Aizenman, Joshua; Jinjarak, Yothin

Working Paper

De facto fiscal space and fiscal stimulus: Definition and assessment

Working Paper, No. 10-20

Provided in Cooperation with:
University of California Santa Cruz, Santa Cruz Institute for International Economics (SCIIE)

Suggested Citation: Aizenman, Joshua; Jinjarak, Yothin (2010) : De facto fiscal space and fiscal stimulus: Definition and assessment, Working Paper, No. 10-20, University of California, Santa Cruz Institute for International Economics (SCIIE), Santa Cruz, CA

This Version is available at:
https://hdl.handle.net/10419/64071

November, 2010

De facto Fiscal Space and Fiscal Stimulus: Definition and Assessment

Joshua Aizenman [UCSC and the NBER] and Yothin Jinjarak [University of London]

Abstract

We define the notion of '*de facto* fiscal space' of a country as the outstanding public debt relative to the *de facto* tax base, where the latter measures the realized tax collection, averaged across several years to smooth for business cycle fluctuations. We apply this concept to account for the cross-country variation in the fiscal stimulus associated with the global crisis of 2009-2010. We find that greater *de facto* fiscal space prior to the global crisis, higher GDP/capita, higher financial exposure to the US, and higher inflation were associated with a higher fiscal stimulus/GDP during 2009-2010. Intriguingly, higher trade openness has been associated with lower fiscal stimulus.

Joshua Aizenman
Economics, E2
Santa Cruz
CA, 95064
jaizen@ucsc.edu

Yothin Jinjarak
College Buildings, 534
London, WC1H 0XG
yj5@soas.ac.uk

Keywords: Fiscal space, fiscal stimulus, trade openness
JEL Classification: E62, F42

1. Introduction

The dire outlook of the global economy in the second half of 2008 propagated unprecedented fiscal expansions of most OECDs and emerging-market countries. The resultant fiscal stimulus focused attention on the degree to which countries possess 'fiscal space' and on ways to apply it in a counter-cyclical manner. A frequent concern about 'fiscal space' is the lack of clarity about it. In attempts to clarify this fuzzy concept, Heller (2005) defined it "*as room in a government's budget that allows it to provide resources for a desired purpose without jeopardizing the sustainability of its financial position or the stability of the economy*." Our paper aims at defining a measurable 'fiscal space' variable, and applies this concept in the context of the global crisis.

To proceed, we define the *de facto* fiscal space of a country at a given time by the outstanding public debt relative to the *de facto* tax base, where the latter is constructed to measure the realized tax collection, averaged across several years to smooth for business cycle fluctuations. We apply these concepts in order to explain the cross-country variation in the fiscal stimulus during the aftermath of the global crisis.

2. Assessment of the *de facto* fiscal space prior to the crisis (2000-2006), and the cross-country variation in the fiscal stimulus, 2009-10

Insight regarding fiscal space may be provided by tracing the pre-crisis, 2006 public debt as a fraction of the pre-crisis average tax revenue during 2000-2006. To recall, the early 2000s were viewed as the continuation of the blissful "Great Moderation" – a period characterized by the drop in macroeconomic volatility and risk premium during the late 1990s and early 2000s.[1] The pre-crisis tax revenue measures the *de facto* tax capacity in years of relative tranquility. The presumption is that a lower pre-crisis public debt relative to the pre-crisis tax base implies greater fiscal capacity to fund stimuli using the existing tax capacity. Similarly, lower average

[1] See Stock and Waston (2002) for analysis of the Great Moderation hypothesis. Recent observers refer to 1987- 2007 as the "Great Moderation" period.

fiscal deficits relative to the average tax revenue during 2000-2006 may suggest greater fiscal space at the on-set of the crisis. Figures 1a and 1b report these measures, subject to data availability. Noticeable is the wide variation in the *de facto* fiscal space, from well below 1 in Australia, to more than 6 in Brazil, and above 10 in Madagascar. For most of the countries in our sample, the *de facto* fiscal capacity reported in 2006 was below 2.8 (see Figure 1a). These figures are consistent with the notion that, even without increasing the tax base, a fair share of countries had significant fiscal space in 2006.[2]

Figure 2 summarizes the averages of these measures for the low, lower-middle, upper middle, and high-income countries. The figure suggests that in 2006, the middle-income countries' fiscal space had been high relative to low income countries. While the debt overhangs [2006 public debt/GDP] of the low and lower middle income countries are slightly above the other groups, their ratio to the tax base is much higher than that of the upper middle income and the OECD countries. This in turn implies that the low and lower middle income countries may have more limited fiscal space than the upper middle income and the OPEC countries. Consequently, the fiscal stimuli of the richer countries would have the side benefit of helping the poorer countries in invigorating the demands facing lower income countries.

