Money, Capital Markets and Welfare: An Analysis of the Effects of Target2 Balances

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As we agree with Hans-Werner Sinn and Timo Wollmershäuser (2011a) on their basic thesis, which says that the mechanism of Target2 balances opens a new and very real channel for additional credit to the GIPS countries (Greece, Ireland, Portugal, Spain), and that it triggers involuntary capital exports of the GLNF countries (Germany, Luxembourg, Netherlands, Finland) without changing the monetary base of the eurozone, we need not engage here in the often heated debate within the scientific community.

In this paper we limit ourselves to three questions: firstly, we intend to supplement the past analysis of demand and supply of the monetary base in the GLNF countries with the corresponding one in the GIPS countries. In this we slightly amend the proposed model of Sinn and Wollmershäuser (2011a). Secondly, we discuss the effects of Target2 balances on the capital markets of the concerned countries in the framework of the New Austrian School of Economics. This model framework stands in the tradition of Friedrich A. v. Hayek's (1929 and 1931) capital theory and was developed principally by Roger M. Garrison (2002). Thirdly and finally we conduct a static welfare analysis of Target2 balances according to Brakman *et al.* (2006).

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## Target2 balances and the market for central bank money in the concerned countries

What are the effects of Target2 balances on the national money markets? Like Sinn and Wollmershäuser we assume a full allotment policy of the ECB: the supply of central bank money is unlimited in principle. The true problem variable is the demand for money (Sinn and Wollmershäuser 2011a).

In Figure 1 we present the demand and supply of base money or central bank money as a function of the interest rate. These refer to the countries with Target2 claims against the ECB, i.e. basically the group of Germany, Luxembourg, Netherlands and Finland (GLNF). The demand curve runs as usual from northwest to southeast, as the opportunity cost of holding money rises with an increasing interest rate.

The monetary base, or central bank money, consists of currency in circulation and the deposits of the commercial banks at the central bank. Given the interest rate for main refinancing operations, there is something like a natural ceiling for the demand for

Figure 1

The market for central bank money in the creditor countries (country group with Target2 claims)
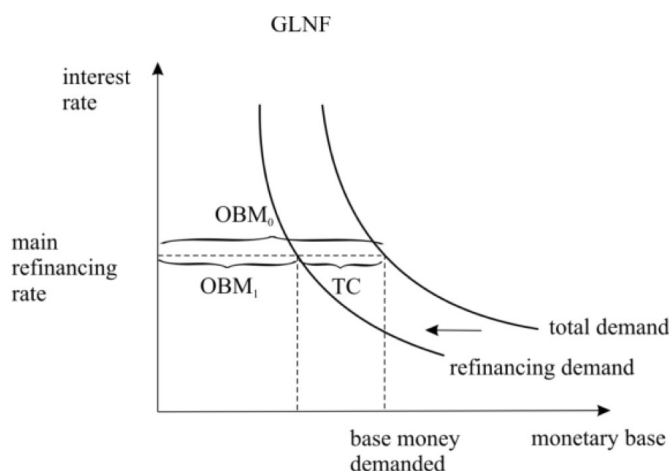
TC = Target2 claims
OBM = original base money

Source: Authors' depiction based on Sinn and Wollmershäuser (2011a).

money that in turn is determined by real income and the payment habits of a country or likewise a country group. As the Target2 claims against the ECB are added to the monetary base – let us call it the secondary monetary base (= Target2 claims TC) – the commercial banks, at a given size of their total money demand, now demand less 'original' base money (OBM_1) than before. The secondary monetary base represents new money that the national central banks – due to the payment transactions moving *via* the Target system – are forced to supply to the commercial banks without granting loans (Sinn and Wollmershäuser 2011a). The original monetary base is created *via* the asset side of the central bank by purchases of gold or foreign exchange as well as by the normal refinancing operations (lending) of the central bank with the commercial banks.

