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Fiscal Spending Multiplier Calculations based on Input-Output Tables – with an Application to EU Members*

Abstract

Fiscal spending multiplier calculations have been revived in the aftermath of the global financial crisis. Much of the current literature is based on VAR estimation methods and DSGE models. The aim of this paper is not a further deepening of this literature but rather to implement a calculation method of multipliers which is suitable for open economies like EU member states. To this end, Input-Output tables are used as by this means the import intake of domestic demand components can be isolated in order to get an appropriate base for the calculation of the relevant import quotas. The difference of this method is substantial – on average the calculated multipliers are 15% higher than the conventional GDP fiscal spending multiplier for EU members. Multipliers for specific spending categories are comparably high, ranging between 1.4 and 1.8 for many members of the EU. GDP drops due to budget consolidation might therefore be substantial if monetary policy is not able to react in an expansionary manner.

Keywords: fiscal spending multiplier calculation, Input-Output calculus, income-expenditure model, European Union, stimulus, consolidation

JEL classification: B22, C67, E12, E62

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Zur Berechnung fiskalpolitischer Ausgaben-Multiplikatoren in der EU mit Input-Output-Tabellen

Zusammenfassung

Fiskalpolitsche Ausgaben-Multiplikatoren haben im Gefolge der Finanzkrise wieder eine erhöhte Aufmerksamkeit erfahren. Während ein Großteil der neueren Literatur auf DSGE-Modellen und VAR-Schätzungen fußt, wird in diesem Beitrag ein anderer Berechnungsweg vorgeschlagen. Der Vorteil bei der Verwendung von Input-Output-Tabellen zur Berechnung fiskalpolitischer Ausgaben-Multiplikatoren ist darin zu sehen, dass damit eine detaillierte Abbildung des Importgehalts verschiedener Nachfragekomponenten und damit der Sickerverluste verschiedener fiskalpolitischer Ausgabenkategorien gegeben werden kann. In der herkömmlichen volkswirtschaftlichen Gesamtrechnung ist dies nicht der Fall und die berechneten fiskalpolitischen Multiplikatoren können verzerrt sein. Beispielsweise übertrifft der auf Basis der Input-Output-Rechnung kalkulierte Multiplikator den herkömmlichen Lehrbuch-Multiplikator im Fall der EU-Länder um durchschnittlich 15%. Für viele EU-Länder können so vergleichsweise hohe fiskalpolitische Ausgaben-Multiplikatoren in der Größenordnung von 1,4 bis 1,8 berechnet werden.

Schlagwörter: Fiskalpolitischer Ausgabenmultiplikator, Multiplikator, Fiskalpolitik, Input-Output-Rechnung, Europäische Union, Konjunkturpolitik, Konsolidierung

JEL-Klassifikation: B22, C67, E12, E62

1 Introduction

The purpose of this paper is to present a new calculation method for fiscal spending multipliers in open economies. The literature on the nature and the size of the fiscal spending multiplier is large and has reached divergent conclusions. There are several routes of accession to this topic among which the macroeconomic textbook introduction to the fiscal multiplier concept is just one. Only recently there has been a revival of New Keynesian literature considering the fiscal multiplier in deep demand-driven recessions.[1] In this contribution we tie in with some recent studies which revived an older debate about the fiscal spending multiplier in open economies and the special role of imports and exports in this context.[2] There are two novel aspects of this study. Firstly, we perform fiscal spending multiplier calculations based on Input-Output calculus as this method seems to be especially suitable for considering multiplier effects in open economies like EU members states. Secondly, we calculate fiscal multipliers for different spending categories which is rarely done in the literature.

The paper is structured as follows. In section 2 we introduce our method of fiscal spending multiplier calculation which controls for the effect of export induced imports. Empirical calculations based on this model are performed in section 3 for Germany and France, as well as other EU member states (at the end). In order to disentangle the relevant fractions of aggregate demand we make use of Input-Output calculus. The results thus derived are compared with values for the textbook fiscal spending multiplier. Section 4 then summarizes the results and concludes.

