EFFECTS OF THE GLOBAL CRISIS ON MACEDONIA: A COUNTERFACTUAL ANALYSIS

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Abstract

This study investigates the effects of the global financial and economic crisis on Macedonia, with a particular focus on the period between 2008 and 2010. The counterfactual approach is used, according to which various hypothetical scenarios are created in order to simulate the movements of the main macroeconomic variables in absence of particular crisis transmission channels. In addition, the effects of monetary policy on macroeconomic variables during the crisis are also analysed. The empirical investigation utilises the Macedonian Policy Analysis Model, which is a small New Keynesian gap model of the National Bank of the Republic of Macedonia for forecasting and policy analysis. Main results indicate that the foreign demand and prices are the main factor for the fall of GDP and inflation and the slowdown in foreign trade. The loss of confidence and domestic financial factors also negatively affected the domestic economy, but their impact was relatively smaller. In the acute stage of the crisis, monetary policy was forced to react to pressures on foreign exchange market. However, there are indications that, once the situation in the foreign exchange market stabilised, monetary policy started to support economic growth.

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1. Introduction

The global financial and economic crisis that erupted in 2007 and 2008 and the ensuing Great Recession had a huge impact on the Macedonian economy. Previous healthy growth rates were rapidly interrupted towards the end of 2008, and GDP even fell in 2009, before recovering sluggishly in 2010-2011 and then slightly falling again in 2012. As a small open economy, heavily dependent on trade and financial links with other countries, it is commonly thought that the trade channel was the strongest transmission channel. Indeed, exports were the first to react to the crisis, falling rapidly by 6.3% in 2008 and 15.8% in 2009, in real terms. Other GDP components were more sluggish, but eventually they also adjusted downwards. Imports only slowed down in 2008, but then fell by 14.3% in real terms in 2009. Most of the adjustment in domestic demand also occurred with some delay, with personal consumption falling by 4.7% in 2009, while gross investments were almost unchanged in 2009 and then fell by 6.7% in 2010. However, the effects of the crisis were also felt via the financial channel. Unlike most other countries, this was not so much due to the halt of foreign funding, as lending was mostly financed by domestic deposits, but to the heightened uncertainty and consequently the more conservative bank lending activity. Indeed, credit growth slowed from 34.4% in 2008 to 3.5% and 7.1% in the end of 2009 and 2010 respectively, and is still far from the double-digit growth before the crisis. In addition, the uncertainty regarding the euro crisis also affected private transfers, which are essential in financing relatively large trade deficits. Their annual growth became negative in the final quarter of 2007, and they continued to fall in most of 2008 and early 2009. Finally, these movements in the economy, and particularly in foreign reserves, resulted in various policy responses by the central bank. Unlike most other central banks, the NBRM was tightening its policy until March 2009 in order to maintain the exchange rate stability, and then kept it unchanged by the end of 2009 before the start of its gradual relaxation. In addition, the central bank intervened in the market by selling foreign currency, particularly in the first half of 2009. The central bank also undertook additional measures in order to maintain and strengthen financial stability. Certainly, monetary policy actions were significantly affected by the need to maintain a stable exchange rate, while inflation slowed down due to supply side factors, which implied that output movements had only secondary priority in the early stage of the crisis. However, once foreign reserve movements were stabilised, the central bank did pay additional attention to supporting economic growth.

This study aims to estimate the effects of the global economic and financial crisis on the Macedonian economy. We analyse the most important transmission channels of the crisis, and compare the effects on the key macroeconomic variables. We also analyse the monetary policy, and the effects it had on counteracting the consequences from the crisis. We focus on the period until 2010 when the crisis had the highest impact, and pay less attention to 2011 and 2012, when several signs of stabilisation began to appear. The effects of the crisis on the economy are analysed via the counterfactual scenario approach. This empirical approach consists of building counterfactual, hypothetical scenarios for economic movements in absence of the crisis. Such hypothetical scenarios

are then compared to actual outcomes in order to assess the impact of the particular crisis factor on key macroeconomic variables. It is expected that the counterfactual approach will yield additional valuable insight into the effects of the crisis on the Macedonian economy. By doing so, it would also complement two other studies that use different approaches to analyse the effects of the crisis on the Macedonian economy: Jovanovikj and Georgievska (forthcoming), who use microeconomic data, and Unevska Andonova and Petkovska (2011), who use structural VAR with macroeconomic data.

The idea of the counterfactual approach has recently been applied by several authors to analyse the effects of the crisis and of macroeconomic policies in various countries, although the practical application of the method differs according to the particular questions being studied, the model used and the design of counterfactual scenarios. Caivano et al. (2011) use the Bank of Italy Quarterly Model (BIQM), which is a large macroeconomic model, as well as several satellite models and out-of-model information in order to simulate the divergences of the actual movements from a hypothetical "no crisis" scenario. A counterfactual approach is also used by Kapetanios et al. (2012) in their analysis of the macroeconomic effects of the first round of quantitative easing by the Bank of England, which are captured via the lower long-term government bond yields, while other possible transmission channels are disregarded. The study uses various models to build counterfactual scenarios: a large Bayesian VAR, a change point structural VAR and VAR with time-varying parameters. Lenza et al. (2010) also build counterfactual scenarios with Bayesian VAR to analyse the effects of unconventional monetary policy on economic activity and bank lending in the euro area.

Our study draws heavily on the investigation for the case of Italy by Caivano et al. (2011), particularly regarding the design of the main crisis factors. Caivano et al. (2011) also provide a comprehensive description of the idea, advantages and drawbacks of the counterfactual approach. In particular, it is important to reiterate that the very idea of the counterfactual approach is not to provide accurate answers, but approximate indications for alternative paths not taken. Indeed, building alternative scenarios is notoriously difficult, and it inevitably involves a certain degree of arbitrariness in designing particular hypothetical scenarios. Further, in line with most empirical studies, monetary policy is only represented through the nominal policy rate, thus ignoring other important policy measures which were undertaken during the period. In addition, hypothetical results are also affected by the structure and calibration of the model used. In our case, this means that we are unable to analyse the effects of fiscal policy, which is absent in the main macroeconomic model of the central bank. Nevertheless, we try to include reasonable assumptions for alternative scenarios, and to properly justify our particular choices. We first briefly describe the model used in the next section, and then describe in more details the way we design the crisis factors in Section 3. Results are presented in Section 4. Section 5 concludes.

