

Fiscal Consolidations

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Figure 1.1. Interest Expense and Government Debt, 2007–21

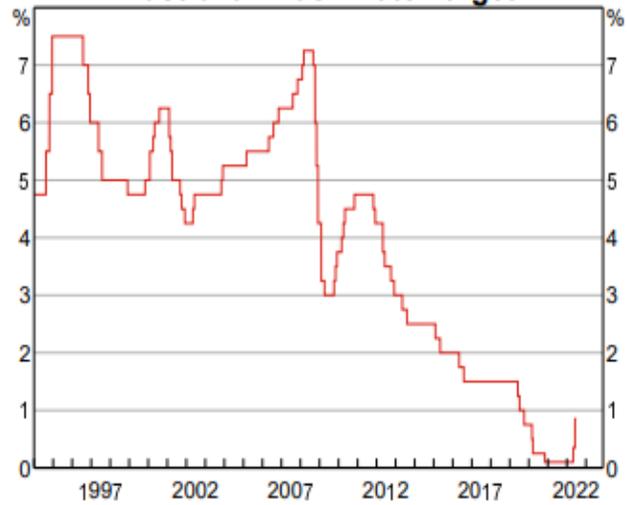
(Percent of GDP; debt-to-GDP, left scale; interest expense, right scale)

Despite rising public debt levels, interest bills are lower in advanced and emerging market economies.



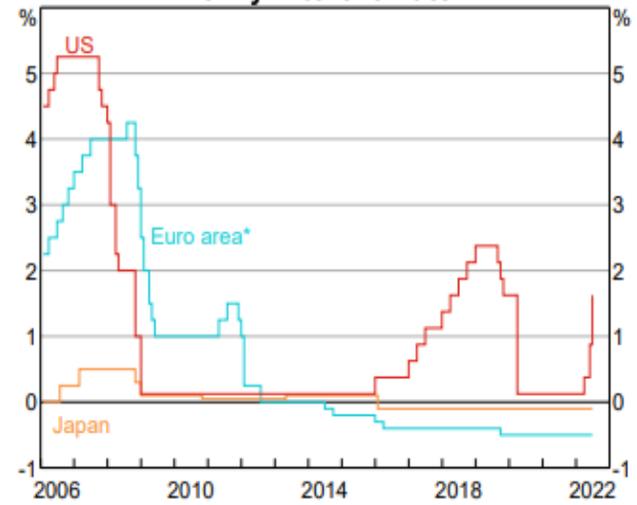
Sources: IMF, World Economic Outlook database; and IMF staff calculations.

Australian Cash Rate Target



Source: RBA

Policy Interest Rates



* Main refinancing rate until the introduction of 3-year LTROs in December 2011; deposit facility rate thereafter.

Source: Central banks

Table 1.1. General Government Overall Fiscal Balance, 2017–27
(Percent of GDP)

