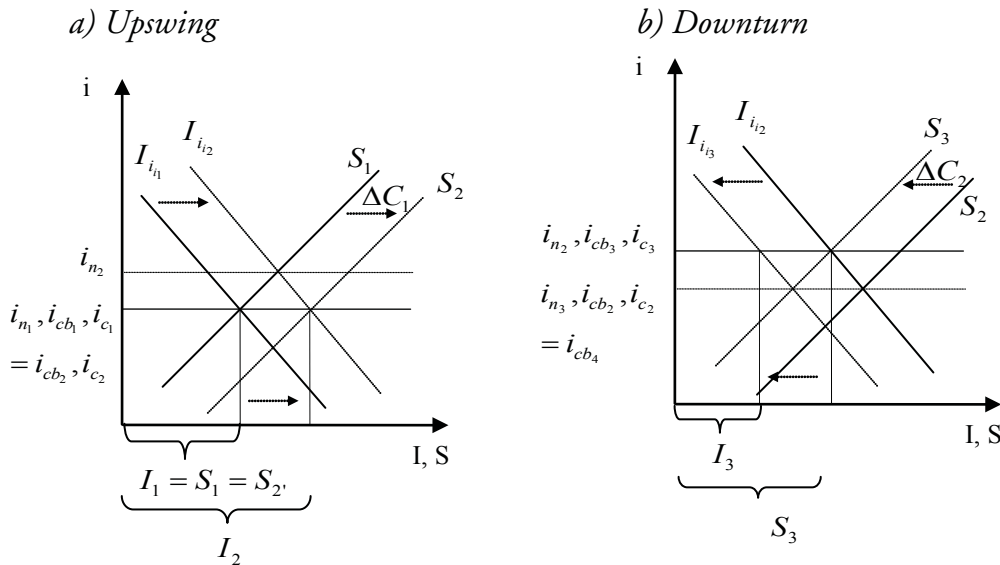
According to Hayek (1935), excessive lending at constant capital market rates during the upswing distorts the production structure of the economy. If saving had increased to  $S_2$  together with investment, (future) preferences of households would be in line with the investment plans as more saving signals rising consumption in the future. As capital market rates stay low despite higher investment, the credit expansion falsely signals to investors that saving  $S_2$  (preferences of households to forgo present consumption) has increased to  $S_2$ . With consumption being expected to decline in the present and to increase in the future, high future returns on investment of capital goods (goods aimed at producing future consumer goods) are expected. This induces a boom in the capital goods sectors. Unemployed capacities and labour are drawn into the production of investment goods.

In this environment, more consumption is induced by rising employment, wages and income. Given low interest rates, the demand for consumer goods – particularly durable (expensive) goods – rises as well. This provides an incentive to further increase capacities (Garrison, 2004). Investment goods are in high demand and expected returns in investment goods industries remain high.

During the boom households may aim to participate in rising enterprise profits (or are unwilling to consume at higher prices) and decide to invest in stock markets (shift in saving preferences). By doing this, households provide additional capital to investors. This dampens the inflationary pressure in the consumer goods sectors for a while. As the equity of firms increase, banks are inclined to lend even more at low interest rates. The profitability of investment depends on too low capital market rates and increasing asset prices.

<sup>1</sup> We use an apostrophe for ex-ante saving at the given interest rate if an artificial credit expansion or contraction augments the savings (capital supply) curve.

Figure 2: Closed economy disequilibria



Investment and consumption can co-move upwards as long as there are unemployed workforce and idle capacities. At some point, labor becomes scarce and capacity limits are reached. Temporary over-employment of resources may emerge to satisfy the further increasing demand.<sup>2</sup> But due to overinvestment, resources are bound in the capital goods sectors, while the consumption goods sector is unable to satisfy increasing demand. Overinvestment in capital-intensive sectors is followed by overconsumption, i.e. rising incomes chase a stagnating amount of consumer goods.

The boom turns bust, when over-employment of capital and labor cannot be sustained to keep up the production level and consumer price inflation accelerates. The central bank increases the interest rate to fight inflation (Mises, 1912; Hayek, 1929; 1935) and/or commercial banks reassess the credit risk of first investment projects turn unprofitable or cannot be finished due to scarcity of resources (Hayek, 1935; Minsky, 1986).

In Figure 2b central bank policy rates and capital market rates rise to  $i_{cb_3}$  and  $i_{c_3}$  as credit is restricted by  $\Delta C_2$ , which shifts the savings (capital supply) curve back to the right to  $S_3$ . Investment projects with an internal interest rate below  $i_{cb_3} = i_{c_3}$  have to be dismantled. Asset prices burst, which worsens the equity positions of firms. The investment curve falls to  $I_{i_3}$ . The left shift of the investment curve pulls the natural rate of interest below the capital market rate ( $i_{n_3} < i_{c_3}$ ). A saving overhang emerges because saving is more lucrative at relatively higher rates while investment is less

<sup>2</sup> In the short-run e.g. longer working hours or over-use of machinery (capital consumption as opposed to maintenance) in the overinvested industries may relief the resource constraint. The resulting rapid depreciation of capital goods may look justified by rising expected profits (Garrison, 2004; 2006).

profitable ( $S_4 > I_4$ ). This leads to further disinvestment. Production declines, unemployment rises and wages fall. Due to falling consumption (at higher interest rates), private consumption drops and prices start to deflate.

