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Cross-Country Evidence on Determinants of Fiscal Policy Effectiveness: The Role of Capital Flows and a Country's International Trade and Financial Position

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Cross-country evidence on determinants of fiscal policy effectiveness: The role of capital flows and a country's international trade and financial position

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Abstract

This paper studies the determinants of size differentials between fiscal multipliers in countries around the world, both advanced and developing economies. Besides domestic conditions and exchange rate regimes, we also introduce variables not before considered for explaining multiplier size differentials such as capital flows and the openness of capital markets. We also disaggregate GDP into its main components in order to identify the channels through which external and internal factors can influence GDP after a change in fiscal policy. Our results point to the existence of a new channel through which fiscal policy effectiveness is affected. Capital flows, especially FDI flows, play an important role in determining the sizes of fiscal multipliers, and a country's external conditions largely explain GDP changes after fiscal expenditure shocks. Our results also point toward a strong link between a country's international position and its real economy.

JEL Classification: E62; F41.

Keywords: Fiscal policy; Government spending multiplier; Fiscal transmission mechanism; Cross-country heterogeneity; International linkage.

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1. Introduction

The role and effectiveness of fiscal policy have interested both policymakers and economists for a long time. The outbreak of the global financial crisis reopened discussion about the role of fiscal policy. Recent years have seen governments in many countries using fiscal expenditure to stimulate their economies and fend off bigger falls in output. This spending has resulted in high deficits and debt levels, compelling governments to turn to austerity measures.

Studies on the determinants of fiscal policy effectiveness in this context are of twofold importance. If fiscal policy is carried out effectively, similar results can be achieved with less expenditure of resources. In times of necessary fiscal expansion, this would mean lower budget deficits. When a government takes austerity measures, knowledge of the conditions for fiscal effectiveness helps the government cut fiscal spending and balance budgets without significant output slowdowns.

In investigating the efficacy of fiscal policy quantitatively, an essential step is to isolate the 'policy-induced' changes in fiscal expenditure, the so-called fiscal expenditure shocks, in actual economies. There is a large literature which proposes the econometric methodology to identify fiscal expenditure shocks. A good number of studies, such as Kuttner and Posen (2001), Blanchard and Perotti (2002), Mountford and Uhlig (2009), and Fatas and Mihov (2001), employ a structural vector autoregressive (VAR) model to estimate the effect of fiscal expenditure shocks on macroeconomic variables. As they argue, the structural VAR model is one of useful empirical tools to distinguish fiscal

policy shocks from the automatic effects of unexpected movements in activity on fiscal variables.[1]

While the literature on fiscal policy expenditure concentrates on the problem of identifying fiscal policy shocks, or on the strength of its effects without explaining the determinants of its effectiveness or lack thereof, papers concentrating mainly on the determinants of the effectiveness of fiscal policy expenditure are rather scarce.[2] In a literature review on the subject, Hemming et al. (2002) presents both a theory and empirical research results on fiscal policy and its effectiveness. They focus on the size of fiscal multipliers, the situations when multipliers can become negative, and the crowding out effect. In a more recent paper, Ilzetzki et al. (2013) analyse the determinants of fiscal multipliers of different sizes across countries. They show that degree of development, exchange rate flexibility, openness to trade, and debt burden are the main determinants of fiscal multiplier size.

Yet the analysis of fiscal policy can no longer be carried out only from a domestic perspective. Increases in global financial flows, the development of international financial markets, and the international expansion of companies change the whole

[1] An alternative approach bases on the narrative evidence and focuses on the changes in fiscal policy expenditure at the specific events not related directly with a country's economic conditions. That is, it takes unanticipated changes in fiscal policy as a proxy of the fiscal expenditure shocks. For instance, Ramey and Shapiro (1998) use narrative evidence on military spending to construct fiscal shock variables. Ramey (2011a) compares results based on VAR shocks with the results achieved with shocks based on narrative evidence. While both approaches intend to control for economic situation in the process of fiscal shocks' identification, the results might differ depending on the approach used, resulting in the continued discussion in the literature on the appropriate identification methodology.

[2] Ramey (2011b), while briefly reviewing both theoretical and empirical literature on fiscal policy effects, mentions mostly identification methodology and the effects of fiscal policy shocks.

economic situation of a country, and with it the country's methods for carrying out economic policies. Fiscal policy is no exception.

In this paper, basing on the VAR methodology to identify fiscal expenditure shocks, we first calculate cumulative fiscal multipliers as measure of fiscal policy effectiveness and then compare the results across countries. We consider the theoretical determinants of fiscal policy effectiveness studied in previous research and mentioned in textbooks, in order to identify the reasons for divergent fiscal policy effects. The variables previously used, however, have described mainly domestic economic conditions and the international stances of countries and do not in themselves seem to sufficiently explain differences in fiscal spending effectiveness across countries. Thus, we go further and search for new facts that might serve as determinants of fiscal policy effects.

Noticing the lack of studies trying to link fiscal policy and advancing globalization effects, we attempt to find the determinants of fiscal policy effectiveness against this background. While controlling for the factors used in the previous research, we introduce new variables describing a country's international financial situation and trade position, factors not yet considered in this context. We also take interest in the potential channels through which these variables can determine the influence of fiscal policy on domestic GDP. To check this point we examine how the potential determinant variables affect fiscal policy impacts on the four main GDP components: consumption, investment, exports, and imports.

Our main results single out net capital inflows as one of the most important determinants of fiscal policy effectiveness. When combined with capital account openness as a robustly significant variable, this result implies that a country's capital

account, and by extension its financial position, play a significant role in determining fiscal policy effectiveness. FDI flows, however, turn out to be the most meaningful out of the capital flows analysed, which suggests that sources of divergent government expenditure effectiveness lie in the real economy, as well. Our results thus point to a new channel through which fiscal policy effectiveness is affected, connecting a country's real economic situation domestically with its international financial position. We also find in an analysis of GDP components that export and import fiscal multipliers are mostly affected by the same variables affecting the GDP as a whole. This reinforces our finding that a country's external conditions strongly influence the effectiveness of fiscal policy on GDP.

The rest of this paper is constructed as follows. Section 2 presents the empirical methodology we use to find the determinants of fiscal expenditure effectiveness. Section 3 describes our data and some stylized facts about them. Section 4 presents and interprets our estimation results. Section 5 analyses the determinants of fiscal multipliers for the main GDP components. Section 6 concludes.

2. Empirical methodology

This section describes the econometric methodology we use to find determinants of the effectiveness of fiscal policy. First we use the VAR model to extract cumulative fiscal multipliers by country. Next we carry out OLS regressions to determine the variables influencing the sizes of the multipliers.

2.1. VAR specification

Our econometrical strategy starts with a simple VAR framework. First, in each country i, we construct the following structural VAR model consisting of two variables: government spending ($g_{i,t}$) and real GDP ($y_{i,t}$):

$$B_i(L)X_{i,t} = b_{i,0} + \epsilon_{i,t}, \tag{1}$$

where $X_{i,t} = (g_{i,t}, y_{i,t})'$, $b_{i,0}$ is a constant vector, $B_i(L) = B_{i,0} - B_{i,1}L - \cdots - B_{i,p}L^p$ is a p th order lag polynomial of a two-by-two coefficient matrix $B_{i,m}$ $(m = 0, \cdots, p)$, and $\epsilon_{i,t} = (\epsilon_{i,t}^g, \epsilon_{i,t}^y)'$ is a vector of serially uncorrelated structural disturbances with a mean zero and a covariance matrix I. The two-variable model is estimated with 4 lags.

The structural model above can be described by the following reduced-form VAR:

$$A_i(L)X_{i,t} = a_{i,0} + u_{i,t}, \tag{2}$$

where $a_{i,0}$ is a constant vector, $A_i(L) = I - A_{i,1}L - \cdots - A_{i,p}L^p$ is a p th order lag polynomial of two-by-two coefficient matrix $A_{i,m}$ $(m = 1, \cdots, p)$, and $u_{i,t} = (u_{i,t}^g, u_{i,t}^y)'$ is a vector of serially uncorrelated reduced-form innovations with a mean zero and a covariance matrix Σ_{ui}. We use Cholesky decomposition of the reduced-form covariance matrix Σ_{ui} to identify structural shocks.[3]

In our VAR model we place government spending before real GDP. We think it stands to reason that changes in government spending, a component GDP, influence GDP contemporaneously, and that GDP shocks have only a lagged impact on the spending.

