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‘Red Star Spangled Banner’ Scrutinizing the Root Causes of Financial Crisis

Andreas Kern/Christian Fahrholz

GLOBAL FINANCIAL
MARKETS

University Jena
Carl-Zeiss-Str. 3
D-07743 Jena

University Halle
Universitätsplatz 5
D-06099 Halle

Tel.: +49 3641 942261
+49 345 5523180

E-Mail: info@gfinm.de
www.gfinm.de

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Introduction

Many analysts agree that today’s financial crisis’ resolution depends upon its causes. Some debates in the public sphere have identified the greed of financial investors as the original sin. In sharp contrast to such a scapegoat approach, some academic researchers have highlighted the fact that financial intermediation has been subject to sensible policy decisions directed towards deregulation of financial markets (Spaventa, 2008). Particularly, dysfunctional central banking policies, especially in the US in terms of too lax monetary policies, have been identified in the recent academic literature for having aggravated economic performance. Having decreased interest rates to historically low rates in response to a bursting dot.com-bubble, the US central bank’s interventions have rather resulted in throwing increasing amounts of money down the drain. According to this view, the global savings glut is particularly due to overly relaxed monetary policies in the US since the beginning of the new century (Boeri and Guiso, 2008). In this context however, an enquiry into the fundamental causes of the global savings glut and according global imbalances has been far less developed. This especially applies to export-oriented economies which may be

at the heart of global imbalances (Eichengreen, 2008; Lane and Milesi-Ferretti, 2005). In this paper we argue that global imbalances are the result of politically induced distortions in international production and specialization.

We set forth that in particular financial repression in emerging market economies has put the chains on real wages and real exchange rates respectively, spurring economic growth in the short-term not only within the emerging economies themselves but also in mature economies (cf. Montiel and Servén, 2008; Rodrik, 2008). Consequently, rather controlled economies have concentrated on exporting labor-intensive production, which in the presence of command economy style distortions has been reflected in a remarkable savings glut. To cope with distorted competition in international production – due to the suppressed upward pressures in real wages abroad – few options exist for more mature economies: possible reactions of rather flexible market economies comprise of lowering real wages and/or pushing ahead with the marginal product of other factors, such as capital or land. As depressing real and correspondingly nominal wages considerably is not a viable option for rather flexible market economies, spurring the marginal product of capital and land have thus been the only appropriate reaction to distorted international competition. Academic researchers have already scrutinized the influence that relative price and terms of trade distortions, due to labor market rigidities, exert

on other global competitors (Krugman, 1995a). However, the causal relationship between financial repression and excessively labor-intensive production in restrained economies on the one hand, and severe distortions in production specialization in market economies on the other hand have not been prominently discussed in the academic literature so far. We develop a line of theoretical arguments alongside a Heckscher-Ohlin-Samuelson (HOS-)model and demonstrate theoretically, why financial repression in large real appreciation controlling economies has substantially contributed to an increase in financial market activities and a corresponding increase in the marginal product of capital in mature market economies. According to our line of argument, suppressing real appreciation in rapidly growing economies results in the production of high net saving surpluses, i.e. an export of real appreciation pressures and severe global imbalances, which are at the heart of the present financial crisis.

The remainder of the discussion surveys the relevant literature on the global imbalances and a corresponding global savings glut in section 2. Subsequently in section 3, we develop a theoretical framework comprising of a stylized HOS-model with financial repression. Section 4 then briefly delineates the perils of financial market imperfections that may further exacerbate global imbalances due to their pro-cyclical impact on economic forma-

tion. Finally, section 5 summarizes key insights from the analysis and sketches policy implications.

Review of the Literature

There exists a vast amount of literature on the interdependencies of relative prices in a two-country world. Explaining trade relations in the world from a factor endowment and production side perspective lies at the heart of the HOS-model. Krugman (1995a), for instance, examined the impact of a trade shock on a minimum wage constrained Europe and a flexible wage America, concluding that it would raise unemployment in the former and reduce wages in the latter. His study, on a theoretical plane, belongs to earlier works of comparative studies. That is to say that he examines one country at one time. As Davis (1998) shows however the results might change dramatically if a global perspective is added to the discussion, in which Europe and America exist in the same world. In this respect, the latter author argues that engaging in trade between a flexible-wage America and a rigid-wage Europe also raises wage levels in the former economy. Most notably, the author posits the ‘insulation hypothesis’, according to which wage rigidities in Europe completely insulate the American economy from new market entries by low-skilled ‘Southern’ labor. Our analysis aims at identifying a related argument towards the root causes of the present financial crisis.

Authors, such as Boeri and Guiso

(2008), have argued that the crisis has its origin in Alan Greenspan's low interest rate policy (former President of the US Federal Reserve Board), which injected enormous amounts of liquidity into the global financial system. Contrary to this argument, Ioannidou et al. (2008) have shown that despite the theoretical appeal and widespread resonance of this argument, the empirical evidence is not sufficient to support a robust link between monetary policy and bank risk-taking. Bearing this in mind, we emphasize that global imbalances, due to distortions in relative prices and terms of trade, lie at the heart of the problem.