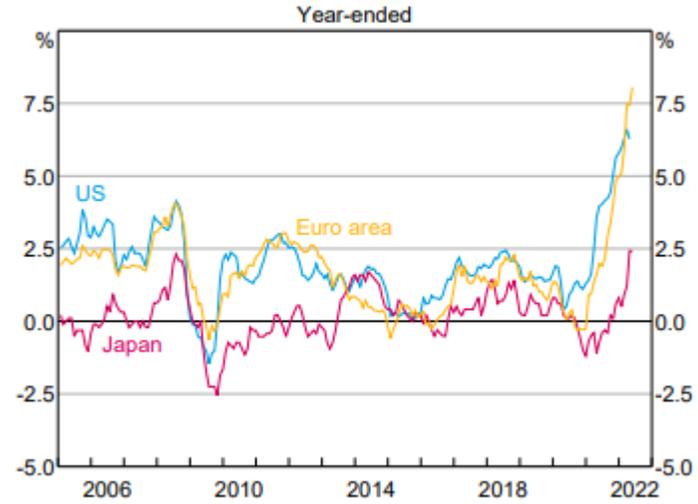
	2017	2018	2019	2020	2021	Projections					
						2022	2023	2024	2025	2026	2027
World	-3.0	-2.9	-3.6	-9.9	-6.4	-4.9	-4.0	-3.9	-4.0	-4.0	-3.9
Advanced Economies	-2.4	-2.5	-3.0	-10.5	-7.3	-4.3	-2.9	-2.8	-3.0	-3.0	-3.0
Canada	-0.1	0.4	0.0	-11.4	-4.7	-2.2	-0.8	-0.7	-0.5	-0.4	-0.3
Euro Area	-0.9	-0.4	-0.6	-7.2	-5.5	-4.3	-2.5	-2.0	-1.8	-1.7	-1.7
France	-3.0	-2.3	-3.1	-9.1	-7.0	-5.6	-3.8	-3.4	-3.3	-3.3	-3.3
Germany	1.3	1.9	1.5	-4.3	-3.7	-3.3	-0.7	-0.1	0.3	0.4	0.4
Italy	-2.4	-2.2	-1.5	-9.6	-7.2	-6.0	-3.9	-3.3	-3.0	-2.8	-2.5
Spain ¹	-3.0	-2.5	-2.9	-11.0	-7.0	-5.3	-4.3	-3.9	-3.9	-3.9	-3.9
Japan	-3.1	-2.5	-3.0	-9.0	-7.6	-7.8	-3.5	-2.5	-2.5	-2.6	-2.8
United Kingdom	-2.4	-2.2	-2.2	-12.8	-8.0	-4.3	-2.3	-1.5	-1.4	-1.3	-1.0
United States ²	-4.6	-5.4	-5.7	-14.5	-10.2	-4.8	-4.0	-4.4	-5.2	-5.1	-5.2
Others	1.2	1.2	-0.1	-4.7	-2.6	-1.7	-0.9	-0.6	-0.5	-0.4	-0.3
Emerging Market Economies	-3.9	-3.6	-4.6	-9.3	-5.3	-5.7	-5.5	-5.4	-5.3	-5.3	-5.2
Excluding MENA Oil Producers	-3.8	-3.7	-4.7	-9.4	-5.6	-6.6	-6.1	-5.9	-5.7	-5.6	-5.5
Asia	-3.6	-4.2	-5.8	-10.4	-6.6	-7.7	-6.9	-6.8	-6.6	-6.6	-6.5
China	-3.4	-4.3	-6.1	-10.7	-6.0	-7.7	-7.1	-7.0	-6.9	-6.9	-6.8
India	-6.2	-6.4	-7.5	-12.8	-10.4	-9.9	-9.1	-8.5	-8.0	-7.7	-7.5
Europe	-1.8	0.3	-0.6	-5.6	-1.9	-4.6	-4.8	-4.6	-4.3	-3.9	-3.5
Russian Federation	-1.5	2.9	1.9	-4.0	0.7	-4.0	-5.3	-4.8	-4.1	-3.0	-1.9
Latin America	-5.4	-5.0	-4.1	-8.8	-4.5	-4.7	-4.2	-3.4	-3.0	-2.8	-2.7
Brazil	-7.8	-7.0	-5.9	-13.3	-4.4	-7.6	-7.4	-5.6	-4.9	-4.4	-4.5
Mexico	-1.1	-2.2	-2.3	-4.4	-3.8	-3.2	-3.2	-2.9	-2.8	-2.8	-2.8
MENA	-5.4	-1.9	-2.9	-8.0	-3.1	1.5	0.1	-1.0	-1.6	-1.9	-2.2
Saudi Arabia	-9.2	-5.7	-4.4	-11.3	-2.4	5.5	4.7	4.4	4.3	4.5	4.6
South Africa	-4.0	-3.7	-4.7	-9.7	-6.4	-5.8	-6.1	-6.6	-7.0	-7.5	-7.9
Low-Income Developing Countries	-3.7	-3.3	-3.5	-5.1	-4.9	-5.2	-4.6	-4.3	-4.2	-4.1	-4.0
Kenya	-7.4	-6.9	-7.4	-8.1	-8.1	-6.9	-5.3	-4.5	-4.3	-4.0	-3.8
Nigeria	-5.4	-4.3	-4.7	-5.7	-6.0	-6.4	-5.9	-5.9	-6.1	-6.3	-6.4
Vietnam	-2.0	-1.0	-0.4	-3.9	-4.2	-5.0	-5.1	-4.7	-4.4	-4.0	-3.7
Oil Producers	-2.8	0.3	-0.4	-7.4	-2.2	0.2	-0.5	-1.0	-1.3	-1.4	-1.5
Memorandum											
World Output (percent)	3.7	3.6	2.9	-3.1	6.1	3.6	3.6	3.4	3.4	3.3	3.3

Source: IMF staff estimates and projections.