2 The Fiscal Spending Multiplier

The fiscal spending multiplier in the basic open economy income-expenditure model is typically calculated by assuming that private consumption C and imports M

[1] See Christiano, Rebelo, and Eichenbaum (2009), Freedman, Kumhof, et al. (2009), Erceg and Linde (2010). More neutral (with respect to theory) examples for statistical estimations of the fiscal spending multiplier include vector autoregression (VAR) estimations, such as Auerbach and Gorodnichenko (2010) and Almunia, Benetrix, et al. (2010). Furthermore, the fiscal spending multiplier can also be estimated using traditional structural macro models.

[2] See Laski, Osiatynski, and Zieba (2010) and Palley (2009). The topic is however older. Palley (2009:311) mentions early contributions from the 1970s.

are fixed fractions of GDP, denoted as cp and m, respectively.[3] Hence we have $C = cpY$ and $M = mY$, where Y denotes GDP and is given by the familiar identity $Y = C + I + G + X - M$, where I, G and X denote private investment, government spending and exports, respectively. The fiscal multiplier[4] is then given by:

$$\frac{dY}{dG} = \frac{1}{1 - cp + m}. \tag{1}$$

This multiplier can be calculated using national accounts data in a straightforward fashion by inserting $m = \frac{M}{Y}$ and $cp = \frac{C}{Y}$.

However, assuming that imports depend on GDP is not as plausible as it might seem. This assumption implies that imports are proportional to domestic absorption, i.e. $C + I + G$, on the one hand and net exports $X - M$ on the other. C, I and G all represent quantities of final goods: Assuming that some of them come from abroad or that their domestic production requires a fraction of imported inputs might be a plausible first approximation. However, $X - M$ is not a final good. It is not clear why it should be *net* exports which drive the demand for imported inputs of the export goods producing sector rather than its final output, namely X. Hence a more consistent approach would be to assume that imports of the home country are a fixed fraction m' of final demand of the home country plus goods produced at home but exported to the rest of the world, i.e. $M = m'(C + I + G + X)$. Just as m, m' can be easily calculated using national accounts data. Under this assumption the fiscal spending multiplier is given by:

$$\frac{dY}{dG} = \frac{1 - m'}{1 - cp(1 - m')}. \tag{2}$$

Since the output of final goods $C + I + G + X$ exceeds Y, $m' = \frac{M}{C+I+G+X} < m = \frac{M}{Y}$ and thus the multiplier of eq. (2) will differ from the textbook multiplier of eq. (1). Laski, Osiatynski, and Zieba (2010) argue that if the home economy is very open, i.e. if both the share of exports and imports in GDP is large, the traditional approach will underestimate the multiplier by overestimating the effect of domestic demand

[3] The average rate of private consumption cp is the result of net taxation of private income and private consumption/investment decisions.

[4] The fiscal spending multiplier of eq. (1) goes back to Samuelson (1948). Usually the textbook literature refers to marginal consumption quotas and autonomous spending categories, which we do not overtake for our paper. The calculations could be improved in this direction. For the demonstration of differences in magnitude between the different multiplier concepts applied here this is however not important.

List of symbols

$\mathbf{A}$	Input-Output matrix of domestic production,
$\mathbf{A_M}$	Input matrix of imported inputs,
AU	autonomous spending,
C	private consumption,
CO	public construction works,
cp	average rate of private consumption,
cp^*	average rate of private consumption (adjusted for means-tested benefits),
DA	domestic absorption,
fm	fiscal spending multiplier (different concepts, e.g. fm_{DA} as multiplier of DA),
G	government spending,
I	private investment,
$\mathbf{Id}$	identity matrix,
M	imports,
M_{DA}	imports induced by DA,
M_X	imports induced by X,
M_{RX}	imports for direct re-export,
m	import quota of Y (textbook concept),
m'	import quota goods produced domestically (including X),
m_{AU}	import quota of AU,
m_C	import quota of C (Input-Output concept),
m_{CO}	import quota of CO (Input-Output concept),
m_{DA}	import quota of DA (Input-Output concept),
m_G	import quota of G,
m_I	import quota of I,
m_{PC}	import quota of PC (Input-Output concept),
m_X	import quota of X (Input-Output concept),
μ_x	vector of imports used for the production of x,
PC	public consumption,
WI	welfare income,
X	exports,
x	vector of export goods (domestic production),
y_x	vector of (domestic) production induced by exports,
Y	GDP

on imports. This overestimation arises because assuming that imports are a fraction of GDP does not sufficiently account for the fact that some imports are used in the production of exported goods rather than domestically absorbed goods.