The idea of identifying global imbalances as the origin of financial crises is not new. Many authors have identified financial repression in countries like China as being responsible for global imbalances. As McKinnon and Schnabl (2008) argue, despite massive efforts by the People's Bank of China to sterilize the monetary consequences of the reserve buildup, China has become an inflationary force on American and European price levels. According to these authors, this observation can be attributed to China's excess liquidity spilling over into the world economy. Following Tyers (2008), any change in policies directed at savings, dividends, fiscal expansion and privatization would raise China's apparent production costs relative to foreign investment and would retard investment. Therefore, instead of

flowing out to finance China's trade surplus, the People's Bank of China has used its liquidity to accumulate large amounts of foreign exchange, mainly in the form of US treasury bonds (Freytag, 2008; McKinnon and Schnabl, 2008). This fact indicates that, in line with Davis' argument, national factor market institutions matter as they profoundly affect global patterns of output, employment and wages (Davis, 1996). This however poses a serious weakness to China, as it could contribute to a misallocation of resources for investment (Barnett and Brooks, 2006). According to the latter authors' argument, the drivers of fixed asset investment have been real estate, manufacturing and infrastructure.

Focusing more on the internal effects of Chinese financial repression, Lardy (2008) argues that financial repression, defined here as low or negative real return on deposits, has seriously distorted the structure of demand. While the decline in real interest rates has reduced the costs of maintaining an undervalued exchange rate, increasing inflation has eroded household consumption in gross domestic product (GDP) (Lardy, 2008). Although this observation runs seemingly counter to our argumentation, we concur with Prasad and Rajan that "financial system repression has meant that there are few alternatives to funnelling these savings into deposits in the state-owned banking system" (Prasad and Rajan, 2006:332). In this regard, prevailing implicit deposit insurance

schemes have increased the willingness of households to hold bank deposits, despite the weakness of the banking system. Nevertheless the main channel of private savings can be traced to an over-competitive export sector and thus be tracked on the production side of the economy. From this perspective, savings are generated in form of firm profits, which are additionally supported from policies preventing a real appreciation of the domestic currency. Therefore, distorted relative prices stemming from financial repression are leading to 'excess savings' in the economy.

At the same time, US consumption has been a major driving force behind the growth of global demand (Obstfeld and Rogoff, 2004). While the US personal saving rates have been very low, driven by an unsustainable rise of house prices and historically low interest rates, growth in China has been accompanied by a rocketing household saving ratio (Modigliani and Cao, 2004). Although the current account surplus and the massive excess liquidity have come at the expense of investment and consumption, the imbalances have benefited the Chinese economy as well (Eichengreen and Park, 2006). In addition, a rapid integration of the international financial system has enabled these imbalances to persist (Lane and Milesi-Ferretti, 2007; Obstfeld and Rogoff, 2004). Differences in financial market developments have led more advanced

financial markets to accumulate foreign liabilities in a gradual, long-lasting process (Mendoza et al., 2008). This clearly differs from the standard view that mature industrial countries should be exporting capital to poor developing countries due to a relatively higher marginal product of capital. Gruber and Kamin (2008) highlight that per capita income, relative growth rates, fiscal balances, demographic variables and economic openness cannot account for the global pattern of current account imbalances. Our argument is, therefore, that for example China's concentration on labor-intensive production and the according export of goods and capital *via* the terms of trade, have forced the US and other flexible market economies to focus on capital-intensive production. In this regard, globalized financial markets have allowed China to sustain US demand by exporting its 'excess savings', specifically for the most part to the said US economy.

Theoretical Framework

The aim of this theoretical analysis is to develop a global trade model between two groups of countries, i.e. flexible market economies on the one hand and a group of non-mature economies controlling real appreciation on the other hand. This theoretical framework may then reveal the root causes of the present financial crisis.

In deriving our model along the lines of the HOS-model, we broadly follow Davis (1998) and proceed in a

five step course. In a general equilibrium model we firstly highlight the influence that financial repression, i.e. a lower bound on capital asset returns, in a real appreciation suppressing, non-mature economy exerts on production. In this context, we show that these financial repression mechanisms have the same effect as an upper bound on real wages in a closed economy. This symmetry can easily be derived by the so-called Lerner Condition in the discussion on the symmetric nature of export subsidies and import taxes. Although an economic policy stance building on financial repression has remarkably lost momentum in the last decades (Fry 1997; see Abiad et al. (2008) for an empirical survey on related financial matters), there is some empirical evidence that policy measures of a similar nature have been applied to support a real undervaluation conducive to economic growth (cf. Prasad and Rajan, 2006). This portion of the analysis yields that suppressing real appreciation results in the generation of 'excess savings' in the form of 'stalled investments' in the non-mature economy. In the second stage of developing our theoretical arguments, we demonstrate with the help of simple arithmetic in balance-of-payment matters that the latter savings push ahead with current account surpluses. Thirdly, in an open economy model with an integrated equilibrium of international factor price equalization this 'push' is depicted in terms of increasing capital-intensity within a