Table 1.2. General Government Debt, 2017–27
(Percent of GDP)

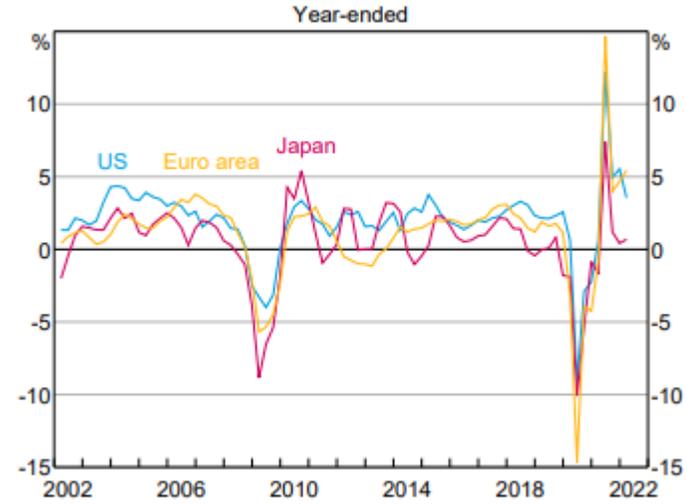
	2017	2018	2019	2020	2021	Projections					
						2022	2023	2024	2025	2026	2027
Gross Debt											
World	82.0	82.2	83.6	99.2	97.0	94.4	94.1	94.5	95.0	95.4	95.5
Advanced Economies	103.2	102.7	103.8	123.2	119.8	115.5	113.7	113.1	113.0	112.9	112.7
Canada ¹	88.9	88.9	87.2	117.8	112.1	101.8	98.5	96.2	93.4	90.5	87.7
Euro Area	87.5	85.5	83.5	97.3	96.0	95.2	93.4	92.1	91.0	90.0	88.9
France	98.1	97.8	97.4	115.2	112.3	112.6	112.9	113.1	113.3	113.6	114.0
Germany	64.7	61.3	58.9	68.7	70.2	70.9	67.7	65.5	63.2	60.9	58.7
Italy	134.2	134.4	134.1	155.3	150.9	150.6	148.7	147.2	145.7	144.3	142.9
Spain	98.6	97.5	95.5	120.0	118.7	116.4	115.9	114.7	114.5	114.5	114.6
Japan	231.4	232.5	236.1	259.0	263.1	262.5	258.3	258.7	259.4	260.5	261.8
United Kingdom	85.1	84.5	83.9	102.6	95.3	87.8	82.7	79.6	76.3	73.4	70.7
United States ¹	106.2	107.5	108.8	134.2	132.6	125.6	123.7	124.0	125.1	126.2	127.4
Emerging Market Economies	50.5	52.3	54.6	64.9	66.1	67.4	69.8	72.1	74.2	75.9	77.2
Excluding MENA Oil Producers	52.1	54.1	56.3	66.8	68.3	70.8	73.2	75.6	77.6	79.4	80.7
Asia	52.8	54.5	57.6	68.9	72.9	76.5	79.5	82.6	85.4	87.7	89.6
China	51.7	53.8	57.2	68.1	73.3	77.8	81.8	85.8	89.6	92.8	95.4
India	69.7	70.4	75.1	90.1	86.8	86.9	86.6	86.1	85.3	84.7	84.2
Europe	30.0	29.7	29.2	37.9	36.3	37.1	38.6	40.1	41.6	42.9	43.5
Russian Federation	14.3	13.6	13.7	19.2	17.0	16.8	18.9	20.0	20.9	21.4	21.2
Latin America	61.1	67.5	68.4	77.8	72.4	71.7	71.9	71.8	71.5	71.0	70.2
Brazil ²	83.6	85.6	87.9	98.7	93.0	91.9	92.8	93.4	94.2	94.9	94.3
Mexico	54.0	53.6	53.3	60.3	57.6	58.4	58.9	59.2	59.5	59.8	60.1
MENA Region	43.2	41.0	44.4	53.8	52.6	43.1	42.9	43.3	43.5	43.5	43.6
Saudi Arabia	17.2	18.3	22.5	32.4	30.0	24.1	24.5	24.4	23.9	23.3	22.6
South Africa	48.6	51.6	56.3	69.4	69.1	70.2	73.4	76.7	80.1	83.7	87.5
Low-Income Developing Countries	42.1	42.4	43.6	49.5	49.8	50.3	48.8	47.8	47.1	46.5	45.9
Kenya	53.9	56.4	58.6	67.6	68.1	70.3	69.4	67.7	65.5	62.8	60.4
Nigeria	25.3	27.7	29.2	34.5	37.0	37.4	38.8	40.2	41.6	42.9	44.2
Vietnam	46.3	43.7	41.3	41.7	40.2	41.3	42.0	42.3	42.4	42.4	42.2
Oil Producers	42.4	44.0	45.0	58.7	55.6	49.0	49.5	49.5	49.2	48.7	48.2

