Calculating the multipliers within the Eurozone
Calculations based on Input-Output Tables
PKSG Keynes Seminar

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Outline

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Introduction

Some of my inspirations for this contribution:

- Input-Output researchers at my institute (Ludwig and Brautzsch 2008), reacting to the Bazaar Economy debate in Germany (launched by Sinn)

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- Input-Output researchers at my institute (Ludwig and Brautzsch 2008), reacting to the Bazaar Economy debate in Germany (launched by Sinn)
- Two rather recent contributions considering the fiscal spending multipliers by Polish (Laski et al. 2010) and US (Palley 2009) researchers
- A general comeback of fiscal policy after the World Financial Crisis

Introduction 2

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- Today Input-Output analysis is applied by researchers around the world, especially in Asia and the Netherlands.
- Examples: Analysis of sectoral policies (e.g. R&D), tax policy, regional policy issues

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- 1st problem of many studies: linear approximation of fiscal spending multipliers (the same in booms as in downturns) which is unrealistic for a number of reasons
- 2nd problem of many studies: macro data, only implicitly is the production structure reflected

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Assumptions:

- based on familiar accounting identity:
  $Y = C + I + G + \mathbf{X} - \mathbf{M}$
- marginal consumption and import quota: c, m

Input-Output tables

$$\text{Domestic Input-Output table} = \begin{pmatrix} a_{1,1} & \dots & a_{1,n} & D_1 \\ \dots & \dots & \dots & \dots \\ a_{n,1} & \dots & a_{n,n} & D_n \\ OC_1 & \dots & OC_n & 0 \end{pmatrix}$$

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- nominal values
- vertical $a_{.,j}$: absorbing sector (Inputs...)
- horizontal $a_{i,.}$: delivering sector (Outputs...)
- $a_{i,j}$ input of good i for production of good j
- D_i: final demand of good i (Outputs)
- OC_j: other costs for production of good j (incl. value added)

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Import matrix M: entries $m_{i,j}$, final demand, no other costs

Input-output multiplier: Domestic Absorption

1st step: Domestic absorption $DA = C + I + G$

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Calculation of M_X, M_{DA} **and** Δ_{DA}**:**

$$
\begin{aligned}
x &= y_x - \mathbf{A} \cdot y_x, \\
y_x &= (\mathbf{Id} - \mathbf{A})^{-1} \cdot x, \\
\mu &= \mathbf{A_M} \cdot y_x, \\
M_X &= \sum_{i=1}^{n} \mu_i, \\
M_{DA} &= M - M_X \\
\Delta_{DA} &= \frac{1 - m_{DA} \left[= \frac{M_{DA}}{DA} \right]}{1 - c\,(1 - m_{DA})}
\end{aligned}
$$

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Textbook and DA multipliers

	Germany				France			
	Textbook		DA concept		Textbook		DA concept	
	m	*mult*	m_{DA}	*mult*	m	*mult*	m_{DA}	*mult*
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
2007	0.37	1.22	0.20	1.44	0.27	1.43	0.19	1.52
max. decrease		13%		9%		5%		4%

Table: Import quotas and multipliers for Germany and France; Source: Eurostat, own calculations

Government consumption multipliers

	Germany			France		
	c	m_{PC}	$mult$	c	m_{PC}	$mult$
2000	0.57	0.08	1.73	0.57	0.08	1.70
2001	0.58	0.08	1.74	0.57	0.08	1.70
2002	0.58	0.08	1.75	0.57	0.08	1.71
2003	0.58	0.08	1.76	0.57	0.08	1.72
2004	0.58	0.08	1.74	0.57	0.08	1.71
2005	0.58	0.08	1.72	0.57	0.09	1.69
2006	0.57	0.09	1.67	0.57	0.09	1.68
2007	0.55	0.09	1.64	0.57	0.09	1.67
max. decrease			7%			3%

Table: Private consumption quotas, import quotas and public consumption multipliers for Germany and France

Construction spending multipliers

	Germany		France	
	m_{CO}	*mult*	m_{CO}	*mult*
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	1.76	0.07	1.73
2006	0.06	1.72	0.07	1.72
2007	0.06	1.69	0.07	1.71
max. decrease		6%		3%

Table: Import quotas and multipliers of construction for Germany and France

Welfare spending multipliers

	Germany		France	
	m_{Cp}	*mult*	m_{Cp}	*mult*
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	1.43	0.20	1.43
2007	0.20	1.41	0.20	1.42
max. decrease		8%		5%

Table: Import quotas and multipliers of welfare spending for Germany and France

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Different spending multipliers for EU member states

		Textbook		DA concept		PC concept		Construction		Welfare	
	c	m	$mult$	m_{DA}	$mult$	m_{PC}	$mult$	m_{CO}	$mult$	m_{Cp}	$mult$
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

Table: Consumption quotas, import quotas and multipliers in 2005

Different spending multipliers for EU member states

		Textbook		DA concept		PC concept		Construction		Welfare	
	cp	*m*	*mult*	m_{DA}	*mult*	m_{PC}	*mult*	m_{CO}	*mult*	m_{Cp}	*mult*
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

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Thank you for comments, discussion and for the invitation.