Table 1 overviews the crisis related fiscal stimulus/GDP, 2009-2010, subject to data availability. The crisis propagated a significant fiscal stimulus in the USA, Japan, and Germany, the magnitude of which increased from 2009 to 2010, reflecting various lags associated with fiscal policy. It also induced massive "bailout" transfers to the banking systems in the USA, Germany and the UK, attempting to stabilize the financial panic. It is noteworthy that in Germany and the UK the size of the transfers to the financial systems exceeded the fiscal stimulus to the non-financial sector. Similar trends, though in varying intensity, were observed in emerging markets. China, South Korea and Russia provided front loaded fiscal stimulus at rates that were well above the one observed in the OECD countries. Notable is the greater agility of the emerging markets' response relative to that of the OECD countries, reflecting possibly a

[2] This inference is in line with Aizenman and Pasricha (2010), finding that the projected flow cost of public debt is low for about half of the OECD countries. See Aizenman and Jinjarak (2009) for a study accounting for the cross country variation in the *de facto* tax base.

faster policy response capacity of several emerging markets.[3] This observation is remarkable considering the earlier evidence of the fiscal pro-cyclicality observed in emerging markets and developing countries during the 1980s-90s [see Kaminsky, Reinhart and (2005)].

Table 3 reports the regression analysis, accounting for the cross-country variation in the fiscal stimulus during 2009-10, in 64 countries, chosen based on data availability. The explanatory variables are the *de facto* fiscal space, GDP per capita, trade openness, inflation, and measures of the financial exposure to the US. GDP per capita (PPP, thousands) and Trade/GDP (percentage) are 2000-06 averages. Inflation (GDP deflator, percentage) is averaged from 1995-2006. The financial exposure to USA is the position of each country in 2006, obtained from the US Treasury International Capital System (TIC): 'assets' is foreign portfolio holdings of USA securities, and 'total' is 'assets' plus USA portfolio holdings of foreign securities. To account for potential correlation among countries in each geographic region, the estimation is done with clustering at a regional level, based on the World Bank's geographic classification. As shown, the regression analysis explains about half of the variations across countries in crisis-related fiscal stimulus, and in the stimulus plus net cost of financial sector support. The coefficient estimates are all statistically significant, indicating that a greater *de facto* fiscal space, higher GDP/capita, higher financial exposure to the US, lower trade openness, and higher inflation were positively associated with fiscal stimulus/GDP during 2009-2010.[4]

We provide in Figure 3 the economic significance of the cross-country estimates in regression 2, Table 3. For each explanatory variable, we multiply its standard deviation with the estimated coefficient in the regression, to approximate the effect of its one standard deviation change on the size of fiscal stimulus. The calculation suggests that the size of the stimulus in 2009-10 is larger in countries with higher income, smaller trade openness, larger *de facto* fiscal

[3] The deeper safety net of the OECD [unemployment insurance, food stamps, social security, socialized medical care, etc.] provides automatic stabilizers that work to cushion the economy in addition to the crisis related stimulus.

[4] The results in regression (4) imply that the positive association of *de facto* fiscal space with the fiscal stimulus is stronger in lower GDP/Capita countries.

space, and greater financial exposure to the USA. For the *de facto* fiscal space measure, a decrease in the public debt/tax revenue by 1.7 [from that of the lower middle income group (3.6) to that of the high income OECD group (1.9)] implies, other things being equal, an increase in the fiscal stimulus during the crisis by 15.8*1.7 = 27 basis points, or 0.27 percent of GDP.[5]

3. Concluding remarks

Our analysis shows the usefulness of the *de facto* fiscal space concept in accounting for the size of fiscal stimulus. Intriguingly, we found that higher trade openness had been associated with a lower fiscal stimulus. A possible interpretation is that, as fiscal multipliers may be lower in more open economies, these countries opted for a smaller fiscal stimulus, putting greater weight on adjustment via exchange rate depreciation ('exporting their way to prosperity'). If this interpretation is valid, it suggests gains associated with greater fiscal coordination among countries. A coordinated fiscal stimulus may generate positive spillover effects, mitigating the reliance on competitive depreciations.