Inflation – Advanced Economies*



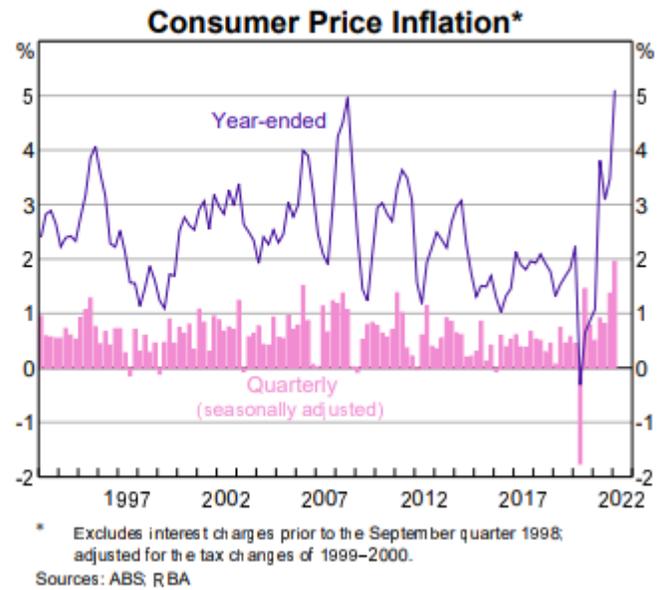
* Personal consumption expenditure (PCE) inflation for the US; Japan data excludes the effects of the consumption tax increase in April 2014.
Sources: RBA; Refinitiv

GDP Growth – Advanced Economies

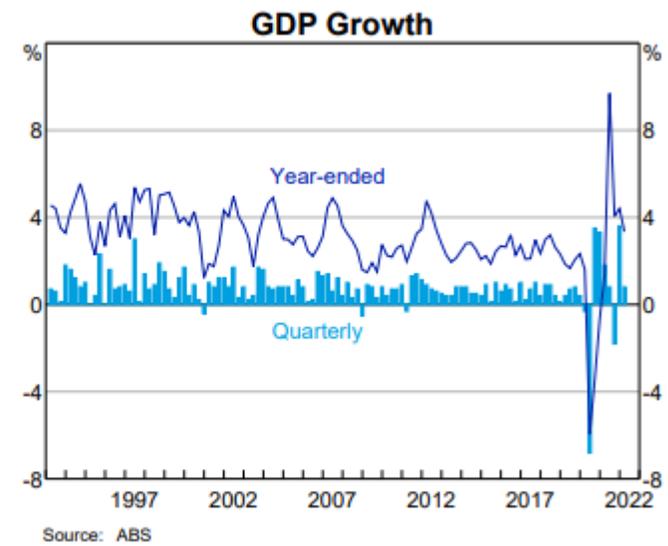


Source: Refinitiv

Australian Inflation



Australian Growth



Question:

- What is the effect of action-based fiscal consolidations on GDP growth?

Fiscal Consolidations

by

Markus Brueckner*

June 2022

Abstract: I examine whether action-based fiscal consolidations are exogenous to contemporaneous GDP growth. Based on the narrative record, these fiscal consolidations had the primary objective to reduce a budget deficit. I find that temperature changes, the GDP growth rate of trading partners, and an international commodity price index have significant: (i) negative contemporaneous effects on action-based fiscal consolidations; (ii) positive contemporaneous effects on GDP growth. These results imply that it is highly unlikely that action-based fiscal consolidations are exogenous to contemporaneous GDP growth. Using an instrumental variables approach, I find that action-based fiscal consolidations have significant positive effects on GDP growth.

