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Adjustment of global imbalances: Illustrative scenarios for Hungary

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Adjustment of global imbalances: Illustrative scenarios for Hungary

(Globális egyensúlytalanságok korrekciója: illusztratív szcenáriók Magyarországra)

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Abstract

In this study we examine the impact on Hungary of a possible correction of global imbalances. We distinguished four different channels of the global adjustment process, which are widely referred to in the literature (fiscal tightening in the U.S.; housing price correction in the US; an increase in the risk premium of dollar assets; increase in domestic demand in the Asian region) and analyzed them through model simulations. We constructed global scenarios using the NIGEM model, while we captured the domestic impacts using the Quarterly Projection Model (NEM) of the Magyar Nemzeti Bank. According to our results, both the global and domestic effects differ significantly with respect to whether the correction originates from the U.S. or Asia and whether it is a result of policy or market processes. We found that a possible global correction will pass through to Hungary mainly through the Eurozone countries, thus its main impact will be relatively dampened. The responses of domestic macroeconomic variables depend on our assumptions on the reaction of monetary policy and the developments in the risk premium on forint denominated assets.

JEL: E27, E50, F32, F42, F47.
Keywords: monetary policy, global inbalalnces, forecasting, simulation.

Összefoglaló

Az alábbi tanulmányban a globális egyensúlytalanságok esetleges korrekciójának magyarországi hatásait vizsgáltuk meg. A globális korrekciós folyamat négy, a szakirodalomban gyakran tárgyalt csatornáját különítettük el (költségvetési szigorítás-, lakásár-korrekció az USA-ban, a dollárbefektetésektől elvárt kockázati prémium emelkedése, keresletélénkülés egyes ázsiai feltörekvő országokban), majd ezeket modellszimulációk keretében elemeztük. A globális szcenáriókat a NIGEM-modell segítségével állítottuk elő, míg az ezekből következő hazai hatások megragadásához az MNB Negyedéves előrejelző modelljét használtuk. Eredményeink szerint mind a globális, mind a hazai hatások esetében lényeges különbség mutatkozik a tekintetben, hogy a korrekció az Egyesült Államokból vagy a feltörekvő ázsiai országokból indul ki, illetve hogy a korrekciót a piac kényszeríti ki vagy kormányzati politika eredménye. Az esetleges globális korrekció hatásai elsősorban az euroövezet országain keresztül gyűrűznek be Magyarországra, így azok viszonylag tompítottan jelentkeznek. A hazai makrogazdasági változók válasza ugyanakkor függ a monetáris politika reakciójától, illetve a forinteszközöktől elvárt kockázati prémium alakulására vonatkozó feltételezésünktől.

JEL: E27, E50, F32, F42, F47.
Kulcsszavak: monetáris politika, globális egyensúlytalanság, előrejelzés, modellezés.

1. Introduction

In this paper we focus on the potential effects of one of the major risks currently facing the world economy in general, and Hungary in particular. Imbalances of a sheer and previously unprecedented scale have emerged in the global economy, which are reflected by the large US current account deficit and the current account surpluses of certain emerging and developed countries. Although the development of these imbalances may also reflect equilibrium processes, even for the United States a current account deficit of more than 5% of GDP is highly likely to be unsustainable in the medium to long run. A potential correction of global imbalances may occur in a number of ways and work through several channels, which, in turn, may lead to a range of possible outcomes for the world economy. By its very nature, it is of key importance to look at the possible macroeconomic effects of a correction on Hungary.

In our analysis we attempt to map out the main risks identified as being the most relevant to the Hungarian economy. To achieve this goal, we employ several analytical techniques. The presentation of the various channels of adjustment is based on model simulations. We simulate adjustment processes through various channels using the NiGEM world economic model. Then, the results obtained from the MNB's Quarterly Projection Model (NEM) are used in analysing the effects on Hungary. Four global scenarios are examined, which are widely discussed in the relevant literature: fiscal tightening in the US; a fall in US house prices; a rise in the US dollar's risk premium and an expansion of demand in Asian countries. In respect of the possible effects on Hungary, we use two assumptions for monetary policy: a policy of shadowing the ECB's interest rate moves and one which is based on an independent Taylor-rule.

Our results show that it makes much difference whether a correction emanates from the US or from emerging Asian economies. A decline in US demand, a rise in the dollar's risk premium or fiscal tightening in the US may have a downward effect on European aggregate demand (and thus indirectly on Hungarian demand), while a fall in Asian raving ratios (i.e. a pick-up in consumers' demand) may provide a stimulus to Hungarian economic activity. Furthermore, in terms of the macroeconomic effects, there may be substancial differences depending on whether a correction is triggered by the markets (e.g. a sudden rise in dollar risk premia) or it reflects government policy measures (e.g. a tax increase in the US).

The reactions of Hungarian monetary policy also play a significant role in the ultimate domestic impacts. Generally, a policy of shadowing the ECB's interest rate decisions leads to less volatile output responses. On the other hand, an independent Hungarian monetary policy is more able to keep inflationary pressures under control, while limiting growth sacrifice to a level broadly similar to the ECB-shadowing case.

However, our model simulations focus on the real economy side of the adjustment process and thus are capable of providing only a narrower view of the correction of global imbalances. While the adjustment of the real economy – assuming no disruption on the financial side – can be considered as a protracted and gradual process, the size and direction of capital flows recorded in the financial account of the balance of payments may change much faster. These effects are difficult, if not impossible, to model; however, they may have particular relevance. And although there is a relatively low probability that a disorderly correction, originating in the financial markets, and leading to a significant drop in the US current account deficit in a short time period takes place, it woud be an event with a very significant impact. Therefore, it may be useful to look into the issue at least on a qualitative basis.

From a Hungarian perspective, a global correction, involving emerging markets and affecting capital flows adversely, may induce a significant rise in the risk premium. This, in turn, may reduce growth over the medium term, particularly if firms' cost of capital increases and borrowers' balance sheets deteriorates. On the other hand an exchange rate weakening caused by a rise in the risk premium may lead to higher inflation over the short term.

2. Global imbalances and the possible channels of adjustment

WHAT DO WE MEAN BY GLOBAL IMBALANCES?

By global imbalances we mean, specifically, the persistently high US current account deficit, unprecedented by the standards of developed economies, which is matched by the current account surpluses of several emerging and developed countries. A natural consequences of the expansion in world trade and increased financial integration may be a higher cross-sectional dispersion of current account positions and a decline in the correlation between domestic savings and investment in certain countries. Theoretical considerations, however, suggest that it is a feature of countries relatively well-endowed with capital that they tend to register current account surpluses (i.e. they export capital), while other, less developed countries with an insufficient capital stock but with a significant growth potential typically record current account deficits (i.e. they import capital). In a similar vein, countries in the upward phase of the business cycle provide credit (i.e. they register current account surpluses) to countries that find themselves in a relatively less favourable cyclical position. Consequently, in this context it may be an optimal choice for countries with rapid economic growth to run, though for a limited period, current account deficits. It may, moreover, be rewarding for them to borrow, and then to service their debt obligations later, during cyclical upturns or at times when they earn high incomes, and so to transform future income into current. However, a significant, one-off productivity shock to a developed country may, *ceteris paribus,* justify – albeit only temporarily – the current account swinging from surplus into deficit.

There are several possible, mutually complementing rather than exclusive, approaches to analysing the imbalances discussed above. In providing a more detailed account of global imbalances, we mainly rely on the savings-investment balance approach applied by the IMF (2005), which is consistent with the intertemporal model of the current account.

The imbalances began to build up in the second half of the 1990s, with the process split into two distinct phases. A deterioration in US households' net financial balance was observed throughout the entire period, the effects of which on domestic savings were offset in part by disciplined fiscal policy in the pre-2000 period. In the first phase, from 1997, it was mainly US productivity growth and the related strong expansion in fixed investment which were the underlying causes of the widening in the gap between savings and investment, i.e. the growing current account deficit. The deterioration in the current account in the period may be seen as an equilibrium response to a positive productivity shock. During the period which began in 2001, however, fixed investment activity slowed, with the further increase in the current account deficit leading to a rapid fall in the combined net savings of households and general government. If households' expectations about the future rise in their permanent income are well-founded, then the fall in domestic savings may also reflect equilibrium processes (see Engel and Rogers, 2006; however, in the opposite case (e.g. households are myopic or overly optimistic), the surging US current account deficit indicates macroeconomic imbalances. For example, a decline in net savings cannot be regarded as an equilibrium response, if households' extra consumption expenditure is caused by wealth effects resulting from temporary rises in financial asset or real estate prices.

As a consequence of the developments outlined above, the US current account deficit reached USD 800 billion, or 6%, of GDP by 2005. It is important to note however, that the US net foreign asset position deteriorated only slightly, despite the accumulation of current account deficits; and the income balance become negative only in the most recent past. The latter implies that US foreign liabilities consist primarily of relatively low-yielding dollar-denominated debt securities, while the assets side is dominated by higher-yielding direct investment assets and holdings of equity capital (see Lane and Milesi-Ferretti, 2005). Thus, a potential depreciation of the dollar may – ceteris paribus – lead to revaluation gains on external assets and liabilities.[1]

[1] The effects of revaluations resulting from fluctuations in the dollar's exchange rate are well illustrated by balance of payments data for 2003-2004. These indicate that, despite the US recording a significant current account deficit of more than 4% of GDP in both years, the net external asset position improved in 2003 and it remained practically unchanged in 2004, while the dollar weakened (for more details, see Cline, 2005, chapter 2).

Paralell with the processes discussed above, the savings-investment balance of a number of Asian and oil-producing countries improved, which is reflected in rising current account surpluses.[2] In Asian countries, except in China where a high investment ratio by international standards is associated with an even higher savings rate, the improvement in current account balances relative to historic levels arose from a sharp fall in investment ratios and a slight drop in saving rates. These surpluses in net

Chart 1

Saving and investment as a percentage of GDP in the world's major regions

Source: IMF International Financial Statistics.

[2] The percentage share of oil-exporting countries' savings within capital flows financing the US current account deficit has grown recently, which may be explained by the sustained rises in the price of oil over the past few years.

savings may be attributed to several factors. Oil-producing countries try to smooth their windfall incomes from high oil prices over time, while in Asian countries insufficient consumption demand, lack of lucrative investment opportunities and socio-demographic factors[3] may explain the imoproving saving-investment balance.

THE ROLE OF ECONOMIC POLICIES

An important issue that should be addressed in presenting global imbalances is the role of various economic policy actions and processes. The literature on the issue cites a number of economic policy factors which may have contributed to the development and persistence of financial imbalances.

One such factor is the fiscal policy of the United States which became increasingly loose in the post-2000 period. Fiscal expansion, combined with rising household debt, may have been the driver of the fall in the saving rate (Chinn, 2005). It is important to note, however, that there is insufficient evidence supporting a causal relationship between the US fiscal and current account balances. The Fed steered monetary policy to maintain a low interest rate environment over a protracted period. This may have also played a role in movements in financial asset and real estate prices causing significant wealth effects, to which the fall in the US household saving ratio can partly be attributed.

The exchange rate policies pursued by Japan, China and other South-East-Asian countries may have been another factor playing a role in the development and persistence of the imbalances. Some of the countries in question supported their tradable sectors by limiting the appreciation of their currencies, as a result of which they became undervalued against the dollar in real terms[4], and consequently, those countries amassed large foreign currency reserves. Real exchange rate undervaluation had an upward effect on the United States' trade deficit (although the significance of this factor is a matter of debate), while US dollar reserves accumulated by central banks through foreign exchange market interventions stimulated global demand for low-risk dollar assets, and so they may have been a driving force behind the emergence of historically low long-term dollar yields. Modest domestic demand in certain developed European economies and Japan may also have contributed to global imbalances to some extent. However, this is seen as a relatively less important influence.

WHAT ARE THE MAIN CONSTITUENTS OF AN ADJUSTMENT PROCESS?

According to the mainstream of theoretical and empirical research on the issue (see e.g. Eichengreen, 2006), global imbalances will prove to be unsustainable over the longer term, assuming no policy change. However, there is great uncertainty about the timing and profile of a potential correction, as well as about the extent to which it would affect the world's major economic regions.