### 3 Monetary Nationalism and International (Economic) Instability

The seminal credit cycle theories of Mises (1912), Hayek (1929; 1935) and Minsky (1986) were closed economy frameworks. International capital flows were not addressed. To analyze how monetary policy of one economy can cause a credit cycle as shown above in another economy, we augment the credit cycle theories to a two-country framework. The interpretation of the augmented model reflects the notion that in an asymmetric world monetary system, monetary policy in a large – what we call – center country can cause boom-and-bust cycles in small – what we call – periphery countries (McKinnon, 2010; Freitag and Schnabl, 2010).

#### 3.1 International Capital Flows and Equilibrium

Figure 3 models international borrowing as additional source of liquidity in an open economy framework. We assume that there are two types of economies, which are populated with individuals with different (aggregated) saving and consumption preferences. Investment returns in one economy are higher than in the others. This implies a lower interest rate level as long as capital markets are closed.

One economy is the center economy, in which monetary policy decisions are exogenous (for instance based on domestic inflation and growth). The other economy is (a group) of periphery countries. The model does not pre-impose a restriction on which is the center and which the periphery. But we will elaborate it assuming that the economy with higher saving preferences is the center economy. Further, we assume a similar size of the center economy and an aggregated group of periphery countries.<sup>3</sup>

Given open capital markets, savings are allocated to the most profitable international investment opportunities. Higher expected returns on investment (interest rates) in the periphery attract savings from the center economy where expected returns and capital market interest rates are lower as saving is relatively abundant. Therefore, the center economy exports capital as the creditor economy. The periphery imports capital as the debtor in our model.

<sup>3</sup> In practice, the capital exports of one large creditor country are matched by the capital imports of a group of debtor countries as, for instance, in the case of Germany and many European countries.

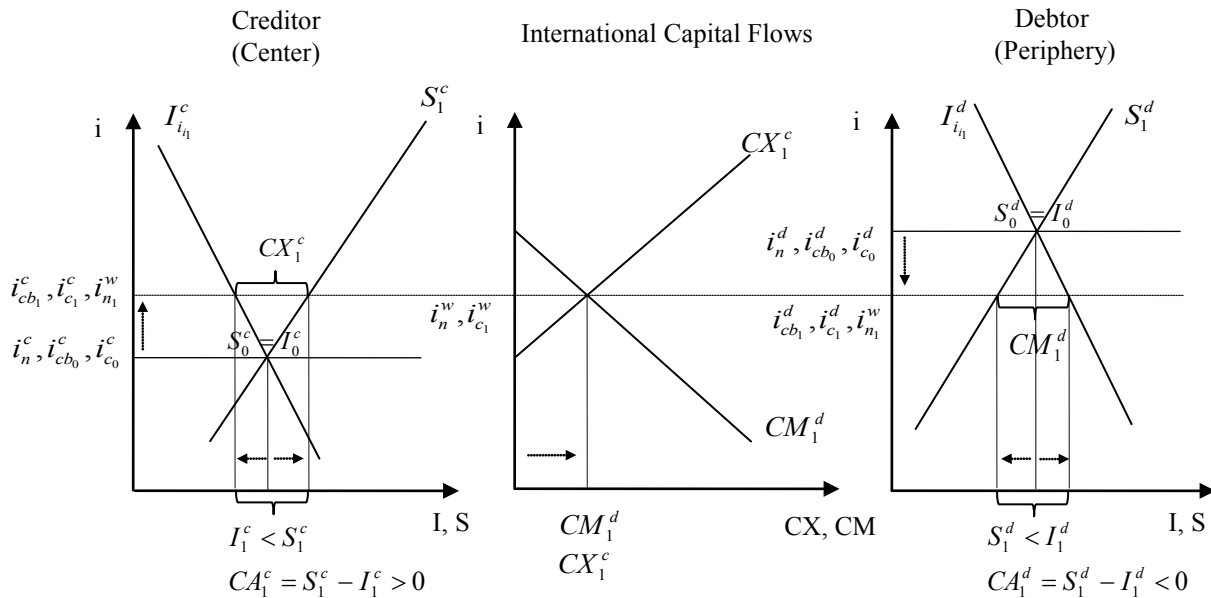


Figure 3 illustrates the convergence process. The initially closed economy capital market rate of the creditor (center) economy  $i_{c_0}^c$  (at which  $S_0^c = I_0^c$ ) and the initial debtor (periphery) capital market rate  $i_{c_0}^d$  (at which  $S_0^d = I_0^d$ ) converge to a world capital market rate  $i_{c_1}^w = i_{c_1}^c = i_{c_1}^d$ . The amount of capital exports of the creditor (center) economy is  $CX_1^c$ , which is equal to the amount of capital imports  $CM_1^d$  of the debtor economies (periphery).<sup>4</sup>

With capital market rates increasing in the creditor (center) economy ( $i_{c_0}^c < i_{c_1}^c = i_{c_1}^w$ ) following international financial liberalization, saving is stimulated ( $S_0^c < S_1^c$ ), while domestic investment is replaced by foreign investment ( $I_0^c > I_1^c$ ). In the debtor economies (periphery), the lower capital market rate ( $i_{c_0}^d > i_{c_1}^d = i_{c_1}^w$ ) originating in capital inflows discourages saving ( $S_0^d > S_1^d$ ) and promotes investment ( $I_0^d < I_1^d$ ). A domestic saving-investment gap arises in both economies with opposite signs. Internationally aggregated saving and investment are balanced at the world capital market interest rate, which is equal to the world natural interest rate ( $i_{c_1}^w = i_{n_1}^w$ ).