Key words: Fiscal Consolidations, GDP Growth, Identification, Narrative Approach, Simultaneous Systems of Equations

JEL codes: E0, O4

The data on action-based fiscal consolidation are from the International Monetary Fund (Devries et al., 2011; David and Leigh, 2018). The data were assembled by IMF economists following the narrative approach. In the working paper that accompanies the dataset, Devries et al. (2011, pages 3 and 5 write) write:

"We examine policymakers' intentions and actions as described in contemporaneous policy documents, and identify measures motivated primarily by deficit reduction...Following Romer and Romer (2010), we use the contemporaneous estimates contained in these sources since retrospective estimates are rarely available."

A database on discretionary fiscal policy aimed at consolidating the budget is extremely valuable.

- According to Repec, Devries et al. (2011) cited in more than 118 distinct research papers.

Discretionary fiscal policies are different in nature to variations in the budget balance that arise due to automatic stabilizers.

Discretionary fiscal policies aimed at consolidating the budget are actions taken by policy makers:

- tax-based consolidations are those actions by policy makers where tax rates are increased;
- expenditure-based consolidations are those actions taken by policy makers that reduce government expenditures (broadly defined, i.e. purchases of goods and services, social transfers and subsidies).

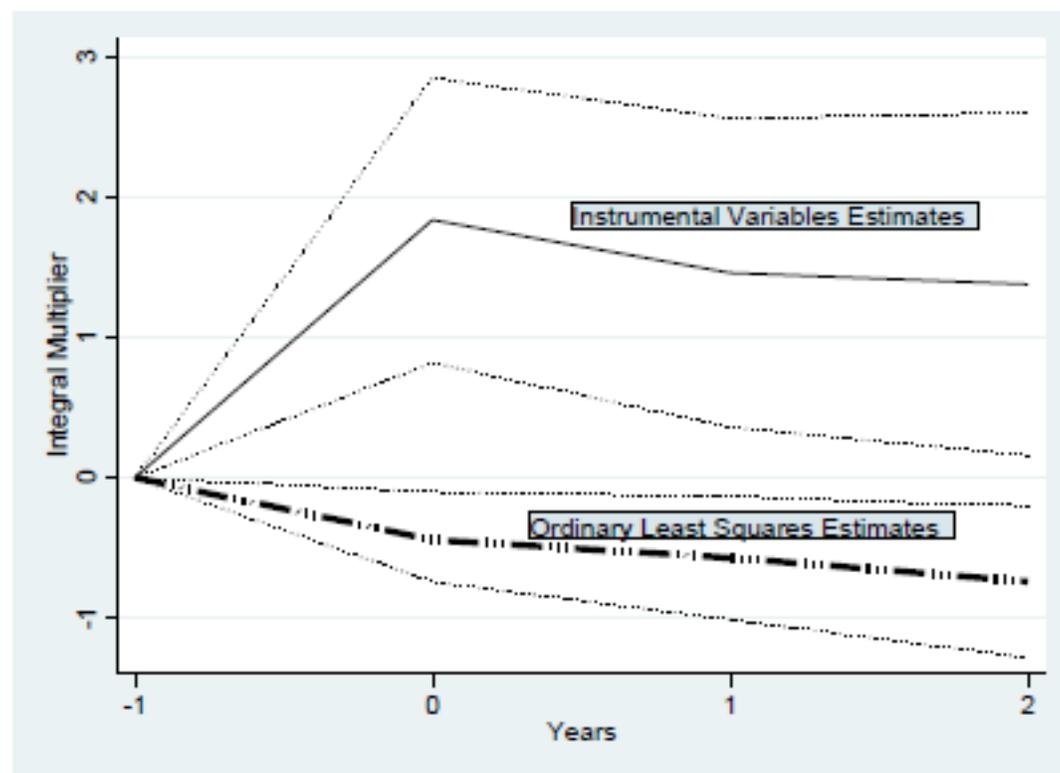
The fiscal policy literature has computed so-called “integral multipliers”, see e.g. Ramey (2016).

The dynamic simultaneous equations model for integral multipliers is:

$$(1) \quad \text{FiscalConsolidation}(h)_it = a_i + b_i + \alpha^h \text{GDPGrowth}(h)_it + \Gamma_1 X_{it-1} + \Gamma_2 X_{it-2} + u_{it}$$

$$(2) \quad \text{GDPGrowth}(h)_it = c_i + d_i + \beta^h \text{FiscalConsolidation}(h)_it + \Pi_1 X_{it-1} + \Pi_2 X_{it-2} + \Theta Z(h)_it + e_{it}$$

Figure 1. Estimated Effect of a 1% of GDP Fiscal Consolidation on Real GDP



Note: The figure shows estimates of the coefficients β^h in equation (2) on page 30. The letter h in the superscript refers to the horizon in years. The solid line in the above figure are the β^h coefficients obtained from instrumental variables regressions. The thick, long-dash-dotted lines are the β^h coefficients obtained from ordinary least squares regressions. The thin, tight-dotted lines are 95% confidence bands.