In Figure 1 the demand for 'true' refinancing, i.e. original central bank money, shifts to the left exactly by the amount of Target2 claims (TC): without Target2 balances, the affected countries would have demanded the amount OBM_0 of central bank money completely *via* regular refinancing instruments at the central bank, while with existing Target2 claims this demand declines to OBM_1. This and nothing else is what Sinn and Wollmershäuser – unclear for many – have called "crowding out of refinancing credit" (Sinn und Wollmershäuser 2011b, 19). The total demand for central bank money remains constant, although it is now partly met by the secondary monetary base. The decision regarding a possible 'crowding out of refinancing credit' is determined by the commercial banks in the GLNF countries and therefore (endogenously) on the demand side of the market for central bank money; it is not made by the central banks of the GLNF countries. It is possible that the term 'crowding out' in this context has fed the above-mentioned misunderstandings, as this term is normally chosen for involuntary rather than voluntary, i.e. self-determined actions.

The market for central bank money in the GIPS countries may be presented analogously (see Figure 2): since we defined Target2 claims as a positive secondary monetary base, we must now present the Target2 liabilities (TL) as a negative secondary

monetary base. Whereas the Target2 claims against the ECB create central bank money, the Target2 liabilities destroy central bank money. Without the existence of Target2 balances, the GIPS countries demand base money – at the current refinancing rate – in the volume of OBM_0. In contrast, as soon as this country group builds up Target2 liabilities against the ECB, it demands in addition base money in the amount of TL. In Figure 2 this means a shift of the solid demand curve to the right. Now the dashed demand curve represents the entire money demand. The distance between these two demand curves represents exactly the volume of TL. The demand for original base money expands to the distance OBM_1. In the GIPS countries there is an inverted development to that in the creditor countries (GLNF), where the demand for original base money declines.

The ECB on its part is unable to control this redistribution of the European monetary base from one to the other country group, at best if there is no full allotment of tender operations. Since October 2008, this full allotment has been installed: the ECB decided that the weekly main refinancing operations will be carried out through a fixed rate tender procedure with full allotment at the interest rate on the main refinancing operation (European Central Bank 2008). In October 2011, the ECB confirmed this policy by asserting its intention to continue conducting its MROs (main refinancing operations) as fixed rate tender procedures with full allotment for as long as necessary, and at least until the sixth maintenance period of 2012 ends on 10 July 2012 (European Central Bank

Figure 2
The market for central bank money in the debtor countries (country group with Target2 liabilities)

TL= Target2 - liabilities
OBM = original base money
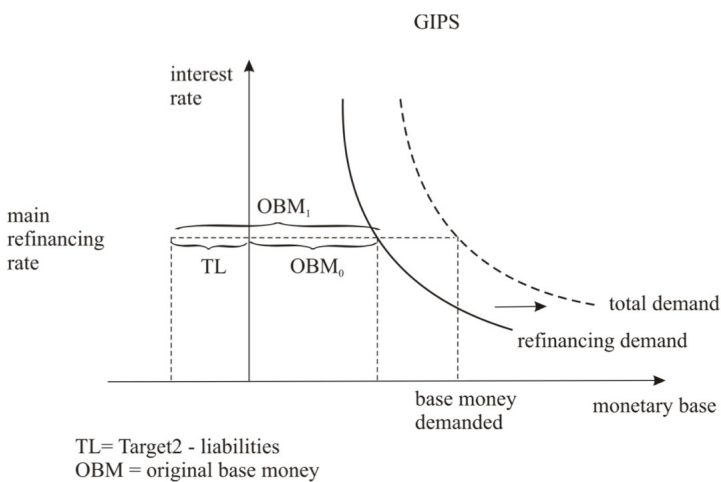
Source: Authors' depiction.

2011). This promise of full allotments does not induce the national central banks from Target2 debtor countries to reduce their own Target2 liabilities. Such a full allotment permits them practically at any time and in any amount to get original base money from the ECB. Only the European calendar for tender operations represents a (weak) limitation of their demand.