However, assuming that imports depend on exports and domestic absorption (DA) in the same way as is assumed for the derivation of eq. (2) might be too restrictive. Zeddies (2010) and Ludwig and Brautzsch (2008) provide evidence that the development of international production networks tends to reduce the fraction of the value added domestically in the value of final exported goods. This would imply that the import quota of exports might be substantially higher than the import quota of DA. To account for this evidence, we postulate the following more general model of import demand:

$$M = m_C C + m_I I + m_G G + m_X X, \tag{3}$$

where m_C, m_I, m_G and m_X denote the import quotas of private consumption, private investment, government spending and exports, respectively. These import quotas are not equal in general. For the purpose of our paper we follow Laski, Osiatynski, and Zieba (2010) at first and assume that all components of DA have the same import quota, i.e. $m_{DA} = m_C = m_I = m_G \neq m_X$, where m_{DA} is the import quota of DA.[5] Hence we have $M = m_{DA} \cdot (C + I + G) + m_X X$, implying that the fiscal spending multiplier is given by:

$$\frac{dY}{dG} = \frac{1 - m_{DA}}{1 - cp\,(1 - m_{DA})}. \tag{4}$$

Clearly, if the import quota of exported goods exceeds the import quota of DA, i.e. if $m_X > m_{DA}$, then the value of m' obtained from the data will exceed m_{DA} and thus (2) will give a downward-biased estimate of the multiplier. However, unlike m', m_{DA} cannot be calculated on the basis of national accounts data alone. In this paper we draw on information contained in the Input-Output tables to calculate the quantity of imports induced by domestic absorption M_{DA}. Since in the model we have $M_{DA} = m_{DA} \cdot (C + I + G)$, we can then calculate $m_{DA} = \frac{M_{DA}}{(C+I+G)}$.

To calculate M_{DA} we proceed as follows. The vector of export goods produced domestically in in the various industries of the economy (gross nominal value), which is denoted as x, can be written as $x = y_x - \mathbf{A} \cdot y_x$,[6] where y_x denotes the vector of

[5] In the following sections we relax this assumption and also present calculations for the specific fiscal spending multiplier of government consumption and other spending components.

[6] See Ludwig and Brautzsch (2008). For an introduction into Input-Output analysis see also Holub and Schnabl (1994:chapter 6.4).

output in the various industries induced by the production of export goods (including the value of imports used in the production process, though), $\mathbf{A}$ is the Input-Output matrix of domestic production and the negative term $-\mathbf{A} \cdot y_x$ secures that inputs are not double counted. Both $\mathbf{A}$ and x can be obtained from the Input-Output tables. Next we solve for y_x:

$$y_x = (\mathbf{Id} - \mathbf{A})^{-1} \cdot x,$$

where $(\mathbf{Id} - \mathbf{A})^{-1}$ denotes the Leontief inverse and $\mathbf{Id}$ the identity matrix. We now use y_x and the Input-Output matrix for imported inputs $\mathbf{A_M}$, which is also part of the Input-Output tables, to calculate the vector of imports used for the production of exported goods μ_x:

$$\mu_x = \mathbf{A_M} \cdot y_x. \tag{5}$$

Summing up all the entries of μ_x yields the value of imported goods used in the production of exports, M_X. Hence we can calculate M_{DA}[7]:

$$M_{DA} = M - M_X - M_{RX},$$

substracting also the value of imports used for direct re-export (M_{RX}) and we can calculate the import quota of DA:

$$m_{DA} = \frac{M_{DA}}{(C + I + G)}.$$

For the purpose of our study it is interesting that eq. (3) can be modified in order to calculate multipliers of specific categories of government spending. To this end we have to drop the assumption $m_{DA} = m_C = m_I = m_G$ and use specific (generally unequal) import quotas of the different spending categories, e.g. the import quota m_{CO} of public construction works (CO). If this is inserted into the equation determining equilibrium GDP (resulting from the multiplier process):

$$Y = cpY + AU + CO - m_C \cdot cpY - m_{CO}CO - m_{AU}AU, \tag{6}$$

where AU denotes autonomous (or exogenous) spending components and m_{AU} their import quota, then a derivation by CO yields the specific multiplier, e.g. of public

[7] Some of the imported goods are used for direct re-export. These do not show up in eq. (2) and (5). However, they are accounted for in the ensuing calculations and hence they are not included in the import quota of DA.

construction works:

$$\frac{dY}{dCO} = \frac{1 - m_{CO}}{1 - cp\,(1 - m_C)}. \tag{7}$$

Spending multipliers for other components of public spending can be derived similarly. In the following we will proceed with the calculation of the DA multiplier and more specific spending multipliers.