2. Model specification

As noted above, we follow the study by Caivano et al. (2011), particularly regarding the design of the main crisis factors. However, in absence of relevant satellite models and out-of-model

information, we rely solely on the Macedonian Policy Analysis Model (MAKPAM). MAKPAM is the core macroeconomic model of the National Bank of the Republic of Macedonia that is used for regular macroeconomic forecasts, as well as for policy analysis and scenario analysis. MAKPAM is a small, semi-structural, calibrated gap model for Macedonia. The model is not explicitly derived from microeconomic foundations, but it contains the key equations and features of modern New Keynesian models. In addition, it is extended to capture specific aspects relating to the Macedonian economy, particularly the high openness and the fixed exchange rate to the euro. GDP, real interest and real exchange rates are all expressed as gaps, or deviations from their potential values, which are derived by Kalman filtering. Key equations in the model are consisted of an IS curve, a forward-looking Phillips curve and a monetary policy rule. Unlike most similar models, the policy rule is not defined as a Taylor rule but as modified uncovered interest rate parity towards the euro[2]. The rule defines the policy rate to be equal to the euro area short-term interest rate corrected for some risk premium, while exchange rate changes are omitted due to the fixed regime. The rule therefore exploits the fact that, according to the Mundell-Fleming impossible trinity, with high but not perfect capital mobility, there is some space for monetary policy autonomy. However, the determination of a risk premium for Macedonia is quite difficult, due to the absence of liquid government bonds traded regularly on international markets. Therefore, the risk premium is linked to the domestic economic developments via the change in foreign reserves, i.e. it is a function of foreign exchange flows in the following year. This approximation is reasonable since, as in most fixed regimes, perceptions about the riskiness and overall sustainability of the economy by policymakers, investors and trade partners rely heavily on foreign reserve movements. In addition, model simulations indicate that foreign exchange flows approximate risk perceptions fairly well: in periods of pressure on the foreign exchange market and falling reserves, the risk premium rises, and the central bank has to increase the policy rate in order to alleviate pressures. Finally, the flow of foreign exchange is defined as the sum of the key balance of payment components: exports, imports, private transfers and FDI.

3. Design and incorporation of crisis factors

The idea of the counterfactual analysis is to create a hypothetical "no crisis" scenario and subsequently produce a forecast of key economic variables in absence of the global economic crisis and its effects. Afterwards, such a forecast is compared to actual movements in order to assess the impact of the crisis.

The global economic and financial crisis affected the economy through several channels, so we try to define various crisis factors and assess their impact. In defining the crisis factors or

[2] An early version of the model with the Taylor rule "broke down" at the outset of the crisis, when the central bank had to respond to falling reserves by raising interest rates, despite the negative output and price movements.

channels, we follow closely their definition by Caivano et al. (2011) for the Italian economy. In their comprehensive analysis they cover 4 distinct crisis factors and the reaction of monetary and fiscal policy. We believe that similar factors can be used to capture the main transmission channels of the crisis in Macedonia: the imported crisis, the domestic financial factors and confidence effects. Certainly, the way they are defined here differs from their study, and this is related both to the specifics of the two economies and to the capabilities of the models used for the analysis. These factors also affect our decision to omit wealth effects, which are the fourth crisis factor analysed by Caivano et al. (2011). They are found to be small in Italy and are probably negligible in Macedonia, given the dormant stock exchange and the relatively undeveloped real estate market. As for policy factors, we focus only on monetary policy, since fiscal policy is not included in the MAKPAM model.

In order to be able to better analyse the effects of separate factors and in line with Caivano et al. (2011), we define the three crisis factors or channels and the effects of monetary policy separately. This means that 4 separate scenarios are created for each of the factors, and they are then aggregated to analyse the overall impact of the crisis on Macedonia. We define the crisis period to be between 2008 and 2010. One might argue that the crisis is still going on, despite the signs of stabilisation after 2010. However, focusing on the period until 2010 limits our attention to the most important and deepest wave of the crisis. Besides, extending the analysis to 2011 or 2012 was somewhat problematic for the first analysed channel, since that would mean using simple trend forecasts for foreign variables, as the available long-term economic forecasts are usually statistical and convey little economic meaning.