Identification of a Simultaneous System of Equations

Consider the simplest possible simultaneous system of two equations:

$$(1) \quad \text{FiscalConsolidation} = \alpha \text{GDPGrowth} + u$$

$$(2) \quad \text{GDPGrowth} = \beta \text{FiscalConsolidation} + e$$

where I have dropped subscripts to keep the notation as simple as possible. (In the spirit of the Frisch-Waugh-Lovell theorem, one can think of the above variables as the residuals obtained from separate regressions of GDP growth and fiscal consolidations on a set of control variables, such as country and time fixed effects, past GDP growth and past fiscal consolidations.)

$$(I) \quad \beta^{LS} = \beta + \text{cov}(\text{FiscalConsolidation}, u) = \beta + \alpha(1-\alpha)^{-1} \sigma^2(e) / \sigma^2(F)$$

Identification of a Simultaneous System of Equations

In order to identify the simultaneous system of two equations I need at least one variable, denoted here by Z , that satisfies the following conditions: (i) Z is exogenous to GDP Growth and fiscal consolidations; (ii) Z affects GDP Growth; and (iii) Z affects fiscal consolidations through its effect on GDP Growth:

$$(2) \quad \text{GDPGrowth} = \beta * \text{FiscalConsolidation} + \phi Z + e'$$

Under conditions (i)-(iii), Z can be used as an instrument for GDP growth to obtain a consistent estimate of α in equation (1).

Identification of a Simultaneous System of Equations

Once an estimate of α is obtained (from an IV regression where GDP growth is instrumented by Z) the next step is to construct the residual variation in fiscal consolidations that is not due to GDP growth, i.e. $u_{res} = FiscalConsolidation - \alpha^{IV} GDPGrowth$. Then use u_{res} as an instrument for fiscal consolidations in equation (2). This yields the following IV estimator:

$$\begin{aligned}(II) \beta^{IV} &= cov(u_{res}, GDPGrowth) / cov(u_{res}, FiscalConsolidation) \\ &= \beta + cov(u_{res}, e) / cov(u_{res}, FiscalConsolidation) \\ &= \beta + cov(u, e) / cov(u, FiscalConsolidation) \\ &= \beta\end{aligned}$$

Table 1. Contemporaneous Effects of Temperature Changes on Fiscal Consolidations and GDP Growth

	Fiscal Consolidation	Fiscal Consolidation	GDP Growth	GDP Growth
	(1)	(2)	(3)	(4)
	Whole Sample	Excluding Large Economies	Whole Sample	Excluding Large Economies
Temperature Change, t	-0.07** (0.04)	-0.10** (0.04)	0.71*** (0.20)	0.75*** (0.22)
Country Fixed Effects	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	986	805	986	805
Countries	31	26	31	26

Note: The dependent variable in columns (1) and (2) is *Fiscal Consolidation* in year t ; in columns (3) and (4) the dependent variable is *GDP growth* in year t . The method of estimation is least squares. Columns (1) and (3) show estimates for the whole sample; columns (2) and (4) show estimates for the sub-sample that excludes France, Germany, Japan, United Kingdom, and United States. Huber robust standard errors (shown in parentheses) are clustered at the country level. *Significantly different from zero at the 10 percent level; **5 percent level; *1 percent level.

- columns (1) and (2): a one standard deviation increase in the year $t-1$ to t change in temperature decreases the magnitude of a fiscal consolidation in year t by around 0.04 to 0.06 percent of GDP
- columns (3) and (4): a one standard deviation increase in the year $t-1$ to t change in temperature increases GDP growth in year t by around 0.4 percentage points.