mature, flexible economy in reaction to financial repression in a non-mature economy. Fourthly, a model of global trade patterns demonstrates that financial repression in opening-up, non-mature economies indeed stimulates production as well as savings, which are absorbed and quasi 'pulled out' by the flexible economy. Finally, we set forth that stifling real appreciation in a non-mature economy takes place in the form of exporting labor-intensive production towards the mature economy. This is to say that real appreciation pressures are exported to flexible market economies. In this respect, one could think of net saving surpluses and/or capital flight to a safe haven (Antras and Caballero, 2007; Dooley et al., 2007), which are reflected in large current account surpluses. Consequently the flexible market economy builds up foreign liabilities, which reflect a surge in real interest rates above their fundamental level. Following this line of reasoning, we additionally argue that an economic bubble in financial markets might occur due to insurmountable financial market imperfections within the flexible market economy (Allen and Gale, 2000).

The conclusion of our analysis is that both misalignments in balances of payments and global trade relations stem from warped relative prices in non-mature economies seeking real undervaluation. Such catch-up strategies actually rely on exporting real appreciation pressures to flexible market economies thus precipitating financial crises such as the latest tur-

moil occurring in the US.

Setting the stage: autarky

We consider a closed economy, which has two factors of production, i.e. capital and labor, at its disposal. These factors are available in fixed supply given by K and correspondingly L . These input factors are used to produce two goods under an omnipresent production technology subject to a conventional Cobb-Douglas production function with constant returns to scale. The economy can produce the good x , which is capital-intensive, and the labor-intensive good y . As in the stylized HOS-model setup, preferences are homothetic and both goods are used in the economy. We denote w to be the return to labor, r to represent the return on capital, and P to be the resulting relative price of x in terms of y . In a fully flexible economy the competitive cost conditions c ensure that for each sector the sector price has to equal marginal costs of production:

$$c_x(w, r) = P \quad \text{and} \quad c_y(w, r) = 1,$$

whereas P denotes the relative price between capital and labor-intensive goods. Furthermore, it can be assumed that production takes place efficiently and that therefore the following conditions have to be satisfied:

$$K_x + K_y = K \quad \text{and} \quad L_x + L_y = L.$$

Given the Walras' Law, goods market clearing is ensured by the equal-

ity of demand and supply. In the following paragraphs, we utilize Davis (1998) in establishing three key relationships. First we establish the link between the relative endowment and capital intensity $k = K/L$ and the relative price level P in the fully flexible economy. In line with the Heckscher-Ohlin theorem a rise in capital abundance reduces the relative price of the capital-intensive good. For the sake of the argument, we propose the following equation to capture these characteristics of the theorem:

$$P = f(k), \text{ whereas } f'(k) < 0.$$

The latter function implies that the relative price P declines with increasing capital intensity k in production.

In a second step we include the Stolper-Samuelson proposition in order to establish a direct link between factor and relative good prices. Given a specific relative factor price, a rise in the real interest rate can be traced back to a decline in relative good prices in terms of a labor-intensive good unit y . That is to say that a corresponding reduction in the produced amount of capital-intensive goods relative to labor-intensive goods may be due to a change in factor prices, i.e. here the real interest rate. An according change in the rental rate on capital shifts the economy towards labor-intensive goods production. Given that the capital-intensive good is x , we can thus derive the following Stolper-Samuelson condition for the real interest rate

depending on the relative price P :

$$r = g(P), \text{ whereas } g'(P) > 0.$$

Thus, given the relative capital endowment ratio and capital intensity k of the closed economy, we can directly determine the equilibrium goods relative price in the flexible market economy as well as the resulting real interest rate:

$$r = g(P) = g(f(k)).$$

These equations are thus sufficient to establish a general equilibrium in goods and factor markets. In the following section, we introduce a politically induced market distortion, i.e. financial repression.

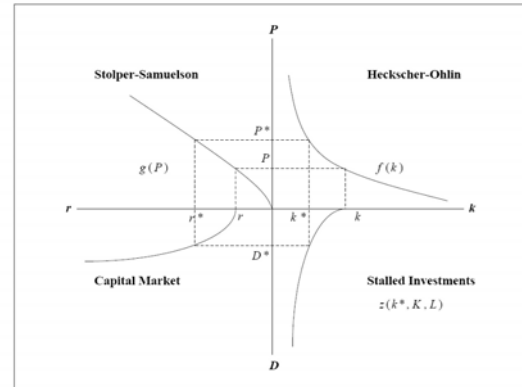
Financial repression

For the sake of simplicity and taking the Walras' Law into consideration, we model the market distortion as a minimum rental rate on capital assets $r^* > r$, which is identical to a form of financial repression with the aim of preventing real appreciation.¹ Our argument can theoretically be traced in the works of Aghion et al. (2004) and Rodrik (2008), in which financial repression in terms of capital controls and excessive borrowing constraints prevents a real appreciation (Aghion and Banerjee, 2005). This assumption is consistent with a stable equilibrium featuring diversified

production, if and only if the relative goods price is

$$P^* = g^{-1}(r^*) > P \text{ (see figure 1).}$$

Figure 1: Financial Repression in General Equilibrium



This would be the equilibrium goods price, if and only if employed factors are in the ratio

$$k^* = f^{-1}(g^{-1}(r^*)) < k.$$

Accordingly, capital that would have been employed in production in the case of no financial repression must be off-set in terms of 'stalled investments'. This is equivalent to saying that some portion of capital has been squeezed out of economic production relative to original factor endowments. This de-capitalization D^* occurs in terms of

$$D^* = z(k^*, K, L), \text{ whereas } z'(k^*) < 0 \text{ for all } k^* < k.$$

Hence, the final quadrant simply depicts a crowding out of capital investments hinging upon the level r^* of financial repression.