Given liberalized goods and capital markets, to fulfil the balance of payments identity the debtor economies (periphery) import goods from the creditor (center) economy. The gaps between supply and demand on capital markets are closed via trade. Capital exports  $CX_1^c$ , capital imports  $CM_1^d$  and respective current accounts ( $CA_1^c$  and  $CA_1^d$ ) in Figure 3 reflect an efficient allocation of resources, which matches national preferences for inter-temporal saving and consumption (Hoffmann, 2010; McKinnon and Pill, 1997).

Figure 3: International capital and goods market equilibrium



<sup>4</sup> Lucas (1990) argues that capital does not always flow from rich to poor countries because of diverging risk premiums.

### 3.2 International Credit Boom

Whereas international capital mobility can stimulate investment and growth in economies with a shortage of capital and higher expected returns of investment, it can contribute to too easy liquidity conditions and boom-and-bust cycles. This is particularly the case when interest rate cuts in center countries bring about excessive capital inflows into small open economies with underdeveloped capital markets as currently observed on a global level (Löffler et al, 2010).

In the models of Mises (1912), Hayek (1929; 1935) and Minsky (1986; 1992), credit booms emerge on a national level (as modeled in Figure 2) if the central bank lowers policy rates too much or/and the banking sector finances too risky investment by holding capital market rates below the natural rate. In an asymmetric world monetary system the international availability of capital originates in large financial markets of center economies, which are backed by international currencies. We assume that central banks in these economies take into account only domestic goals such as inflation and growth<sup>5</sup> – what Hayek (1937) called “monetary nationalism”.

Then, they initiate capital flows to periphery economies (with higher interest rate levels), where monetary policy decisions strongly hinge on external factors such as international capital flows and exchange rate stabilization. If interest rates in the center economy are held low to boost domestic growth, investors can finance (risky) investment in periphery economies that would not have been profitable under tighter liquidity conditions.<sup>6</sup> For instance, currently, carry trades and momentum betting for interest rate arbitrage and exchange rate revaluation gains lead to excessive reserve accumulation and monetary expansion in emerging markets.<sup>7</sup> As capital markets in emerging markets are underdeveloped and shallow, the *credit boom elasticity* of monetary expansion is likely to be higher than in large developed capital markets.

In Figure 4, we illustrate the emergence of a credit boom in the periphery triggered by liquidity expansion in the center economy, which we assume to be the international creditor economy. The starting point is Figure 3. Capital market and central bank interest rates in the two economies have converged towards the world natural

<sup>5</sup> As formalized in the seminal Taylor rule (Taylor, 1993).

<sup>6</sup> Previous research suggests other reasons for a drop of capital market rates than capital inflows into emerging market economies: First, implicit credit guarantees by the government increase risk-appetite of banks (Corsetti et al., 1999; Krugman, 1998; McKinnon and Pill, 1997; Garrison, 2006, p. 121). Second, the volatility of investment returns is underestimated, and therefore the risk premia are too low (Saxena and Wong, 2002). Third, innovations in credit markets cause additional credit expansion and interest rate cuts (Minsky, 1986).

<sup>7</sup> McKinnon and Schnabl (2004) show why in emerging markets free floating is not a feasible policy choice.

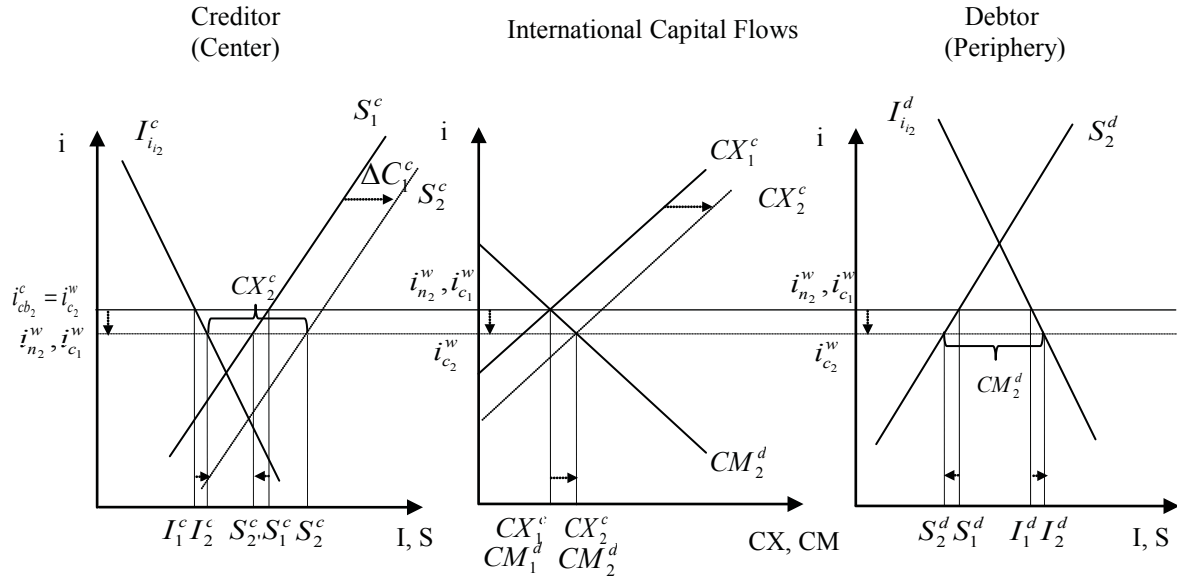
interest rate  $i_{n_1}^w$ . International aggregated saving preferences are equal to aggregate investment. The world natural interest rate is equal to the world capital market interest rate. Capital exports amount for  $CX_1^c$  and capital imports are  $CM_1^d$ . The current account imbalance is  $CA_1^c = S_1^c - I_1^c > 0$  in the creditor (center) economy and  $CA_1^d = S_1^d - I_1^d < 0$  in the debtor (periphery) economies.