3 Calculation of Fiscal Spending Multipliers

We now apply the fiscal spending multiplier calculation method which we introduced above. For reasons of clarity we first perform the multiplier calculation only for two countries, namely Germany and France. Furthermore, to check the stability of results we focus on the evolution of the multiplier over time. Apart from calculating the multiplier of general government spending in subsection 3.1., we also compute the output effects of changing three subcategories of government spending: government consumption, government construction expenditure and welfare expenditures. The Input-Output tables contain data allowing us to compute the import propensities of these components of domestic absorption.

Government consumption (the value of goods produced by the state except investment, mainly education and social services) is by far the largest fraction of government spending – the percentage of GDP in the time span from 2000 till 2009 was 19% in Germany and 23% in France. Multipliers for government consumption are calculated in subsection 3.2.

Government investment is less important in size than government consumption – its mean value from 2000 till 2009 was 1.6% of GDP in Germany whereas it was 3.2% of GDP in France. However, public investment is highly relevant as a means of fiscal stimulus because it can be easily reverted (which is probably more complicated for reasons of politics in the case of public consumption). Figures for this spending category are not available in Input-Output tables, which do not distinguish between private and public investment. As a proxy, we calculate instead the multiplier of construction investment. This will be done in subsection 3.3.

Before we proceed to calculate fiscal spending multipliers for those EU member states, for which Input-Output tables are available, in the last subsection 3.5., in subsection 3.4. we will also calculate a fiscal multiplier for welfare spending.

3.1 The General Government Spending Multiplier

In this subsection we demonstrate the crucial difference of the fiscal spending multiplier based on Input-Output calculus as compared to the textbook fiscal spending multiplier. To this end we compare the values of the textbook multipliers with the DA multipliers as introduced above for the two largest economies in the Eurozone, i.e. Germany and France (empirical results for other EU states are given in subsection 3.5.). This also includes a calculation of spending multipliers for consecutive years to check for stability of results. The comparison starts with the DA concept which we introduced above. Below, we proceed with more specific spending categories of DA.

Table 1: Import quotas (m: textbook concept, m_{DA}: DA concept) and multipliers (fm: textbook concept, fm_{DA}: DA concept) for Germany and France; Source: Eurostat, own calculations

	Germany				France			
	Textbook		DA concept		Textbook		DA concept	
	m	fm	m_{DA}	fm_{DA}	m	fm	m_{DA}	fm_{DA}
2000	0.31	1.37	0.19	1.52	0.26	1.43	0.18	1.53
2001	0.30	1.38	0.18	1.55	0.26	1.45	0.18	1.54
2002	0.29	1.40	0.17	1.58	0.24	1.48	0.17	1.57
2003	0.29	1.40	0.17	1.59	0.23	1.51	0.17	1.59
2004	0.31	1.36	0.18	1.56	0.24	1.49	0.17	1.57
2005	0.33	1.32	0.19	1.53	0.26	1.46	0.18	1.55
2006	0.37	1.24	0.20	1.47	0.27	1.44	0.18	1.53
Decrease from peak		11%		8%		5%		3%

Table 1 shows a certain degree of volatility of multipliers thus calculated. From their peak values in 2002 and 2003, respectively, the conventional multiplier and the multiplier of DA for Germany have decreased by 11% and 8% in 2006. For France, these decreases are somewhat lower, 5% and 3%. We argue that this volatility partly stems from shifts in GDP composition in the considered time frame. For example, Germany experienced a strong increase of export demand after 2000. Accordingly, a contributing source of a decreasing textbook multiplier might be a relatively high import intake of exports. In the case of the DA multiplier a high import intensity of investment – highly volatile in the business cycle – might play a role in explaining volatility. In line with this, peak values of the DA multipliers for Germany and France can be found for 2003, close to a business cycle trough, decreasing afterwards.