If such an adjustment occurs, it can be assumed that the US savings-investment gap will close due to a rise in the United States' historically low domestic savings, which may be matched by a decline in savings in Asian countries, particularly in China. An increase in US domestic savings may start from an improvement in household net savings, owing to higher real interest rates and/or a correction in house prices. Fiscal tightening may also contribute to a rise in total domestic savings, although the effect of this depends greatly on the extent to which households smooth their consumption. In our simulation we captured the improvement in US domestic savings assuming a correction in house prices causing wealth effects and a scenario of an improvement in the fiscal position. A decline in Chinese (Asian) savings, in turn, may result from a prolonged time preference shock.[5]

The major current account adjustment episodes of the past two decades show that the narrowing of the savings-investment gap is typically associated with (real) exchange rate depreciation and an output loss (see Freund and Warnock, 2005); the scale and persistence of this may be influenced by a number of other factors as well. Such factors can be the size of net and gross external liability/asset positions; their maturity and capital profile; the currency profile of economic agents' balance

[3] Propensity to accumulate additional savings, due to population ageing and the deficiencies of the social security system.

[4] The reader may ask how real exchange rates can be diverted away for such a long period using economic policy tools: the main reason is that in certain countries, e.g. China, the price system is not fully liberalised, and so there is an opportunity for the authorities to counterbalance the inflationary effects of the undervalued currency and certain cost shocks (e.g. vehicle fuel price increases) by maintaining or introducing price and/or wage controls.

[5] Faruqee et al (2005) model the rise in the US saving ratio using a similar approach.

sheets; and the structural features of the financial system. Simulations carried out for the US using calibrated models [e.g. Obstfeld and Rogoff, 2005, and Blanchard et al., 2005) suggest that bringing the current account back into balance requires a substantial depreciation of the dollar's real effective exchange rate,[6] which implies a comparable depreciation of the nominal effective exchange rate. However, Gourinchas and Rey, 2005, and Lane and Milesi-Ferretti, 2004 point out that, in the event of a massive dollar depreciation, the revaluation effects on external assets and liabilities may help the adjustment process to proceed more smoothly over time. If the dollar lost its safe haven status due to a significant real exchange rate depreciation or a shift in economic policy preferences (see Roubini and Setser, 2004), long-term dollar yields would be expected to rise significantly. Some papers (e.g. Warnock and Warnock, 2005) argue that in the absence of an accumulation in foreign central banks' dollar reserves, ten-year dollar yields would be some 100-150 basis points higher than their level in 2004. In this context, we simulate a dollar depreciation and a related rise in interest rates with a risk premium shock.

An eventual correction might start with (i) a fall in US domestic demand (with an increase in households' and/or general government's savings), (ii) a rise in domestic demand in Asian countries with the highest current account surpluses (iii) an increase in the risk premia on dollar denominated assets (iv) a combination of these components is occurring. The time profile of the adjustment process may greatly depend on whether or not the correction of imbalances materialises with or without coordinating economic policies. Presumably, an adjustment process, supported by multilateral economic policy actions (e.g. increasing exchange rate policy flexibility in certain Asian countries; fiscal adjustment in the US; structural reforms aimed at stimulating domestic demand in EU Member States and Japan), would proceed more evenly over time and geographically, and it would be less likely to lead to a disruption of global financial processes (see Bini-Smaghi, 2006).

WHAT ARE THE CHANNELS THROUGH WHICH THE HUNGARIAN ECONOMY WOULD BE AFFECTED BY A CORRECTION?

The Hungarian economy may be affected by a potential correction of global imbalances through a number of real-economy and financial channels. Since net exports towards the U.S. have a significant contribution to growth in Hungary's most important European trading partners, a correction of the US current account deficit may affect negatively Hungarian exports integrated to the value-added chain of European export goods. The effects of this negative external demand shock could be reduced if a strengthening in domestic demand offsets a decline in exports by European countries. If, during the correction a real exchange rate depreciation of the dollar – which is highly likely to occur – takes place vis-à-vis the euro, then euro area exports are expected to decline, due to a deterioration in their price competitiveness in the US markets. The latter effect may be weaker if the real exchange rate depreciation of the dollar also occurs against the major Asian currencies. It is important to note, however, that according to our simulation results, the scale of exchange rate flexibility in Asia is of little relevance to the effects of the correction on the Hungarian economy.

A correction of global imbalances may act to change investors' preferences for emerging market assets, particularly if it is realised in an abrupt or disorderly way and/or associated with financial market turbulence. The current strong global risk appetite may fall, which, in turn, could lead to a rise in risk premia for holding emerging market financial assets. In the case of Hungary, this could result in increasing costs of financing of the current account deficit and, in the event that the fall in risk appetite leads to massive outflows of capital from emerging country assets, it could trigger a significant weakening of the forint against the euro.

[6] A 33% dollar depreciation is required in the baseline scenario of Obstfeld and Rogoff (2005).

3. Scenarios for the world economy

In analysing the effects on Hungary of the potential correction of global financial imbalances, we performed a variety of model simulations using the NiGEM world economic model and the MNB's Quarterly Projection Model (NEM).[7] It should, however, be noted that the use of models in addressing such questions requires great care: they are typically capable of capturing orderly correction mechanisms and have a limited ability to depict accurately the responses of the financial system. A third deficiency is that in these models the costs of intermediate production (e.g. the implications of oil prices on cost inflation) are not detailed. Nevertheless, using the NiGEM model offers many advantages, as the most significant world economic linkages are modelled. The NEM model, in turn, may be a useful analytical framework to describe the Hungarian economy. In all of the scenarios analysed, there is a sustained fall in the US current account deficit as a percentage of GDP, the size of which in each case is fixed at 0.25 percentage points in the fourth year following the shock.[8]

In our analysis the scale of the improvement in the US current account balance is small. In the current situation (2006) an even ten times greater correction may be required in order for the US external balance to become sustainable. The degree of the improvement we chose can be justified by the fact that the effect of individual shocks, taken separately, is also small, provided that the magnitude of the shocks assumed is realistic. Furthermore, assuming shocks of a greater magnitude, the likelihood of non-linear reactions increases which cannot be captured by our models. Therefore, under a correction scenario resulting in a sustainable path, the combinations of shocks presented below may take place; and non-linear effects that cannot be captured with the models employed by us may also emerge. Consequently, the objective of our investigations cannot be to present an all-round adjustment process. Rather, we are only able to examine (i) the channels through which small shifts towards a correction in the US external balance, coming from different sources, spill over and (ii) the shifts they induce in the major Hungarian macroeconomic variables.

In the model simulations, economic policy responses to the shocks are also taken into account. We assume that monetary policies in the major economic regions, e.g. the US and the euro area, follow a standard Taylor-rule, whereas fiscal policies develop in line with the long-term solvency constraints. In handling Hungarian monetary policy, we have chosen a pair of solutions. In the baseline scenario, it is assumed that the MNB shadows the ECB's interest rate decisions, which can be partly reconciled with a tight ERM II type regime based on nominal exchange rate stability with unchanged risk premium. In addition to this, however, we also analyse the case of a more independent Hungarian monetary policy in each simulation exercise. Another important point to be made is that in the model simulations we assume that China maintains a floating exchange rate regime. Although the role Chinese and other Far-Eastern exchange rate policies play in the maintenance of global imbalances is difficult to dispute, a number of analyses (Faruqee et al., 2005 and Al-Eyd et al., 2005) have suggested that abandoning exchange rate pegs itself has insignificant effects on the world economy, and the European economy in particular.[9] Our simulation led to the same conclusion: the assumption for Asian exchange rate policies (i.e. fixed vs. floating exchange rates) was only marginally reflected in euro-area demand vital for Hungary, and consequently, nor were the effects on Hungary materially dependent on the assumption for the Chinese exchange rate policy.

FISCAL TIGHTENING IN THE US

In recent years, the US fiscal deficit has become one, although not a single, factor behind the country's growing current account deficit.[10] From a surplus in 2000, the budget deficit has risen to above 4% of GDP in the past four years. Consequently, an obvious source of correcting global imbalances lies in fiscal policy tightening. In our first simulation, we assume a persistent fiscal tightening in the US equal to 0.5% of GDP, which the government implements entirely by boosting income tax revenues.

[7] We analysed the world economic effects in NiGEM. NEM, which better describes the Hungarian economy, was used to analyse the possible effects on the Hungarian economy. Using the two models in combination was made possible y the assumption that the effects of the Hungarian economy of global process is negligible.

[8] See the Appendix for the details of the simulation results.

[9] Faruqee et al (2005) examined the additional effects of Asian exchange rate flexibility under the scenario of fiscal tightening in the US and a decline in demand for dollar assets. Their results show that exchange rate flexibility significantly reduces output and inflation volatility in Asia, but its effects on the world economy are less significant Al-Eyd et al. (2005), who analysed the effects of the 10% appreciation of the Chinese renminbi following the abandonment of its pegs, made similar observations. The latter NIESR paper was also written using the NiGEM model.

[10] It is important to stress once again that this does not necessarily mean that there is a long-term causal relationship between the fiscal and current account deficits.

A rise in income taxes in the US results in a dampening of private sector demand growth, which leads to a decline in GDP growth. But despite this, the shock drives up the country's inflation slightly, which is the result of higher imported inflation in response to a slight depreciation of the dollar. Through a fall in US demand for imports and deterioration in international price competitiveness, the shock also affects euro-area economic growth negatively. However, this slight effect on Europe fades away by the fourth year, which is facilitated in part by some monetary easing in Europe against the background of imported disinflationary pressure. However, a counterpart to the improvement in the US current account deficit is a persistent negative effect on the euro-area current accout balance.

A CORRECTION OF US REAL ESTATE PRICES

A realignment of US net financial savings can be achieved not only through well-defined economic policy action, but also via a market-driven shock changing the behaviour of the private sector. One example of this may be a negative shock to the real estate sector, which could have an upward effect on US households' very low saving ratio, caused in part by wealth effects stemming from real estate prices. According to the most recent studies analysing real estate prices in the United States, relative prices are overvalued by at least 10%,[11] which, however, is obscured by significant regional differences. Although currently the extent to which real estates are overvalued is believed to be moderate by international standards, a market driven correction in the near future cannot be ruled out – at least in the regions with the strongest past increases in real estate prices. In this context it is worth noting that, according to July-August 2006 data, the number of new homes built in the US fell significantly, which may foreshadow an impending correction in the real estate sector. In our simulation, a persistent 9% decline in nominal prices would be necessary in order for the required reduction of 0.25 percentage points in the current account deficit to take place.

Falling real asset values in the US, caused by the decline in real estate prices, act as a brake on domestic consumption growth, and the household saving ratio rises persistently by 0.5 percentage points. In year 1, the degree to which economic growth slows is about three times the overall impact of fiscal tightening, but it requires less time to run its course. This is so because the recovery of investment demand as an effect of falling long-term rates, caused by disinflationary pressures, counteracts the decline in growth. However, the effect of the shock is more sustained and somewhat greater. The pass-through effects on the euro area are very similar in terms of size to the case of fiscal restriction discussed above, although the initial drop in euro-area economic growth is stronger under the assumption of a real estate price shock, similarly to the case of the US.

Despite the similarities of the results, the substantial differences between fiscal restriction and the real estate price shock should also be taken into account. These differences result mainly from factors that our models are incapable of handling. Consequently, in reality fiscal tightening may also generate non-Keynesian effects via changes in business behaviour which further reduce the real economic costs of a correction.[12] By contrast, a significant shock to real estate prices may affect investor sentiment adversely and feed through into other asset markets. As a result of these effects falling outside the scope of the model, the negative influences of a real estate price shock may even be significantly greater and persist for longer.