[3] We also extend the model to a four-variable version by adding the ratio of the current account balance to the GDP (CA_t) and real effective exchange rate ($REER_t$), then estimating the model with two lags for each variable.

Based on the described VAR specification, we retrieve impulse-response functions for government spending shocks. Then, using real GDP and government spending responses to a government spending shock, we follow Mountford and Uhlig (2009) and calculate cumulative multipliers at time H in country i, defined as:

$$CM_i(H) = \frac{\sum_{h=0}^{H}(1+r_i)^{-h}\hat{y}_{i,h}}{\sum_{h=0}^{H}(1+r_i)^{-h}\hat{g}_{i,h}}, \quad (3)$$

where $\hat{y}_{i,h}$ is the estimated response of real GDP to a government spending shock at period $h=1,\cdots,H$ in country i, $\hat{g}_{i,h}$ is the estimated response of the fiscal expenditure to a government spending shock at period $h=1,\cdots,H$ in country i. As a discount factor r_i, we use the sample period median of each country's bond yield.[4]

2.2. Cross-country regressions

In the next step we move on to explaining the sizes of the estimated calculated multipliers of country i, $CM_i(H)$ (8th period cumulative multiplier in our benchmark case, $H=8$, for example). To do so we estimate a linear regression model of the form:

$$CM_i(H) = \beta_0 + \beta_1 Z_{1i} + \cdots + \beta_k Z_{ki} + e_i; i = 1,\cdots,N, \quad (4)$$

where $Z_{1i},\cdots,Z_{ki}$ are candidate k cross-country variables representing the characteristics of country i which can explain the differences of the size of the fiscal multiplier among countries, and e_i is the error term.

[4] The results change little, however, if no discounting takes place.

We estimate coefficients $\beta_0, \beta_1, \cdots, \beta_k$ using Ordinary Least Squares (OLS) regression with White's (1980) heteroskedasticity-consistent standard errors.

3. Data and stylized facts

VAR models are estimated with data of quarterly frequency. All the data are seasonally adjusted, and all are expressed in logarithms except for the ratio of the current account balance to GDP. For model estimations we use datasets for 44 countries, both advanced and developing economies. The data period varies from country to country, with samples starting between the years 1980 and 2000 and ending in 2013. A country list with individual sample periods is provided in the appendix.

Based on the VAR models, we calculate cumulative fiscal multipliers as explained above and choose 8th period multipliers as dependent variable for our benchmark cross-country regressions. Then we use 4th period multipliers for a robustness check.

Table 1 presents summary statistics for the 8th and 4th period cumulative multipliers calculated with a 2-variable VAR model.

The analysis of our estimated cumulative multipliers tells us that fiscal policy effects do not reach their peak shortly after the shock but tend to have a more prolonged and rising impact on the economy for at least two to three years. The average cumulative multiplier is higher in the 4th period, one year after the fiscal shock, than in the 8th period, two years after the shock, but this is very likely to be due to the very low minimum values in the 8th period. We can see that the maximum value and minimum value are both higher (in absolute terms) in the 8th period. The median value and standard deviation are also higher two years after the shock. Thus, fiscal policy steps

should be planned and taken not from a short-term, but rather a middle-term, perspective.

We intend to explore the determinants of fiscal policy effectiveness by looking for explanations for fiscal multiplier sizes using a wide range of macroeconomic and financial variables. We follow Ilzetzki et al. (2013) and include in our regression proxies for a country's degree of development, exchange rate flexibility, openness to trade, and government debt. We also introduce variables controlling for international finance, trade balance, and euro adoption.

The development level is proxied by a dummy variable taking the value 1 if a country is considered an advanced economy by the IMF. The exchange rate regime is also a dummy variable, based on the *de facto* classification of Ilzetzki et al. (2009) taking 1 for inflexible exchange rate regimes.[5] Openness to trade is measured by the ratio of summed exports and imports to GDP. Government debt and trade balance are also formed as ratios to GDP. International finance is characterised with two variables: the ratio of net capital inflows to GDP and the Chinn and Ito index (KAOPEN) measuring capital account openness. We also introduce a dummy taking the value 1 for countries that became members of the euro area in the year 1999 (plus Greece, which joined in 2001). Detailed descriptions of the data and its sources are provided in the appendix.

We need data that can be used in cross-country analysis. Yet most of the variables we have are time series. To adjust we take sample period averages of the time series to use in the regressions. Later, we also use the 2000 year values for the robustness check. In the case of dummy variables, dummy values as of the year 2000 are included in the

[5] As fixed exchange rate regime countries we include countries with no separate legal tender, pre announced pegs, currency board arrangements, crawling pegs, or de facto or pre-announced bands or crawling bands with margins no larger than ±2%.

regression, with robustness checks for different periods carried out later. The year 2000 seems to be a good point for taking the values of the variables that cannot be averaged, as it does not include the most recent changes and is available even for the shortest samples.

Table 2 contains the correlations of our cross-country explanatory variables $Z_{1i},\cdots,Z_{ki}$. Few of our explanatory variables show high correlations with each other. The biggest exception is the developed country dummy, which shows high correlations with most of the other variables. Yet the high correlations of the dummy with many variables demonstrate the characteristics of the advanced economies quite well and thus pose no problems for the regressions. Specifically, we observe that developed countries have more open capital accounts and lower net inflows than developing economies. The latter characteristic may be readily explainable, as the developed countries with high gross capital inflows are also major capital exporters. The high correlation coefficient with the monetary union dummy derives from the fact that all euro area members are classified as advanced economies. We can also see that developed countries are usually highly indebted relative to their GDPs. The high debt levels may derive from the typically higher credibility of these countries and their ability to borrow more money on the market at lower cost. We can observe a similar relation for the monetary union countries. The high correlation coefficient between the MU dummy and exchange rate dummy can be explained by our treatment of euro area countries as countries with fixed exchange rate regimes.

Meanwhile, we find no high correlations between KAOPEN and net inflows, no high correlations between KAOPEN and the other variables, and no high correlations between net inflows and the other variables. One noteworthy finding is the inverse

correlation between capital account openness and net inflows. This tells us that lower capital account openness is associated with higher net capital inflows, and vice versa. This may point at the fact that capital account restrictions are not always symmetrical and might often restrict capital outflows more than capital inflows. We also see in our correlation matrix, reassuringly, that capital account openness and trade openness are almost wholly uncorrelated. The introduction of the KAOPEN index into the regression clearly brings in new information not included in the trade openness variable.

4. Empirical results

This section presents empirical results based on our econometrical framework. We begin by presenting benchmark model results. Then we introduce more detailed analyses for capital flows.

4.1. Benchmark model results

In our benchmark model we regress the 8th period cumulative multipliers with the following variables: developed country dummy, exchange rate regime dummy, monetary union dummy, capital account openness (KAOPEN), net capital inflows to GDP, government debt to GDP, trade to GDP, and trade balance to GDP. Columns (1) to (10) of Table 3 present the estimated coefficients. [6]

The first points to note are the high values of R^2 and the adjusted R^2 coefficients in the benchmark specifications. Values over and just under 50% show that the chosen

[6] In the robustness section of the appendix we carry out the analysis for 4th period cumulative multipliers.

explanatory variables fit well and that the model we use explains much of the variation of the dependent variables.

The estimation results imply that capital account openness and net capital inflows are the most important determinants of fiscal policy effectiveness. The coefficient of net capital inflows is high and statistically significant both in the case of full regression and in the case of regression with capital inflows as the only regressor beside the constant term. Note, also, that the very high R^2 coefficient for the latter regression implies that net capital inflows account for much of the fiscal multiplier difference across countries.

The sign of the coefficient on the net inflows variable implies that higher net capital inflows diminish the effects of fiscal expansion. That is, the effectiveness of the fiscal policy dwindles as the capital entering a country increases relative to outflow. This stands to reason, because foreign capital looks for the most productive investment opportunities. As a consequence, large amounts of foreign capital entering a country force government spending to either concentrate on less productive projects or to crowd out private capital. Either way, the fiscal policy becomes much less effective. Note that the interpretation we provide here is only general and preliminary. The net inflows variable represents the wide range of divergent capital inflows and outflows. It would be impossible to state exactly what influences the fiscal policy expenditure effectiveness, or how, based on this one result alone. This limitation as well as the high value of the coefficient, compels us carry out a more detailed analysis of the capital flows later.