In the next section we shall analyse how the expanded monetary base in the GIPS countries, or the reduced demand for original base money in the GLNF countries, may be integrated into the New Austrian Economics model.
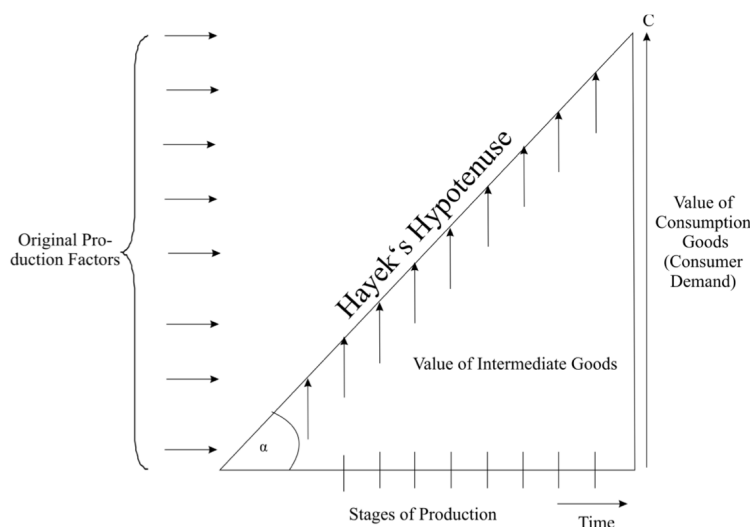
Figure 3
Hayek's Triangle

Sources: v. Hayek (1931); authors' depiction.

The capital market in the model of the New Austrian Economics and its application to the topic of Target2 balances

Figure 3 demonstrates the core of F.A. v. Hayek's capital theory (1929 and 1931): it shows a right-angled triangle, whose base line symbolises the time axis as well as the consecutive steps of industrial production. Available for this production are the factors labor and land that can be used at any point in time for the production of intermediate goods. The value of the intermediate goods may be measured at any point in time as the area of the triangle above the base line. The more 'active' time passes, the higher is *ceteris paribus* their value and the larger the area of the triangle.

The tangent of the angle α represents the implicit rent of the accumulation and is identical to the market-clearing interest rate on the capital market in equilibrium. The factors of production land, labor and intermediate goods are used for the production of consumer goods. The value of these consumer goods is given by the length of the vertical side of the triangle that, together with the base line forms the right angle. Here the following applies:

(1) The longer the (continuous) production process, the larger is *ceteris paribus* (i.e. at a given return on the accumulation, see above) the quantity of consumer goods that can be produced from a given quantity of original factors of production at a given point in time.

Accordingly, we could *ceteris paribus* let the output of C_i become 'infinitely' large, provided we were willing to wait long enough for the corresponding consumer good. Another special aspect of Hayek's Triangle is that:

(2) There is a 'continuous-input/print-output' phenomenon: production of the intermediate goods consumes time, whereas consumption occurs 'timelessly', i.e. at a certain point in time.

Thirdly:

(3) The large the time interval between the input of the original factors of production and the completion of the consumer goods, the more capital intensive is *ceteris paribus* the production.