FASTER DEMAND GROWTH IN ASIA

Considering global savings, the record US current account deficit is matched in large part by the current account surplus of the East-Asian region.[13] The exchange rate policies pursued by certain East-Asian countries play a role in the maintenance of imbalances – these countries keep their national currencies at levels which can be considered as undervalued and consequently their central banks accumulate dollar reserves, which in turn generate stable and interest rate insensitive capital inflows to the US. However, an important structural feature should not be ignored: saving ratios in the East-Asian economies seem to be persistently and substantially higher than those in Western economies, owing in part to cultural and social factors.

With robust economic growth continuing and household lending expected to rise in emerging Asia, and particularly in China, it is conceivable that domestic demand will grow somewhat faster in the short term, i.e. saving ratios will fall. In the shock

[11] See Holland and Metz (2006).

[12] On the non-Keynesian effects of fiscal adjustments, see, for example, Horváth et al. (2006).

[13] However the current account surpluses of the large oil-producing countries, which even grew further in the past two years, is worth noting. Over the same period, the combined current account of euro-area countries remained in balance.

scenario, our assumption is for growth in emerging Asian countries to be some 1 percentage point faster annually in the coming four years (endogenously), relative to the baseline scenario where the economy grows at its historical average rate.[14]

An adjustment via the expansion of demand in Asia brings economic benefits for both the US and the euro area. Increased import demand in Asia contributes to growth in both large regions through net exports over the longer term. Employment rises, which provides a boost to growth through higher household consumption. Even the upward effects on capital costs of expectations of an interest rate rise in response to increased inflationary pressure cannot completely cancel out this higher growth. In this scenario, the euro-area current account also improves. This is matched by a significant deterioration in the current accounts of emerging Asian countries.[15]

HIGHER RISK PREMIUM VIS-À-VIS THE US DOLLAR

Among other factors, strong demand for dollar assets in international financial markets facilitated the development of the current level of global imbalances. As the US dollar continues to be a dominant reserve currency, it is hard to tell – based on past experience with currency crises – how longer the current strong demand for the dollar can be maintained in the light of the current US twin deficit problem.[16] In the pessimistic scenario, investors' demand for dollars may even plunge as a shock, entailing a substantial depreciation. In our analysis below we examine an increase in risk premia vis-à-vis the dollar which results in a permanent nearly 10% depreciation in the nominal effective exchange rate.[17,18] Obviously, the shock is stylised: it does not take into account the possibility that the dollar's bilateral exchange rates may depreciate to different degrees and that the risk premium shock may be 'contagious' to other currencies as well.

In terms of its macroeconomic impact, this scenario lies closest to a disorderly or 'disruptive' correction. Although, initially, rising exports stimulate US economic growth owing to an improvement in international price competitiveness, other components of growth, e.g. rising long-term yields, and declining investment and consumption caused by falling real wages and employment, are offsetting this effect from year 2. The slump in domestic demand acts as a drag on economic growth over the longer term and contributes to the improvement in external balance. However, the effects of a sustained improvement in the trade balance are reduced by a deterioration in the income account, as international yield differentials are moving against the United States. But due to the positive revaluation effects mentioned earlier, the value of US net external assets initially rises by around 6% of GDP, which is beneficial for external sustainability.

Of the four scenarios, the effects of the one discussed above on the euro area are more modest, but nevertheless the most unfavourable over the short run. Although exchange rate appreciation vis-à-vis the dollar affects adversely Europe's competitiveness, the euro effective exchange rate strengthens only moderately, as in the scenario all other currencies appreciate against the dollar. Initially, economic growth slows sharply due to the decline in exports; however, this slowdown is short-lived: growth returns to trend by year 3. The conditions for stabilisation are benign, given that disinflationary pressure caused by exchange rate appreciation allows a greater degree of monetary easing. But despite this, it takes several years for inflation to return to around trend. There is a sustained deterioration in the current account balance; however, it is smaller in comparison with the effects on the Asian region.

[14] Similarly to the other three, we conducted the simulation under the assumption that China, South-Korea and Taiwan pursue independent monetary policies with a floating exchange rate regime, like the other large economic regions.

[15] In such a situation the world price of oil also rises; and as mentioned earlier, in the NiGEM model oil prices mainly affect (in our case raise) aggregate demand, and cost inflation caused by higher production costs is not modelled. In reality, an expansion of demand in Asia may even have larger effects.

[16] Edwards (2006), based on the experiences from past crises, attempted to estimate the probability of a US balance of payments crisis breaking out. Accordingly, the likelihood of an outbreak of crisis rose from 1.7% in 1999 to 15% in 2006. However, Edwards' estimates are also incapable of handling the fact that the case of the US is unprecedented, in part due to the central role of the dollar and in part because previous crises mainly affected smaller and developing economies.

[17] In floating exchange rate regimes, this implies a quarterly increase of 0.5 percentage points in the risk premium over the time horizon. For fixed exchange rate regimes, while maintaining the exchange rate peg, we assume a one-off 10% nominal appreciation vis-à-vis the dollar in the first period.

[18] It may be surprising that a dollar depreciation of this scale is only capable of achieving such a modest reduction in the current account deficit. A number of studies, for example, Obstfeld and Rogoff, (2004), (2005), and Blanchard, Giavazzi and Sa (2005), have already pointed out that – also because the US is a closed economy – an only very modest improvement can be achieved in the current account balance through the expenditure switching effect of the exchange rate depreciation.

Table 1

Effects of the four shock scenarios on the US and the euro area*

(Deviations in percentage points from the baseline scenario; exchange rate changes are in per cent)

	US fiscal contraction		US house price fall		Asian demand		Dollar risk premium	
	Year 1	Year 4	Year 1	Year 4	Year 1	Year 4	Year 1	Year 4
USA								
GDP	-0.19	-0.12	-0.60	0.09	0.03	0.08	0.03	-0.39
CPI	0.06	-0.02	0.04	-0.18	0.03	0.04	0.62	1.29
CA/GDP	0.02	0.25	0.09	0.25	0.05	0.25	-0.22	0.25
Euro Area								
GDP	-0.05	-0.01	-0.11	0.02	0.05	0.08	-0.21	0.04
CPI	-0.07	-0.06	-0.09	-0.08	0.03	0.03	-0.38	-0.28
CA/GDP	0.01	-0.10	0.04	-0.11	0.01	0.30	-0.02	-0.10
EUR/USD exchange rate	-1.69	-1.91	-2.11	-1.46	0.22	0.14	-9.55	-10.44

** All shock scenarios were set to result in a 0.25 percentage point improvement in the US current account at the end of year 4 relative to the baseline scenario.*

Based on the experimental model scenarios presented above, two major conclusions can be drawn, as follows. First, the costs of a correction emanating from the US are higher if they are driven by market forces (which was modelled by a rise in US dollar risk premia), than if it is a result of economic policy action. This statement holds even if we take into account factors – mainly attributed to changes in economic agents' expectations – which cannot be modelled: a market-driven shock may easily spill over, contaminating other markets, and may affect economic agents' expectations adversely over the longer term.

Second, the costs of a correction to be borne by developed economies may be reduced, if it takes place in part through a fall in Asian countries' net financial savings. Although abandoning the exchange rate peg, and consequently, the appreciation of currencies may be a component of the adjustment process in Asia, a robust and sustained effect on the world economy can only be the result of the currently strongly export-oriented economies gradually embarking on a path of higher domestic demand, and consumption demand in particular. From the perspective of the euro area, a correction emanating from Asia has favourable effects, as the unwinding of global imbalances occurs mainly between the current accounts of the US and Asia.

4. What cannot be modelled – the possibility of a disorderly correction

The simulations presented in the previous chapter provide a basis on the profile of the correction of global imbalances. However, they are unsuitable for giving an account of potentially disruptive corrections of imbalances, the probability of which is low, but which may entail much greater macroeconomic consequences than those presented above. One reason for this is that most economic models – including those we used – are only capable of analysing the effects of small shifts around the steady state approximated by log-linearisation. However, they are less capable of handling shifts of a larger scale, potential non-linear effects and interactions which may occur as a combination of various shocks. That is why we provide only some qualitative aspects of a potential disorderly, or disruptive, correction of global financial imbalances.

Global imbalances are defined as those which are composed of a real economic (balance of trade and current account) and a financial (financial account) component. In contrast with the financial component, the real economic component is relatively easy to model. Either implicitly or explicitly, simulations typically assume that a current account adjustment is associated with the financial account responding passively, i.e. during the process there is no disruption or abrupt change in international capital flows.

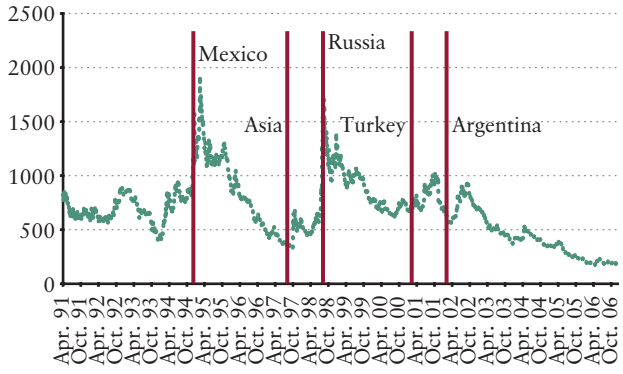
While, as also reflected by our simulations, the adjustment of the real economic side is a prolonged and gradual process, in certain cases – which were rare in developed countries – the size and direction of capital flows recorded in the financial account may exhibit swifter changes. However, a sudden change either in the size or the direction of capital flows inevitably has a bearing on the real economic balance, as all countries of the world are only capable of maintaining current account deficits which they can afford to finance by borrowing from abroad.

It is worth emphasising that, according to international experience (see Tóth, 2005), the current account adjustments of the past, associated with a sudden disruption of capital flows or a change in their direction, have been mainly a characteristic of emerging markets. During the corrections of this kind, there have been sharp rises in the expected risk premium on dollar-denominated emerging country assets, which has had negative effects on the majority of emerging economies burdened with external imbalance.

The aforementioned is indicated well by movements in the EMBI global spread, an indicator calculated by JP Morgan, during current account adjustment episodes in the major emerging countries. In developed countries, in contrast, the majority of current account adjustments took place with capital flows remaining broadly uninterrupted (see Freund, 2000).

Chart 2

EMBI global* spread (1991-2006)



** JP Morgan Emerging Market Bond Index: an index derived from dollar-denominated sovereign bonds of 27 emerging countries. The vertical lines represent the occurrence of individual 'crisis' episodes.*

Furthermore, based on international experience, current account corrections in emerging economies often took place in association with uncontrollable exchange rate depreciation, rises in yields and sharp declines in GDP. These effects may be explained, among other factors, mainly by the existence of weak institutions, inadequate regulation of financial intermediaries and economic agents' short-term foreign currency borrowings unhedged against exchange rate risk. In developed countries where the aforementioned problems do not exist or are relatively scarce, typical current account corrections are associated with temporary rises in yields, real exchange rate depreciation, slight sacrifice of growth, and moreover, in some cases they entail a pick-up in the rate of economic growth (see Croke et al., 2006).

The current situation of global imbalances reflect unusual conditions to the extent that the US current account deficit is financed mainly by emerging country investors. The direction of capital flows therefore is reversed compared with current account correction episodes which could provide lessons about the disorderly, or disruptive, correction of global imbalances stemming from the financial side.

Other features of the current global imbalances are that (i) the US dollar is the number one reserve currency of the world, and partly as a consequence, (ii) official inflows of capital (through central banks, national oil funds, etc.) have a very significant share in the US financial account (see, for example, Cooper, 2006). The stability of these official flows in question is partly a function of economic policy decision (e.g. foreign exchange market interventions, reserves management by the central bank) and partly of movements in the price of oil. Dollar investments held by foreign private sector investors are also of special importance, as they may play the role of a safe haven currency during significant financial market turbulence, in addition to the great degree of their liquidity and wide accessibility.

The US is therefore inevitably exposed to sudden declines in, of disruptions of, capital inflows, due to its large current account deficit. However, because of the unique properties of US capital markets, the probability of an eventual abrupt and massive flight from dollar investments is low. Consequently, a disorderly correction emanating from the financial side, leading to a substantial reduction in the US current account deficit in a short time-interval, can be considered as a low probability but potentially high impact event.