¹ A wage rate policy including a far too low real wage rate would yield the same result. For the sake of tractability and simplicity, we concentrate on the case of financial repression, which yields the same result.

A flexible interest rate will always ensure that capital will, at all times, be fully employed. However, adding politically induced market distortions to the capital market with a binding minimum on the rental rate of capital, a market clearing *via* the price mechanism could potentially not occur. In the following subsection, we show that the resulting real undervaluation is equivalent to a huge amount of savings.

Real appreciation controlling: a view from the balance of payments

In order to show that a savings glut results from financial repression and a corresponding drop in capital intensity amounting to k^* , we expand our analysis towards balance-of-payment issues. Although such an approach to balance-of-payment matters presents an *ex post* view on the international flow of real quantities and according claims and liabilities, a closer look at balance-of-payment matters prepares the ground for the subsequent analysis of ‘excess savings’ from the viewpoint of international trade.

In the previous step we have shown that financial repression results in distorted relative factor and good prices at level P^* . In this respect, relative scarcity of capital is tightened by not deploying capital in production amounting to \bar{D}^* at a level of capital intensity k^* , which is identical to an ‘excessive’ savings behavior in the economy. With $r^* = g(f(k^*))$ subject to the endowments K and L , ‘stalled investments’ \bar{D}^* represent the

amount of capital de-invested in the economy. In reference to our comparative statics in figure 1, applying identities of the balance of payments yields that \bar{D}^* must be equivalent to ‘excess savings’ in the economy.

In following the line of argument formulated by Freytag (2008) and without distinguishing private and public consumption, equation (1) portrays domestic production Y consisting of consumption C , domestic investment I^d corrected by the ‘stalled investments’ \bar{D}^* and the current account in terms of the difference of exports and imports $(X - M)$. At the same time, equation (2) depicts the use of the present production Y in terms of consumption C and savings S . In equilibrium overall savings are identical to domestic investment I^d corrected by the ‘stalled investments’ \bar{D}^* , foreign portfolio and direct investment abroad I^f as well as the change in foreign reserves dR of the central bank (equation (3)).

$$(1) \quad Y = C + (I^d - \bar{D}^*) + (X - M)$$

$$(2) \quad Y = C + S$$

$$(3) \quad S = (I^d - \bar{D}^*) + I^f + dR$$

$$(4) \quad I^f + dR = (X - M) \text{ and } S - I^d + \bar{D}^* = (X - M)$$

The subsequent equations in (4) then highlight the fact that capital and financial accounts, i.e. investments abroad and changes in the reserve level $(I^f + dR)$ balance the current account $(X - M)$. The latter trade balance must then be identical with the level of ‘fundamental savings’, which are not invested in the domestic economy, plus the ‘excess savings’

due to the de-capitalization in the course of financial repression in terms of 'stalled investments' D^* .

The basic link between financial repression and excess savings is rather simple: For competitive firms to access financial funds on capital markets at interest rate r^* , they need to sell off their products at least at a relative price P^* . When financial repression puts a binding constraint on firms, the goods price will only be attained, if the relative scarcity of capital increases. This will apply only if a sufficiently large share of capital is unemployed in production.²

These equations certainly describe identities that must hold true *ex post*. From a viewpoint of the production side, however, we have explained in the previous subsection on financial repression that the emergence of 'stalled investments' results from distorted relative prices. This discussion on balance-of-payment issues shows that the 'stalled investments' must be identical to 'excess savings'.

After having referred to production and balance-of-payment issues we subsequently develop an isomorphism between the closed economy with financial repression and a trad-

ing world, in which financial markets are fully liberalized. This investigation relies on the analysis of Dixit and Norman (1980), which has entered the literature as the so called 'integrated equilibrium concept'. This concept allows for establishing conditions under which trade in goods is sufficient to establish the same world equilibrium, as occurs in the closed economy setting with both goods and factor mobility.

Open economy model

We now consider the world economy consisting of two countries with free trade and zero transaction costs.³ The mature country (A), representing the group of flexible market economies, has completely liberalized financial markets, in which the interest on capital assets is determined freely by market forces (for an empirical assessment see, for instance, Blanchard 2006; Aghion et al., 2004). The representative real appreciation controlling economy (C) has imposed some form of financial market repression to support their economic development strategies, leading to a upwardly bended minimum real interest rate r^* , though still in line with competitive cost conditions (see above). Let a bar of the variable represent the level of that variable in the integrated equilibrium. Let index i represent goods and J index countries A and C. The set of divisions of world endowment among involved

² Looking into labor market wage dynamics would yield a similar result. Imagine the wage rate would be fixed at a rate lower than in the competitive scenario, an excess demand for labor-intensive goods would result in the closed economy setting, which is similar in its very nature to our 'excess savings' results.