Roger W. Garrison is a present-day representative of the Austrian Economics and is simultaneously one of the most important exegetes and interpreters of the business cycle and capital theoretic contributions of F.A. v. Hayek. His 'total model' comprises – besides Hayek's Triangle – a typical concave production possibility curve (see Figure 4 upper right-hand side), which, in the style of Paul Samuelson's presentation in his legendary textbook *Economics*, does not use two consumer goods but a (representative) consumer good ('butter') and a (representative) investment good ('guns').
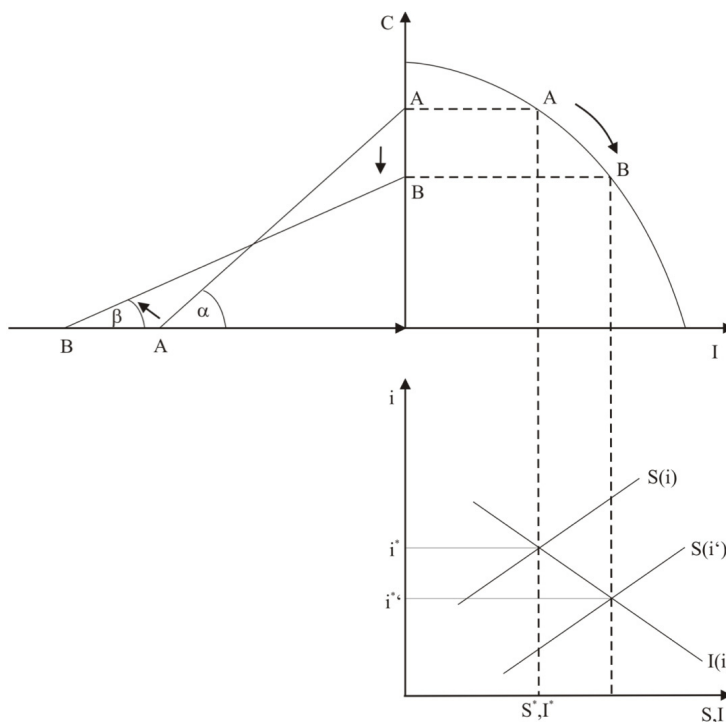
The third building block in Garrison's total model (see Figure 4 lower right-hand side) represents a classical capital market like the one used also by Knut Wicksell for his own overinvestment theory. Here it is important that the equilibrium interest rate corresponds to the natural interest rate, as long as – but only as long as – the equilibrium is determined exclusively by private savings and investment desires. Disturbances to this equilibrium by interventionist measures of monetary or fiscal policy generate a market interest rate that deviates from the natural interest rate. A weakness of the model, which concerns not only Garrison himself but also Wicksell's original from 1898, is the little addressed difference between the money market interest rate and the capital market interest rate. The transmission of a lower money market interest rate occurs over the lower refinancing costs of the commercial banks that are reflected in lower lending rates on the credit market. These induce firms to substitute capital market financing (in part) by credit financing with the result that prices rise on capital markets and interest rates fall. This says nothing, however, about the shape of the yield curve.

If all three building blocks are now put together (see Figure 4), where the total model ought to be read from the bottom up and then from right to left, the following is derived: equilibrium in the capital market is where $S(i) = I(i)$ and it initially determines the size of investment. It should be noted that we are in a stationary economy ($I^* = I^{br}$; $I^n = 0$); therefore there is no net investment or an expansion of the capital stock that would shift the production possibility curve outwards. The interest-rate equilibrium determined in the capital market also determines the slope of the angle α in Hayek's Triangle and at the same time corresponds to the natural interest rate. Once the size of the investment is fixed, then that quantity of consumer goods is determined as a residual from the production possibility curve that is planned by the firms and therefore is to be produced. From the size of the equilibrium quantity of consumer goods, on the one hand, and the known angle α, on the other, we can easily determine the length of the base of Hayek's Triangle (because of the consistency condition for right angled or any other triangles that says that the sum of all angles must add up to 180°). At the same time this determines the time length of the production process or the number of production steps.

Figure 4
Equilibrium in a closed economy without Target2 balances

Sources: Garrison (2002); Sell (2010).

The equilibrium in Garrison's total model can now, regarding the capital market, be disturbed by various events. Let us assume, for example, that private savings are induced by a change in the time preference of households: in the capital market the supply of savings curve will shift right (see Figure 4) and consequently *ceteris paribus* the (equilibrium) interest rate will decline. This interest rate decline will now further stimulate investment at the expense of the production of (non-durable) consumer goods, i.e. a move from A to B on the production possibility curve. In Hayek's Triangle the value of the consumer goods production declines in accordance with the wishes of consumers. At the same time the rate of return on the accumulation will necessarily decline. As a result, the time axis becomes longer; the early phases of the production process lengthen at the expense of the last phases

that are directly directed at the production of consumer goods. This result corresponds very well to the wishes of investors and consumers so that a new equilibrium time structure of capital allocation is established.

Let us now extend the macroeconomics of the capital structure in order to be able to analyse the effects of Target2 balances. For this purpose we create a model framework for two countries (country groups).