A sudden change in investors' portfolio preferences – i.e. that they would be willing to finance the US current account deficit only at a much higher risk premium – may serve as a trigger for a disorderly correction of imbalances. For example, such a situation would arise if there is a sudden slowdown (or, possibly, a reversal) in official capital inflows financing the US current account deficit, which capital market participants have thought of as persisting. For example, official capital inflows may decline in response to the signs of instability in the Chinese financial system growing deeper, which, in turn, reduces the upward pressure on the yuan's exchange rate, and consequently, dollar demand arising from central bank intervention falls back sharply.

The risk premium shock discussed above may lead to significant rises in US yields, which then would induce or aggravate a correction of house prices and, through this, it may lead to a significant deterioration in financial wealth of households already heavily indebted. This may spill over to the entire financial system, which, in turn, may lead to a sharp decline in consumption/domestic demand.

We are unable to provide assumptions for the effects on other economic regions of a possible disruptive correction, similar to the one discussed above. Presumably, the direction of those effects is the same; however, their extent may be significantly different from those dealt with in the baseline scenario.

5. Implications for the Hungarian economy

Hungary conducts the majority of its external trade with Europe, and, for the most part, its trade relationships with the United States are indirect, involving other European countries. As a consequence, the effects on Hungary of corrections of global imbalances are mainly determined by the processes taking place in the euro area already discussed. But while the implications for Hungary generally are similar to those for the euro area, there also exist a number of differences. First, the short-term impact on growth and inflation – particularly because it is indirect – is slightly weaker than that on the euro area. Second, however, the impact on the current account is more accentuated, due to the openness of the Hungarian economy.

The effects perceived over the longer term are greatly influenced by the nature of monetary policy implementation. We analysed two different cases for monetary policy: one which shadows the ECB's interest rate policy, and another which operates independently under a Taylor-rule. The Taylor-rule used is based on the estimation of Hidi (2006), using Hungarian data, however, the results prove robust under other parameterisations, such as in the case of the standard Taylor-rule[19] parameters (see Appendix).

It is important to note that the results below should be understood as a response to a very strict assumption. In the scenarios we examine, the risk premium required for holding forint-denominated assets is constant, and consequently, they do not include the possibility of either a potential loss of confidence due to the current domestic external imabalances, or a general decline in demand for emerging country currencies. As a consequence of the above, we demonstrate the effect of an increase in the expected risk premium on forint denominated assets in a different scenario, independent of those presented earlier.

Table 2

Effects of the four shock scenarios on Hungary

(Deviations in percentage points from the baseline scenario; exchange rate changes are in per cent)

	US fiscal contraction		US house price fall		Asian demand		Dollar risk premium	
	Year 1	Year 4	Year 1	Year 4	Year 1	Year 4	Year 1	Year 4
Shadow ECB (constant HUF/EUR exchange rate)								
GDP	-0.02	-0.04	-0.03	-0.04	0.01	0.07	-0.10	-0.15
CPI	-0.02	-0.08	-0.03	-0.13	0.01	0.09	-0.10	-0.36
CA/GDP	-0.04	-0.14	-0.06	-0.18	0.03	0.13	-0.20	-0.53
Short rate	-0.09	-0.17	-0.13	-0.22	0.07	0.20	-0.38	-0.66
Estimated Taylor-rule								
GDP	-0.02	-0.03	-0.09	-0.01	0.01	0.13	-0.02	0.08
CPI	-0.02	-0.03	-0.03	-0.12	-0.01	0.01	-0.10	-0.12
CA/GDP	-0.03	-0.13	-0.09	-0.17	0.01	0.23	-0.10	-0.51
Short rate	-0.03	-0.18	-0.06	-0.46	-0.07	0.08	-0.12	-0.95
HUF/EUR exchange rate	0.04	0.19	-0.10	-0.15	-0.88	-1.48	0.00	0.61

MONETARY POLICY SHADOWING THE ECB'S INTEREST RATE MOVES

In the first case, we assumed that Hungarian monetary policy shadows the ECB's interest rate moves, which means a constant nominal EUR/HUF exchange rate, with an unchanged forint risk premium.

It is also obvious from the results for Hungary that a correction enforced by international markets, i.e. a dollar risk premium shock, is the most unfavourable both for economic growth and external balance. Under this scenario, the Hungarian economy experiences the greatest degree of deterioration in price competitiveness in the international goods market, as well as the

[19] In the standard parameterisation of the model, the deviation of inflation from target was set to 1.5, the output gap to 0.5 and the historical interest rate to 0.25.

strongest decline in external demand, and consequently, in GDP. The consequences for output and inflation of the other type of market correction, i.e. and adjustment via a fall in US real estate prices, are less important, as they unfold only indirectly, through a lagged and more smooth adjustment of US consumption demand.

The cases of corrections, other than that of a dollar risk premium shock, involve more moderate effects on GDP, similarly to that in the case of the euro area. However, a potential acceleration in import demand of Asian countries may alleviate significantly the implications of the correction for Hungarian output.[20] It is true, however, that in this scenario the improvement in the Hungarian current account is less pronounced relative to the euro area, given the smaller role of Asian economies in the country's exports and because it is only the indirect effects of the pick-up in demand in the European Union, Hungary's most important trading partner, that come into play.

This is explained by the fact that the effect on Hungarian GDP is strongly influenced by the extent to which the shock arises directly through the goods market. Whereas the direct influences of the fall in US real estate prices and the increase in taxes are on US household income/wealth, and US consumers, while adjusting to these changes, cushion these effects (consumption smoothing), the dollar's risk premium shock and the Asian demand shock directly affect demand in international goods markets through foreign trade, and so their consequences for Hungarian exports and GDP are more pronounced.

As regards the inflationary effects, corrections via asset prices typically involve more pronounced consequences (i.e. a fall in inflation) over the longer term. It is also observable that inflationary effects mainly arise in the longer run in all four cases. The most important reason for this is that, in the NEM model used to run simulations for Hungary, wages with a fundamental influence on consumer prices over the longer term adjust only slowly: according to our estimates, domestic wage-setting is persistent and inflation only changes significantly after three to four years. In the various scenarios, there are also significant differences in terms of the inflationary impact: an Asian demand shock (essentially a positive demand shock) has upward effects on inflation, while the other three have downward effects.

In general, Hungarian monetary policy shadowing European interest rate moves is incapable of stabilising domestic inflation perfectly – at least on the four-year horizon examined. This is understandable, as the EUR/HUF exchange rate, i.e. the most important channel of the Hungarian monetary transmission process, remains unchanged in this scenario. Furthermore, the monetary reaction function used (which tracks the Taylor-rule based policy of the ECB) is not a rule obtained from an optimisation exercise; rather it describes the historical average monetary policy response.

INDEPENDENT HUNGARIAN MONETARY POLICY

Under the assumption of an independent Hungarian monetary policy, two important features arise. First, we allow for volatility of the EUR/HUF exchange rate. Second, there is an opportunity for Hungarian monetary policy to place different weights on GDP and inflation, than if it shadowed the ECB's policy.

Our simulations show that allowing for an independent Hungarian monetary policy results in different macro effects relative to a policy of shadowing the ECB, mainly due to the endogenous adjustment of the EUR/HUF exchange rate, rather than to the different weights attached to GDP and inflation. This is illustrated by the fact that in the majority of cases the Taylor-rules, one using standard weights, the other estimated on the basis of Hidi (2006), produced similar results for the dynamics and scale of both inflation and GDP growth.

Generally speaking, an independent Hungarian monetary policy performs better in keeping inflationary pressures in check over the longer term than a policy of shadowing the ECB. It is able to reduce inflationary effects to between a half and a ninth, except in the US real estate price scenario. In the simulation for a fall in US real estate prices, an independent Hungarian monetary policy results in a more modest improvement in stabilising inflation relative to the scenario of shadowing the ECB's monetary policy.

[20] It should be pointed out here that in the NiGEM model the pass-through effects of oil prices into costs are not modelled, an so they are probably underestimated.

Although the annual average numbers in year 4 do not reflect it, analysing the quarterly numbers the stabilisation of inflation is not perfect in either case. An explanation for this is that a fall (a rise in the Asian demand shock scenario) in inflation (not yet reflected in the annual averages), unfolding gradually, is discernible from year 4. One reason for this is that, as has been case with a policy of shadowing the ECB, there is a more pronounced fall (a rise in the Asian demand shock scenario) in inflation from around year 4, due to the persistence of Hungarian wages. Forward-looking monetary policy is incapable of neutralising this strong inflationary impact in a relatively short period of time – inflation is eventually stabilised well beyond the four-year horizon. This is closely related to the fact that the monetary policy rules used are not optimal; even the rule assumed on the basis of Hungarian data describes the average Hungarian monetary policy of the past.

Considering developments in Hungary's GDP, in each case independent monetary policy implies changes of a similar scale on average over the longer term than the policy of shadowing the ECB. However, under assumption of independent monetary policy, in each case an adjustment in GDP in the short run is associated with increased volatility. In the US real estate price shock scenario, for example, initially GDP declines faster, while after four years the decline is smaller compared with the case of policy shadowing. The case of a US dollar shock is just the opposite: the initial impact on GDP is much weaker, while in year 4 the exchange rate weakening of the forint caused by a more aggressive easing of policy may even result in higher GDP growth.

The major source of these differences is the extent and timing of a change in the EUR/HUF exchange rate. However, in simulations looking ahead for such long period it is difficult to provide a clear-cut explanation of the change in the exchange rate. The underlying reason for this is that the initial response from the exchange rate depends on all future interest rate differentials – and not only on those observed in years 1-4 – due to the uncovered interest rate parity assumption. However, according to the charts showing interest rate differentials over longer periods, the difference between European and Hungarian interest rates happens to be wide in the period we analysed. This may be explained by the fact that, as discussed earlier, a more significant adjustment of wages only gets underway from about year 4, which triggers another massive disinflationary (inflationary under the Asian demand shock scenario) effect from year 5. As noted earlier, it is relatively difficult to neutralise this effect and, after a while, it justifies lower (higher under the Asian demand shock scenario) interest rates than those of the ECB. Given, however, that the exchange rate is a forward-looking variable, and additional monetary easing (tightening under the Asian demand shock scenario) may persist for longer (between year 4 and year 8), it may lead to a gradual weakening (strengthening under the Asian demand shock scenario) of the exchange rate. This interesting exchange rate response introduces a higher degree of cyclicality into GDP responses relative to a policy of shadowing the ECB. The question may arise about why this does not result in a similar degree of exchange rate volatility. An explanation for this may be that one of the monetary policies used attaches greater weight to inflation, and therefore, it pursues a more activist approach. Second, the inflation response depends mainly on the reaction of nominal wages, which, in turn, adjust only gradually, along a smooth path, due to persistence. To summarise, permanent changes in the exchange rate and cyclical fluctuations in GDP, as well as the slow adjustment of wages except in the case of an Asian demand shock, result in much more pronounced responses from short-term interest rates in the case of an independent monetary policy relative to the one shadowing the ECB.

AN INDEPENDENT SCENARIO: RISK PREMIUM SHOCK

As Calvo and Talvi (2006) point out, there is a greater probability of a correction of global imbalances leading to financial distress in emerging markets, even assuming that it occurs gradually in developed countries, and particularly if it takes place in a disorderly way. Consequently, we considered it important to examine the possibility that the correction of global imbalances would lead to financial market turbulence in emerging markets which would also have adverse effects on Hungarian financial market developments. It should be noted that our scenario presented below is not directly comparable with earlier scenarios, as they assume that the correction of global imbalances takes place in an orderly way, without causing financial turbulence in emerging markets.

According to our assumption, a potential financial market turbulence leads to a rise in the risk premia of Hungarian forint-denominated assets. We reproduced the size and dynamics of the risk premium shock on the basis of the estimates by Vonnák (2005). A source of difficulty was that, in the case of Hungary, we found only one past example of a large risk premium shock with global economic consequences originating in emerging countries: the Russian financial crisis of 1998. Therefore, in the absence of other clues, in our simulation we assumed that the risk premium shock was similarly distributed between the

exchange rate and the short-term yield, as was the case during the Russian crisis. In the simulations, we assumed an independent Hungarian monetary policy,[21] as assuming a policy of shadowing the ECB would not have been realistic, given that Hungary received a significant one-off shock. Importantly, however, if Hungary was already a member of the euro area at the time the emerging market shock occurs, a risk premium shock of this sort would not affect it.