We also find that the effects of fiscal policy weaken in countries as their capital accounts open further. We have confirmed this result in both kinds of regressions carried out. The effect of higher capital account openness in pushing down fiscal multipliers is consistent with the theory. The IS-LM framework holds that a complete

crowding out takes place in a state of perfect capital mobility, rendering fiscal policy ineffective. According to the above explanation, that is certainly true when an open capital account leads to higher net capital inflows.

We also find evidence that fiscal policy is more effective in developed countries than in developing ones. This pattern holds in regression (9). It follows the findings of Ilzetzki et al. (2013), but stands in opposition to some other research identifying higher fiscal multipliers in developing countries. This result is difficult to interpret for the moment, but we will return to it after further analysis.

Our data also provide evidence that a country's trade balance influences the effectiveness of its fiscal policy expenditure. The coefficient is positive, which implies that a higher trade surplus supports the effectiveness of fiscal policy expenditures. We will leave our interpretation for this result for later, just as we do for our earlier result on the developed country dummy.

Meanwhile, we find no evidence supporting the significance of other variables studied by Ilzetzki et al. (2013) or other empirical research on the subject. All of them fall short of statistical significance, even when included in our regressions as sole explanatory variables. Most important, we find no evidence that an exchange rate regime influences fiscal multipliers, a notion often asserted in the literature on the determinants of fiscal policy effectiveness. Also, the government debt to GDP ratio leaves the fiscal multiplier size unaffected, both for benchmark regression and individual regression for each variable. In the cases of trade openness, our results directly oppose those of Ilzetzki et al. (2013). We find that fiscal multipliers are higher in economies more open to trade.

4.2. Gross capital flows analysis

In studying the results of our benchmark specifications, we observe that the ratio of net capital inflows to GDP is one of the most important factors influencing the size of fiscal multipliers. Earlier we mentioned that the net capital inflows variable is very general and that a detailed interpretation based solely on that variable would be difficult to provide. Thus, the first question we encounter is whether gross capital flows can better explain the level of fiscal policy effectiveness. That is, we want to check whether the levels of capital flowing out of or into a country are important for the fiscal multipliers, or whether the difference between the outflows and inflows of capital plays a big role. We check this by carrying out regressions similar to before, substituting net capital inflows with gross capital inflows and gross capital outflows.

Before presenting regression results, we report correlation coefficients for the two new explanatory variables presented in Table 4. We first notice a very high correlation between gross capital inflows and gross capital outflows. This tells us that countries with high capital inflows are also countries that have high capital outflows. Meanwhile, both of the new explanatory variables correlate weakly with the developed country dummy. These weak correlations may be attributable to the tendency of developing countries to have higher gross flows as a ratio of GDP, a tendency partly explainable by their lower GDPs. The higher correlation with outflows versus inflows in the developed country dummy shows that these countries often export more capital than they import.

Gross capital inflows and gross capital outflows both have low positive correlations with capital account openness. This finding shows that higher openness stimulates capital flows in both ways, albeit not to a considerable degree. The correlation coefficient is higher for capital outflows, which means that the abolishment of

restrictions stimulates gross outflows more than inflows. This pattern may be connected to the point we made earlier, namely, the tendency of capital account restrictions to be stricter for capital outflows than inflows. Therefore, the opening of the capital account will naturally signify a higher increase in outflows than in inflows.

Here we check the importance of gross capital flows for fiscal policy effectiveness by carrying out three types of regression. First we introduce gross inflows and gross outflows, separately, to the regressions with other explanatory variables. Then we use both variables at the same time in our specification.

Table 5 presents the results. When using only gross inflows or gross outflows, none of these variables are significant for the size of the fiscal multipliers. Fiscal policy effectiveness cannot be explained by looking at just one of these variables. And if we substitute net capital inflows with just one of the gross values, we also observe big falls in the R-squared and adjusted R-squared statistics.

The situation changes completely when we introduce both gross inflows and outflows to the model. We observe that both variables are significant, with high coefficients of opposite signs. The negative sign of the coefficient on gross inflows informs us that the inflow of capital causes a decline in fiscal multipliers. Gross capital outflows, meanwhile, stimulate the effectiveness of fiscal policy. These results are consistent with our interpretation of the results for net capital inflows. When foreign capital enters a country, it chooses the most productive opportunities, leaving less space for government spending. The capital outflow frees that space, allowing fiscal stimulation to exert more effects. One has to be careful with these results, however, given the very high correlation coefficient between gross capital inflows and gross capital outflows.

We can judge, in summary, that the important variables to consider when forecasting the effects of fiscal policy are not limited to gross inflows or gross outflows, but include net capital inflows as well. What matters is not only the gross inflow or gross outflow of capital in a country, but also the difference between the inflow and outflow.

4.3. Detailed analysis of capital flows

The above estimation results show that just gross capital inflows or gross capital outflows are insufficient to explain differences in fiscal multiplier sizes. We therefore carry out an even more detailed analysis dividing capital inflows and outflows according to the IMF classification into FDI, portfolio, and other flows. We carry out regressions of our benchmark specification with each variable substituting net capital inflows. We also introduce net inflows for each category.

Before moving to the regression results we will turn to the correlations of the detailed capital flow variables. As Table 6 shows, few of the capital flow variables show high correlations with the other explanatory variables. The biggest exception is the high negative correlation between net FDI flows and the developed country dummy. This, like the previous analysis, points to the basic characteristics connected to a country's development level and implies that net FDI flows are lower in advanced economies and higher in developing ones.

We can observe high correlations between outflows and inflows of the same category. The correlation is highest for other capital flows, followed closely by portfolio flows. The correlation between outflows and inflows is the lowest among the FDI flows.

Because we carry out regressions that include all categories of inflows and outflows at the same time, we also check correlations for all types of inflows and outflows with

each other. In doing so, we find high correlation coefficients between portfolio outflows and other outflows. The values are less pronounced for the rest of the categories, so we assume there are no problems with carrying out this kind of regression.

Tables 7-10 present the results of OLS regressions. On the whole, the results imply that fiscal policy effectiveness is influenced not by capital inflows, but capital outflows. None of the inflow variables considered are statistically significant. We achieve significant results, on the other hand, for FDI outflows, as well as for all outflow variables when they are included in the model at the same time.

The results also show that the FDI flows are the most important determinant of fiscal policy effectiveness. FDI outflows and net FDI variables are both statistically significant, and the coefficient is the highest among the types of outflows considered. The signs imply that higher FDI outflows increase the effectiveness of fiscal policy expenditure while higher net FDI inflows diminish it.

Portfolio flows, on the other hand, cannot be considered determinants of fiscal multiplier sizes. Portfolio outflows, inflows, and net values all fall short of statistical significance. We only find a significant coefficient when outflows of all types are put into one regression. The negative sign implies that higher capital outflows increase fiscal policy effectiveness. Yet none of the coefficients in the individual regressions are significant, so we conclude that there is no direct connection between portfolio investment and fiscal expenditure effectiveness.

We find evidence, however, that other capital flows are important. Net other flows are statistically significant with a high negative coefficient. This implies that higher net inflows of other kinds of capital lead to decreases in fiscal multipliers. The variable "other outflows" is also significant when put into regression together with the outflows

of the other two types. A positive coefficient sign means that fiscal spending is more effective when there is a higher outflow of other kinds of capital. The interpretation of these results, however, is convoluted. The "others" category consists of flows of different types such as bank lending or official flows, and the type of flow that actually influences fiscal policy effectiveness is hard to determine within the wide range of possibilities.

We can also see that the trade balance variable is quite robust in our specification. This finding confirms our previous observation that fiscal policy tends to be more effective in countries with trade surpluses. A country has a trade surplus when it earns more from its exports than it spends on its imports. Hence, companies within such a country have excess capital. The national income identity implies that countries with current account surpluses finance the current account deficits of their trade partners by lending to them. Capital therefore flows out from the country, and we assume (based on other results) that the outflow raises fiscal policy effectiveness.

On the whole, our results point at a completely new channel through which effectiveness of fiscal policy is affected. The significance of the FDI outflow and trade balance variables lets us conclude that fiscal policy is more effective in countries with internationally strong companies and the capacity to work out trade surpluses and invest those surpluses abroad. This is so because companies that generate high export revenues and companies that invest abroad are very likely to have high competitive skills. These companies have high and rising productivity, which both influences the domestic economies of their countries and improves the effectiveness of country's fiscal policies. And growth is not constrained by the level of domestic demand, as the limit rises through the import of demand from abroad. The potential demand of the economy becomes higher, so there is also more space for fiscal policy to create additional demand

without reaching excess demand levels. The effectiveness of fiscal spending therefore increases. While few studies paid attention to the role of fiscal policy on a country's international financial and trade situation, it seems natural to conclude that FDI outflow and trade balances, which determine fiscal multipliers most out of the types of flow considered, are important given that governments stimulate their economies mainly by making long-term investments in the real sector.