Assume two regions within the European Monetary Union, one (on the left-hand side of Figure 5) that is characterised by a high level of interest rates, comparatively low domestic savings and a considerable potential for commercial capital imports. The other one (on the right-hand side of Figure 5) is conversely characterised by a comparatively high savings rate, a low level of interest rates and a considerable potential for capital exports. In the following we shall analyse the scenarios below that are relevant for the issue of Target2 balances:

(i) the period 1999 to mid-2007,
(ii) the period from mid-2007 to 2011 in the absence of a functioning Target2 mechanism,
(iii) the period from mid-2007 to 2011 with a functioning Target2 mechanism.

(i) In the beginning, i.e. in the period from 1999 to mid-2007, Target2 (or its predecessor Target) played no significant role in the movement of central bank money between the two regions. Commercial capital flows financed the respective current account balances instead. For purposes of simplification we assume that the rest of the world played a negligible role in this: excess demand (ED) for savings on the left-hand part of Figure 5 therefore corresponds exactly to the excess supply (ES) on its right-hand side.

As interest rates tended to converge at level $\tilde{\imath}$ (where the interest rate in the GIPS countries moved down from the higher level i_0^* and that in the GLNF countries moved up from the lower level $i_0^{*'}$), point C_S (C_S') of the consumer goods supply of the

Figure 5
Disequilibria between GIPS and GLNF countries
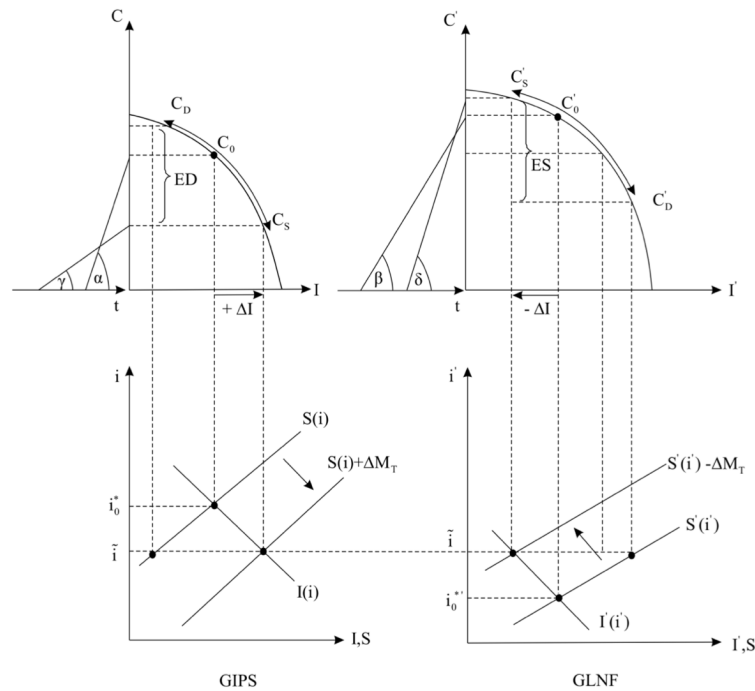
Source: Authors' depiction.

GIPS countries (GLNF countries) moved down (up) to the right (left), whereas the consumer goods demand point C_D of the GIPS countries (C_D' of the GLNF countries) moved up to the left (down to the right) when investment increased (declined). In Hayek's Triangle there was a reorganisation of capital in favour of longer-term (shorter-term) investments in the GIPS countries (GLNF countries). Intermediate goods were withdrawn from the late (early) stages of production – because here demand weakened due to the currently low demand for consumer goods (investment goods) – and directed to the early (late) stages, as here a strong demand was observable. Responsible for this was a low (high) level of interest rates.

This period may be roughly characterised by an investment boom, a low level of production of consumer goods and above-average, but unsustainable economic growth in the GIPS countries, accompanied by low investment, a comparatively high level of production of consumer goods as well as weak and below-average economic growth in the GLNF countries.