The risk premium shock has two effects in our simulation. First, it puts downward pressure on the exchange rate of the forint and, second, it raises firms' cost of capital. The latter influences economic activity mainly through corporate fixed investment.

Table 3

Effects of the risk premium shock on Hungary[22]

(Deviations in percentage points from the baseline scenario; exchange rate changes are in per cent)

	Year 1	Year 4
without credit or balance sheet effects		
GDP	0.16	-0.08
CPI	0.15	-0.14
CA/GDP	0.65	0.80
Short rate	0.81	-0.03
HUF/EUR exchange rate	7.33	1.63
with credit and balance sheet effects		
GDP	-0.13	0.04
CPI	0.17	-0.34
CA/GDP	0.95	1.44
Short rate	0.95	-0.75
HUF/EUR exchange rate	8.7	3.00

It is not straightforward, however, whether or not the presence of some factors result in non-standard behaviour of demand for capital. One such issue is that, in the case of the corporate (and household) sector, a risk premium shock and nominal exchange rate depreciation may induce credit channel and (particularly at firms indebted in foreign currency) balance sheet effects. We modelled these with a scenario of a higher increase in the cost of capital.

The results show that, taking no account of the balance sheet effects, a risk premium shock first stimulates then slows GDP growth through the effect of forint depreciation on net exports, while the balance of payments improves. Initially, inflation rises in response to exchange rate weakening, and then it begins to fall slightly, due to effects through the decline in investment activity. The chosen monetary policy rule is unable to offset the fall in inflation over the period examined. One reason for this is the slow wage adjustment process already mentioned. Another is that the chosen rule is not optimal, but rather it is an empirical result.

The results of simulations conducted for credit and balance sheet effects on the basis of the assumption of a stronger increase in the cost of capital show a reaction of opposite direction in growth and an even stronger reaction of the same direction in the current account balance. An explanation for the former is that a higher increase in the cost of capital offsets the positive effect of exchange rate depreciation on net exports. However, the fall in inflation over the medium term is stronger in this case, while the initial rise in inflation is practically identical to that observed in the case of a smaller cost of capital.

[21] Also modelled using the monetary policy reaction function estimated by Hidi (2006).

[22] The percentage deviations of the risk premium required for holding forint-denominated investments are 5.6%, 2.7% and 0.75% in years 1, 2 and 3. If we do not assume other factors, increases in firms' cost of capital are equal to those. We attempted to approximate the effects of other factors (credit channel, balance sheet effects) in a way that we set the value for the rise in the cost of capital to twice the above risk premium path.

6. Conclusions

Our paper dealt with the effects on Hungary of one of the most important risk factors in the global economy. A global correction may take several forms, each of which is of key importance for the Hungarian economy. In our illustrative model simulations, we were able to handle the effects of orderly corrections; however, we stressed that a potential disorderly adjustment cannot be ruled out either. We found that, from the perspective of Hungary, whether one or another major economic region of the world begins to adjust in the process of rebalancing the world economy makes a material difference. A correction originating in Asia has a positive demand effect. By contrast, influences working their way through from the US may hold back Hungarian economic growth. In addition, whether the initial adjustment is reflected in asset prices (the dollar exchange rate and real estate prices) or in demand factors also is of key importance. Looking at global processes, it can be stated that a correction of global imbalances is associated with the lowest loss if it occurs through an expansion of domestic demand in Asia.

In respect of the effects on the Hungarian economy, monetary policy reactions may play a key role in determining whether output or inflation become more volatile. If Hungarian monetary policy adjusts passively to the ECB's interest rate moves, more significant inflationary effects can be expected than under the assumption of pursuing an independent monetary policy. By contrast, the effects on average output are practically identical in the case of both monetary policy reactions.

After qualitatively assessing the possibility and the potential impact of a disorderly correction, we attempted to approximate the effects of a potential financial turbulence in emerging markets which may arise in the context of global imbalances with a rise in the risk premium of the forint and an associated increase in the cost of capital. We found that, in this case, inflation initially rises due to a weakening in the exchange rate. But this is later offset by a decline in investment caused by higher costs of capital, and a lower inflation environment may develop as an effect of slower economic growth over the medium term. The current account balance would improve; however, the direction of the effect of the risk premium shock on GDP growth is not clear-cut – it depends on the importance of the rise in the cost of capital compared with the initial stimulus to growth of the temporarily weaker real exchange rate.

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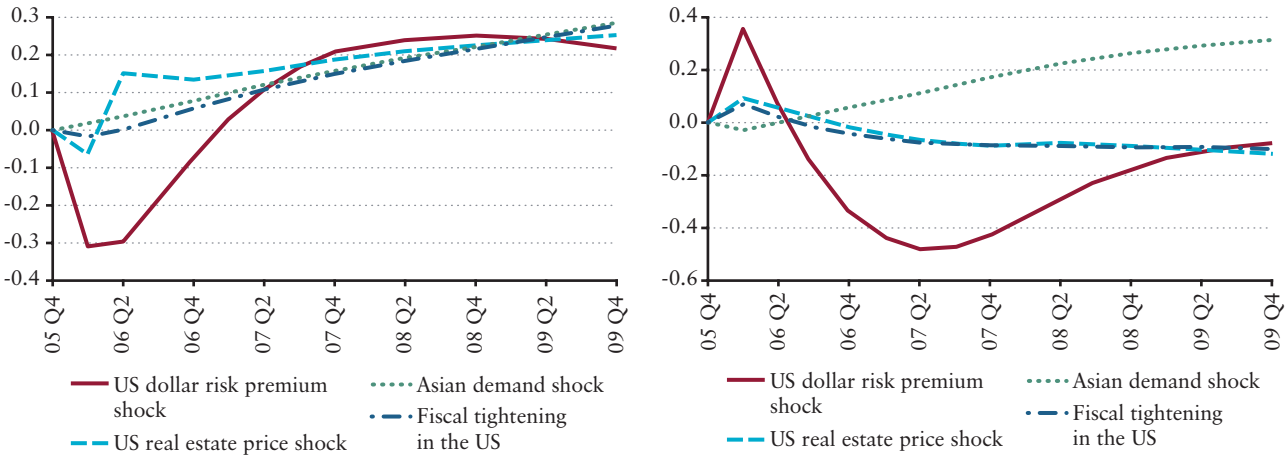
Appendix

Global responses

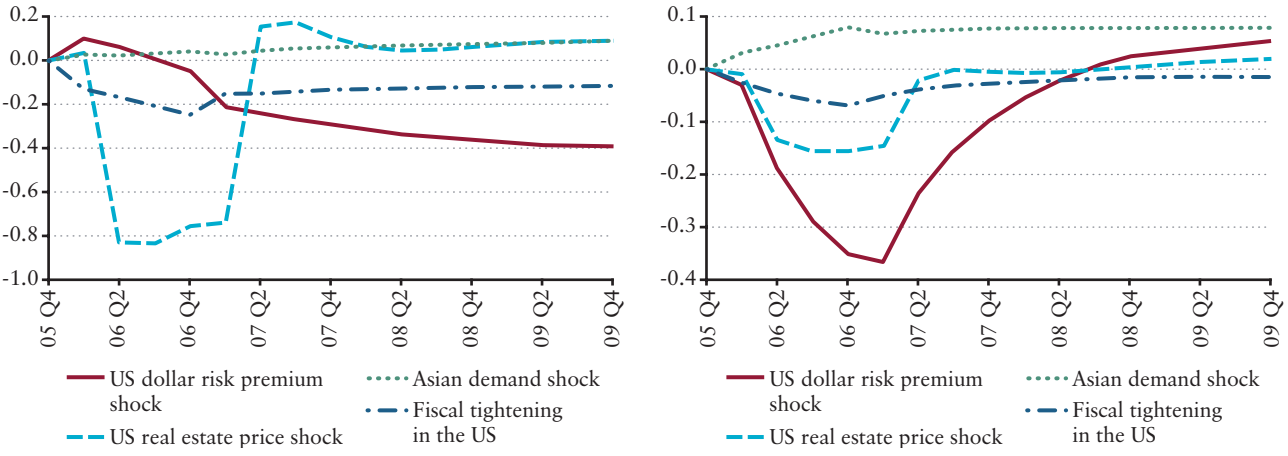
(percentage point deviations from the baseline)

USA **Euro area**

Current account balance (as a per cent of GDP)