This analysis also helps us explain the positive significant coefficient of the developed country dummy in some specifications. The positive sign implies that fiscal policy is more effective in developed countries than in developing ones. Our new channel presents an explanation to this result. We have stated that the fiscal policy is more effective in countries that have high FDI outflows and trade surpluses, and by extension, globally oriented companies with sufficient strength to generate such flows. These conditions are more likely to be fulfilled by advanced economies than by developing countries. Therefore, fiscal policy will also be more effective in the former group, as our estimation results show.

5. Determinants of GDP component multipliers

The results from the previous section show that a country's international position largely influences the effectiveness of its fiscal policy. Capital flows, and especially FDI, play the most important role. This leads us to a question: through what channels can external factors influence a country's GDP? To explore this we now study the main GDP components, namely, private sector consumption, private sector investment, and exports and imports, and check the determinants of their multipliers after the change in government fiscal expenditure.

The procedure is similar to the above. First, using VAR models for each country and each GDP component separately, we calculate cumulative multipliers. Then we use the multipliers as dependent variables in cross-country regressions in order to determine factors responsible for their sizes.

Table 11 presents summary statistics of the fiscal multipliers for GDP components. The figures show that investment has the highest multipliers by far. That is, fiscal policy influences GDP mainly through its impact on investment. The second most important component through which the policy can influence GDP is imports, and the third is consumption. Fiscal expenditure is the least effective in influencing a country's exports.

Table 12 holds the results of the cross-country regressions with fiscal multipliers for consumption, investment, exports, and imports as dependent variables.

The results for consumption multipliers imply that the high importance of capital flows mentioned above does not hold for private consumption. Neither net capital inflows nor FDI flows are statistically significant. On the other hand, portfolio and other flows, especially inflows, seem to play a role in determining private sector consumption after the change in fiscal expenditure. The higher the inflows to the economy are, the lower the multiplier seems to become. More important, the ratio of government debt to GDP seems to be the most important determinant of the consumption multipliers, even though it has little importance for GDP as a whole.

Next, similar to the case with consumption, differences in investment multipliers after the fiscal expenditure shock also seem to depend less on ratio of net capital inflows to GDP than GDP itself. Again, portfolio inflows seem to hold the most important meaning among the different kinds of capital. Additionally, a country's trade balance

also determines investment multipliers. A country's international situation therefore seems to influence investment more than consumption, and investment is the main channel through which the current account works on the GDP multipliers. Finally, similar to consumption, a higher ratio of government debt to GDP decreases also the investment fiscal multipliers.

The results of the regressions with export multipliers as dependent variables imply that the size of the multiplier seems to be highly influenced by all types of capital flows, both inflows and outflows. The higher the FDI and other flows are, the higher the multiplier for exports become, and the opposite holds for portfolio flows.

Lastly, the results for the determinants of the sizes of the imports multipliers imply that a country's exchange rate regime and monetary union (euro area) participation are the strongest determinants of the extent to which imports increase after fiscal expenditure shock. The capital flows also extend some meaning for the divergent multiplier sizes across countries, with FDI – both inflows and outflows – holding the highest importance.

Summing up, the results imply that external conditions strongly influence the changes not only in GDP as a whole, but also in some of its components, after fiscal expenditure shocks. Section 4 implies that a country's international position, especially its capital flows and trade balance, is the important determinant of the size of the fiscal multipliers. In this Section we show that FDI flows not only confer a large influence on the size of the fiscal multiplier for GDP, but also have the strongest explanatory power over multipliers for exports and imports.

On the other hand, consumption and investment multipliers seem to depend more on a country's internal characteristics. Especially, our results imply that in countries with

high debt burden measured by the government debt to GDP ratio, government spending shocks have less or negative impact on consumption and investment. This finding supports the view suggested by the previous literature, e.g., Blanchard (1990), Sutherland (1997), Perotti (1999), and Ilzetzki et al. (2013).[7]

Our results in no way refute the role of domestic demand in contributing to GDP changes. In fact, we can confirm the very high levels of investment multipliers. Rather, they provide evidence that a country's external conditions also play a considerable role in determining the effectiveness of its fiscal policy spending.

One of the channels through which government expenditure can influence exports and imports is investment in infrastructure. Besides the traditionally studied channel of increased employment, wages, and thus consumption, one can also think of the infrastructure investment carried out to lower transportation costs, facilitate the transportation of goods, and thus increase trade. That strategy is implemented most often in developing countries, mostly as a means of encouraging foreign investment and thereby increasing production, employment, and trade, and ultimately GDP growth.

Our results on the vital role of external conditions also imply that government expenditure has more influence on the behaviour of firms than on individuals. This point is also largely confirmed by the strength of FDI flows and trade balance as

[7] There are competing views regarding the efficacy of fiscal policy; an increase in government expenditure has a positive effect on GDP/private consumption (standard Keynesian effect), no effect (Ricardian equivalence), and a *negative* effect (non-Keynesian effect). Using a nonlinear fiscal policy model and a cross-country data of OECD countries, Perotti (1999) finds that the non-Keynesian effect occurred only when the government debt to GDP ratio was high. Blanchard (1990) and Sutherland (1997) have theoretically demonstrated this nonlinear effect and its dependence on the economic environment.

determinants of the fiscal multipliers and by the fact that the investment component has the highest multiplier values.

6. Concluding remarks

In this study we present evidence on a new channel through which domestic fiscal policy effectiveness is affected. Based on economic theory and previous studies, we analyse the importance of domestic conditions and the importance of the exchange rate regime and trade openness as proxies for international conditions. We consider these factors insufficient, however, for analysing the role of the international environment in fiscal expenditure effectiveness. We therefore introduce, to our analysis of the fiscal multiplier determinants a number of variables describing capital market openness and capital flows, as well. We also disaggregate GDP into its main components in order to identify the channels through which external and internal factors can influence GDP after a fiscal policy changes.

Our results single out a country's capital flows as one of the most important determinants of fiscal multiplier size. The effectiveness of fiscal expansion is limited in countries with large net capital inflows and open capital accounts. What's more, not all flow categories affect fiscal multipliers equally. FDI flows are by far the most influential determinants of the effectiveness of fiscal policy, while portfolio flows have relatively little influence.

Especially high FDI outflows can explain higher fiscal multipliers well. This result points at the link between a country's international financial situation and real economy conditions. While a country's capital account situation is vital for fiscal policy effectiveness, the magnitude of FDI flow depends strongly on a country's macroeconomic

condition. To explain this result, we demonstrate that high FDI outflows can take place when a country has strong, internationally competitive companies that are able and willing to invest abroad. This condition can only be fulfilled with a good domestic macroeconomic situation and growth environment.

The extensive influence of FDI capital flows on the size of export and import multipliers shows that GDP changes are largely explained by external conditions that possibly outweigh changes in domestic demand. Moreover, all of the results provided suggest that fiscal expenditure influences the behaviour of mainly companies and not individuals.

The results achieved provide important hints for carrying out fiscal policies. The existence of internationally competitive companies also helps a domestic economy, raises productiveness, and thereby makes fiscal policy more effective, as well. A country's fiscal policy expenditure (fiscal stimulation introduced in order to raise GDP) should therefore focus on the creation of good development conditions for its companies to help them achieve higher international competitiveness. This will help the domestic economy by pushing up productivity and trade surpluses, and further increasing the effectiveness of fiscal policy.

More effective fiscal expenditure also means that lower spending levels can be achieved without diminished results. Such an outcome would translate into a sounder fiscal stance (lower deficits/debt). In other words, well fitted fiscal stimulation needs fewer resources, which makes it possible to somehow limit the role of the state. It is enough to limit state intervention to the creation of good development conditions and let the market do the rest.

Our analysis is not free from potential caveats. In this paper we apply VAR estimation methodology in order to identify 'policy-induced' fiscal shocks. As mentioned in the introduction, the discussion on the appropriate methodology for identification of fiscal policy shocks is still ongoing and the results might differ depending on the chosen method. In particular, the fiscal VAR literature points at potential problems for identifying fiscal shocks, problems mainly to do with the anticipation of policy changes (e.g., Ramey, 2011a).[8] Therefore, we cannot rule out some changes in our results in investigating the cross-country heterogeneity of the effect of `unanticipated' fiscal shocks. The issue of the differentials between results based on different identification approaches, however, is not the subject of this paper and is left for further study in the future.