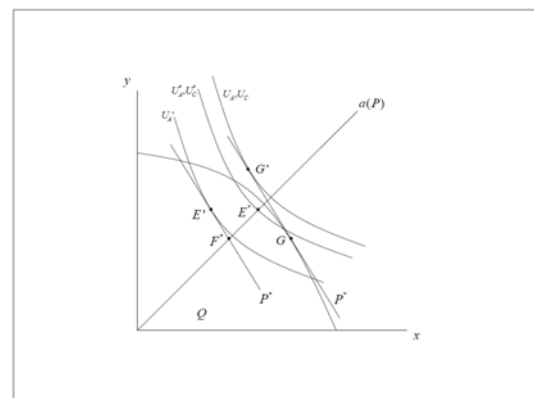
³ Again, the technologies and preferences in the two countries are identical to the ones in the closed economy. The technologies are assumed to constant returns to scale, while preferences are homothetic and identical.

account (see above). Under the conditions noted above, international trade equalizes factor prices between the financially liberalized economy A and the financially repressed economy C. The factor price equalization follows directly from the common competitive cost conditions (see above). The according distortion in relative factor prices resulting from financial repression is reflected in a shift towards a new integrated equilibrium E^* . At this point capital intensity in the production of the labor-intensive good has decreased. Accordingly, the original vector k_x^* , for instance, has been altered to k_x , which is longer and flatter. The increase in size results from factor substitution in the course of financial repression, whereas the altered slope stems from the change in the factor ratio of capital to labor. At the same time, capital intensity in the capital-intensive production within country A has increased from k_y to k_y^* . The actual length and location of the ‘bended’ vectors k_x and k_y depend particularly on factor substitution elasticities of the production function in each economy. In the face of a global market, free commodity trade fully equalizes factor prices and thus exports warped relative prices from real appreciation controllers to flexible economies. In the following subsection, we inquire further into the formation of trade patterns distorted by financial repression and warped relative prices.

Trade adjustments in the course of financial repression

In this section we want to demonstrate how economic integration in the form of trading between a mature, flexible market economy A and a non-mature, real appreciation controlling economy C are impacting on both economies. In particular we are interested in investigating how financial repression in one country affects the production in the other country. For the sake of establishing our basic result, we start with a world in which country A and country C would be identical in any relevant economic key variable, i.e. endowments, technologies, and preferences U . The only distinguishing feature between both economies is that one economy is characterized by repressed financial markets, dampening credit/capital demand and accordingly stifling real appreciation. Figure 3 depicts the core aspects of the general trade equilibrium.

Figure 3: Trade Patterns between Country A and C



The technological production possibility frontier is common to countries A and C. In country C, to sup-

port financial repression and the non-appreciation condition r^* , the equilibrium price must be P^* . The composition of demand is given by $a(P)$. Thus under full employment of capital assets and production at prices P^* , country C would be at G and demand at G' . This implies an incipient demand for Q , tending to raise P as well as lowering r below r^* . However, the incipient fall in the capital rental rate is stanchied *via* 'stalled investments' equivalent to an increase in savings in country C (see above). In the HOS-model framework it is particularly the Rybczynski theorem (1955) that deals with the effects of endowment changes. Thus at fixed goods prices, an increase in the endowment of one factor leads to a more than proportional increase in output in the sector that uses this factor intensively. At the initial equilibrium price, this would be expected to create an excess supply of the good that uses the factor intensively, hence, lowering its equilibrium price. According to the Stolper-Samuelson condition, this results in a decrease of the return to that factor. However, with one factor price fixed, i.e. financial repression and an upward bended rental rate for capital, our result is just the Rybczynski theorem in reverse. This is to say that output is shifted onto a financially repressed production possibility frontier towards the original demand line. Therefore, production in the closed economy C would have to be at point F^* , at which the constrained supply exactly matches the demand at prices

P^* . The shift of production in country C from G to F^* reflects the expansion of savings, exactly necessary to eliminate the excess demand for capital-intensive goods (i.e. investment) indicated by the line segment GG' .

Now we consider the case in which country A and C are trading freely. In order to support financial repression at level r^* , country C still needs to maintain price P^* in equilibrium. Since absorption is at point E' due to country A's original demand in G' , this would require country C's production to be in point E' . As demand is homothetic and production linear, the build up of 'excess savings' in moving from F^* to E' surmounts the pre-existing 'excess savings' of the previously closed economy in country C. This is to say that in this stylized framework the country C's opening of trade with country A would even further increase country C's 'excess savings' in terms of 'stalled investments' and the ruled-out demand for capital-intensive goods in country C respectively. The reason is that country C would be quasi forced to generate the full integrated amount of savings to sustain at a level r^* for both economies, which implies a move from E' towards the integrated equilibrium E^* (see also figure 2). In country A, the absence of financial market intervention comes at the cost of lower interest rates on invested capital for investors. However, once trade commenced, the flexible market economy of country A come to share country C's high real interest rate because it

will have to share the upward bended real interest rate $r^* > r$.