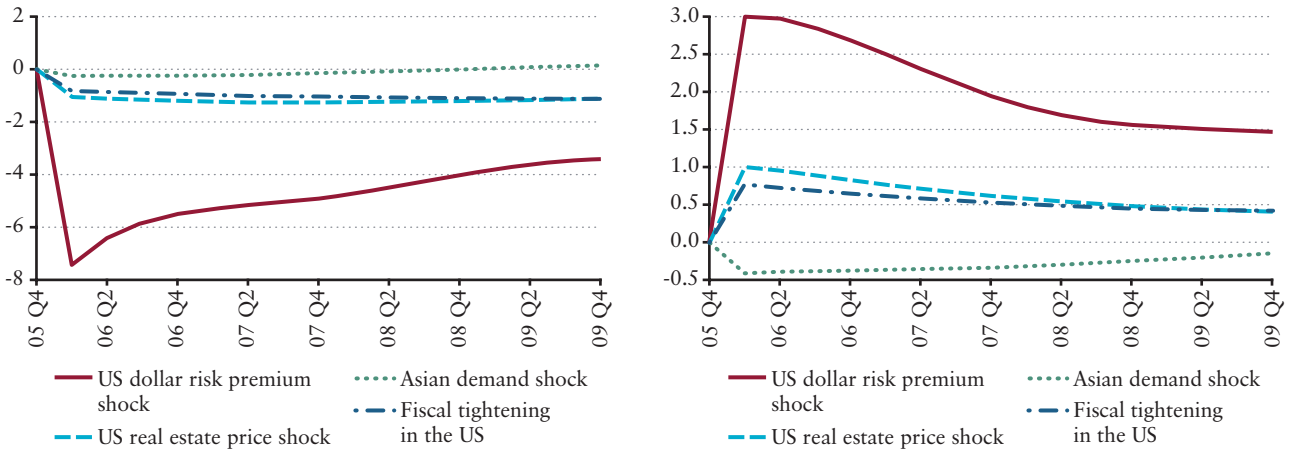


GDP growth

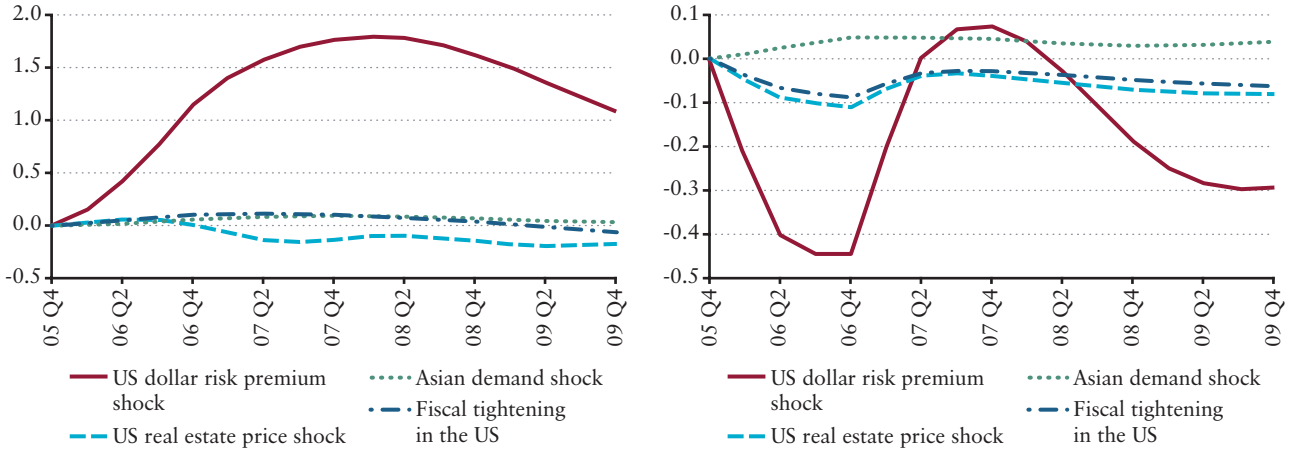


USA **Euro area**

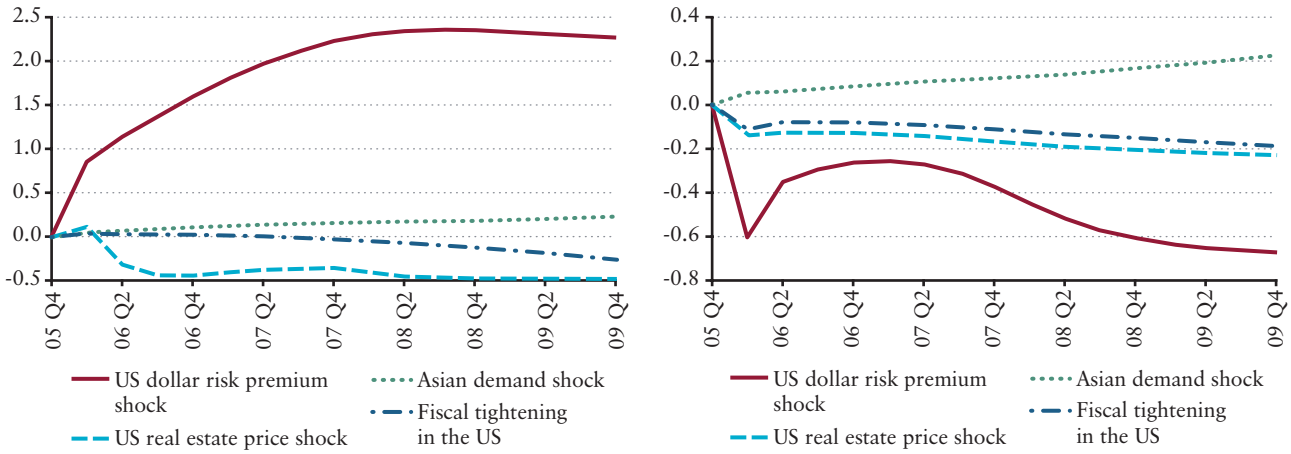
Real effective exchange rate



Consumer price inflation

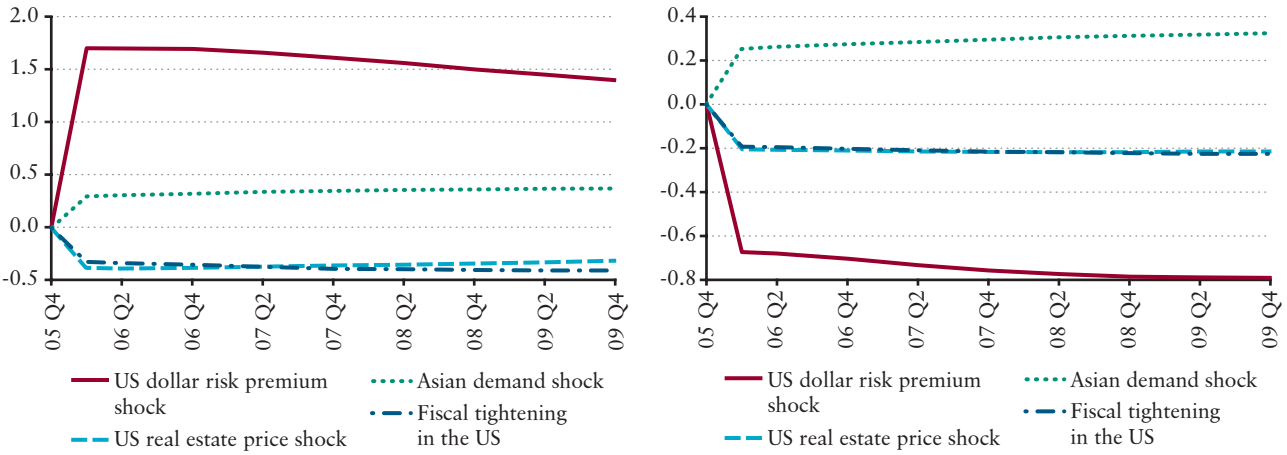


Short-term interest rate (3-month)

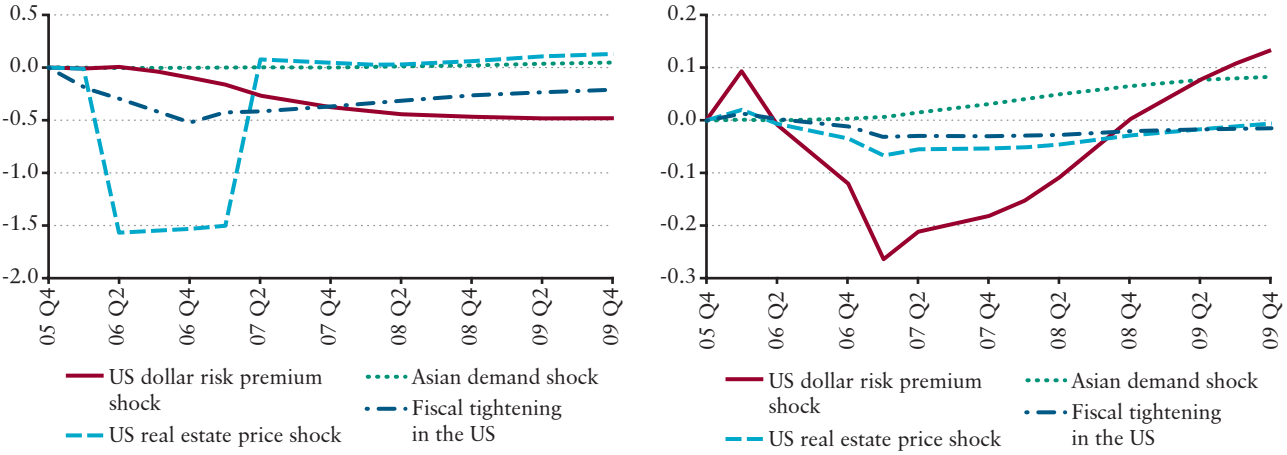


USA **Euro area**

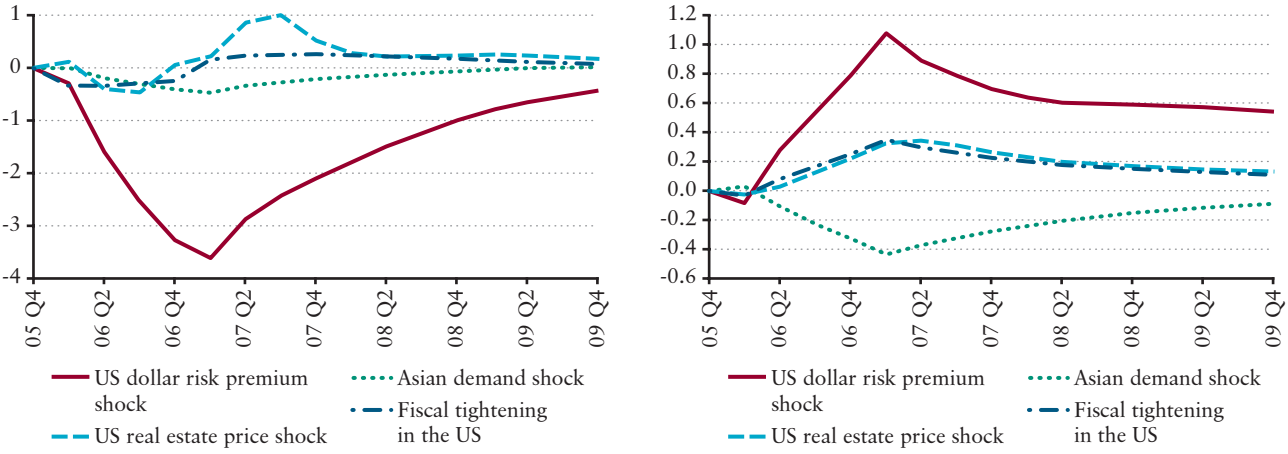
Long-term interest rate (10-year)