There are pros and cons for considering the DA multiplier as a relevant concept for economic policy. Here we can make reference to the German example, an economy which shows a high degree of specialization in manufacturing of motor vehicles and investment goods. If world demand for the latter category of goods plummets, it is doubtful that the state steps in and buys machinery for the production of private goods. Actually what Germany experienced after the financial crisis hit in 2008 was higher public investment in construction and subsidies for the private purchase of new cars. Thus, not every component of private spending is subject to state activity in a recession but some might well be, for which the car purchase subsidy is an example.

3.2 The Spending Multiplier of Government Consumption

As a first more specific fiscal spending multiplier we shall calculate fiscal spending multipliers for government consumption which include specific import intensities of the aggregate demand components. To this end we relax the assumption $m_{DA} = m_C = m_I = m_G$ and replace it by the more general case of eq. (3). For the calculation of public consumption multipliers only the values of m_C and m_{PC} are relevant where PC denotes public consumption (the derivation is however similar to the DA multiplier). These values can be obtained with the same method as used above for the calculation of the import intensity of exports. In Table 2 we have listed results for the public consumption multipliers of Germany and France.

What can be seen from Table 2 is that the multipliers of public consumption show a lower degree of volatility especially for Germany (see Table 1 for comparison). During the last business cycle they have decreased by 5% in Germany and 3% in France. This development might reflect changes of consumption spending patterns in the business cycle (the German average rate of private consumption *cp* decreased by 1% from 2003 to 2006) or other sources like a higher weight of imported goods in public and private consumption due to globalisation. However, the variation is fairly limited. In general the values of public consumption multipliers seem to be higher than the multipliers of DA and the textbook fiscal spending multipliers introduced earlier.

Table 2: Import quotas (m_{PC}) and multipliers (fm_{PC}) of public consumption for Germany and France; Source: Eurostat, own calculations

	Germany		France	
	m_{PC}	fm_{PC}	m_{PC}	fm_{PC}
2000	0.08	1.73	0.08	1.70
2001	0.08	1.74	0.08	1.70
2002	0.08	1.75	0.08	1.71
2003	0.08	1.76	0.08	1.72
2004	0.08	1.74	0.08	1.71
2005	0.08	1.71	0.09	1.69
2006	0.09	1.68	0.09	1.68
Decrease from peak		5%		3%

3.3 The Multiplier of Government Spending on Construction

The Input-Output tables do not distinguish between public and private investment. As a proxy we therefore compute the multiplier of overall construction investment. On this base an import quota of construction and a multiplier can be calculated as introduced above. Values for Germany and France are shown in Table 3, where also the import quota of construction expenditure is shown (m_{CO}).

Table 3: Import quotas (m_{CO}) and multipliers (fm_{CO}) of construction for Germany and France; Source: Eurostat, own calculations

	Germany		France	
	m_{CO}	fm_{CO}	m_{CO}	fm_{CO}
2000	0.06	1.76	0.06	1.73
2001	0.06	1.78	0.06	1.74
2002	0.06	1.79	0.06	1.75
2003	0.06	1.79	0.06	1.76
2004	0.06	1.78	0.06	1.75
2005	0.06	1.75	0.07	1.73
2006	0.07	1.72	0.07	1.72
Decrease from peak		4%		3%

What can be seen from Table 3 is that construction multipliers are slightly higher than multipliers of public consumption. However, usually much of construction work in European high income countries is done by companies, subcontractors and workers from abroad. Therefore the average rate of private consumption which we used for the calculation of the multiplier might be too high in this case due to remittances of foreign workers to their home countries. Thus, the calculated multipliers indicate the upper margin in this case. This would bias the computation of the multiplier upwards.