The fact that country A shares the high interest rate r^* under trade follows from the fact that trade links goods prices, that both countries remain diversified and that producers still face competitive cost conditions. In effect, trade forces country C to bear the burden of 'excess savings' to maintain country C's comparative advantage and hinder a real appreciation. However, forcing capital markets in country A to increase capital rental rates up to a level r^* implies that opening to free trade will lead to a deviation of the capital rental rate from its economic fundamental value. This would lead to an over-utilization of capital and increasing capital intensity in country A's economy. An economic bubble emerges at the heart of country A, which cannot be detected by simply looking at the fundamentals.⁴ In order to illustrate our argument we are going to establish an import-export framework.

⁴ The attentive reader will be aware that at this stage we would encounter the problem of Ricardian dynamic effects in reference to the endogeneity of capital (particularly, Baldwin, 1989; further, Krugman (1995b) on 'factor content' and factor prices). Please note that the purpose of this article is to show that financial repression in non-mature economies results in real undervaluation. We show that such stifling of real appreciation results in exporting 'excess savings' in form of labor-intensive goods (see below). Here, however, we do not enter into a discussion of the stock-flow problematic of increasing capital intensity in the production in mature, flexible market economies. This issue may be subject to future research.

Transfer of 'excess savings'

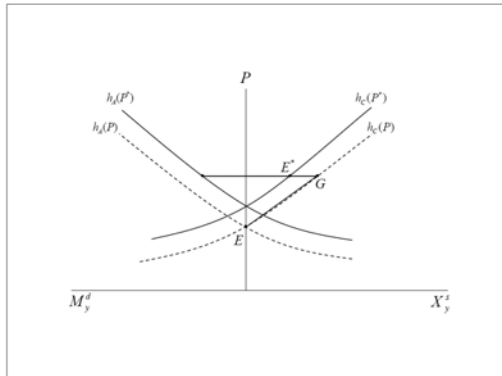
In the following paragraphs, we highlight the fact that 'excess savings' of country C are indeed exported to the flexible market economy of in country A. The previously outlined balance-of-payments arithmetic has already shown that real appreciation controlling is achieved by a contraction of capital-intensive good production in terms of 'stalled investments', fuelling the current account surplus of country C. However, such balance-of-payment matters only depict the *ex post* view on economic formation. This subsection sets forth, how distorted relative factor and good prices affect the formation of import-export relations *ex ante*. A framework of import demand and export supply between country A and C fills this niche and buttresses the results gained thus far.

As we have demonstrated, the upward bended real interest constraint r^* makes country C export 'excess savings', i.e. real (excess) supplies, at a relative price level of P^* . The actual export volume not only depends on the level of P^* , which reflects various corresponding levels of 'excess savings' but also on the trade ties with country A.

In figure 4, we arbitrarily depict some equilibrium point E a non-distorted integrated equilibrium between country A and C. Again, both countries avail themselves of identical endowments, technology, preferences and are at least weakly diversified. At the non-distorted equilibrium E trade flows between country A and C

are balanced in the long-run, i.e. possible changes in export supply X_y or import demand, for instance, in the course of some exogenous shocks, are only temporarily. At this stage, export supply X_y on the horizontal axis refers to the positive difference of produced (denoted by a sub-index P) and domestically used (denoted by a sub-index u) quantities of labor-intensive goods y . Accordingly, it applies that $X_y = y_p - y_u$, whereas the opposite pertains to an import demand. Since country A and C are identical, the left hand side of figure 4 (i.e. country A) is simply a mirror image of the right hand side (country C), so that we simply depict excess demand in country A by $M_y^d = -X_y$.

Figure 4: International General Equilibrium



Henceforth, arguing country C's perspective, enables us to elaborate on the influence that financial repression in country C exerts on import-export relations. In this respect, the country-specific (nonetheless identical) relative price levels

P on the vertical axis are of relevance. As we have already argued, a surge in relative price levels results in a relatively increased production of labor-intensive goods and a contraction of capital-intensive production respectively. Therefore, export supply in country C results from changes in the differential $y_p - y_u$, whereas y_p rises and y_u declines in P according to our previous analysis in the discussion of figure 3 (see above), so that

$$X_y^s = h(P), \text{ whereas } h'(P) > 0.$$

From this starting point, we can now portray the implications of financial repression on import-export flows. The point G depicts the outset of financial repression in country C, which ultimately breeds the new bended integrated equilibrium E^* in the course of opening up to international trade. Graphically, this implies that the constrained export supply curve has a horizontal segment GE^* that corresponds to the Rybczynski segment of the constrained production possibility frontier. In figure 4 we depict this along with country A's import demand curve for a case in which countries are otherwise identical (see above). Because of the mirror-imaging within this two country world the accrued export supply X_y in country C is identical with the import demand M_y^d of country A (i.e. the line segment between E^* and the vertical axis P).⁵ At the same time, the relative price level P has

⁵ Actually, this import demand, i.e. a current account deficit, must be balanced in terms of an export of liabilities *via* the capital account.

also adjusted upward towards P^* in country A ensuring that the new integrated equilibrium rental rate on capital will be at a level of $r^* > r$.