Household consumption

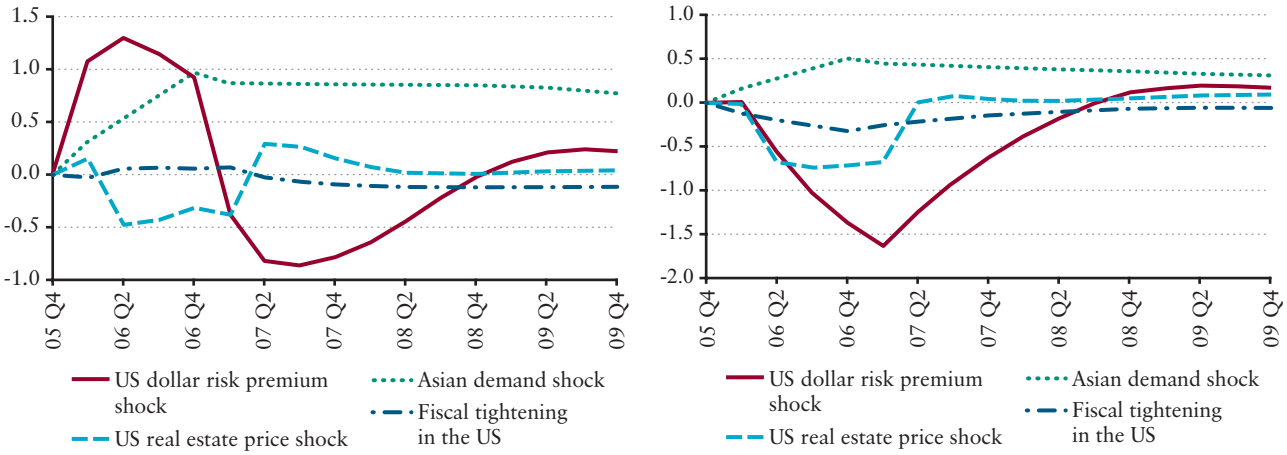


Private sector investment

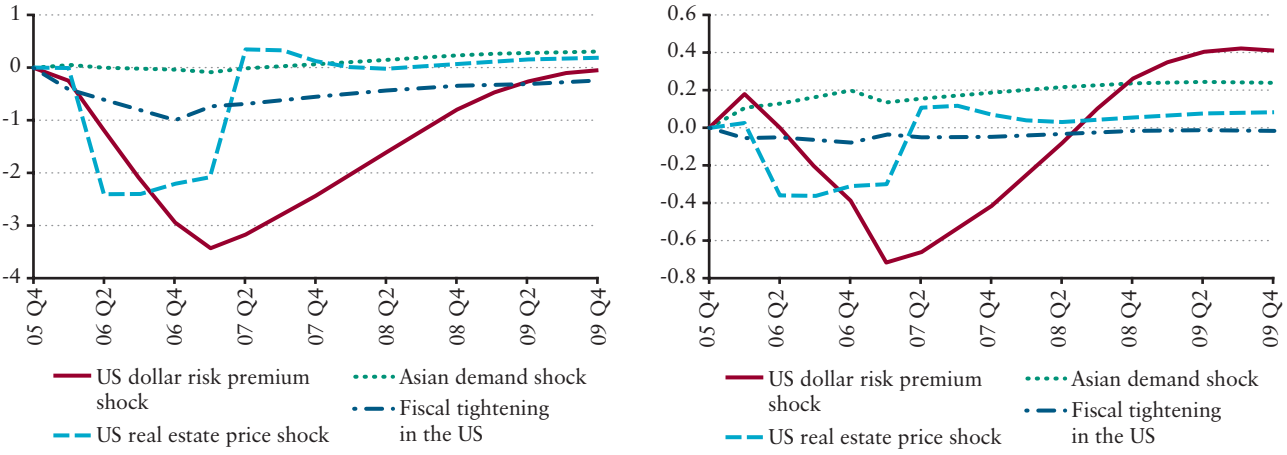


USA **Euro area**

Exports



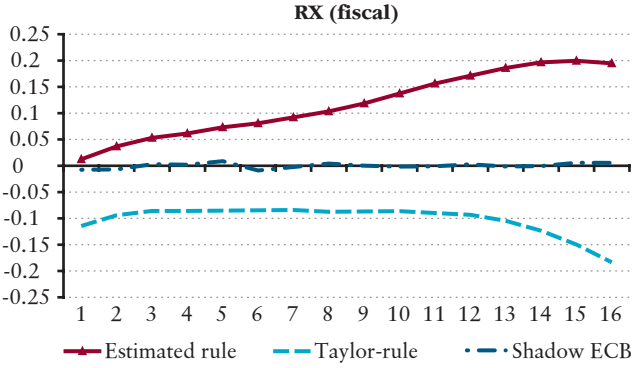
Imports



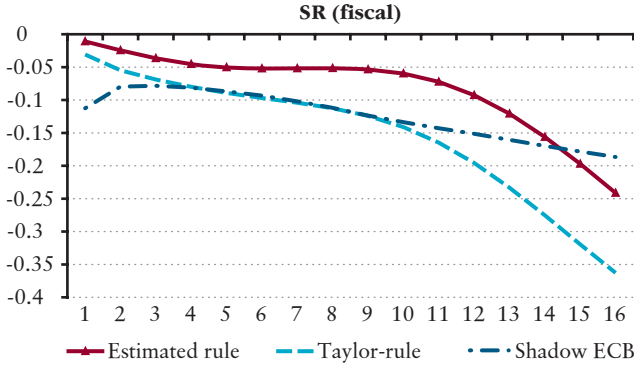
Hungarian responses – Fiscal tightening in the US

(percentage point deviations from the baseline)

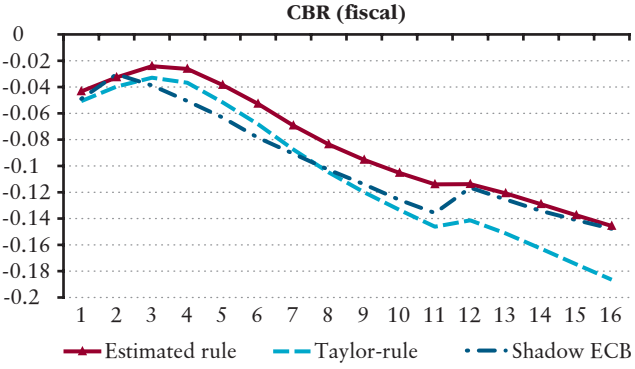
EUR/HUF exchange rate
RX (fiscal)



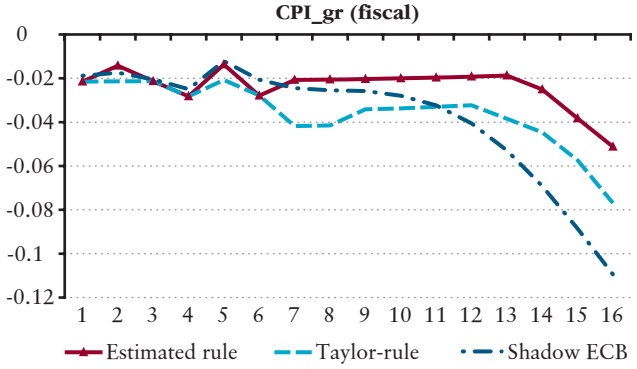
Short-term interest rate
SR (fiscal)



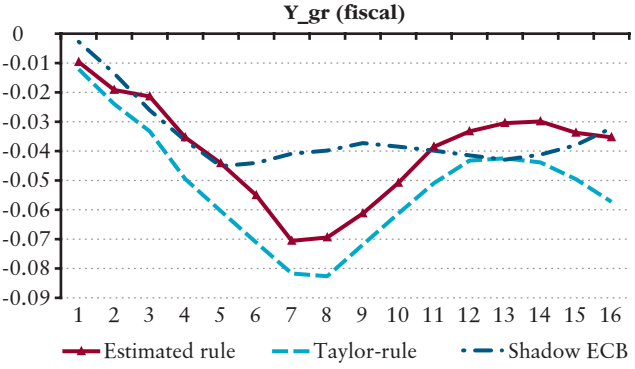
Current account balance (as a % of GDP)
CBR (fiscal)



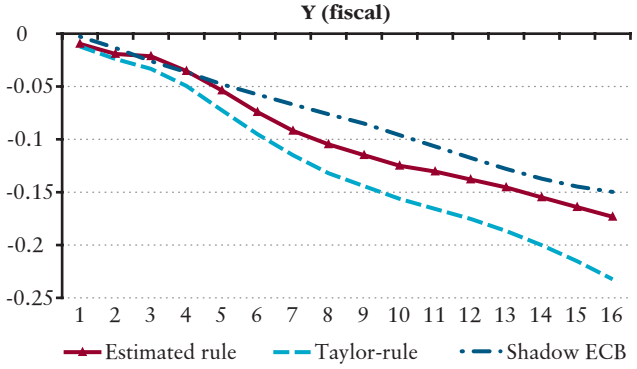
Consumer price inflation
CPI_gr (fiscal)



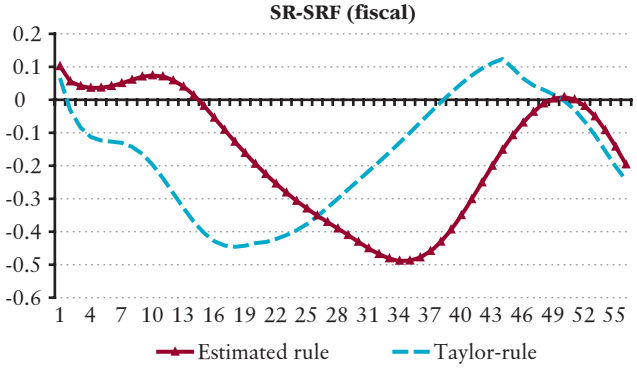
GDP growth
Y_gr (fiscal)



GDP level
Y (fiscal)



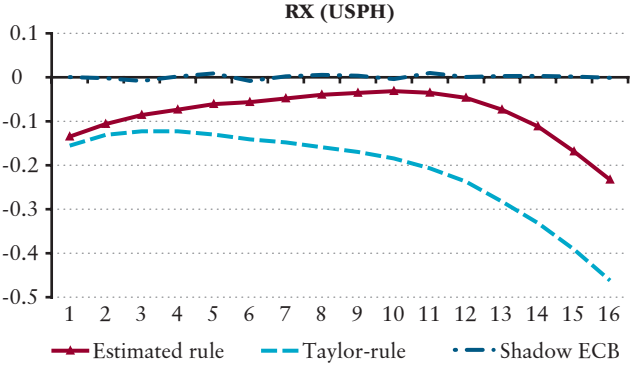
Interest rate differential (to the euro area)
SR-SRF (fiscal)



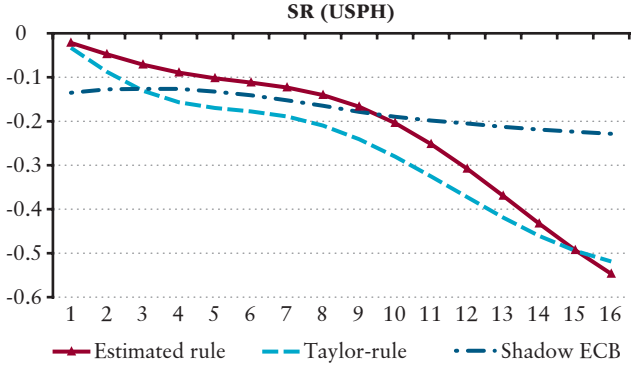
Hungarian responses – Correction of US real estate prices

(per cent or percentage point deviations from the baseline)

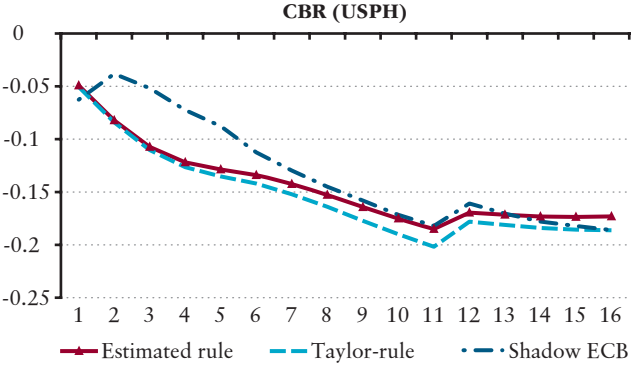
EUR/HUF exchange rate
RX (USPH)



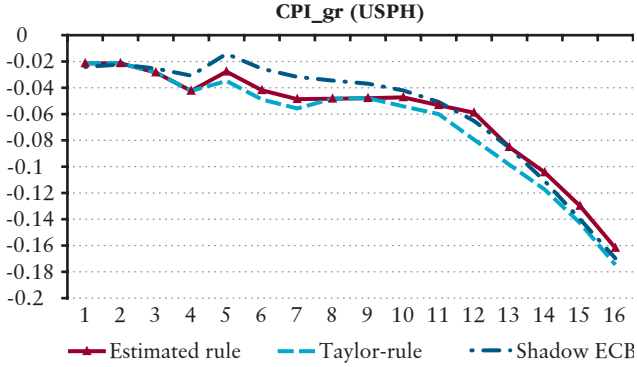
Short-term interest rate
SR (USPH)



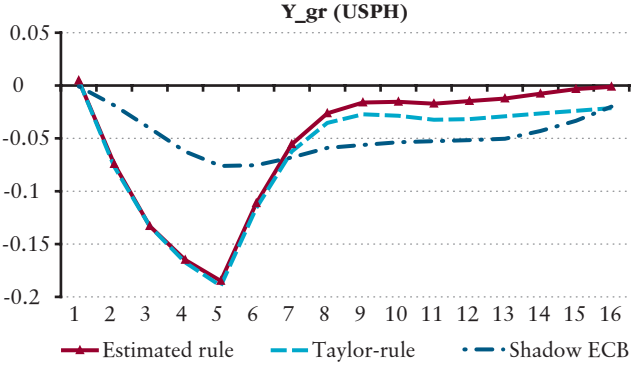
Current account balance (as a % of GDP)
CBR (USPH)



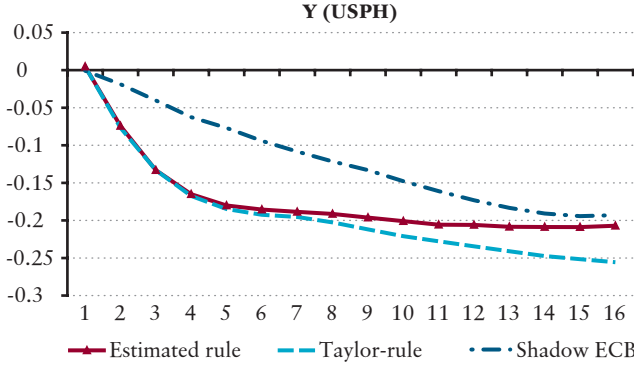
Consumer price inflation
CPI_gr (USPH)



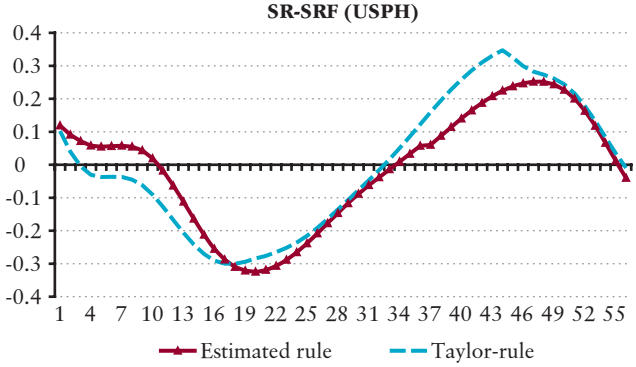
GDP growth
Y_gr (USPH)