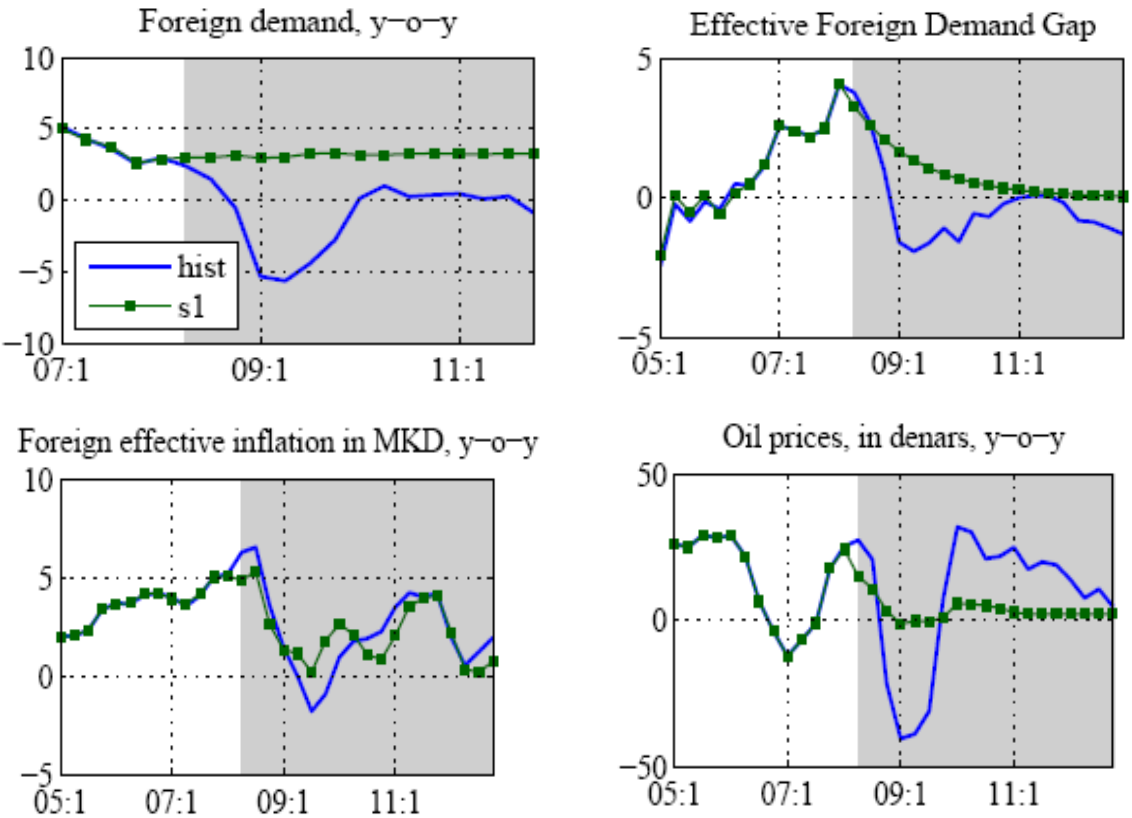
3.1 Imported crisis

In order to analyse the direct effects of the imported crisis, we created a new, hypothetical database. To do so, we cut the current, historical database of foreign and domestic variables in early 2008, and extend it with hypothetical movements for foreign variables until the end of 2009. This hypothetical database thus reflects the movement of foreign variables that would probably ensue if there was no crisis. More precisely, we extend foreign effective GDP, foreign effective inflation, exchange rates, oil prices and 1-month EURIBOR interest rates using the Consensus Forecast projections available in early 2008. World food prices and the world export price index for Macedonian products are extended using Consensus Forecast and IMF World Economic Outlook projections also from early 2008. After filling the database, a forecast exercise is carried out in order to find out the hypothetical developments, with the forecast starting at the second quarter of 2008.

The hypothetical, "no crisis" projected movements are dramatically different from the actual data[3], especially regarding foreign effective demand and inflation (Figure 1). Actual data show that

[3] It should also be taken into account that foreign demand growth rates, and particularly foreign inflation and oil prices were already relatively high in 2007, which means that base effects are also important for these comparisons (for both actual and hypothetical data).

foreign demand growth slowed to 1.6% in 2008, and then fell by 4.5% in 2009 before slowly recovering to rates of around zero in 2010 and 2011. On the other hand, if the crisis did not materialise and economic growth in the main exporting markets went on as projected, foreign demand would have grown by around 3% each year. This is then also reflected in foreign demand gap figures, which are actually used in MAKPAM: there is a continuous negative demand gap until 2011 in the actual data, as opposed to the gradual closure of the positive gap in the hypothetical scenario. The comparison of foreign effective inflation also shows a huge impact from the crisis. Foreign prices actually rose by 5.4% in 2008 before falling by 0.6% in 2009, and then rising by 1.3% and 4.2% in 2010 and 2011 respectively. On the other hand, in absence of crisis, foreign prices would have risen by 4.3% in 2008, and then they would have slowed down to 1.1% in 2009 and slowly intensified to 1.7% in 2010 and 3.4% in 2011. The "no crisis" scenario would have predicted a similar rise of the denar price of oil in 2008, but an almost unchanged price in 2009 compared to the actual deep fall of 37.8%. Further, the oil price would continue to grow slowly after 2009, unlike the actual strong increase of about 30% in both 2010 and 2011. Somewhat similar to this, world export prices fell strongly and then more then compensated the fall in 2010. On the other hand, the "no crisis" scenario would have seen them adjust downwards only gradually after reaching very high levels in 2007. Finally, the absence of crisis implies only a gradual lowering of EURIBOR rates, as opposed to the actual swift fall in 2009 and their maintenance at very low levels until the end of 2010.



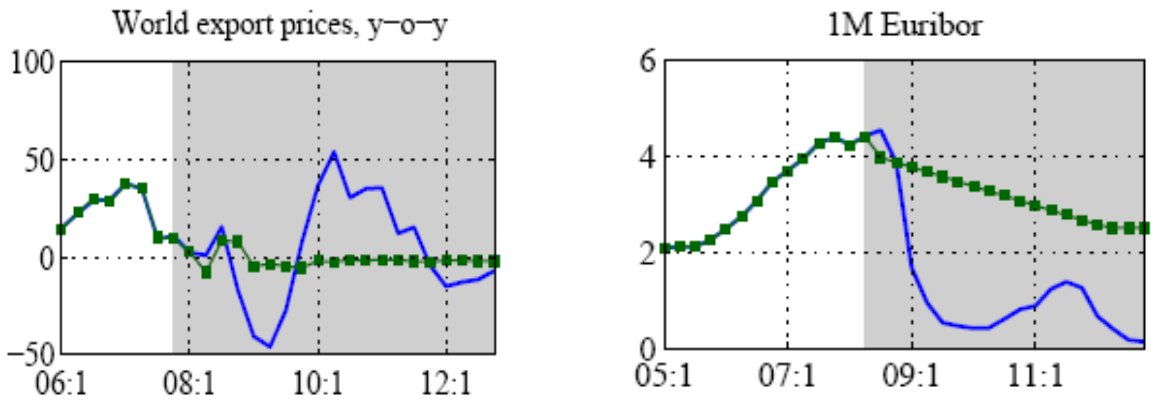


Figure 1. Imported crisis: actual data versus projected movements in the "no crisis" scenario

3.2. Domestic financial factors

The global economic crisis and particularly the European banking crisis also had an impact on the domestic economy via the availability and the cost of credit. Higher lending rates and a potentially more restricted loan supply enabled the commercial banks to account for higher levels of risk and uncertainty. In addition, banks were also offering higher deposit rates, aimed at preventing a potential large withdrawal of savings amidst a global uncertainty and lack of liquidity.

The definition of this crisis factor in the counterfactual exercise is more difficult because of the lack of any relevant estimate for the particular effects of the crisis on interest rates and on the loan supply, so it must rely on a considerable degree of arbitrariness. Therefore, we proceed in the following manner. We ignore the loan supply channel, which does not feature explicitly in the MAKPAM model. In addition, estimates by Kabashi and Suleva (forthcoming) indicate that loan supply shocks have fairly limited effects on the volume of loans in Macedonia. On the other hand, we approximate the effect of the crisis on bank interest rates by assuming that both lending and deposit rates would be significantly lower between 2008 and 2010. Indeed, we assume that, in absence of crisis, they would have been lower than the observed ones by 1 percentage point in 2008 and 2010, and by 2 percentage points in 2009, when the maximum effects of the crisis were felt. Such a movement of nominal lending and deposit rates would have resulted in lower real rates, and consequently in lower real lending and deposit rate gaps, which are however still positive, i.e. contractionary in 2009 (Figure 2).