Accordingly, we may now argue that the upward bended relative price corresponds to country C's real exchange rate and inversely affects its terms of trade. This is to say that country C improves its terms of trade with the help of financial repression. As indicated in the FPE set (see above), the according 'excess savings' amounting to D in country C (see above) are transferred in terms of an export supply of labor-intensive goods X_y . At the same time, country A heavily borrows from country C and absorbs these 'excess savings', which, in turn, allows for spurring capital-intensive production in country A. From the viewpoint of country C, this is simply an export of its real appreciation pressure towards country A *via* its downward bended terms of trade. Interestingly therefore, it is the labor force in country C that bears the burden of internal economic adjustment to suppressed real appreciation.

One may also think of adding diverging factor endowments between the country A and C in our baseline HOS-model setup.⁶ Assuming, for the moment that country A is relatively well endowed with capital and country C has a comparative

advantage in labor-intensive production in combination with financial repression, we could establish a similar result. As this process would not deliver any substantial new insights to the debate, but rather a additional reinforcement of our results, we do not pursue this extension to our framework. Instead we are more concerned about demonstrating, how financial markets in mature economies, such as the US, might have reacted to these trade distortions. We are especially interested in linking our theoretical model to the recent financial crises. For that reason, we subsequently put forth a line of argument on the role of financial market imperfections in mature and flexible market economies, which might have amplified the effect of distorted trade relationships with a group of non-mature, real appreciation suppressing countries.

An extension to the theoretical framework: financial market imperfection

Without going into excessive formal modeling, we want to explain how these warped trade patterns have been amplified *via* financial market imperfections in a flexible market economy, such as the US. Given exported 'excess savings' from real appreciation controlling economies, US financial markets have reacted to these inflows in some form of overshooting, which has resulted in a consequent lending boom in the last years (Dell'Arricia et al., 2008; see also Mendoza and Terrones (2008) for a comprehensive empirical survey). Although, as we have argued in earlier sections, the capital-intensive

⁶ Furthermore, one could think of any extension along the key assumptions of the classical HOS-model setup.

sector in the US has disproportionately gained in terms of a surge in capital asset returns from trade ties with real appreciation suppressing countries, we want to highlight the fact that financial market imperfections in combination with a lack of regulation have substantially contributed to an overreaction in US financial markets.

In order to understand this economic trade-off relationship, capital rent rate movements have to be linked to the monetary side of the economy and to financial markets. However, banks and monetary policy in a simple dichotomous economic framework play a minor role, as deposits have to equal bonds and loans by definition in a stylized macroeconomic setting (Bernanke and Blinder, 1988). Nevertheless several empirical and theoretical assessments point to the fact that the process of monetization in the economy can hardly be controlled by central banking authorities, as monetization and subsequently allocation of financial assets is primarily taking place in financial markets (Stiglitz and Greenwald, 2003). In this respect, the credit creation mechanism of financial intermediaries generates some room for maneuvering. This is to say that lending booms in form of rapidly increasing credit to the private sector have substantially contributed to real money supply shifts, which have been observed in

the US economy.⁷ In this respect, the microeconomic structure of financial markets plays a central role for the efficacy of monetary policy. Impending incentive problems and asymmetric information might lead to deviations of interest rates, which financial intermediaries charge on their creditors and depositors (Stiglitz and Weiss, 1981; Mishkin, 2007). In this context, banks and financial intermediaries may also demand collateral to ensure their outstanding credit. In presence of even small changes in fundamentals due to shifts in the terms of trade, balance sheets of firms might improve rising nominal collateral values and thus affect the lending behavior of banks. Given the key result of our model that trade openness between mature and non-mature economies induces a shift of production towards capital-intensive production in mature, flexible market economies, and thus rise cash-flows and profits of producers in this sector, collateral lending procedures will lead to an increase in lending in the mature flexible market economy. Consequently an exogenous shock such as a policy induced distortion of trade relations *via* financial repression in one country can amplify real economic distortions *via* financial market frictions (Aghion and Banerjee, 2005). This phenomenon has been

⁷ For a survey of literature on the credit channel see Bernanke and Gertler (1995) and for a special treatment on emerging market economies see Tornell and Westermann (2002; 2003). Égert et al. (2006) additionally provide an empirical treatment on the working of the credit channel in transition economies.

introduced into the monetary economics literature by Bernanke, Gertler and Gilchrist (1999) as the financial accelerator mechanism (further, Kiyotaki and Moore, 1997). In presence of a financial accelerator, shocks to asset prices are amplified through the balance sheets of companies and financial intermediaries. Following this line of reasoning perverse incentives on the sides of borrowers and lenders translate into over optimism about future earnings, an overestimation of the net worth of firms and thus firms' capacities to borrow on domestic and foreign capital markets, increase the overall level of bank credit in the economy (Dell'Arriccia and Marquez, 2006). However, if the profit performance of firms cannot be satisfied, expectations turn sour and a devaluation of asset prices hits financial markets and thus balance sheets of creditors (e.g., Allen and Gale, 1999; Borio and Lowe, 2002).