[5] We also run a regression using the flow fiscal space (fiscal deficit/tax revenue in Table 2). The coefficient estimate of this second measure is statistically insignificant in the fiscal stimulus equation. The public debt/tax revenue provides therefore a better measure of fiscal space than the fiscal deficit/tax revenue variable.

References

Aizenman J. and G. Pasricha. (2010) “Fiscal Fragility: What the Past may say about the Future,” NBER Working paper # 16478, September.

Aizenman, J. and Y. Jinjarak. (2009) “Globalisation and Developing Countries - a Shrinking Tax Base?“ *Journal of Development Studies*, 45 (5). pp. 653-671.

Fiscal Monitor. (2010) “Navigating the Fiscal Challenges Ahead,” Fiscal Affairs Department, IMF.

Heller, S. P. (2005) “Back to Basics -- Fiscal Space: What It Is and How to Get It,” *Finance and Development*, 42, 2.

Kaminsky, G. L., C. M. Reinhart and C. A. Végh. (2005) “When It Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies,” *NBER Macroeconomics Annual* 2004, 19.

Stock J. H. and M. W. Watson (2002). "Has the Business Cycle Changed and Why?" *NBER Macroeconomics Annual* Vol. 17, pp. 159-218.

Table 1: Fiscal stimulus, financial sector support, and government expenditures.

This table reports crisis-related fiscal stimulus/GDP, net cost of financial sector support/GDP, and government expenditures/GDP [G/Y] from 2000-09 (all in annual percentage). For USA, the difference of G/Y between 2008 and 2009 = 5.4 percent, consisting of 1.8 percent of crisis-related fiscal stimulus and 3.6 percent of financial sector support. While the matching of data is less precise for other countries, the reported G is inclusive of transfers and bailouts to banks, and does not match the G in GDP accounts [which is the base of Y]. Hence, in understanding the aggregate demand equation where G + C + I + NX = Y, 'G' in the equation is not the G reported below; the bailout, beyond a transfer, does not increase aggregate demand directly.

Sources: Authors' calculation from IMF Fiscal Monitor (2010, May) and WEO (2010, April).

Country		Crisis-Related Fiscal Stimulus/GDP		Net Cost of Financial Sector Support/GDP	Government Expenditures/GDP			
					Total		Transfers	
		2009	2010	2009	2000-2007	2008-09	2000-2007	2008-09
Industrial Countries	Australia	2.8	1.8	-0.1	34.3	35.9	3.1	3.1
	Canada	1.8	1.7	4.4	40.1	42.0	7.6	7.9
	France	1.0	.5	0.3	52.6	54.7	23.9	25.0
	Germany	1.5	2.1	4.8	46.5	46.5	18.8	18.1
	Japan	2.8	2.2	0.1	35.6	38.3	15.3	18.0
	Norway	1.2	..	..	42.8	43.4	13.7	12.8
	Sweden	1.4	..	..	52.5	53.0	17.7	17.1
	Switzerland	.6	..	..	35.8	36.2	10.4	9.9
	United Kingdom	1.6	.2	5.4	39.1	45.8	11.2	11.5
	United States	1.8	2.9	3.6	34.4	40.9	8.7	10.6
Euro Area	Austria	1.5	.3	..	51.1	51.0	24.1	24.9
	Belgium	1.0	..	..	49.7	52.6	18.6	20.8
	Denmark	1.9	3.1	..	53.6	54.6	2.8	1.8
	Finland	3.3	..	..	44.1	48.3	12.5	14.5
	Greece	..	..	..	44.7	50.2	15.9	20.4
	Ireland	..	..	..	32.9	44.4	6.6	9.4
	Italy	.0	.1	0.3	47.8	50.6	19.4	21.5
	Netherlands	1.4	..	..	45.6	48.6	14.9	16.6
	Portugal	1.3	..	..	45.4	48.2	12.6	15.5
	Spain	3.7	..	..	38.7	44.4	10.4	12.1
Emerging Markets	Argentina	1.5	.0	..	27.2	34.9	5.5	6.9
	Brazil	.7	.6	..	38.9	38.5	6.4	7.0
	China	3.1	2.7	..	18.5	22.3	..	..
	Czech Republic	1.6	..	..	44.5	44.3	12.4	13.4
	India	.6	.4	..	27.3	29.7	..	..
	Indonesia	1.1	.6	..	19.5	18.6	..	..
	Mexico	1.5	1.0	..	22.5	25.5	..	..
	Russia	4.5	2.8	..	33.3	37.9	8.9	10.6
	South Korea	3.6	1.1	0.1	20.0	23.1	..	..
	Thailand	..	..	..	20.6	22.7	..	..