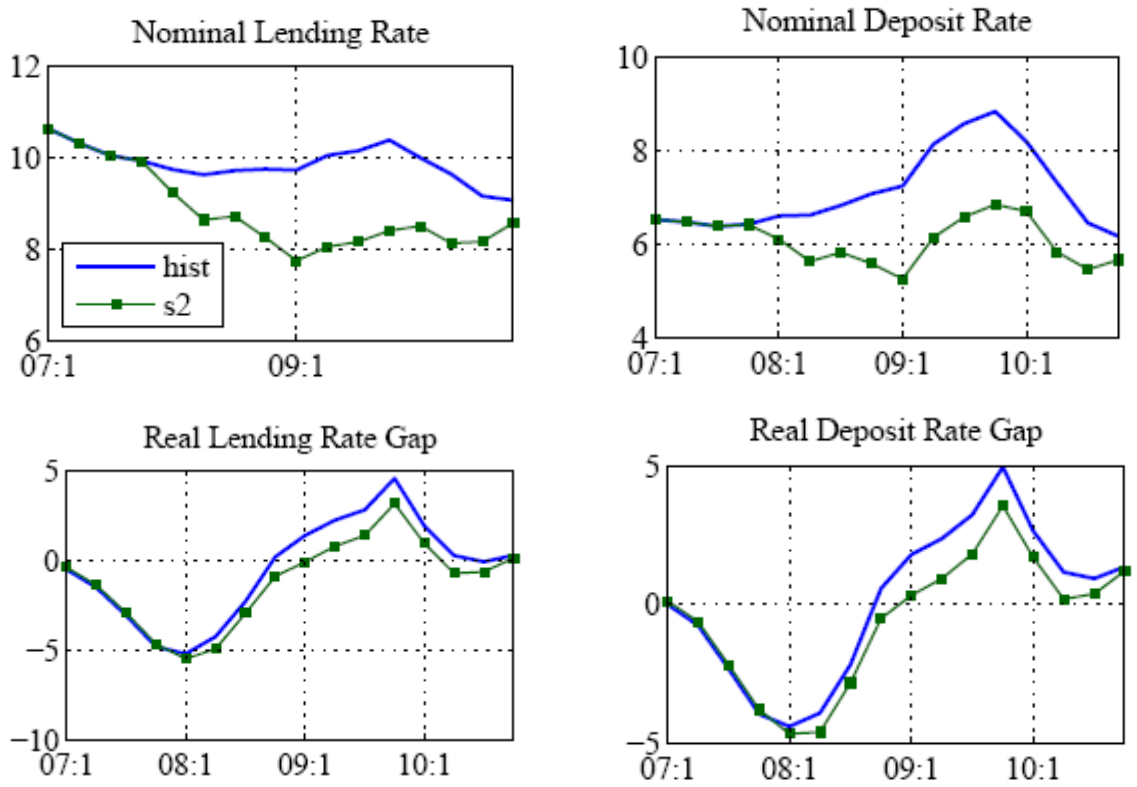


Figure 2. Domestic financial factors: actual data versus assumed movements in the "no crisis" scenario

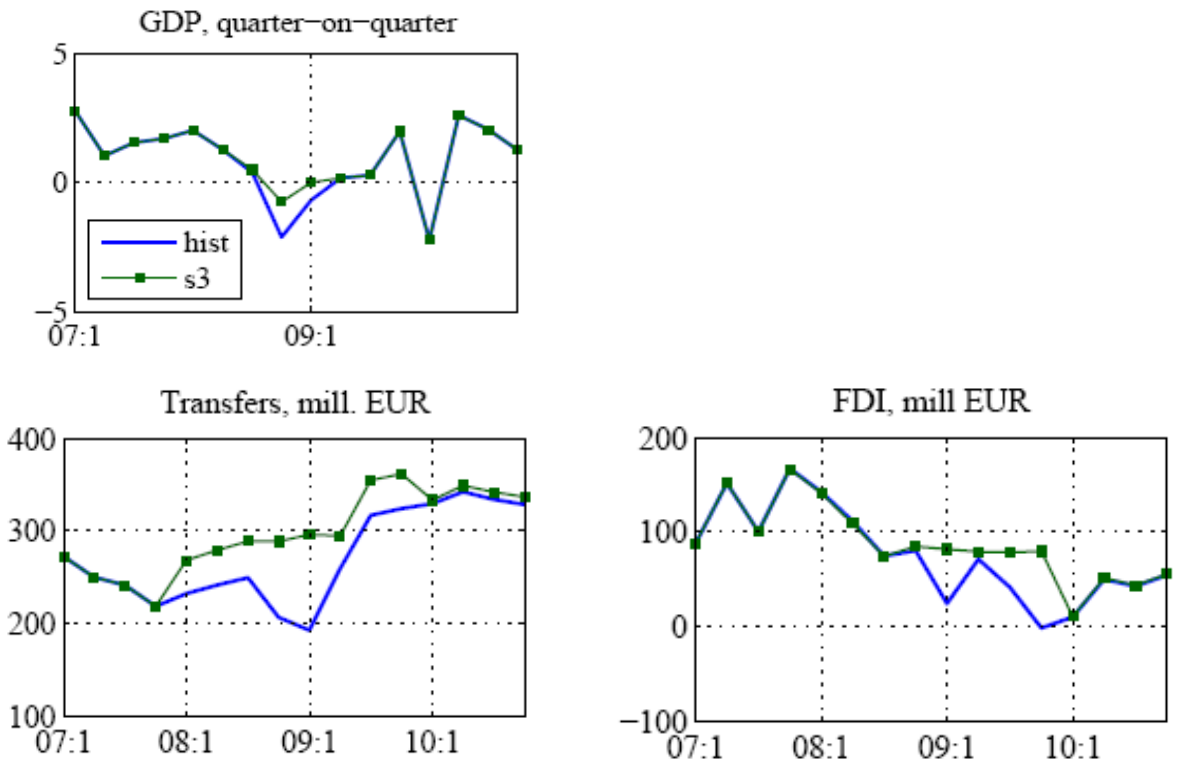
3.3 Confidence effects

The global economic and financial crisis also resulted in lower confidence, which in turn affected household and business decisions as well as overall economic movements. Similar to the previous crisis channel, a precise estimate of confidence effects does not exist, so a degree of arbitrariness is also involved in this approximation.