In this situation an economic downturn might trigger a credit crunch, tipping the economy into recession (Bernanke et al., 1999). In this regard, even small cyclical economic upturns (e.g., productivity shocks), leading to more optimistic expectations in combination with financial market imperfections can trigger a lending boom, which is conditional on the severity of financial market frictions and their regulation. Hence, increasing income levels due to changes in overall productivity can also lead to demand driven expansions of the

economy, which in turn might be amplified *via* a financial accelerator. In our model, which we have introduced in previous sections, such an exogenous shock arises from distorted financial markets in real appreciation controlling economies. In addition, if an according expansionary economic process is financed *via* international savings, as has been the case with the US economy, shocks in domestic productivity might lead to a surge in foreign capital inflows, impacting the real exchange rate and thus amplifying business cycle swings (Aghion et al., 2006). For that reason, we are convinced that distorted trade relations in combination with a lack of financial market regulation, which should have been controlling for imperfections in financial markets in the US, are at the root of the recent financial turmoil.

Conclusions and Outlook

As we argued at the start, crisis resolution depends upon crisis causes. However, in contrast to an isolated monetary approach, we have put forth an analytical framework of international trade economics in order to investigate the root causes of recent financial turmoil in a broader context. We demonstrate how economic dynamics in an asymmetric global economic integration process have contributed to fuelling international liquidity and thus contributed to an expansion of financial markets in mature, flexible market economies beyond their fundamental economic capacity. In this regard, our central assumption has been that financial

repression has been applied in non-mature economies in order to prevent real appreciation pressures, as well as to stabilize economic growth processes in these economies (Aghion and Banarajee, 2005; Rodrik 2008). However, these policy measures have worked as a push factor and a driving force behind international capital flows to mature financial markets. Applying an HOS-model, we could establish a link between financial repression in real appreciation controlling economies, and warped relative prices in global production. An astonishing finding to come out of this process is that comparatively low-capital endowed economies engage in financial repression, and thus produce substantial ‘stalled investment’ (i.e. a de-capitalisation process). From a balance-of-payments perspective these ‘stalled investments’ are equivalent to ‘excess savings’ exported *via* the current account. An analysis of factor price equalization in an integrated global equilibrium also shows that financial repression in non-mature, real appreciation suppressing economies results in upward bended capital intensity in the sector of capital-intensive production in mature economies. At the same time labor intensity increases in the sector of labor-intensive production in non-mature economies. In line with existing literature, financial repression may be interpreted as a device for spurring export-led growth in non-mature economies.

For this reason, we argue that latter

non-mature economies are the ‘producers’ of the global savings glut, which, in turn allows for capital intensification in the sector of capital-intensive production in mature and thus financially developed and liberalized economies. The according absorption of international liquidity may nevertheless also reflect global asset shortages (Caballero et al., 2008) as depicted in the fall of global capital intensity in the integrated world equilibrium. The combination of both the saving glut and a lack of appropriate financial market regulation has been fuelling consumption and production in these mature economies beyond their fundamental capacities. From this perspective standard approaches and measures applied in assessing financial and macroeconomic vulnerabilities must have failed to show signs of overexpansion and misalignments. In fact, a large current account deficit in combination with a stable US Dollar exchange rate and increasing labor productivity in the US in recent years have been rather persuading policy makers and investors to put trust in the sustainability of global imbalances. Nevertheless, given the results of our theoretical framework, an artificial contraction of capital-intensive production in real appreciation controlling economies lies at the heart of the economic expansion of financial industries and consumption in the US beyond their fundamental limits.

According to this view from the production side, it becomes apparent that accruing real misalignments between mature and non-mature

economies in a globalized world are a root cause of the current global financial crisis. For that reason, any policy measure aimed at restoring misaligned economic structures will lead to a freeze of a suboptimal equilibrium, exposing mature and non-mature economies to substantial economic vulnerabilities in the near future. Nevertheless such demand-side oriented measures are possible instruments which may deliver short-run relief to the global economy and employment in the US and other mature economies. At this stage, however, escaping costly structural adjustments on the supply side in form of industrial cutbacks and rising unemployment will hardly be possible. In order to prevent a potential collapse of the global economy in the medium to the long run, correcting structural misalignments should be high on the policy agenda. Hence, fixing according structural misalignments on a global scale with the help of international policy coordination may represent the natural order of things. However, as long as this is not a viable policy option, potential second-best solutions for mature, flexible market economies may comprise imposing trade sanctions on labor-intensive import goods unilaterally. Although such policies would certainly mitigate the extent of structural misalignments in the world economy, such measures would also erode the benefits of trade and financial globalization and mark the renaissance of protectionism.

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Andreas Kern is Senior Research Assistant at the Jean Monnet Centre of Excellence for European Integration at Freie Universität Berlin.

Dr. Christian Fahrholz is a Research Fellow at the Chair of Economic Policy at the Friedrich-Schiller-University of Jena, Associated Fellow at the Zukunftskolleg at the University of Konstanz, and currently Visiting Professor for the Chair of Political Economy at the University of Mannheim.