Table 2: *De facto* Fiscal Space.

This table reports the measures of fiscal space based on 2000 to 2006 data. The denominator, Tax, is average tax revenue/GDP from 2000-06. Public Debt is public debt/GDP as of 2006. Fiscal Deficit is average fiscal deficit/GDP from 2000-06. All variables are deflated by 2006 CPI.

* denotes countries included in regression analysis.

Source: Authors' calculation from the World Development Indicators.

Income Group	Country	iso		Tax revenue avg. 2000-06 (I)	Publid debt 2006 (II)	Fiscal space 1 (II)/(I)	Fiscal deficit avg. 2000-06 (III)	Fiscal space 2 (III)/(I)	Income Group	Country	iso		Tax revenue avg. 2000-06 (I)	Publid debt 2006 (II)	Fiscal space 1 (II)/(I)	Fiscal deficit avg. 2000-06 (III)	Fiscal space 2 (III)/(I)
A. Low Income	Afghanistan	AFG		.06	.10	1.61	5.10	.86	D. High Income Non OECD	Bahamas, The	BHS		.15	.35	2.37	-7.37	-.50
	Bangladesh	BGD	*	.08	.35	4.50	3.85	.49		Bahrain	BHR		.03	.24	6.99	3.10	.92
	Kyrgyz Republic	KGZ	*	.14	1.15	8.22	-4.80	-.34		Cyprus	CYP	*	.31	1.71	5.55	-17.07	-.55
	Madagascar	MDG	*	.10	1.03	10.20	-6.70	-.66		Estonia	EST	*	.20	.05	.25	-3.31	-.17
	Tajikistan	TJK	*	.11	1.03	9.11	-2.98	-.26		Latvia	LVA	*	.14	.12	.90	3.42	.25
	Uganda	UGA	*	.11	.58	5.46	4.10	.39		Malta	MLT	*	.26	.76	2.92	-2.86	-.11
B. Lower Middle Income	Bhutan	BTN	*	.09	.63	7.03	.97	.11		Oman	OMN		.07	.19	2.80	9.71	1.43
	Congo, Rep.	COG	*	.07	.00	.03	6.14	.84		San Marino	SMR		.22	.62	2.88	2.33	.11
	Côte d'Ivoire	CIV	*	.14	.95	6.89	-6.07	-.44		Singapore	SGP		.13	.88	6.61	-3.08	-.23
	El Salvador	SLV	*	.12	.43	3.72	-6.63	-.57	E. High Income OECD	Australia	AUS	*	.23	.20	.89	-3.50	-.15
	Georgia	GEO	*	.09	.28	3.07	.40	.04		Austria	AUT	*	.29	.64	2.23	2.17	.08
	Guatemala	GTM	*	.11	.22	1.91	-5.76	-.50		Belgium	BEL	*	.30	.86	2.81	3.41	.11
	India	IND	*	.09	.61	6.66	-.61	-.07		Canada	CAN	*	.29	.53	1.82	-15.97	-.55
	Indonesia	IDN	*	.11	.29	2.60	-.68	-.06		Czech Republic	CZE	*	.20	.25	1.22	7.96	.39
	Maldives	MDV	*	.20	.50	2.51	16.44	.82		Denmark	DNK	*	.48	.29	.61	-22.03	-.46
	Moldova	MDA	*	.16	.29	1.83	1.99	.13		Finland	FIN	*	.32	.40	1.24	-4.20	-.13
	Mongolia	MNG	*	.19	.55	2.83	-.42	-.02		France	FRA	*	.27	.68	2.51	3.64	.13
	Morocco	MAR	*	.20	.56	2.78	-8.50	-.42		Germany	DEU	*	.23	.43	1.91	4.36	.19
	Papua New Guinea	PNG	*	.26	.72	2.76	-9.19	-.35		Greece	GRC	*	.21	1.18	5.57	3.46	.16
	Philippines	PHL	*	.13	.65	5.00	6.28	.49		Hungary	HUN	*	.26	.70	2.67	3.34	.13
	Senegal	SEN	*	.16	.71	4.43	-8.88	-.55		Iceland	ISL	*	.33	.44	1.33	-16.46	-.49
	Sri Lanka	LKA	*	.14	.89	6.46	-5.41	-.39		Ireland	IRL	*	.25	.28	1.10	-13.58	-.54
	Thailand	THA	*	.16	.26	1.63	-7.59	-.48		Italy	ITA	*	.29	1.08	3.77	-2.50	-.09
	Tunisia	TUN	*	.20	.54	2.64	-8.67	-.43		Luxembourg	LUX	*	.27	.04	.16	-.84	-.03
	Ukraine	UKR	*	.15	.54	3.56	9.33	.62		Netherlands	NLD	*	.24	.46	1.87	9.84	.40
C. Upper Middle Income	Algeria	DZA		.32	.55	1.70	-25.72	-.79		New Zealand	NZL	*	.32	.45	1.37	-11.09	-.34
	Belarus	BLR	*	.39	.07	.17	-7.28	-.19		Norway	NOR	*	.34	.49	1.47	-6.00	-.18
	Brazil	BRA	*	.09	.66	7.04	.60	.06		Poland	POL	*	.21	.47	2.25	7.45	.35
	Colombia	COL	*	.13	.57	4.31	4.20	.32		Slovak Republic	SVK	*	.19	.42	2.16	7.65	.39
	Jamaica	JAM		.28	1.17	4.24	-23.17	-.84		Spain	ESP	*	.22	.34	1.52	-5.48	-.24
	Kazakhstan	KAZ	*	.13	.06	.46	-2.08	-.16		Switzerland	CHE	*	.22	.25	1.15	-5.18	-.23
	Lithuania	LTU	*	.16	.21	1.34	4.04	.26		United Kingdom	GBR	*	.29	.47	1.64	-1.44	-.05
	Mauritius	MUS	*	.16	.41	2.65	-6.44	-.41		United States	USA	*	.20	.47	2.33	-3.84	-.19
	Peru	PER	*	.13	.31	2.39	-2.21	-.17									
	Russian Federation	RUS	*	.15	.10	.66	1.21	.08									
	South Africa	ZAF	*	.26	.46	1.77	-6.19	-.24									
	St. Kitts and Nevis	KNA	*	.22	.96	4.43	-9.84	-.46									
	Turkey	TUR	*	.20	.51	2.61	8.93	.45									
	Uruguay	URY	*	.18	.67	3.82	.28	.02									