If the central bank in the center (creditor) economy lowers the policy rate below the world natural rate of interest to  $i_{cb_2}^c$  to promote domestic investment and growth, the banking sector will create additional credit  $\Delta C_1^c$ . This credit expansion mimics an increase in ex-ante saving which is modeled by a right shift of the savings curve from  $S_1^c$  to  $S_2^c$  (with  $S_2^c = S_1^c + \Delta C_1^c$ ). The world capital market interest rate falls from  $i_{c_1}^w$  to  $i_{c_2}^w$ , capital exports increase from  $CX_1^c$  to  $CX_2^c$  and capital imports of the debtor (periphery) economies rise from  $CM_1^d$  to  $CM_2^d$  in Figure 4.

New investment projects are started. Investment activity accelerates from  $I_1^c$  to  $I_2^c$  in the center (creditor) economy and from  $I_1^d$  to  $I_2^d$  in the periphery (debtor) economies. Due to lower capital market rates, ex-ante private saving falls to  $S_2^c$  in the creditor (center) economy and from  $S_1^d$  to  $S_2^d$  in the debtor (periphery) economies. Thus, the term  $S_2^c$  represents private saving activity  $S_2^c$  plus the additional credit expansion  $\Delta C_1^c$  ( $S_2^c = S_2^c + \Delta C_1^c$ ) at  $i_{c_2}^w$ . Rising capital exports are reflected in a growing current account surplus from  $CA_1^c$  to  $CA_2^c = S_2^c + \Delta C_1^c - I_2^c = S_2^c - I_2^c >> 0$  in the center (creditor) economy. In the periphery (debtor) economies the current account deficit  $CA_1^d$  widens to  $CA_2^d = S_2^d - I_2^d << 0$ , as capital imports increase to  $CM_2^d$ .

Because ex-ante saving  $S_1^c$  has not increased with the credit expansion but actually fallen to  $S_2^c$ , the world capital market interest rate is below the world natural interest rate  $i_{c_2}^w < i_{n_2}^w = i_{n_1}^w$ . A global disequilibrium between saving and investment activity emerges, which amounts for the difference between  $S_2^c$  and  $S_2^d$ . As the global interest rate level has declined to  $i_{c_2}^w$ , the credit expansion triggers investment with lower expected marginal returns. The average default risk of investment increases as – given resource constraints – new investment projects are unsustainable once the capital market rate returns to the natural rate (Minsky, 1986; Hayek, 1929)

Figure 4: Credit expansion and overinvestment



It is possible that there is no credit boom in the center economy itself despite the interest rate cut. This can be the case in the aftermath of a financial crisis, when investors and banks do not expect adequate profits in the domestic economy despite easy liquidity conditions. A low interest rate elasticity of domestic investment would correspond to a close to vertical investment curve  $I_{i_2}^c$  in Figure 4. Then, given sluggish expectations in the center, the additional credit is exported entirely after the center economy's central bank has lowered policy rates.

At this "Austrian moment", the banking sector in the center economy tightens domestic credit, while investment is made in more promising foreign markets. The credit expansion and rising capital exports of the center country fuel a boom in the periphery, which will be the larger, the smaller the relative size of the periphery countries and the lower and the longer the interest rate is held low by the central bank in the center. In the periphery economies, an overinvestment cycle and distortions in the production structure as described in section 2 emerge.