We represent the effects of the loss of confidence in two manners. First, lower consumer and business confidence affected private consumption and business investment, which further affected GDP. Statistical data show that the highest fall of quarterly GDP happened in the final quarter of 2008 and in the first quarter of 2009. In particular, this period includes the largest quarterly fall of consumption during the crisis, as well as a quarterly fall in private investment. Since we do not have confidence effects, or GDP components separately included in the MAKPAM model, we approximate the effects of the loss of confidence by assuming a lower quarterly fall of GDP in the last quarter of 2008 and an unchanged GDP instead of the quarterly fall in the first quarter of 2009.

The second way in which we approximate the loss of confidence effects is fairly specific to Macedonia, and is related to two balance of payments components: FDI and particularly private

transfers. The high uncertainty related to the European crisis and the potential effects on Macedonia resulted in sharp slowdown in private transfers between late 2007 and early 2009. This movement of transfers reflects both the lower inflow of remittances and higher preference for holding foreign currency cash by households. In addition, the uncertainty also affected decisions of foreign companies to postpone or cancel their investments in Macedonia. Therefore, in order to capture the effects of the loss of confidence on private transfers and FDI, we assume that the gaps of their respective shares to GDP from their steady state values are more positive than the observed ones[4]. More precisely, we assume that the deviation of the FDI-to-GDP ratio from its steady state value is zero instead of negative in 2008 and 2009. A similar approach is applied for private transfers: the gap is zero in 2008 and the first half of 2009 when the observed gap is negative, while it is slightly higher than the observed positive gap in the second half of 2009. This intervention in the gaps of private transfers and FDI also implies that hypothetical flows from these items would have been larger than the observed ones (Figure 3).



[4] In MAKPAM, steady state ratios of transfers and of FDI to GDP are defined as their respective average shares between 2005 and 2010.

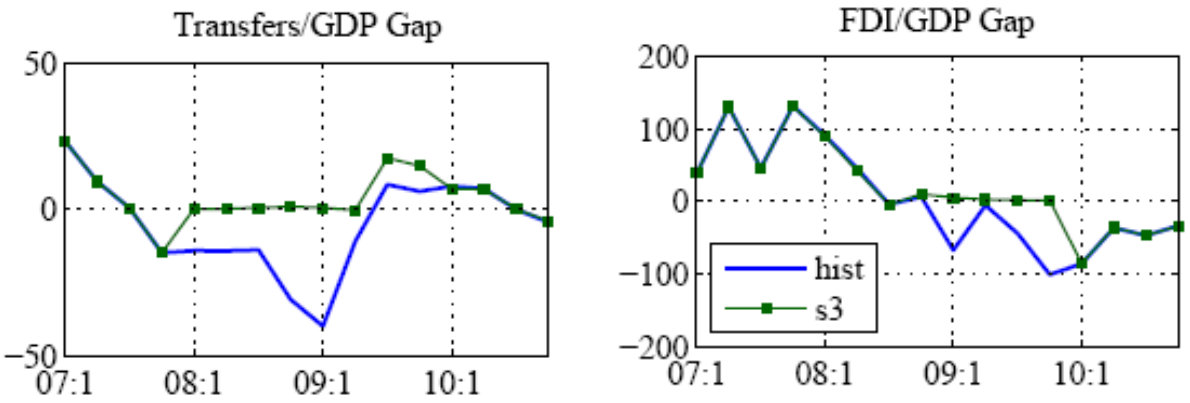


Figure 3. Confidence effects: actual data versus assumed movements in the "no crisis" scenario

3.4 Monetary policy reaction

The policy rate started to increase in the end of 2007, as a result of inflationary pressures and weaker movements in the foreign exchange market. As the crisis intensified, the central bank continued the gradual increase of the main interest rate, which reached its maximum level of 9% between April and December 2009, and then gradually fell as the pressures on reserves started to ease and inflation weakened, accompanied by negative movements in GDP. In the counterfactual exercise, we were interested in estimating how would the monetary policy evolve if there was no crisis, and what would be the hypothetical effects on the economy. To do so, we use the results from the first crisis channel. More precisely, we substitute the observed policy, bank lending and bank deposit rates from the second quarter of 2008 with the respective rates that would have resulted in the absence of the imported crisis (the first crisis factor). As would be expected, in absence of crisis, monetary policy would have been considerably more relaxed until around the first half of 2010, since there would be no foreign exchange market pressures to react to. Bank lending and deposit rates would also be more supportive to growth, as they are positive but lower than the observed ones in most of the period. In addition, the policy rate has a continuous downward path in 2008 and most of 2009. The only exception from this is the first period of the hypothetical forecast: the policy rate would have been considerably increased in the second quarter of 2008 if the model policy rule was followed (Figure 4). However, this reflects the fact that, in the first quarter of 2008, the actual policy rate was below the model prediction, while in the second period it immediately catches up with the model prediction.