3.4 The Multiplier of Government Spending on Welfare

As a last example of specific fiscal spending multipliers we want to calculate a fiscal multiplier for welfare spending. In order to do this we use means-tested benefits data supplied by Eurostat as one item for which we can reasonably assume a consumption quota out of welfare income (WI) of 100%. This however implies that we cannot keep up our initial assumption of an average rate of private consumption in eq. (7) which is why we calculate a rate of private consumption cp^* net of effects due to welfare-induced consumption:

$$cp^* = \frac{C - WI}{Y - WI}, \tag{8}$$

which is the consumption quota out of income not supplied by welfare ($Y - WI$).[8] This consumption quota is lower than cp and contributes to lower multipliers of welfare spending. Another factor contributing to lower welfare spending multipliers is a higher leakage due to imports in the first spending round as the import quota of private consumption is generally higher than the import quota of public consumption or construction.

Results for Germany and France are shown in Table 4 (where m_C denotes the import quota of private consumption). Cyclicality of welfare spending multipliers is somewhat higher than the figures for the fiscal spending multiplier of public consumption (table 2) and construction (table 3) as the last line of Table 4 shows. Welfare spending multipliers were highest in the business cycle trough 2003 (as with the other multipliers introduced earlier) and decreased thereafter.

[8] The relevant size of consumption for this quota is consumption net of consumption by welfare recipients ($C - WI$) in the nominator of eq. (8).

Table 4: Import quotas of private consumption (m_C) and multipliers of welfare spending (fm_{WI}) for Germany and France; Source: Eurostat, own calculations

	Germany		France	
	m_C	fm_{WI}	m_C	fm_{WI}
2000	0.19	1.50	0.19	1.46
2001	0.19	1.51	0.19	1.46
2002	0.18	1.53	0.19	1.48
2003	0.18	1.53	0.18	1.49
2004	0.18	1.51	0.19	1.48
2005	0.19	1.47	0.20	1.45
2006	0.20	1.44	0.20	1.43
Decrease from peak		6%		4%

3.5 Fiscal Spending Multipliers for EU Members

Calculations of fiscal spending multipliers for EU members in 2005 are shown in Table 5 (most EU members supply Input-Output tables at least every five years).[9] These include the textbook multiplier, the DA concept and more specific spending multipliers which we have introduced earlier. The latter are especially interesting as different member states of the EU are facing different pressures to government spending, e.g. the high debt consolidation countries face a different situation as compared to Germany or France.

The effects of refinements of multiplier calculation beyond the textbook concept are quite substantial, as can be seen from Table 5. In all European countries, for which Input-Output tables are available, the DA multiplier is higher than the textbook fiscal spending multiplier. The average increase of the multiplier as compared to the textbook multiplier amounts to approximately 15% (not weighted). Furthermore, the values of public consumption multipliers are higher than the DA multipliers. The reason might be that especially investment goods, which are part of DA and GDP in any case, have a global market with the result of a higher import quota for these goods. Construction multipliers are the highest in most cases (except Greece, Ireland

[9] ISO Country codes are AT: Austria, BE: Belgium, CZ: Czech Republic, DE: Germany, ES: Spain, EO: Estonia, FR: France, GR: Greece, HU: Hungary, IE: Ireland, IT: Italy, LT: Lithuania, PL: Poland, PT: Portugal, RO: Romania, SE: Sweden, SI: Slovakia.

Table 5: Average rates of private consumption (cp), import quotas (m: textbook concept, m_{DA}: DA concept, m_{PC}: import quota of public consumption, m_{CO}: import quota of construction, m_C: import quota of private consumption) and multipliers (fm: textbook concept, fm_{DA}: DA concept, fm_{PC}: multiplier of public consumption, fm_{CO}: multiplier of construction, fm_{WI}: multiplier of welfare spending) for EU members in 2005; Source: Eurostat, own calculations