### 3.3 Crisis and Contagion

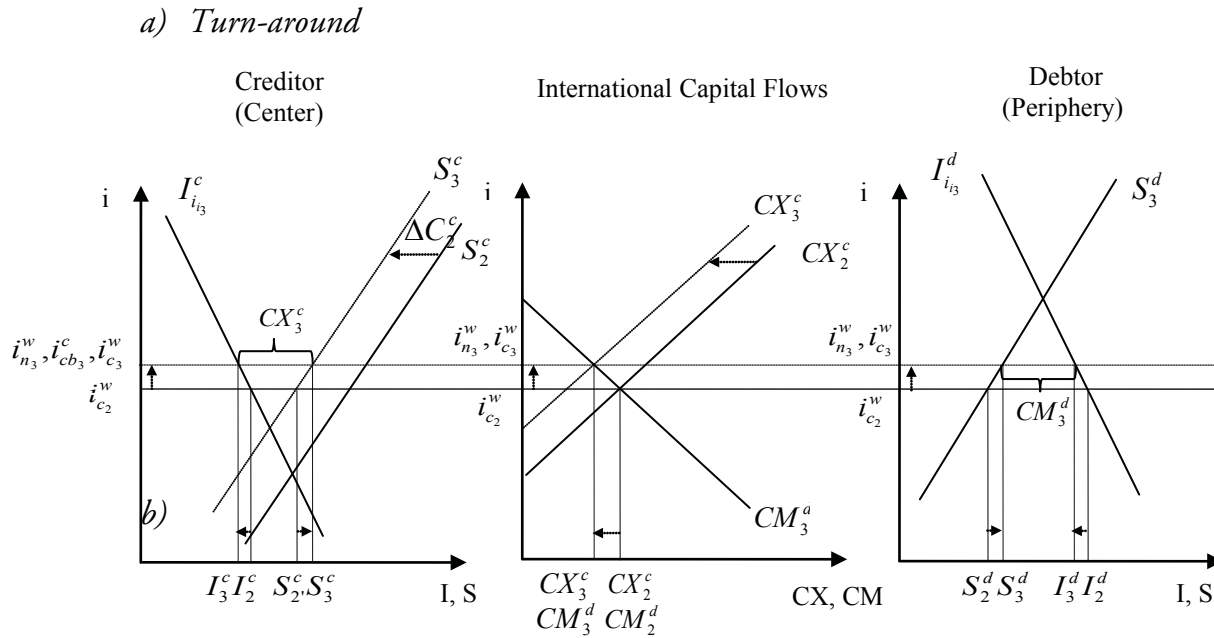
When overinvestment in capital-intensive sectors of the periphery economies along with rising asset prices, increasing incomes and high consumption lead to more demand for consumer goods, overconsumption emerges, inflation accelerates (and current account deficits increase). The turn-around becomes inevitable, when on an international level interest rates rise. The tightening of international credit can originate

in either monetary policy or the private banking sector. Central banks in the center can restrict credit to counteract inflation once domestic activity picks up. Alternatively the banking sector reassesses credit risks once signs of instability in the periphery emerge.

Figure 5a illustrates the turn-around following interest rate increases in the center (creditor) economy. When the central bank tightens money supply, the banking sector has to reduce the credit exposure, for instance by  $\Delta C_2^c$ . The central bank policy rate increases to  $i_{cb_3}^c$ , which is – for instance – equivalent to the world natural interest rate ( $i_{cb_3}^c = i_{n_3}^w$ )<sup>8</sup>. The saving curve shifts back to its initial position ( $S_3^c = S_1^c$ ). Less capital is exported by the center (creditor) economy ( $CX_3^c < CX_2^c$ ). Capital imports of the periphery (debtor) economies fall from  $CM_2^d$  to  $CM_3^d$ . World capital market interest rates rise along with the center policy rate  $i_{cb_3}^c = i_{c_3}^w$ .

This lifts the threshold for the profitability of investment projects. Structural distortions are cleared as investment with internal interest rates below the natural interest rate  $i_{n_3}^w$  has to be dismantled. Investment in the center (creditor) economy falls to  $I_3^c$  and investment in the periphery (debtors) to  $I_3^d$ . Ex-ante saving increases from  $S_2^c$  to  $S_3^c$  in the center (creditor) economy and from  $S_2^d$  to  $S_3^d$  in the periphery (debtors). In this situation, saving and investment are balanced again as the world capital market rate is equal to the world natural interest rate.<sup>9</sup>

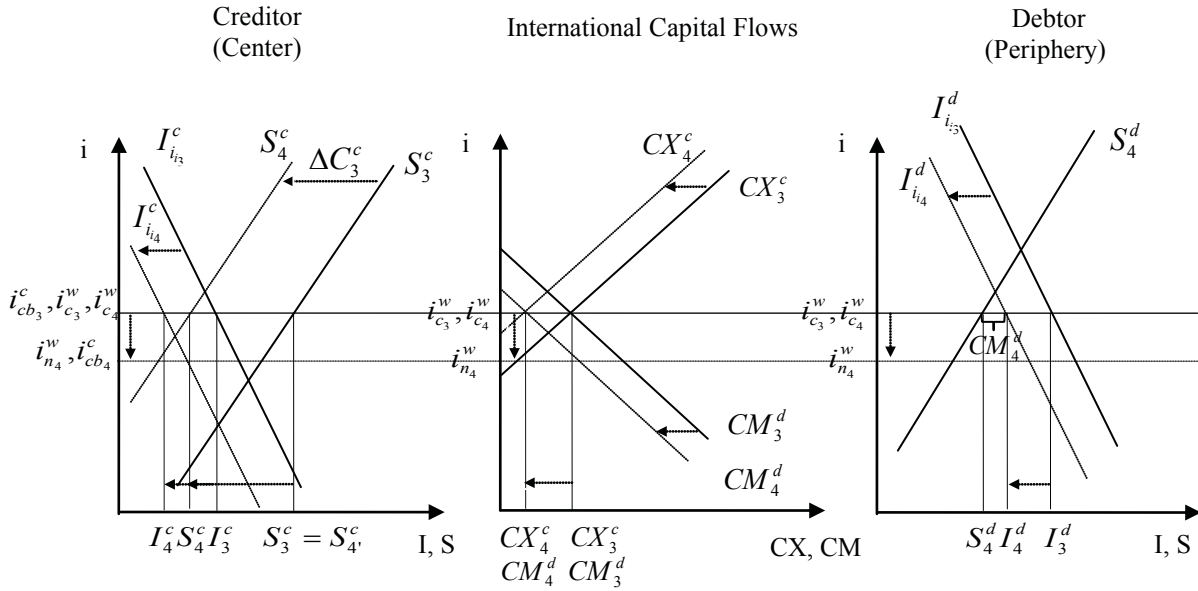
**Figure 5: Turn-around, credit crunch and crisis contagion**



<sup>8</sup> We implicitly assume that due to the asymmetry of world monetary system the world interest rate is determined by the center central bank.