(ii) The hypothetical scenario of 'autarky' in both regions (all relevant variables have now the subscript '0') is accompanied by a relatively high (low) natural interest rate in the GIPS countries

(GLNF countries). The equilibrium points on the respective production possibility curves are now marked C_0 and C_0', the equilibrium interest rates are marked i_0^* and i_0^*'. This scenario is by no means unrealistic or strange as would appear at first glance. After all, it represents quite well the virtual situation after 2007, when no party would have access to the mechanism of Target2 balances. As explained by Sinn and Wollmershäuser (2011b), after the Lehman Brothers bankruptcy voluntary capital exports from the GLNF countries to the GIPS countries fell to almost zero. The GIPS countries were no longer able to generate current account deficits, as no voluntary commercial capital inflows were available.

To be sure, neither were they able to generate surpluses in their current accounts (Sell 2011). Responsible for this was among other things the fact that the earlier investment expenditures had not been directed to those sectors in which comparative advantages were likely, but had been focused primarily on those branches that produce non-tradables (like real estate, local bank services, etc.). Of course, in both regions this scenario shows quite a different capital structure in terms of Hayek/Garrison as (i): the natural interest rate is now high (low) in the GIPS countries (GLNF countries), the production of consumer goods is comparatively strong (weak) in the GIPS countries (GLNF countries), whereas investment is low (high). Under the conditions of this scenario the GIPS countries (GLNF countries) could therefore have focused more on the later (earlier) stages of the investment process and (almost *ex definitione*) therefore could have avoided bigger external disequilibria.

(iii) In sharp contrast, since mid-2007 but at the latest since 2008 the very real Target2 balances scenario has driven a wedge between the preferences of consumers and the production decisions of entrepreneurs. In both regions a considerable internal as well as external disequilibrium has arisen: "toward the end of 2010 … accumulated imports (of the GIPS countries, the authors) amounted to … 44 billion euros. This was 12% of the entire capital requirement created by the current account deficit. Fully 88% was evidently financed by the Target balances, i.e. by the money-printing press" (Sinn und Wollmershäuser 2011b, 32). In our subsequent analysis we further simplify things and assume that 100 percent of the GIPS countries' current account deficits were financed by Target2 balances.

Due to the expansionary (contractionary) effects of Target2 liabilities (claims) on the original monetary base in the GIPS countries (GLNF countries), the effective capital market interest rate falls (rises) in the GIPS countries (GLNF countries) to a level below (above) the natural interest rate. The newly created (withdrawn) original central bank money (ΔM_T) now drives a wedge between savings and investment: the consumers in GIPS countries (GLNF countries) make their consumption decisions according to their respective savings function, analogously, the investors in both country groups orient themselves on their respective investment function. There now will be an excess demand ED (an excess supply ES) for consumer goods in the region of the GIPS countries (GNLF countries). As demonstrated in Figure 5, the excess demand for (excess supply of) consumer goods in the GIPS countries (GLNF countries) combined with the increase $+\Delta I$ (decline $-\Delta I$) of expenditures on investment goods in the GIPS countries (GLNF countries) corresponds exactly to the increase in Target2 liabilities (claims). The effects on Hayek's Triangle and on the capital structure in the respective regions may be summarised as follows: they correspond largely to those of scenario (i), but in contrast to those, the effects on the capital structure in the GLNF countries are now at least 'involuntary', mildly put. It should further be noted that the productivity of the intermediate goods, which had previously be measured by the angle α (β), now turns out lower (higher) in the GIPS countries (GLNF countries), as $\gamma < \alpha$ ($\delta > \beta$).

In contrast to the first scenario, the mechanism of the Target2 balances now induces the GLNF countries to offer an involuntary excess supply of consumer goods. This is accompanied by a reduction of their own expenditures for investment goods. In other words the Target2 balances enabled the GIPS countries to initiate an excess demand for consumer goods and an increase in investment spending.