		Textbook		DA concept		PC concept		Construction		Welfare	
	cp	m	fm	m_{DA}	fm_{DA}	m_{PC}	fm_{PC}	m_{CO}	fm_{CO}	m_C	fm_{WI}
AT	0.57	0.48	1.10	0.25	1.30	0.12	1.57	0.09	1.61	0.24	1.33
BE	0.51	0.74	0.81	0.28	1.13	0.12	1.39	0.10	1.41	0.29	1.12
CZ	0.49	0.69	0.83	0.34	0.97	0.19	1.21	0.14	1.29	0.33	1.00
DE	0.58	0.33	1.32	0.19	1.53	0.08	1.71	0.06	1.75	0.19	1.47
ES	0.61	0.30	1.44	0.21	1.54	0.11	1.72	0.08	1.77	0.21	1.50
EO	0.60	0.81	0.82	0.39	0.97	0.18	1.34	0.15	1.39	0.35	1.07
FR	0.57	0.26	1.46	0.18	1.55	0.09	1.69	0.07	1.73	0.20	1.45
GR	0.76	0.30	1.85	0.22	1.90	0.09	2.26	0.11	2.21	0.22	1.92
HU	0.57	0.67	0.91	0.29	1.18	0.15	1.44	0.12	1.48	0.28	1.21
IE	0.45	0.70	0.81	0.30	1.03	0.14	1.27	0.16	1.23	0.30	1.00
IT	0.60	0.25	1.54	0.18	1.62	0.07	1.81	0.06	1.84	0.19	1.57
LT	0.65	0.65	1.00	0.32	1.24	0.13	1.54	0.08	1.63	0.33	1.19
PL	0.64	0.36	1.37	0.24	1.49	0.09	1.82	0.07	1.86	0.21	1.57
PT	0.67	0.36	1.45	0.24	1.58	0.09	1.85	0.11	1.81	0.25	1.51
RO	0.70	0.44	1.34	0.29	1.42	0.18	1.74	0.10	1.91	0.24	1.59
SE	0.47	0.37	1.12	0.22	1.22	0.11	1.40	0.06	1.47	0.23	1.21
SI	0.58	0.63	0.95	0.33	1.11	0.15	1.43	0.14	1.44	0.30	1.16

and Portugal). Welfare multipliers are below government consumption multipliers, but in most cases well above one (except Czech Republic, Estonia and Ireland).

Some empirical conclusions can be drawn for the prospect of budget consolidation in the EU. First, the spending component with the highest multiplier in most countries is construction. Thus, if fiscal stimulus is withdrawn in the construction sector, there might be substantial negative impulses to GDP. Effects are probably especially high for less developed EU members due to lower involvement of construction companies from abroad. Cutbacks in government investment are probably only the smaller part in countries with high budget consolidation needs. In these cases a look on the other fiscal spending multipliers is interesting. In most countries the multiplier of public consumption is almost as high as the construction multiplier. Thus, there is a

risk of a considerable effect of budget consolidation on GDP even if it is not driven by reductions in public investment. For example, this is the case for France and Germany with public consumption multipliers in the magnitude of approximately 1.7. Greece, Spain and Portugal as countries under pressure of financial markets also reveal relatively high multipliers of approximately 2.3, 1,7 and 1.9, respectively (less so Hungary with a public consumption multiplier of 1.4). By contrast, the multipliers of welfare spending are generally lower due to higher leakage effects in the first spending round implied by the import propensity of private consumption.

Finally, our calculations suggest that fiscal consolidation might involve substantial output losses even in small and very open economies. As can be seen from Table 2, the case is slightly different for countries like the Czech Republic and Ireland with rather low fiscal spending multipliers.

4 Conclusion

The aim of this contribution is a reconsideration of the fiscal spending multiplier calculation for open economies. Our concept of fiscal multiplier calculation is based on Input-Output calculus. Calculations for EU member states show that the textbook fiscal spending multiplier – which was developed in a time of less open economies as compared to the situation today – is not suitable under conditions of open economies. For example, the relatively high import intake of exports in EU member states leads to a fiscal spending multiplier of domestic absorption which is on average 15% higher than the textbook fiscal spending multiplier.

Furthermore, the Input-Output calculus enables us to look at multipliers for different spending categories. Some interesting conclusions can be drawn from these calculations for the judgement of fiscal stimulus and budget consolidation in the EU. Firstly, the fiscal spending multiplier for construction is the highest for many EU members, ranging between 1.3 and 2.2. Secondly, also for fiscal spending on public consumption we could find rather large multipliers, ranging from 1.2 to 2.3. Thirdly, multipliers for welfare spending are low in comparison with other spending multipliers, ranging from 1.0 to 1.9. Furthermore, it is interesting to note that smaller EU members can have large fiscal spending multipliers, especially in the case of multipliers for construction and public consumption. Thus, fiscal consolidation is not going to be an easy walk just because of the smallness of domestic markets.

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