Table 3: Fiscal stimulus and fiscal space.

This table reports regression analysis of fiscal stimulus (dependent variable; Table 1) as explained by economic determinants and the *de facto* fiscal space: Public debt/tax base. All variables are deflated using 2006 CPI and rescaled (see Figure 3 for their economic significance and interpretation). A constant term included but not reported. Absolute values of t-statistics are in parentheses, with standard errors obtained by clustering on geographic region as explained in the paper.

*** (**, *) denote a statistical significance at 1 (5, 10) percent, respectively.

	(1)		(2)		(3)		(4)		(5)		(6)	
Dependent (% of GDP):	Fiscal stimulus of 2009-2010 total						Fiscal stimulus and financial sector support					
Explanatory variable	coeff. (t-stat)		coeff. (t-stat)		coeff. (t-stat)		coeff. (t-stat)		coeff. (t-stat)		coeff. (t-stat)	
GDP capita (PPP)	4.1 (6.5)	***	4.2 (6.4)	***	5.8 (7.7)	***	6.1 (8.7)	***	6.3 (8.6)	***	7.7 (8.9)	***
Trade/GDP	-1.4 (-5.3)	***	-1.4 (-5.4)	***	-1.5 (-4.9)	***	-1.8 (-4.1)	***	-1.9 (-4.1)	***	-2.0 (-4.0)	***
Public debt/tax	-15.7 (-2.3)	*	-15.8 (-2.3)	*	-10.8 (-2.5)	**	-17.5 (-2.2)	*	-17.7 (-2.2)	*	-13.3 (-2.1)	*
Inflation (GDP deflator)	0.3 (4.2)	***	0.3 (4.2)	***	0.3 (3.0)	**	0.3 (3.6)	**	0.4 (3.6)	**	0.3 (3.1)	**
Financial exposure to USA Total (Assets+Liabilities)	1.5 (9.3)	***					3.9 (12.2)	***				
Assets			2.6 (10.0)	***	2.8 (9.4)	***			6.4 (11.8)	***	6.6 (11.2)	***
GDP capita*Public debt/tax					-1.0 (-3.0)	**					-0.9 (-2.4)	*
Countries	64		64		64		64		64		64	
R-sq.	0.4		0.4		0.4		0.5		0.5		0.5	

Figure 1a: *De facto* fiscal space measure based on public debt and tax revenue.