APPENDIX

I. Data definitions and sources

- Government spending – sum of government final consumption expenditure/government consumption and government gross capital formation/ government investment. Sources: Eurostat, Oxford Economics
- Gross Domestic Product – Sources: Eurostat, Oxford Economics, countries' statistical offices

[8] There is usually a lag between a decision on fiscal policy expenditure and its implementation. Most fiscal policy changes are therefore believed to be anticipated by the private sector and to influence the private sector's behaviour even before the fiscal variables change. As a consequence, an analysis of the effects of fiscal policy expenditure based on the VAR methodology, i.e., an analysis focused only on the effects of the innovations of fiscal expenditure, might be inconsistent with the one of the effect of `unanticipated' fiscal shocks. However, as Ilzetzki et al. (2013) argue, we believe that this problem is mitigated especially in developing countries.

- Current account balance – ratio to GDP. Sources: Oxford Economics, countries' central banks
- Real effective exchange rate – deflated with CPI. Sources: IMF IFS, OECD
- Debt to GDP – government debt as ratio of GDP. Sources: IMF, World Economic Outlook database
- Exchange rate dummy – based on the *de facto* classification by Ilzetzki, Reinhard and Rogoff (2009); takes a value of 1 for countries with a fixed exchange rate regime (as defined in Ilzetzki et al. (2013): fixed exchange rate includes no legal tender, hard pegs, crawling pegs, or de facto or pre-announced bands or crawling bands with margins no larger than +/- 2%)
- Monetary union dummy – takes a value of 1 for countries that had joined the euro area in 1999 + Greece (countries that joined later, namely, Slovakia, Estonia, Cyprus, Malta, Latvia, and Lithuania are treated as non-MU countries)
- Developed country dummy – takes a value of 1 for developed countries, based on the IMF list of advanced economies in 2000
- Capital account openness – Chinn and Ito index (KAOPEN)
- Net capital inflows = [gross inflows (sum of IMF IFS data 78bed, 78bgd, 78bid)] – [gross outflows (sum of IMF IFS data 78bdd, 78bfd, 78bhd)], ratio to GDP. Source: IMF IFS
- Openness of the economy –the sum of exports and imports as a ratio of GDP (exports and imports data taken from the IMF IFS database –in US dollars; GDP from the World Economic Outlook database)

- Trade balance – difference between exports and imports, ratio to GDP; (exports and imports data taken from the IMF IFS database –in US dollars; GDP from the World Economic Outlook database)
- Government bond yield – 10-year government bond yield. Sources: IMF IFS, OECD, Thomson Reuters

II. Country list and sample periods

Table A. II.1 lists the countries included in the analysis and the sample starting points.

III. Robustness checks

III.1. Extended model results

As mentioned above, we use a 2-variable VAR model as our benchmark strategy to achieve cumulative multipliers for use in our cross-sectional regressions. We extend our VAR model to a 4-variable version, adding current account balance and real effective exchange rate variables, and calculate cumulative multipliers accordingly. We then use these multipliers as dependent variables in cross sectional regressions. The main results and conclusions in this specification are not much changed compared to the benchmark results.

Net capital inflows are still the main factors explaining the size of the multipliers. In the detailed analysis of capital flows, FDI flows turn out to be the most important factor behind fiscal policy effectiveness. Capital account openness seems to play a slightly less important role here, but it cannot be characterized as trivial. More broadly, we achieve more evidence that trade openness is an essential determinant and that trade balance plays no role.

These observations show, very reassuringly, that fiscal multipliers achieved based on the simple 2-variable VAR are sufficient to analyse the determinants of fiscal policy effectiveness.

III.2. Explanatory variable dates

As mentioned before, one of the problems of our research is the choice of a suitable form for the explanatory variables. Explanatory variables are usually time series data. To perform regressions checking the determinants of fiscal multipliers, we need to transform these time series into cross-sectional variables. For all of the previous regressions we use sample average values of our time series data as explanatory variables. Here, we also carry out the regressions with year 2000 values to verify that the results are not influenced by the choice of sample average values. As we can see, the results do not change significantly. Capital openness and net inflows are still the main factors explaining fiscal policy effectiveness. We also observe that fiscal policy tends to be more effective in developed countries.

We also carry out a robustness check for exchange rate dummy variable date. We calculate our models substituting the year 2000 exchange rate dummy with the dummy values in years 1995 and 2005. The results also seem robust to these changes, with net capital inflows, capital account openness, and trade balance becoming the main variables explaining fiscal spending effectiveness.

III.3. Cumulative multiplier period

The previous results are based on regressions of the 8^{th} period cumulative multiplier (i.e., cumulative reaction 2 years after the shock). We also carry out calculations for the

4th period cumulative multiplier to verify that the results are left unchanged when another period multiplier is used. We observe that many results are robust even when the multiplier period changes.

Here too, we find evidence that capital outflows are a main determinant of fiscal policy effectiveness versus capital inflows. Out of the different kinds of flows, FDI flows, and especially FDI outflows, play the main role in affecting fiscal policy effectiveness. We find some evidence supporting the importance of portfolio inflows, portfolio outflows, and other capital outflows, but these flows still seem less important than FDI flows. We also achieve robust results for capital account openness, though the role of this variable seems to be slightly smaller when the 4th period cumulative multiplier is used. Compared with the results for the 8th period multiplier, we find considerably less evidence that the trade balance is important as a determinant of fiscal policy effectiveness and more evidence that trade openness is important.

Some of the differences we observe might be explicable by the fact that some factors are likely to work better in the shorter period of time, while others work much better over the longer period. By looking at R^2 coefficient, we see that our explanatory variables explain fiscal multipliers better in the 8th period. Hence, there are probably other variables influencing fiscal policy effectiveness in the shorter period. As we state in the main text, fiscal policy has more prolonged effects on the economy. We therefore believe that looking at the 8th period multipliers is more justified.

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Table 1. Summary statistics of the 8th and 4th period cumulative multipliers

	8th period multiplier	4th period multiplier
Average	.086	.138
Median	.224	.129
Maximum	.844	.652
Minimum	-1.900	-.533
Standard deviation	.506	.212

Table 2. Correlation coefficients of explanatory variables

Developed country	Exchange rate regime	MU dummy	KAOPEN	Net inflows	Debt	Trade to GDP	Trade balance	
1	0.089	0.552	0.660	-0.540	0.471	-0.200	-0.060	Developed country
	1	0.552	0.186	0.142	0.160	0.249	0.169	Exchange rate regime
		1	0.335	-0.194	0.412	-0.109	-0.037	MU dummy
			1	-0.263	0.240	0.000	-0.126	KAOPEN
				1	-0.367	0.071	-0.038	Net inflows
					1	0.053	0.130	Debt to GDP
						1	0.513	Trade to GDP
							1	Trade balance

Table 3. OLS regression coefficients (estimations with constant terms)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant term	-.025 (-.166)	.087 (.815)	-.137 (-.614)	**.166*** (1.999)	**.222***** (3.679)	**.224***** (3.679)	.037 (.372)	.080 (1.060)	**.294**** (2.208)	**.350**** (2.639)
Developed country	.212 (1.381)								**.379*** (1.732)	.345 (1.651)
Exchange rate		-.001 (-.006)							.198 (1.348)	.178 (1.182)
Government debt			.412 (1.381)						.009 (.063)	-.012 (-.082)
Openness				-.105 (-1.197)					-.051 (-.765)	**-.113**** (-2.145)
Net inflows					**-4.402***** (-2.747)				**-4.494***** (-4.988)	**-4.446***** (-5.037)
KAOPEN						**-.126***** (-2.107)			**-.303***** (-3.366)	**-.286***** (-3.225)
Monetary union							**.198*** (1.894)		-.017 (-.115)	.005 (.030)
Trade balance								.290 (.1.573)		**.218**** (2.608)
R^2	.046	.000	.051	.015	.271	.091	.030	.036	.581	.594
Adjusted R^2	.023	-.024	.029	-.009	.254	.069	.006	.013	.499	.501

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table 4. Chosen correlation coefficients of gross capital flows

Developed country	Gross inflows	Gross outflows	KAOPEN	
1	0.043	0.207	0.660	Developed country
	1	0.955	0.050	Gross inflows
		1	0.134	Gross outflows
			1	KAOPEN