<sup>9</sup> Note that in this case ex-ante saving is equivalent to overall saving. Thus, we do not use the apostrophe.

## b) Downturn, credit crunch and contagion



When investment projects are dismantled others become unprofitable as general demand declines (negative multiplication effect). Therefore, investor's sentiments about the expected returns from investment  $i_i^c$  and/or  $i_i^d$  can worsen (which can be seen as a "Keynesian moment"). As illustrated in Figure 5b, the investment curve of the center economy shifts from  $I_{i_3}^c$  to  $I_{i_4}^c$  and the investment curve of the periphery shifts from  $I_{i_3}^d$  to  $I_{i_4}^d$ . The world natural rate falls to  $i_{n_4}^w$ . With falling capital demand, policy rates would have to decline to  $i_{c_4}^c$ .

Following Minsky (1986) and Hayek (1935), during a crisis panic in financial markets can dry up credit markets even if the central banks slash policy rates towards the natural rate to allow for credit creation as shown in Figure 5b.<sup>10</sup> Given credit defaults due to disinvestment in the creditor and debtor economy, the banking sector's risk perception is high. In Figure 5b, the center economy's banking sector restricts credit to the private sector, for instance by  $\Delta C_3^c$ . The savings curve shifts to  $S_4^c$  and world capital market interest rates remain at  $i_{c_4}^w$  despite a fall in investment and monetary expansion. The capital market rate is held above the natural rate of interest  $i_{c_4}^w > i_{n_4}^w$  as liquidity preference is high while household consumption preferences re-

<sup>10</sup> For instance a rise in counterparty risk due to loan defaults can cause panic in financial markets. This brings about skyrocketing interbank market rates making short-term liquidity utterly expensive. Interbank rates and central bank rates diverge. Markets won't clear so that the interbank market breaks down and the central bank becomes the only source of short-term liquidity. The resulting liquidity shortage (rising money market rates) is translated into an increase of borrowing costs for private enterprises unless the central bank provides capital at unlimited levels.

main unchanged. The effects of the credit crunch are symmetrically opposed to those of the credit expansion in Figure 4, now driven by risk aversion of banks.

In the center economy, investment has declined to  $I_4^c$  while ex-ante saving remains at  $S_4^c$ . In the periphery the tightening effect is strong, because the center economy's capital exports fall to  $CX_4^c$  and the periphery's capital imports correspond to  $CM_4^d$ . Thus, the credit contraction in the center economy extends to a credit crunch in the periphery, which reinforces the downturn. In the periphery investment is at  $I_4^d$ . Given too high capital market rates, an even larger global capital supply overhang emerges ( $S_4^c - I_4^c > I_4^d - S_4^d$ ), which corresponds to  $S_4^c - S_4^d$ .

With lower investment, overcapacities become obvious, unemployment rises and incomes fall. The positive saving-investment gap triggers falling consumption in both economies. The current account balances narrow to match the capital account. Given lower incomes and lower consumption, prices fall (capital goods devalue) and investment activity remains sluggish.

#### 4 International Feedback Effects and Policy Implications

The effects of national monetary policies in large countries in the center of the asymmetric world monetary system on the smaller periphery countries depend on the relative size and the financial linkages. In our model the sizes of center and periphery were assumed to be equal. If the center is much larger and international capital mobility high, even a moderate credit expansion in a center can trigger severe boom-and-bust cycles in the periphery. This is particularly the case if capital outflows are clustered to a few periphery countries. At the same time, feedback effects of crisis in a small periphery on a large center are negligible. Then, solely domestically oriented policies are the dominant strategy from the point of view of the center.

This changes when the magnitude of international capital flows increases, the periphery economy or a group of periphery economies become larger and therefore feedback effects from crisis in the periphery on the center get significant. Financial instability in emerging markets can be observed to trigger financial instability and outright policy responses in center countries.

##### 4.1 International Feedback Effects

Feedback effects from crisis in the periphery on center countries could be recently observed in East Asia and Europe.<sup>11</sup> Following the burst of the Japanese bubble econ-

<sup>11</sup> Also, significant feedback effects between monetary expansion in the US and credit cycles in the dollar periphery, in particular in East Asia, can be observed. As the monetary interaction between these two blocs is



omy in December 1989, Japan suffered from a severe deflation in stock and real estate prices. Japanese policy makers cut interest rates to prevent a credit crunch. But because of negative expectations domestic investment remained sluggish – which corresponds to a close to vertical investment curve in the creditor economy – and the first large wave of carry trades directed Japanese capital exports to Southeast Asia.

In Southeast Asia, starting from the early 1990s, capital inflows from Japan provided a fertile ground for foreign reserve accumulation, monetary expansion and credit growth (McKinnon and Pill, 1997), which triggered – in line with our overinvestment framework – speculative investment in the export sectors, stock markets and real estate markets. In Japan, the export industry experienced rising revenues from declining production costs and exports to the region. The balance sheets of Japanese banks improved due to higher revenues from lending to the smaller Southeast Asian economies. But at some point of the overinvestment cycle the boom turned into bust, the starting point of the Asian crisis (Hoffmann and Schnabl 2008).