This figure plots country's fiscal space as measured by the size of public debt relative to tax revenue (fiscal space 1): [2006 Debt/GDP] ÷ [2000-06 Average Tax Revenue/GDP], where all variables are deflated by 2006 CPI.

Source: Authors' calculation from the World Development Indicators.

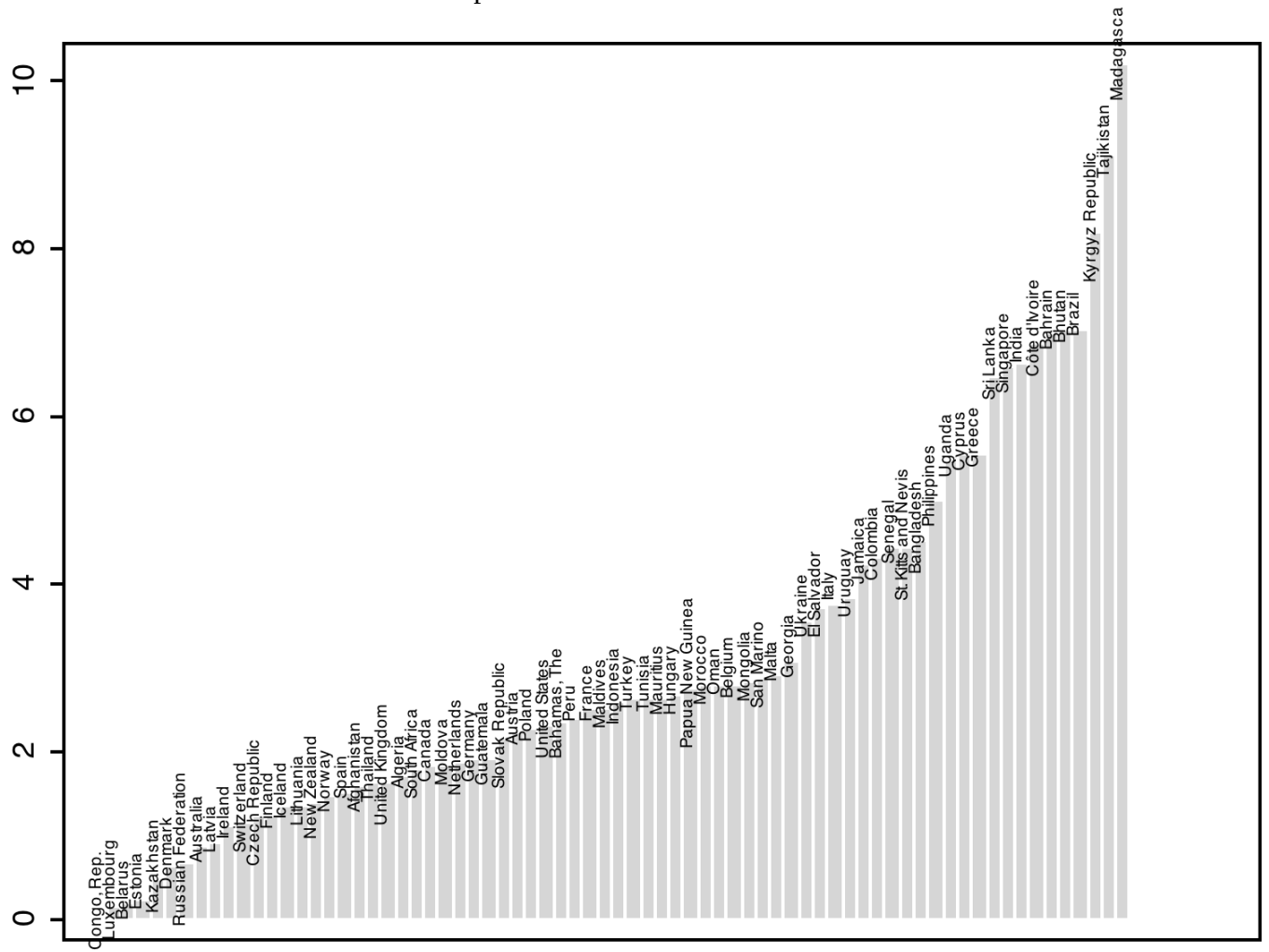

Figure 1b: *De facto* fiscal Space based on fiscal deficit and tax revenue.