A static welfare analysis of Target2 balances

With the help of Figure 6 we can now conduct a static welfare analysis. Here we compare the described three scenarios by presenting the respective investor and savings surplus:
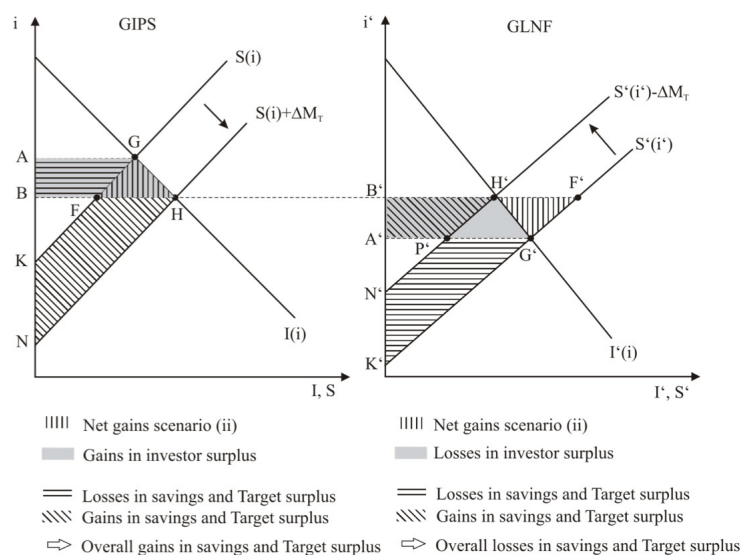
(i) Let us represent the hypothetical regime 'Without Target2 balances' for the period mid-2007 to 2011

by the two equilibrium points at 'autarky' G and G'; the corresponding solutions serve also as reference solutions for the subsequent assessment of the welfare effects.

(ii) From 1999 to mid-2007 there were capital inflows (capital outflows) in the magnitude of FH or H'F' respectively; in both economic regions we register a net welfare gain corresponding to the area of the triangles FGH and H'F'G' (vertically dashed), a result that is well known from textbooks. In detail: in the GIPS countries the gains in investor surplus (hatched in grey) exceed the losses in savings surplus (AGFB),

Figure 6
Static welfare analysis of the Target2 balances

Source: Authors' depiction based on Brakman *et al.* (2006).

whereas in the GLNF countries the gains in savings surplus (B'F'G'A') more than compensate the losses in investor surplus (also hatched in grey). We are very conscious of the fact that this net welfare balance is still too optimistic.

(iii) The period from mid-2007 to 2011 – taking account of the now effective Target2 balances – is more difficult to assess. Let us start with the GIPS countries: here we find gains in investor surplus in the amount of AGHB (hatched in grey), in agreement with scenario (ii). At the same time, there is also a positive surplus now that on the one hand must be assigned to savings, on the other hand also to the Target2 balances: it corresponds to the difference between the area KFHN (hatched diagonally) and the area AGFB (hatched horizontally). Overall, there are gains in surplus for savings and for the Target2 balances. This means that the scenario (iii), the Target2 scenario, results in net welfare gains for the GIPS countries that exceed those of scenario (ii). In contrast to this, the active existence of the Target2 balances results unambiguously in welfare losses for the GLNF countries: now the modest (hatched diagonally) area B'H'P'A' (gains in surpluses to be assigned to savings and Target2 balances) compares to the considerably bigger sum of the (hatched in grey) area B'H'G'A' (loss in investor surplus, identical to scenario (ii)) and the (hatched horizontally) area N'P'G'K' (losses in surpluses distributed

between savings and Target2 balances). The chief result of this static welfare analysis is therefore that the Target2 balances cause a net welfare transfer from the GLNF countries to the GIPS countries. For both country groups combined the Target2 balances do not lead to any change in welfare. This result matches the above statement that the aggregate effects of the Target2 balances on the European monetary base add up to zero.

A brief summary

This contribution has produced three results. First, Target2 balances lead to a shift in the original monetary base within the eurozone that cannot be controlled by the ECB. Second, Target2 balances have, at least for the countries with Target2 claims, involuntary and undesirable effects on their capital structure. Third, Target2 balances cause a forced welfare transfer from the countries with Target claims to those with Target liabilities.

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