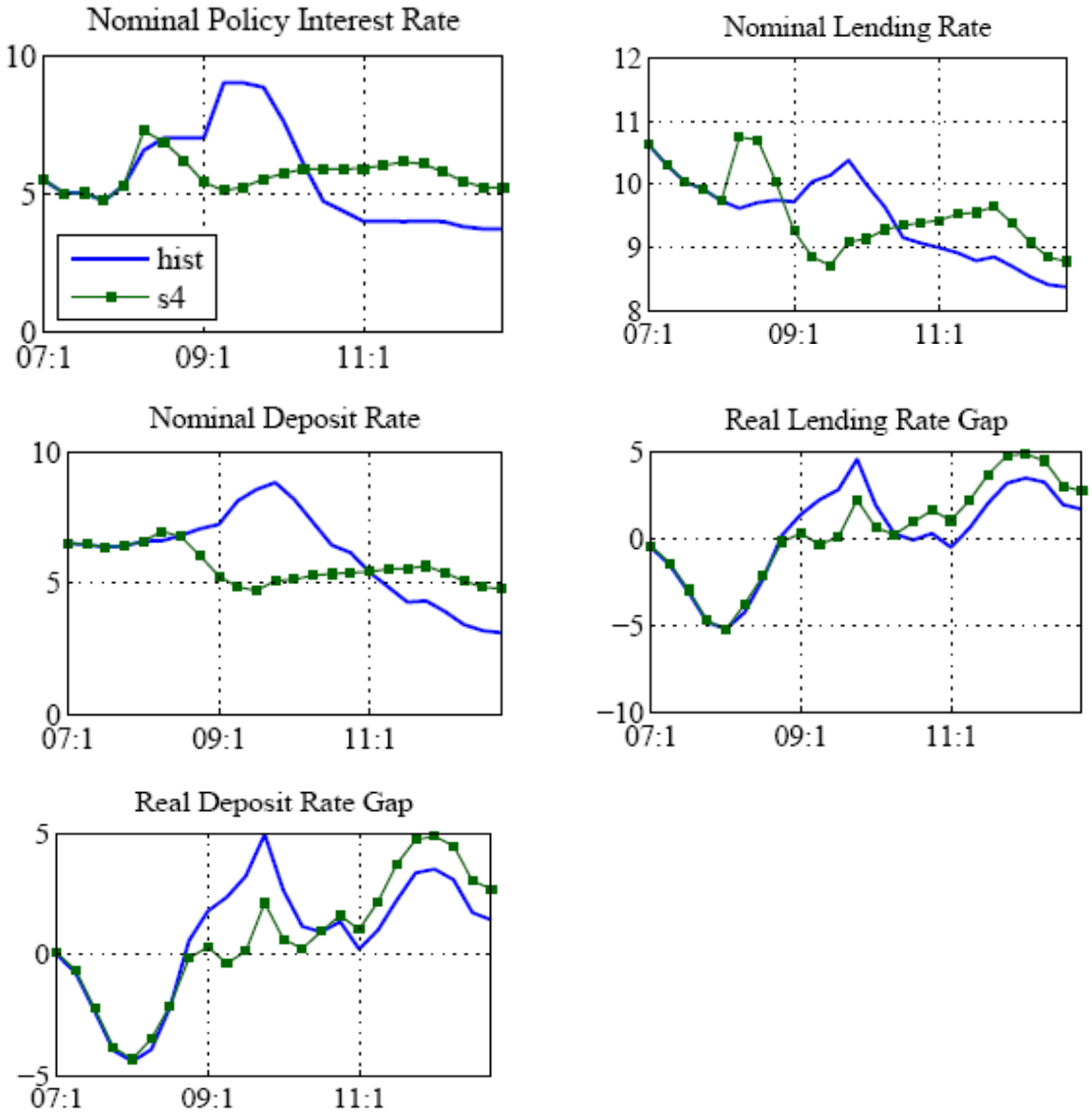


Figure 4. Monetary policy reaction: actual data versus assumed movements in the "no crisis" scenario

4. Results

This section presents the results of the counterfactual exercise: what would be the developments in the economy between 2008 and 2010 if the crisis had not happened at all. To do so, first we discuss the overall results, and then we pay more attention to particular channels and years.

Table 1 shows the percentage deviations of actual key economic variables from their hypothetical values which would obtain if the crisis did not happen. As discussed before, we focus on deviations in 2010, which effectively accumulates the effects of the crisis between 2008 and 2010.

The three crisis factors had a very strong effect on GDP, making it 9.6% lower than the value that would be obtained in absence of crisis and of the monetary policy reaction. The crisis strongly

affected all GDP components, but was mostly transmitted through the foreign trade. Indeed, in absence of crisis, real exports would have been higher for 6.7% while real imports would have been higher for 13.4%. Although other GDP components are not explicitly included in the MAKPAM model, the fall of real imports combined with the fall of GDP indicates that there was indeed a strong fall in private consumption and investment caused by the crisis. This is also indirectly supported by the movements of transfers and FDI, since the crisis lowered them by 11.3% and 45%, respectively. Finally, in absence of crisis, the price level in 2010 would have been higher for 4.5% than the observed one.

While the combined effect of the three crisis factors was to make all the variables reach significantly lower levels than a hypothetical "no crisis" scenario, it is also interesting to note the effects of monetary policy[5]. According to our results, monetary policy reaction subtracted additional 0.4 percentage points from the GDP level, thus bringing the total observed GDP level in 2010 by 10% lower than in the "no crisis" case. In addition, monetary policy also further increased the negative deviation of the price level. At first sight, the restrictive effect of monetary policy might seem counterintuitive for a period when most central banks were trying to fight excessive output and price level falls. However, one must take into account the particular environment where monetary policy operates in Macedonia. Indeed, monetary policy measures in the analysed period, and particularly in 2009, were undertaken with the primary aim of counteracting pressures on the foreign exchange market. Therefore, as in any fixed regime faced with a similar situation, output and price movements were secondary to foreign exchange market movements, particularly when one takes into account the large fall in reserves in the first half of 2009. Further, the lower GDP and price levels as result of monetary policy components also had an effect on balance of payments components. Monetary policy managed to slightly weaken the negative effect of the crisis on real exports, which were also supported by the accompanying marginally lower prices. On the other hand, the lower GDP and lower domestic prices as a result of policy actions further lowered the real imports, thus bringing the total impact of the crisis to 14.6% lower imports than in the "no crisis" scenario.

[5] As noted above, we do not analyse the effects of fiscal policy because it is not included in the MAKPAM model. However, fiscal policy was more relaxed during the crisis period, so it could be expected that it would have contributed to a lower fall in GDP.