Table 5. Gross capital flows check

	(1)	(2)	(3)	(4)	(5)	(6)
Constant term	-.028	.043	-.030	.037	**.301****	**.354****
	(-.166)	(.248)	(-.165)	(.207)	(2.310)	(2.698)
Developed	**.704****	**.660****	**.691****	**.651****	.363	.333
country	(2.356)	(2.234)	(2.313)	(2.190)	(1.689)	(1.613)
Exchange rate	.084	.060	.114	.090	.209	.187
	(.426)	(.300)	(.573)	(.443)	(1.459)	(1.273)
Government	.155	.129	.158	.134	.011	-.008
debt	(.986)	(.818)	(1.044)	(.892)	(.083)	(-.057)
Openness	.024	-.045	-.052	-.115	-.083	**-.137*****
	(.383)	(-.613)	(-.766)	(-1.215)	(-1.260)	(-2.840)
Gross inflows	-.191	-.215			**-4.512*****	**-4.464*****
	(-.965)	(-.938)			(-5.067)	(-5.084)
Gross outflows			.202	.173	**4.682*****	**4.608*****
			(1.013)	(.835)	(5.225)	(5.202)
KAOPEN	**-.332*****	**-.311*****	**-.329*****	**-.309*****	**-.306*****	**-.289*****
	(-2.911)	(-2.737)	(-2.880)	(-2.704)	(-3.420)	(-3.282)
Monetary union	-.014	.016	-.084	-.054	-.039	-.014
	(-.075)	(.084)	(-.425)	(-.271)	(-.252)	(-.087)
Trade balance		**.256***		.241		**.208****
		(1.747)		(1.670)		(2.489)
R^2	.405	.424	.405	.422	.591	.603
Adjusted R^2	.290	.292	.290	.290	.497	.498

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table 6. Correlation coefficients for detailed capital flow variables

Trade balance	FDI inflows	Portfolio inflows	Other inflows	FDI outflows	Portfolio outflows	Other outflows	Net FDI	Net portfolio	Net other	
0.169	0.223	0.230	0.101	0.262	0.132	0.063	-0.024	0.140	0.087	Exchange rate regime
-0.060	-0.224	0.315	-0.018	0.264	0.242	0.094	-0.615	0.102	-0.341	Developed country
-0.037	-0.077	0.436	0.102	0.261	0.303	0.161	-0.404	0.190	-0.116	MU dummy
-0.126	-0.065	0.144	-0.035	0.277	0.104	0.041	-0.353	0.058	-0.136	KAOPEN
0.130	0.042	0.155	0.123	0.305	0.151	0.208	-0.316	-0.041	-0.209	Debt
0.077	0.132	0.189	0.175	0.394	0.172	0.139	-0.254	-0.026	0.187	Government expenditure
0.512	0.605	0.040	0.483	0.393	0.246	0.497	0.382	-0.519	0.263	Trade to GDP
-0.038	0.311	-0.078	0.088	-0.230	-0.139	-0.113	0.733	0.132	0.672	Net inflows
1	0.028	0.111	0.380	0.107	0.224	0.332	-0.099	-0.300	0.305	Trade balance
	1	-0.045	0.392	0.674	0.098	0.338	0.571	-0.376	0.307	FDI inflows
		1	0.492	0.179	0.911	0.530	-0.263	-0.086	0.189	Portfolio inflows
			1	0.249	0.751	0.964	0.232	-0.783	0.652	Other inflows
				1	0.233	0.291	-0.199	-0.184	0.012	FDI outflows
					1	0.783	-0.130	-0.487	0.361	Portfolio outflows
						1	0.115	-0.773	0.459	Other outflows
							1	-0.297	0.470	Net FDI
								1	-0.487	Net portfolio
									1	Net other

Table 7. FDI check

	(1)	(2)	(3)
Constant term	.046 (.270)	.089 (.498)	.109 (.607)
Developed country	**.667**** (2.282)	**.618**** (2.158)	**.532*** (1.769)
Exchange rate	.053 (.273)	.060 (.301)	.093 (.499)
Government debt	.107 (.739)	.077 (.562)	.112 (.750)
Openness	-.171 (-1.126)	-.176 (.562)	.054 (.775)
FDI inflows	1.426 (.667)		
FDI outflows		**2.853**** (2.258)	
Net FDI			**-4.742***** **(-2.785)**
KAOPEN	**-.304***** (-2.879)	**-.315***** (-2.806)	**-.325***** (-2.877)
Monetary union	-.011 (-.059)	-.045 (-.235)	-.075 (-.399)
Trade balance	**.335*** (1.932)	**.301*** (1.954)	.049 (.428)
R^2	.428	.450	.468
Adjusted R^2	.297	.325	.346

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table 8. Portfolio check

	(1)	(2)	(3)
Constant term	.039	.034	.049
	(.222)	(.188)	(.279)
Developed country	**.675****	**.654****	**.658****
	(2.282)	(2.205)	(2.221)
Exchange rate	.073	.073	.106
	(.363)	(.360)	(.504)
Government debt	.123	.133	.128
	(.795)	(.866)	(.839)
Openness	-.079	-.081	-.135
	(-.993)	(-.991)	(-1.381)
Portfolio inflows	-.336		
	(-1.548)		
Portfolio outflows		-.052	
		(-.218)	
Net portfolio			-1.325
			(-1.401)
KAOPEN	**-.313****	**-.311****	**-.309*****
	(-2.713)	(-2.699)	(-2.728)
Monetary union	.003	-.020	-.026
	(.014)	(-.099)	(-.132)
Trade balance	**.257***	**.250***	.240
	(1.727)	(1.703)	(1.611)
R^2	.421	.419	.426
Adjusted R^2	.289	.286	.295

Note: t-statistics are reported in parentheses. *, ** and * indicate statistical significance at the 99%, 95% and 90% levels, respectively.**

Table 9. Other flows check

	(1)	(2)	(3)
Constant term	.033	.043	.224
	(.181)	(.247)	(1.469)
Developed country	**.662****	**.655****	**.482****
	(2.216)	(2.232)	(2.229)
Exchange rate	.077	.106	-.057
	(.363)	(.503)	(.356)
Government debt	.134	.124	.034
	(.878)	(.837)	(.206)
Openness	-.088	-.138	-.067
	(-1.020)	(-1.389)	(-.892)
Other inflows	.044		
	(.123)		
Other outflows		.541	
		(1.431)	
Net other			**-4.519****
			(2.185)
KAOPEN	**-.310****	**-.308*****	**-.279*****
	(-2.720)	(-2.729)	(-3.067)
Monetary union	-.027	-.068	.057
	(-.131)	(-.328)	(.356)
Trade balance	.245	.233	**.430****
	(1.587)	(1.589)	(2.185)
R^2	.419	.427	.529
Adjusted R^2	.286	.296	.422

Note: t-statistics are reported in parentheses. *, ** and * indicate statistical significance at the 99%, 95% and 90% levels, respectively.**

Table 10. Inflows and outflows check

	(1)		(1)
Constant term	.052	Constant term	.125
	(.304)		(.739)
Developed country	**.682****	Developed country	**.652****
	(2.283)		(2.259)
Exchange rate	.056	Exchange rate	.108
	(.273)		(.522)
Government debt	.096	Government debt	.011
	(.657)		(.088)
Openness	-.168	Openness	**-.257***
	(-1.109)		(-1.885)
FDI inflows	1.349	FDI outflows	**2.855****
	(.611)		(2.206)
Portfolio inflows	-.368	Portfolio outflows	**-1.171****
	(-.904)		(-2.039)
Other inflows	.062	Other outflows	**1.415****
	(.142)		(2.166)
KAOPEN	**-.307*****	KAOPEN	**-.317*****
	(-2.882)		(-2.888)
Monetary union	.012	Monetary union	-.066
	(.060)		(-.344)
Trade balance	**.335***	Trade balance	**.299***
	(1.779)		(1.821)
R^2	.430	R^2	.472
Adjusted R^2	.257	Adjusted R^2	.312

Note: t-statistics are reported in parentheses. *, ** and * indicate statistical significance at the 99%, 95% and 90% levels, respectively.**

Table 11. Summary statistics of fiscal multipliers for GDP components

	Consumption multiplier		Investment multiplier		Exports multiplier		Imports multiplier	
	4th period	8th period	4th period	8th period	4th period	8th period	4th period	8th period
Average	0.264	0.362	0.936	0.973	0.119	0.225	0.333	0.442
Median	0.174	0.311	0.614	0.632	0.072	0.146	0.280	0.412
Maximum	2.488	2.524	6.064	6.289	1.949	2.336	2.713	2.278
Minimum	-1.163	-1.112	-1.733	-1.862	-1.161	-1.361	-0.920	-1.027
Std. dev	0.511	0.572	1.413	1.387	0.581	0.629	0.555	0.546

Table 12. Determinants of fiscal multipliers for consumption, investment, exports, and imports.