This figure plots country's fiscal space as measured by the size of government deficit relative to tax revenue (fiscal space 2): [2000-06 Average Fiscal Deficit/GDP] ÷ [2000-06 Average Tax Revenue/GDP], where all variables are deflated by 2006 CPI. Source: Authors' calculation from the World Development Indicators.

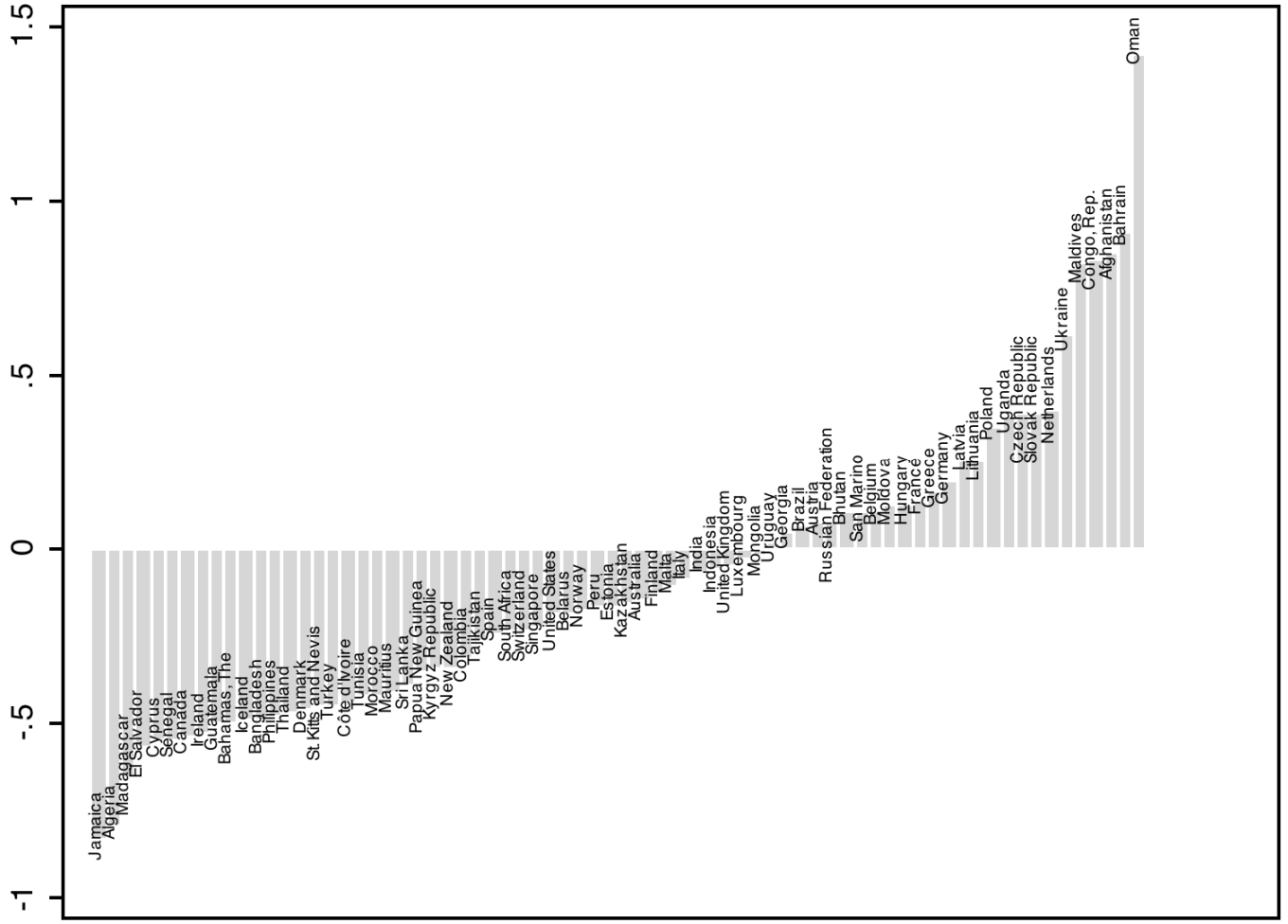

Figure 2: *De facto* fiscal space by income classification.