The Asian crisis returned to Japan via goods and capital markets as Japanese stock prices gradually declined because of three transmission channels. First, Japan's export industry, which constitutes the most important pillar of Japanese growth, was hit by declining exports. Second, the Japanese industry had to realize additional losses, as Japanese FDI in the smaller Southeast Asian economies was rendered unprofitable. Third, the major Japanese banks faced a further increasing stock of non-performing loans, now in Southeast Asia. Thus, as modeled in Figure 5b, the Asian crisis triggered the Japanese financial crisis to which the Japanese central bank responded by new interest rate cuts.

In Europe, the monetary policy of the European Central Bank contributed to boom-and-bust cycles in the inner and outer periphery of the euro area after the turn of the millennium (Freitag and Schnabl, 2010). After the burst of the new economy bubble, German private and public wage austerity (to regain competitiveness after the unification boom) combined with ECB interest rate cuts stimulated capital outflows from Germany to Central, Eastern, Southern and Western Europe. Credit booms as modeled in Figure 4 emerged.

The crises in Central and Eastern Europe and at the southern and western periphery of the euro area were triggered by the interest rate increases of the European Central Bank during the years 2006 and 2007. As modeled in Figure 5a the benchmark for investment in the periphery regions was lifted. Finally, changing sentiment regarding the sustainability of the booms in the European periphery regions led to a credit tightening as modeled in Figure 5b.

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more complex due to sterilization operations in the periphery countries (Freitag and Schnabl, 2010) it will be treated in a separate paper.





Figure 6, the policy makers in the center allow for additional credit expansion and lower policy rates to  $i_{cb_5}^c$ . This improves the banking sectors risk exposure and undoes the contraction which is shown in Figure 6 by a shift of the saving curve back to  $S_3^c$ . Due to the monetary expansion new additional credit  $\Delta C_4^c$  is created and even more investment is triggered, once world capital market rates converge towards the policy rates to  $i_{c_5}^w = i_{cb_5}^c$ . The global interest rate level has now fallen below the natural rate  $i_{c_5}^w < i_{n_4}^w$  again. Capital exports of the center country strongly shift outwards from  $CX_4^c$  to  $CX_5^c$  thereby fuelling new (speculative) investment in the periphery. When investment prospects in the periphery improve so that capital imports shift to  $CM_5^d$ , the investment curve shifts to the right to  $I_5^d$  and world natural rates rise further above the capital market rates to  $i_{n_5}^w$ .

If investment remains sluggish in the center economy – as modeled in Figure 6 – it is likely that the central bank continues to support growth via easy liquidity conditions and does not undo the previous interest rate cuts by raising policy rates towards the natural rate  $i_{n_5}^w$ . As the policy rate and the capital market rate have declined to an unprecedented low level, the marginal efficiency of investment further decreases and structural distortions from the previous credit cycle are preserved. If – as in Figure 6 – the next overinvestment cycle starts from a level of even lower interest rates than the one before (Figure 4), the upcoming crisis will be more severe and necessitate even stronger interest rate cuts to prevent a credit crunch and stabilize growth. As the marginal efficiency of investment declined, an asymmetric intervention pattern emerges if central banks hesitate to raise interest rates in the upswing but lower them decisively during the crisis (Hoffmann and Schnabl, 2011).

Because of the asymmetric pattern of the world monetary system, the monetary policy interventions towards a structural decline in nominal and real interest rates in the large center countries are likely to be transmitted to the rest of the world, independent from the exchange rate regime. Low interest rates in the center are imported by periphery countries based on fixed exchange rates or discretionary foreign exchange intervention. Also flexible exchange does not allow periphery countries to isolate themselves from liquidity expansion in the center, as appreciation pressure on the domestic currencies put a drag on growth.

The outcome is outright interest rate cuts to shield off speculative capital inflows, which make the interest level converge again towards the center's countries interest rates. If a gradual appreciation of the periphery countries currency is allowed for, the interest rate level in the periphery country would fall even below the interest rate level of the center countries, once appreciation expectations become sustained (McKinnon and Schnabl, 2009). The resulting boom-and-bust cycles and structural distortions would be even larger.

Thus, interest rate cuts can be internationally transmitted via competitive depreciations as in the aftermath of the Great Depression<sup>13</sup>. More recently, competitive depreciations seem less prevalent. Instead monetary expansion in the US has been transmitted via exchange rate stabilization or interest rate cuts of freely floating countries, which aim to shield off speculative capital inflows. In a sense competitive depreciations have been substituted by competitive interest rate cuts (McKinnon, 2010). The outcome is a historical low interest rate environment, i.e. a global liquidity glut.

In view of the overinvestment theories, the risk of the current low interest rate environment is fourfold. First, although it is difficult to predict in which corner of the world irrational exuberance will emerge, the probability of boom-and-bust cycles has substantially increased. Second, although at a global level consumer price inflation still seems to remain tamed, inflationary pressure has emerged in raw material and food markets. Third, although speculative capital inflows into emerging markets are controlled by capital controls and non-market based sterilization operations, distortions in domestic and international financial and goods markets are the consequence. Fourth, as nominal interest and real interest rates have declined to very low levels, in view of the overinvestment theories the marginal efficiency has declined on a global level.

Increased financial market volatility, high raw material and food prices, distorted economic structures and a low marginal efficiency of investment put a drag on long-term growth, what contributes to political instability. Therefore, a reform of monetary policy rules is required to return to a long-term sustainable growth path and to prevent rising global political instability.