	Consumption multipliers			Investment multipliers			Exports multipliers			Imports multipliers		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	0.436 (1.730)	**0.512**** (2.537)	**0.503**** (2.395)	**1.558**** (2.075)	**1.676***** (3.448)	**1.728***** (3.017)	0.508 (1.682)	**0.645***** (2.891)	**0.774***** (3.026)	**0.758**** (2.153)	**0.841***** (3.426)	**0.887***** (3.263)
Developed country	-0.004 (-0.018)	-0.008 (-0.033)	-0.037 (-0.157)	-0.272 (-0.517)	-0.219 (-0.377)	-0.225 (-0.384)	-0.236 (-0.556)	-0.222 (-0.725)	-0.310 (-0.941)	-0.359 (-1.080)	-0.341 (-1.290)	-0.407 (-1.441)
Exchange rate	0.143 (0.937)	0.202 (1.166)	0.190 (1.131)	0.671 (0.912)	0.651 (0.920)	0.695 (0.979)	-0.447 (-1.639)	-0.352 (-1.512)	-0.205 (-0.794)	**-0.704***** (-3.296)	**-0.769***** (-3.367)	**-0.688***** (-2.950)
Monetary union	0.406 (1.416)	0.445 (1.380)	0.407 (1.312)	0.698 (0.957)	0.929 (1.195)	0.805 (0.995)	0.308 (0.934)	0.227 (0.741)	0.066 (0.212)	**0.824***** (3.354)	**0.892***** (3.639)	**0.784***** (3.174)
KAOPEN	0.048 (0.643)	0.047 (0.606)	0.053 (0.660)	-0.022 (-0.112)	-0.031 (-0.139)	-0.041 (-0.183)	-0.069 (-0.589)	-0.030 (-0.340)	-0.054 (-0.574)	0.047 (0.503)	0.072 (0.819)	0.044 (0.480)
Government debt	**-0.770**** (-2.554)	**-0.845***** (-2.755)	**-0.818**** (-2.630)	**-1.915**** (-2.141)	**-2.059**** (-2.353)	**-2.148**** (-2.123)	-0.332 (-0.917)	**-0.563*** (-1.857)	**-0.646*** (-1.907)	-0.169 (-0.511)	-0.317 (-1.165)	-0.331 (-1.130)
Openness	0.117 (1.144)	0.061 (0.512)	0.093 (0.790)	0.105 (0.289)	0.053 (0.150)	-0.001 (-0.002)	0.273 (1.389)	-0.269 (-1.681)	-0.199 (-1.098)	0.082 (0.594)	-0.222 (-1.250)	-0.089 (-0.474)
Trade balance	-0.025 (-0.185)	-0.064 (-0.419)	-0.043 (-0.309)	**-0.590**** (-2.360)	-0.430 (-1.410)	**-0.496*** (-1.791)	-0.070 (-0.278)	0.046 (0.260)	-0.087 (-0.539)	0.045 (0.282)	**0.350*** (1.841)	0.119 (0.743)
Inflows to GDP	0.854 (0.670)			0.759 (0.144)			1.205 (0.713)			0.304 (0.172)		
FDI inflows		-0.224 (-0.140)			1.536 (0.430)			**4.343**** (2.267)			**4.872**** (2.694)	
Portfolio inflows		**-1.343***** (-2.894)			**-2.571**** (-2.143)			**-1.726***** (-3.694)			-0.549 (-1.198)	
Other inflows		**0.797*** (1.936)			-0.129 (-0.142)			**2.869***** (8.192)			0.140 (0.405)	
FDI outflows			-0.663 (-0.386)			2.291 (0.681)			**2.368*** (1.880)			**3.659**** (2.575)
Portfolio outflows			-0.599 (-0.562)			-3.662 (-1.400)			**-2.654***** (-3.759)			-0.983 (-1.234)
Other outflows			0.711 (0.664)			2.176 (0.677)			**5.314***** (6.572)			1.057 (1.189)
R^2	0.229	0.247	0.230	0.264	0.284	0.287	0.246	0.525	0.478	0.252	0.347	0.305
Adjusted R^2	0.053	0.019	-0.004	0.096	0.067	0.070	0.064	0.376	0.314	0.076	0.143	0.087

Note: t-statistics are reported in parentheses. *, ** and * indicate statistical significance at the 99%, 95% and 90% levels, respectively**

Table A.II.1. Countries and sample starting points

Country	Sample start	Country	Sample start
Australia	1980Q1	Lithuania	1999Q1
Austria	1980Q1	Malaysia	1980Q1
Belgium	1980Q1	Malta	2000Q1
Brazil	1989Q1	Mexico	1989Q1
Bulgaria	1999Q1	Netherlands	1980Q4
Canada	1980Q1	New Zealand	1987Q2
Chile	1989Q1	Norway	1980Q1
Cyprus	1995Q1	Philippines	1980Q1
Czech Republic	1999Q1	Poland	1999Q1
Denmark	1980Q4	Portugal	1980Q4
Estonia	1995Q1	Romania	2000Q1
Finland	1980Q1	Russia	1993Q1
France	1980Q1	Singapore	1980Q1
Germany	1991Q1	Slovakia	1999Q1
Greece	1988Q1	South Africa	1989Q1
Hungary	1999Q1	Spain	1980Q4
Indonesia	1980Q1	Sweden	1980Q1
Ireland	1985Q1	Switzerland	1981Q1
Italy	1981Q4	Thailand	1980Q1
Japan	1980Q1	Turkey	1987Q2
Korea	1980Q1	United Kingdom	1980Q1
Latvia	1999Q1	United States	1980Q1

Table A.III.1. Regression results for the 8th period cumulative multiplier calculated based on a 4-variable VAR model

	(1)
Constant term	**.453*** **
	(3.090)
Developed country	.141
	(.564)
Exchange rate	-.081
	(.482)
Monetary union	.224
	(1.536)
Kapoen	-.184
	(1.619)
Net inflows	**-3.701*** **
	(-4.216)
Government debt	-.073
	(-.451)
Openness	**-.141** **
	(-2.569)
Trade balance	.097
	(1.110)
R^2	.373
Adjusted R^2	.230

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.2. FDI check

	(1)	(2)	(3)
Constant term	.197	**.256***	.255
	(1.434)	(1.828)	(1.615)
Developed country	.408	.353	.292
	(1.518)	(1.433)	(.968)
Exchange rate	-.180	-.185	-.151
	(-.857)	(-.949)	(-.807)
Government debt	.032	-.021	.029
	(.195)	(-.147)	(.177)
Openness	-.169	**-.227***	.003
	(-1.162)	(-1.945)	(.040)
FDI inflows	.877		
	(.392)		
FDI outflows		**3.425****	
		(2.249)	
Net FDI			**-4.103***
			(-1.893)
KAOPEN	**-.201***	**-.210***	-.217
	(-1.808)	(-1.816)	(-1.868)
Monetary union	.208	.175	.156
	(1.198)	(1.113)	(.931)
Trade balance	.175	.184	-.051
	(.911)	(1.197)	(-.351)
R^2	.260	.300	.292
Adjusted R^2	.090	.140	.130

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.3. Portfolio check

	(1)	(2)	(3)
Constant term	.190	.187	.211
	(1.344)	(1.326)	(1.481)
Developed country	.407	.393	.399
	(1.485)	(1.448)	(1.501)
Exchange rate	-.167	-.160	-.124
	(-.844)	(-.798)	(-.622)
Government debt	.047	.057	.040
	(.270)	(.328)	(.228)
Openness	-.115	-.129	**-.185***
	(-1.420)	(-1.505)	(-1.786)
Portfolio inflows	-.041		
	(-.168)		
Portfolio outflows		.260	
		(1.055)	
Net portfolio			-1.801
			(-2.026)
KAOPEN	**-.205***	**-.203***	**-.203***
	(-1.724)	(-1.706)	(-1.736)
Monetary union	.203	.179	.197
	(1.168)	(1.025)	(1.181)
Trade balance	.122	.113	.111
	(.852)	(.801)	(.762)
R^2	.257	.258	.269
Adjusted R^2	.087	.089	.101