GDP level
Y (USPH)



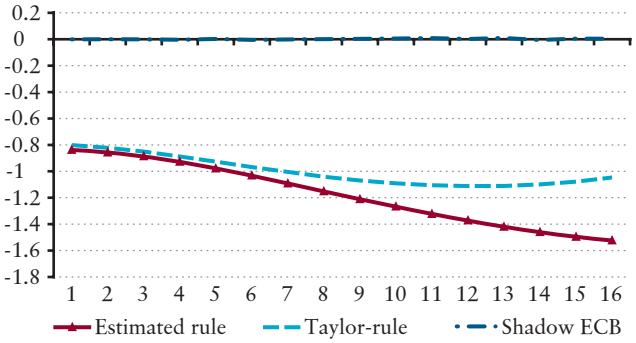
Interest rate differential (to the euro area)
SR-SRF (USPH)



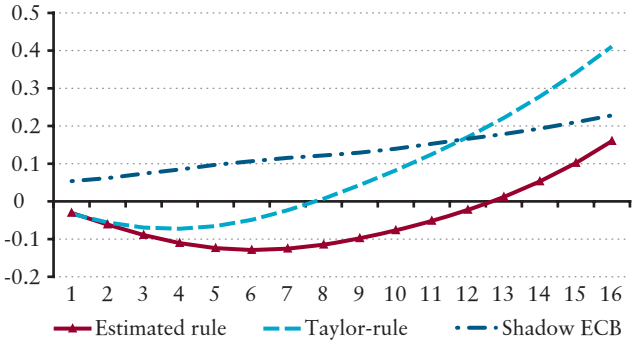
Hungarian responses – Faster Asian demand growth

(per cent or percentage point deviations from the baseline)

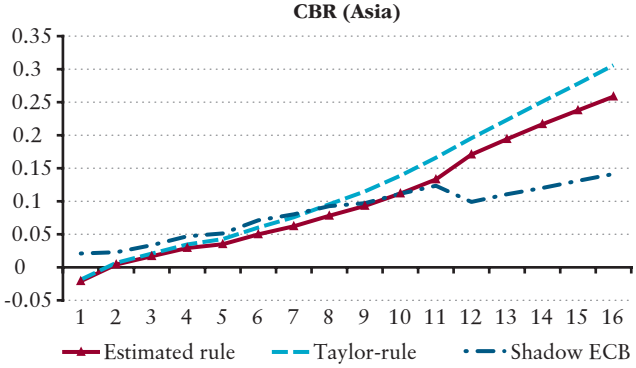
EUR/HUF exchange rate
RX (Asia)



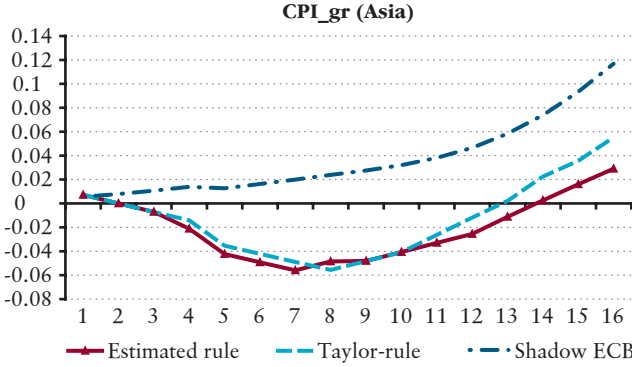
Short-term interest rate
SR (Asia)



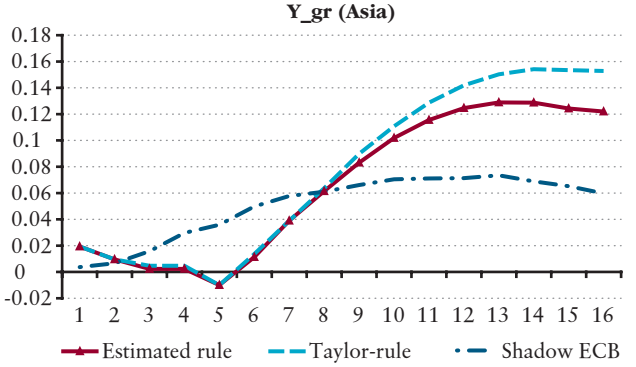
Current account balance (as a % of GDP)
CBR (Asia)



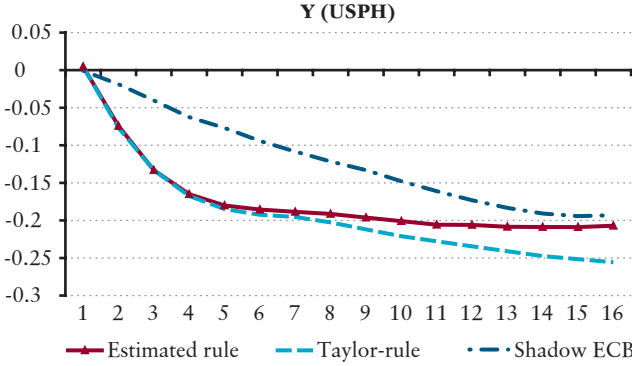
Consumer price inflation
CPI_gr (Asia)



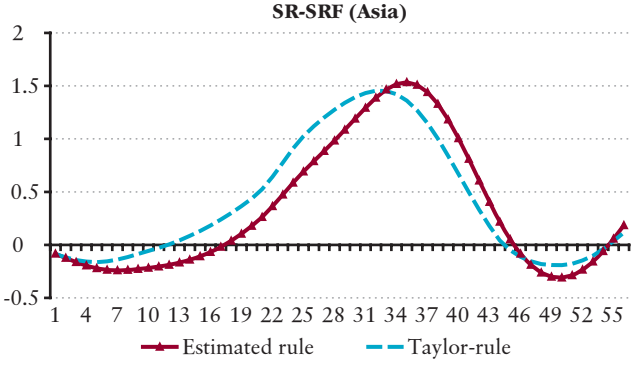
GDP growth
Y_gr (Asia)



GDP level
Y (USPH)



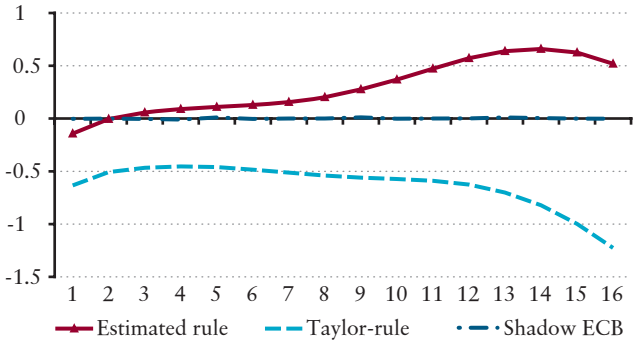
Interest rate differential (to the euro area)
SR-SRF (Asia)



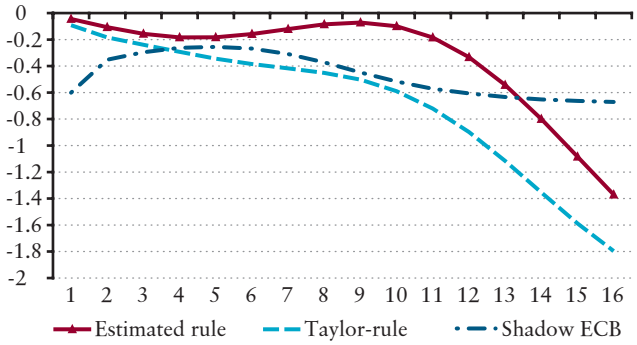
Hungarian responses – Higher risk premium vis-à-vis the US dollar

(per cent or percentage point deviations from the baseline)

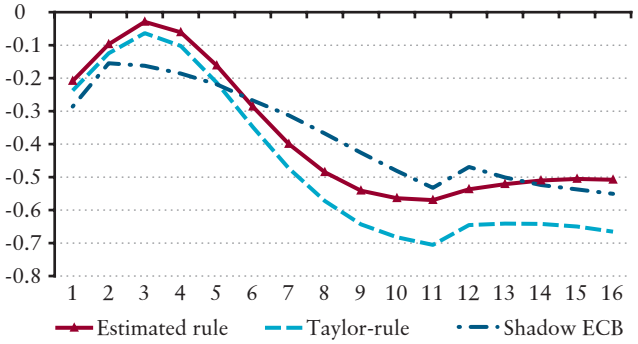
EUR/HUF exchange rate
RX (RX10)



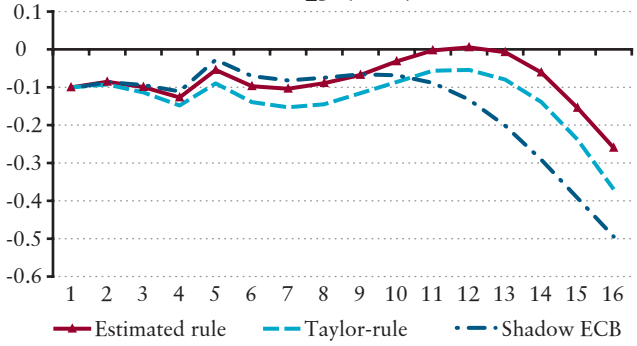
Short-term interest rate
SR (RX10)



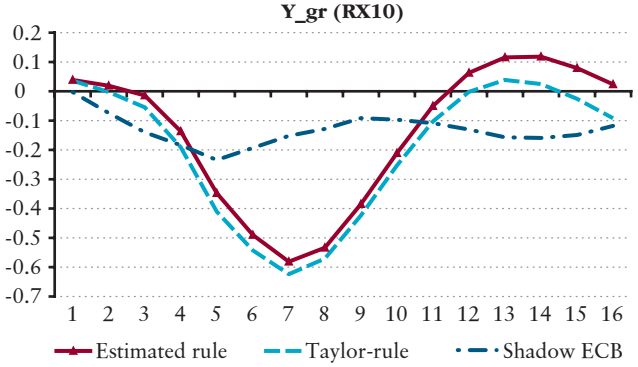
Current account balance (as a % of GDP)
CBR (RX10)



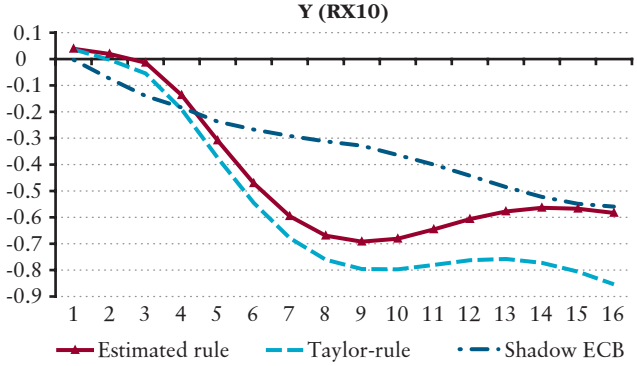
Consumer price inflation
CPI_gr (RX10)



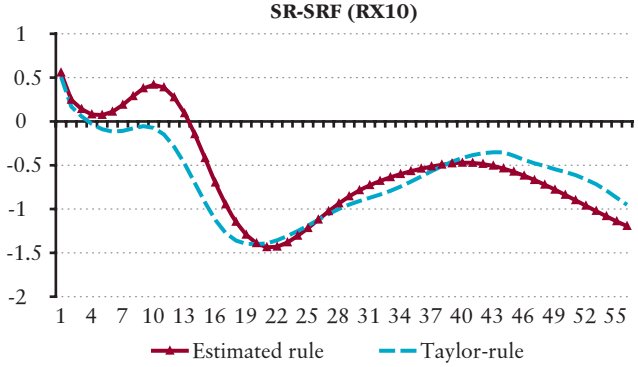
GDP growth
Y_gr (RX10)



GDP level
Y (RX10)



Interest rate differential (to the euro area)
SR-SRF (RX10)



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