	Imported crisis	Dom. fin. factors	Confidence	Overall crisis	Policy	Total impact
GDP	-7.0	-0.3	-2.3	**-9.6**	-0.4	**-10.0**
inflation	-4.3	-0.1	-0.1	**-4.5**	-0.2	**-4.7**
real exports	-5.5	0.6	-1.8	**-6.7**	0.8	**-5.9**
real imports	-10.3	-0.9	-2.2	**-13.4**	-1.2	**-14.6**
private transfers	-8.3	-0.3	-2.7	**-11.3**	-0.3	**-11.6**
FDI	-43.4	-1.0	-0.7	**-45.1**	-1.3	**-46.4**

Table 1. Impact of the crisis - percentage deviations of actual movements from the no crisis scenario between 2008 and 2010

Results in Table 1 also enable us to investigate the strength of the particular crisis transmission channels. They confirm the prior suspicions and the common view that by far the biggest impact of the crisis on Macedonia was transmitted via the imported crisis, i.e. by the lower foreign demand and foreign prices. Indeed, these factors resulted in a GDP level that was by 7% lower than the hypothetical level that would be observed in 2010 in absence of the crisis. In addition, foreign factors subtracted 4.3% from the price level. The other results confirm the importance of the foreign channel for the transmission of the crisis on the domestic economy. Real exports in 2010 were lower by 5.5% as a result of the imported crisis. Lower exports and lower domestic demand in turn resulted in real imports that were lower for more than 10%.

The effect of the two other crisis factors is significantly weaker. Even though in the counterfactual scenario, bank lending and deposit rates would have been significantly lower than the actual ones, particularly in 2009, they had only a marginal effect on GDP and inflation. Again, the limited effect of the domestic financial factors is understandable when one takes into account the country specifics: a small open economy with a fixed exchange rate and a banking sector that is relatively small and shallower than in other countries. This result also indirectly supports the frequent observation that the low development and depth of the financial sector in Macedonia shielded it from stronger negative effects from the crisis. On the other hand, the effects of the loss of confidence were somewhat stronger, although effects partially reflect our design of this channel. If consumer and business confidence would have been stable, the level of GDP would have been higher by 2.3%. Further, the loss of confidence also contributed a further negative deviation of transfers and FDI, which were lower than the "no crisis" scenario by additional 2.7% and 0.7% respectively.

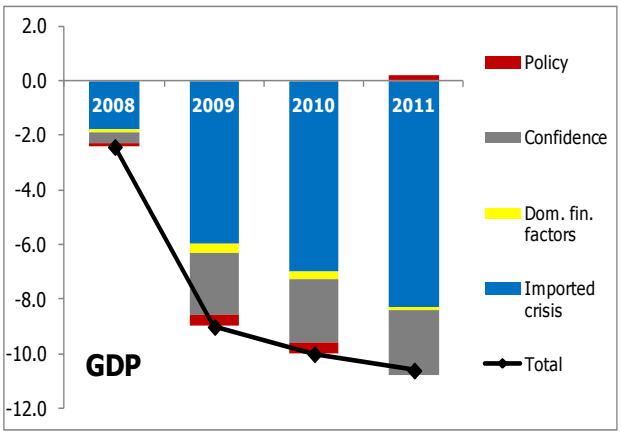
This analysis focuses on the level of key variables in 2010, which is taken to be the delimiting year of the strongest wave of the crisis from the latter additional effects. However, a similar analysis can be performed for the other years as well, and it would help shed additional light on the dynamics of the effects. Therefore, Figure 5 shows the contribution of each of the three crisis factors and of

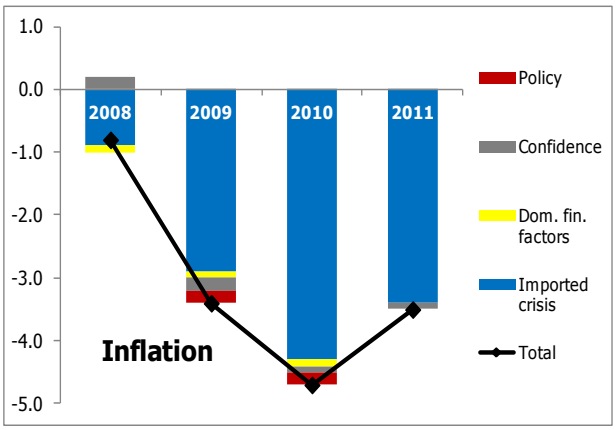
policy measures to the deviation of each of the key variables. Results for 2011 are also shown, although they should be indicative only due to the reasons mentioned before[6]. As before, all the results show the percentage deviation of the observed level of the variable compared to the value that would obtain in absence of the particular crisis channel or policy measures.

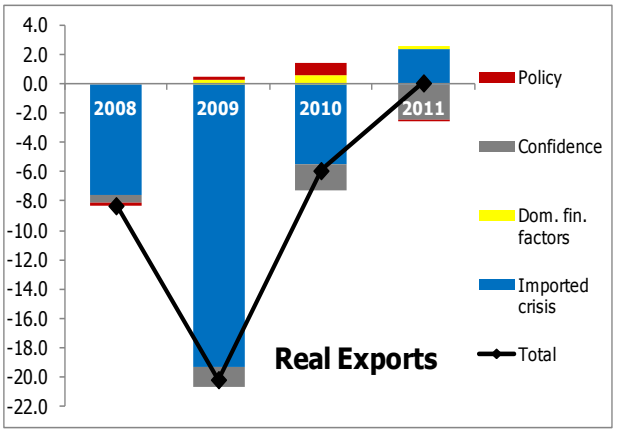
According to the graphs, GDP was already lower in 2008, mostly as a result of falling foreign demand. However, the biggest fall in GDP occurred in 2009, primarily as a result of foreign movements, but also of confidence effects. The negative deviation of GDP is quite persistent, which indicates that the crisis might have also affected the potential level of GDP, at least for a several years in the future. As noted above, monetary policy measures have further lowered GDP in 2009 and 2010, albeit only slightly. However, monetary policy contributed to a slightly higher GDP level in 2011 compared to the "no crisis" case. These results indicate that, once the foreign exchange market pressures were alleviated, the central bank was able to respond to other economic movements, and particularly support the economy by relaxing the policy. However, in all cases the effectiveness of monetary policy was quite weak, since swings of policy rates for several percentage points have very little impact on GDP (and inflation). Again, this is in accordance with the country specifics, since the fixed exchange rate regime combined with relatively high capital mobility leaves very little autonomy for monetary policy, which is further relatively weakly transmitted to the banks and the real economy.