### 4.3 Implications for Monetary Policy Rules

In line with our findings, Diamond and Rajan (2009) argue that *“a central bank that promises to cut interest rates conditional on stress, or that is biased towards low interest rates [...], will induce banks to promise higher payouts or take more illiquid projects. This in turn can make the illiquidity crisis more severe and require a greater degree of intervention, a view reminiscent to the Austrian theory of cycles.”* To cope with the unintended but severe side effects of asymmetric monetary policy patterns, monetary policy making may need to be subject to stricter rules.

First, to forestall global financial and economic instability central banks in the large center countries have to keep interest rates close to the natural interest rate in

<sup>13</sup> In 1931, Britain was the first to exit from the gold standard, which helped to achieve a timely recovery from the great crisis. Losing export shares, the US followed in 1933 and forced the dollar to depreciate. This led to strong appreciation pressure and a drop in production in continental Europe until it went off the parity in 1936 (Eichengreen and Mitchener, 2003; McKinnon, 2010).

the sense of Hayek (1929; 1935) and Mises (1912). This implies that the interest rates in the large countries such as Japan, US and euro have to increase to equilibrate saving and investment preferences on a global level. This also implies that monetary policy has to be used symmetrically during boom and bust (Hoffmann and Schnabl, 2011). To prepare for the next crisis central banks have to raise interest rates more than necessary during the boom to have sufficient scope for interest rate cuts during the crisis. Alternatively, monetary policy may not be regarded as an instrument of business cycle stabilization, but should solely focus on price stability as argued by Friedman (1968). This implies that the adjustment process in crisis is to be left more to the market. Prices decline and productivity increases. This would have a “cleansing effect” as speculative investment and bad enterprises would have to leave the market, while unemployment rises for a while until the economy returns to equilibrium (Schumpeter, 1912, pp. 360-369).

Second, monetary policy rules should be applied in a more forward-looking way. In a financially globalized world the domestic inflationary effects of monetary expansion are postponed, as liquidity expansion takes the detour via international financial and goods markets until it feeds into higher domestic inflation. Adalid and Detken (2007) find that global credit growth is a better predictor for upcoming financial turmoil than national credit aggregates and domestic inflation. As monetary and credit growth can fuel foreign asset prices without affecting domestic consumer price inflation in the short-run, a rapid credit growth combined with sharp increases in asset prices raises the likelihood of future financial instability and therefore should be treated a respective way.

Although integrating international financial markets into domestic monetary policy reaction functions will lead to conflicting goals, as one instrument is confronted with two or more targets, monitoring monetary and asset aggregates to forecast future inflation is necessary to achieve more international financial and economic stability. This presumes, however, that central banks in large center countries are willing to take the responsibility for global financial and economic stability, which brings us to Hayek’s (1937) policy considerations.

## 5 Hayek’s International Solution and Outlook

Hayek (1937) argued that national monetary policies themselves bear the danger of international (economic) instability if they aim to stimulate domestic growth without regard on the international repercussions. We have shown that when national central banks slash interest rates and expand credit in times of crisis, they will cause competitive depreciations or competitive interest rate cuts and thereby the breeding ground

for even larger crisis in the future. Particularly, if the status of a currency as an international currency enables the central bank to redistribute wealth from the periphery to the center – for instance through the depreciation of the domestic currency – a control mechanism against undue monetary expansion has to be found.

Hayek (1937) was pessimistic about self-restriction of policy makers as they tend to follow short-term goals. He pointed out that a system of free banking or an international monetary authority could solve these problems. In particular, he wrote *“a really rational monetary policy could only be carried out by an international monetary authority, or at any rate by the closest cooperation of the national authorities and with the common aim of making the circulation of each country behave as nearly as possible as if it were part of an intelligently regulated international system”* (Hayek, 1937, p. 93).

Such a monetary system might be based on a symmetric fixed exchange rate system which could work similar as a gold standard. Undue monetary expansions, beggar-thy-neighbor depreciations and a *Triffin dilemma* - as currently observed in the US - could be ruled out. But Hayek (1937) referred to his idea as *“utopian dream”* because the necessary policy shift was very unlikely in the 1930s. Therefore, a rule or *“principle (such as the gold standard) which at least secures some conformity of monetary changes in the national area to what would happen under a truly international monetary system is preferable to numerous independent and independently regulated national currencies”* (Hayek, 1937, p. 93).

As in the 1930s, also today the global conflicts about the international repercussions of national monetary policy making and the policy responses at the periphery – as represented by the debate on exchange rate policies between e.g. China and the US – signal that introducing a new international monetary system based on e.g. fixed exchange rates is unlikely to happen soon (McKinnon, 2010). Not even rule changes as proposed in section 4.3 are currently seriously envisaged.

Instead, we can observe a further nationalization of monetary policies. This nationalization is led by ultra low monetary policies in the center economies. It is extended via exchange rate stabilization, non-market based sterilization, capital controls, state-directed capital allocation and the revival of industrial policy in periphery countries. In short, we observe intervention spirals as described by Mises (1929): Well-intended policies in the center countries have unintended negative consequences on other economies that cause further interventions and new distortions in both centers and peripheries that necessitate new interventions, and so on.

Therefore, we believe it is worth revisiting the works of Mises (1929) and Hayek (1937) that warn of the dangers of interventionist spirals and provide good reasons to reconsider international macroeconomic policy making.

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