This figure presents the level of public debt/GDP in 2006 and two measures of fiscal space: Public Debt/Tax Revenue (fiscal space 1) and Fiscal Deficit/Tax Revenue (fiscal space 2). All variables are deflated by 2006 CPI. See Table 2 for country-level data.
Source: Authors' calculation from the World Development Indicators.

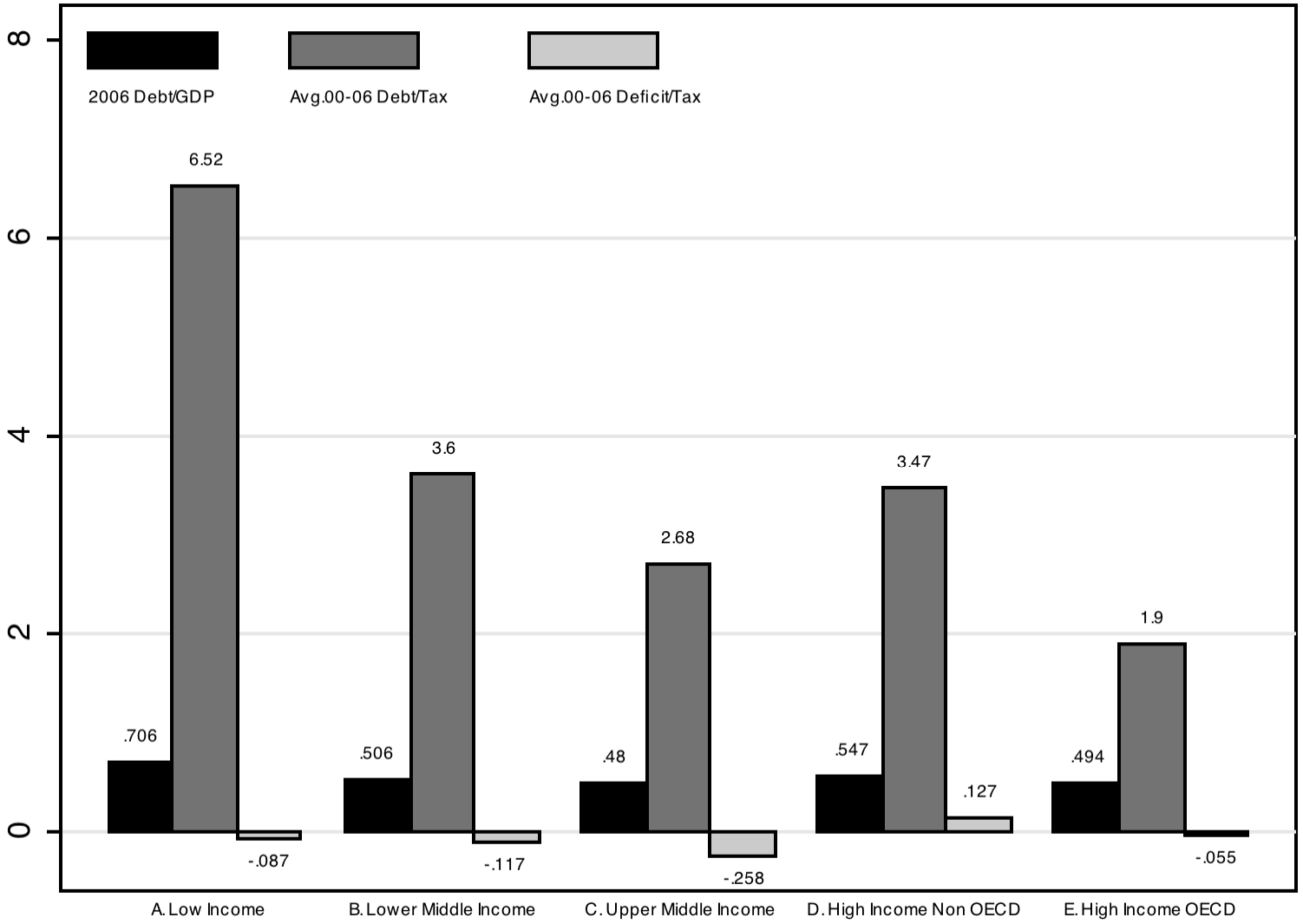

Figure 3: Significance of *de facto* fiscal space and other economic determinants of the size of fiscal stimulus.
Based on Table 3, regression 3 estimates, this figure calculates for each economic determinant its one standard deviation effect on the size of fiscal stimulus (% GDP), 2009-10. All variables are deflated by 2006 CPI.