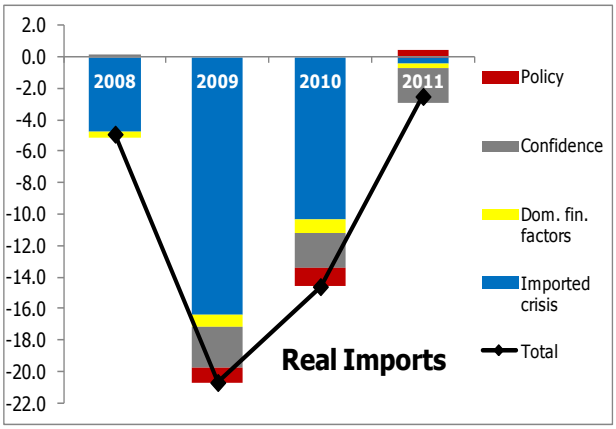
Graphs in Figure 5 also confirm that foreign trade was by far the most important transmission channel for the crisis to the domestic economy, while the loss of confidence also has a large effect. On the other hand, the restricted domestic demand as a result of monetary policy measures did also result in lower imports. In addition, the lower prices also resulting from monetary policy measures contributed to marginally higher exports. The combination of the various crisis channels had divergent effects on the real net exports as a share of GDP. The share of net exports in 2008 was lower, but in 2009 and 2010 it is higher than the one that would be observed in absence of crisis (i.e. the trade deficit is less negative than the hypothetical one). This result could be explained by the dynamics in which the crisis was transmitted to Macedonia. In 2008, the imported crisis and the confidence effects were dominant, in brining imports and particularly exports down, which made the trade deficit worse than in the "no crisis" case, presumably due to the quicker downward adjustment of exports than imports. However, the situation changed in the following two years. As the foreign crisis was driving real imports down comparatively more than the exports, the effects of this channel on the trade deficit was positive. The restrictive effects of monetary policy on imports and the low but positive effects on exports made further contributions to a trade deficit that was better in 2009 and 2010 then the hypothetical "no crisis" one. Finally, the crisis resulted in a significant loss of both transfers and FDI. The negative deviations are mostly driven by the foreign factors, as well as by the loss of confidence effects in 2008 and 2009.

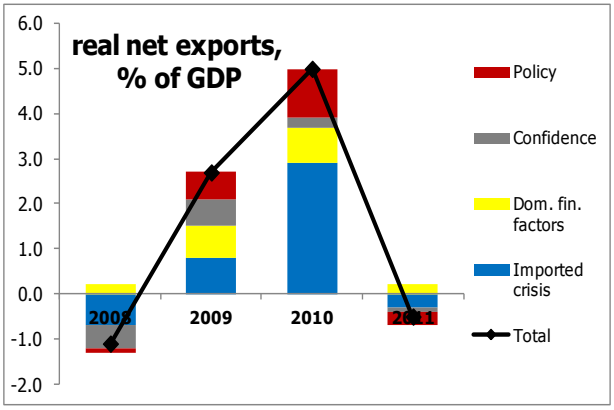
[6] For the later years, results on the imported crisis channel rely mostly on autoregressive movements of foreign variables. This also affects the channel of policy measures, since the hypothetical movement of policy rates in that channel is taken from the imported crisis case.

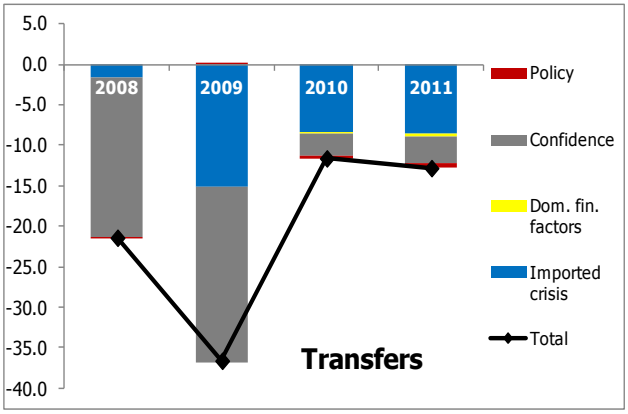












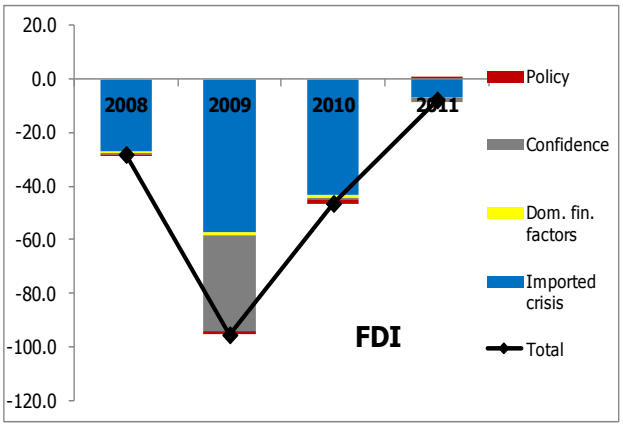


Figure 5. Contribution of crisis and policy factors to key variables

5. Conclusion

This study uses the counterfactual approach to analyse the effects of the global financial and economic crisis on Macedonia. It analyses the key transmission channels, and the effects of each of them on the main macroeconomic variables. In addition, the effects of monetary policy are also analysed. The design of counterfactual scenarios and simulations are carried out via the Macedonian Policy Analysis Model of the National Bank of the Republic of Macedonia, which is a small, calibrated New Keynesian gap model for Macedonia.

Results of the counterfactual analysis are mostly in line with *a priori* expectations. The imported crisis channel was the most important factor that caused the fall in GDP, the slowdown of inflation and the decrease in foreign trade between 2008 and 2010. This result provides an additional confirmation of the importance of foreign demand and foreign prices for a small open economy such as Macedonia. Further, the loss of confidence also had an important effect, which was however considerably lower than the imported crisis, while the impact of domestic financial factors was fairly low. Finally, it appears that monetary policy had an additional, albeit minimal negative effect on the level of GDP and prices between 2008 and 2010. Although this result might seem counterintuitive, one should take into account the primary focus of the central bank on maintaining the fixed exchange rate. Indeed, while monetary policy was forced to fight pressures on the foreign exchange market during the peak of the crisis, there are some indications that, as signs of stabilisation began to appear, after 2010 monetary policy was having a positive influence on economic growth.

However, it should be noted that the counterfactual approach has its drawbacks. For instance, there is a considerable degree of arbitrariness involved in the design of crisis factors. In addition, the analysis is dependent on the particular model used, which in our case prevents the analysis of the effects of fiscal policy. Therefore, while our study provides several important insights, results could be further enhanced in future work which would alleviate these drawbacks.

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