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.4. Other flows check

	(1)	(2)	(3)
Constant term	.190	.202	**.325****
	(1.346)	(1.414)	(2.087)
Developed country	.405	.396	.277
	(1.519)	(1.490)	(1.155)
Exchange rate	-.169	-.128	-.181
	(-.825)	(-.629)	(-.974)
Government debt	.048	.035	-.024
	(.279)	(.211)	(-.131)
Openness	-.113	**-.183***	-.104
	(-1.237)	(-1.702)	(-1.499)
Other inflows	-.026		
	(-.069)		
Other outflows		**.667***	
		(2.005)	
Net other			-3.224
			(-1.668)
KAOPEN	**-.205***	**-.201***	-.183
	(-1.726)	(-1.712)	(-1.646)
Monetary union	.203	.145	.258
	(1.130)	(.832)	(1.572)
Trade balance	.123	.103	.251
	(.817)	(.729)	(1.342)
R^2	.256	.268	.311
Adjusted R^2	.087	.100	.153

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.5. Inflows and outflows check

	(1)		(1)
Constant term	.199	Constant term	**.282***
	(1.457)		(1.948)
Developed country	.405	Developed country	.368
	(1.531)		(1.447)
Exchange rate	-.189	Exchange rate	-.138
	(-.829)		(-.689)
Government debt	.033	Government debt	-0.063
	(.197)		(-0.474)
Openness	-.164	Openness	**-0.210***
	(-1.184)		(-1.793)
FDI inflows	1.004	FDI outflows	**3.390****
	(.401)		(2.178)
Portfolio inflows	.079	Portfolio outflows	-.651
	(.156)		(-1.207)
Other inflows	-.139	Other outflows	**1.124***
	(-.219)		(1.784)
KAOPEN	**-.201***	KAOPEN	**-.210***
	(-1.809)		(-1.793)
Monetary union	.215	Monetary union	.136
	(1.152)		(.834)
Trade balance	.190	Trade balance	.173
	(.834)		(1.078)
R^2	.260	R^2	.314
Adjusted R^2	.036	Adjusted R^2	.106

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table. A.III.6. Explanatory variables for year 2000 (8th period multiplier)

	(1)
Constant term	-.007 (-.037)
Developed country	.783** (2.557)
Exchange rate	-.052 (.277)
Monetary union	.170 (.879)
Kapoen	-.313*** (-3.125)
Net inflows	**-2.266***** (-3.017)
Government debt	.048 (.252)
Openness	-.063 (-1.098)
Trade balance	.216 (1.382)
R^2	.501
Adjusted R^2	.387

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table. A.III.7. Different exchange rate dates

	(1)	(2)
Constant term	**.374****	**.411*****
	(2.638)	(3.068)
Developed country	.300	.261
	(1.540)	(1.362)
1995 exchange rate	.036	
	(.302)	
2005 exchange rate		-.094
		(-.630)
Monetary union	.128	.236
	(1.214)	(1.473)
Kapoen	**-.273*****	**-.263*****
	(-3.118)	(-3.124)
Net inflows	**-4.184*****	**-4.046*****
	(-4.583)	(-4.450)
Government debt	-.012	-.026
	(-.084)	(-.187)
Openness	-.087	-.067
	(-1.554)	(-.927)
Trade balance	**.240*****	**.257*****
	(2.834)	(3.110)
R^2	.579	.582
Adjusted R^2	.483	.487

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.8. Regression results for 4th period cumulative multiplier calculated based on the 2-variable VAR model.

	(1)
Constant term	**.345*** **
	(4.130)
Developed country	.065
	(.936)
Exchange rate	.033
	(.511)
Monetary union	.051
	(.657)
Kapoen	-.101***
	(-3.643)
Net inflows	**-1.705*** **
	(-4.246)
Government debt	-.073
	(-.907)
Openness	**-.091*** **
	(-3.191)
Trade balance	.079**
	(2.446)
R^2	.481
Adjusted R^2	.362

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.9. FDI check

	(1)	(2)	(3)
Constant term	**.225*** **	**.247*** **	**.257*** **
	(2.819)	(3.019)	(3.146)
Developed country	**.187** **	**.168** **	.129
	(2.296)	(2.159)	(1.571)
Exchange rate	-.010	-.014	.001
	(-.116)	(-.169)	(.014)
Government debt	-.020	-.042	-.027
	(-.250)	(-.544)	(-.365)
Openness	-.090	**-.120** **	-.019
	(-1.532)	(-2.254)	(-.598)
FDI inflows	.167		
	(.215)		
FDI outflows		**1.220***	
		(1.906)	
Net FDI			**-2.111** **
			(-2.690)
KAOPEN	**-.110*** **	**-.120*** **	**-.117*** **
	(-3.460)	(-3.534)	(-3.588)
Monetary union	.042	.031	.017
	(.475)	(.363)	(.204)
Trade balance	.100	**.113***	.002
	(1.554)	(1.872)	(.002)
R^2	.334	.366	.389
Adjusted R^2	.182	.221	.250

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.10. Portfolio check

	(1)	(2)	(3)
Constant term	**.219*** **	**.221*** **	**.235*** **
	(2.760)	(2.824)	(2.980)
Developed country	**.176** **	.171	.184
	(2.145)	(2.10)	(2.246)
Exchange rate	-.006	.003	.015
	(-.078)	(.041)	(.176)
Government debt	-.008	-.005	-.022
	(-.101)	(-.073)	(-.279)
Openness	**-.084** **	**-.098** **	**-.116** **
	(-2.145)	(-1.505)	(-2.224)
Portfolio inflows	**.270** **		
	(2.447)		
Portfolio outflows		**.356*** **	
		(3.670)	
Net portfolio			-0.935
			(-1.638)
KAOPEN	**-.109*** **	**-.108*** **	**-.110*** **
	(-3.283)	(-3.266)	(-3.405)
Monetary union	.019	.011	.038
	(.217)	(.124)	(.443)
Trade balance	.084	.079	.085
	(1.548)	(1.480)	(1.463)
R^2	.342	.353	.354
Adjusted R^2	.192	.205	.205

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.11. Other flows check

	(1)	(2)	(3)
Constant term	**.222*** **	**.233*** **	**.278*** **
	(2.800)	(2.989)	(3.240)
Developed country	**.188** **	**.180** **	**.136***
	(2.304)	(2.251)	(1.781)
Exchange rate	.001	.021	-.013
	(.009)	(.247)	(-.172)
Government debt	-.018	-.026	-.045
	(-.238)	(-.361)	(-.562)
Openness	**-.097** **	**-.128** **	**-.075** **
	(-2.196)	(-2.492)	(-2.316)
Other inflows	.161		
	(1.355)		
Other outflows		**.482** **	
		(2.644)	
Net other			-1.281
			(-1.615)
KAOPEN	**-.110*** **	**-.108*** **	**-.102*** **
	(-3.336)	(-3.368)	(-3.483)
Monetary union	.026	.000	.063
	(.289)	(.003)	(.748)
Trade balance	.079	.077	**.142***
	(1.364)	(1.328)	(1.980)
R^2	.340	.368	.384
Adjusted R^2	.189	.224	.244

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**

Table A.III.12. Inflows and outflows check

	(1)		(1)
Constant term	**.220****	Constant term	**.256*****
	(2.720)		(3.096)
Developed country	**.179****	Developed country	**.164****
	(2.169)		(2.085)
Exchange rate	-.005	Exchange rate	.015
	(-.051)		(.170)
Government debt	-.012	Government debt	-.052
	(-.152)		(-.675)
Openness	-.098	Openness	**-0.165****
	(-1.609)		(-2.382)
FDI inflows	.114	FDI outflows	**1.172***
	(.137)		(1.994)
Portfolio inflows	.214	Portfolio outflows	-.038
	(1.282)		(-.139)
Other inflows	.075	Other outflows	.494
	(.461)		(1.417)
KAOPEN	**-.108*****	KAOPEN	**-.110*****
	(-3.37)		(-3.484)
Monetary union	.018	Monetary union	-.006
	(.120)		(-.071)
Trade balance	.087	Trade balance	.099
	(1.237)		(1.565)
R^2	.344	R^2	.399
Adjusted R^2	.145	Adjusted R^2	.216

Note: t-statistics are reported in parentheses. *, **, and * indicate statistical significance at the 99%, 95%, and 90% levels, respectively.**