Table 2. Contemporaneous Effects of GDP Growth of Trading Partners on Fiscal Consolidations and GDP Growth

	Fiscal Consolidation	Fiscal Consolidation	GDP Growth	GDP Growth
	(1)	(2)	(3)	(4)
	Whole Sample	Excluding Large Economies	Whole Sample	Excluding Large Economies
GDP Growth of Trading Partners, t	-0.25*** (0.08)	-0.25*** (0.09)	2.65*** (0.45)	2.61*** (0.46)
Country Fixed Effects	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	913	733	913	733
Countries	30	25	30	25

Note: The dependent variable in columns (1) and (2) is *Fiscal Consolidation* in year t ; in columns (3) and (4) the dependent variable is *GDP growth* in year t . The method of estimation is least squares. Columns (1) and (3) show estimates for the whole sample; columns (2) and (4) show estimates for the sub-sample that excludes France, Germany, Japan, United Kingdom, and United States. Huber robust standard errors (shown in parentheses) are clustered at the country level. *Significantly different from zero at the 10 percent level; **5 percent level; *1 percent level.

- columns (1) and (2): a one standard deviation increase in GDP growth of trading partners in year t decreases the magnitude of a fiscal consolidation in year t by around 0.13 percent of GDP
- columns (3) and (4): a one standard deviation increase in GDP growth of trading partners in year t increases GDP growth in year t by around 1.4 percentage points

Table 3. Contemporaneous Effects of an International Commodity Price Index on Fiscal Consolidations and GDP Growth

	Fiscal Consolidation	Fiscal Consolidation	GDP Growth	GDP Growth
	(1)	(2)	(3)	(4)
	Whole Sample	Excluding Large Economies	Whole Sample	Excluding Large Economies
Commodity Price Index, t	-0.02** (0.01)	-0.02** (0.01)	0.20*** (0.06)	0.18*** (0.07)
Country Fixed Effects	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	908	728	908	728
Countries	30	25	30	25

Note: The dependent variable in columns (1) and (2) is *Fiscal Consolidation* in year t ; in columns (3) and (4) the dependent variable is *GDP growth* in year t . The method of estimation is least squares. Columns (1) and (3) show estimates for the whole sample; columns (2) and (4) show estimates for the sub-sample that excludes France, Germany, Japan, United Kingdom, and United States. Huber robust standard errors (shown in parentheses) are clustered at the country level. *Significantly different from zero at the 10 percent level; **5 percent level; *1 percent level.

- columns (1) and (2): a one standard deviation increase in the commodity price index in year t decreases the magnitude of a fiscal consolidation in year t by around 0.10 percent of GDP
- columns (3) and (4): a one standard deviation increase in the commodity price index in year t increases GDP growth in year t by around 1 percentage point

Table 4. Contemporaneous Effects of GDP Growth on Fiscal Consolidations
(Two-Stage Least Squares with Three Instruments for GDP Growth)

	Fiscal Consolidation (Tax and Expenditure)	Fiscal Consolidation (Tax and Expenditure)	Fiscal Consolidation (Tax)	Fiscal Consolidation (Tax)	Fiscal Consolidation (Expenditure)	Fiscal Consolidation (Expenditure)
	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample	Excluding Large Economies	Whole Sample	Excluding Large Economies	Whole Sample	Excluding Large Economies
GDP Growth, t	-0.07** (0.02)	-0.08*** (0.03)	-0.05** (0.02)	-0.05** (0.02)	-0.03** (0.01)	-0.03* (0.02)
Cragg Donald F-Stat	19.7	13.9	19.7	13.9	19.7	13.9
Kleibergen Paap F-Stat	17.0	13.7	17.0	13.7	17.0	13.7
Hansen J, p-value	0.99	0.75	0.87	0.79	0.63	0.37
First Stage Estimates for GDP Growth, t						
GDP Growth of Trading Partners, t	2.21*** (0.51)	2.13*** (0.52)	2.21*** (0.51)	2.13*** (0.52)	2.21*** (0.51)	2.13*** (0.52)
Commodity Price Index, t	0.17** (0.07)	0.14* (0.07)	0.17** (0.07)	0.14* (0.07)	0.17** (0.07)	0.14* (0.07)
Temperature Change, t	0.71*** (0.22)	0.71*** (0.26)	0.71*** (0.22)	0.71*** (0.26)	0.71*** (0.22)	0.71*** (0.26)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	850	670	850	670	850	670
Countries	29	24	29	24	29	24

Note: The method of estimation is two-stage least squares. Huber robust standard errors (shown in parentheses) are clustered at the country level. Columns (1), (3), and (5) show estimates for the whole sample; columns (2), (4), and (6) show estimates for the sub-sample that excludes France, Germany, Japan, United Kingdom, and United States.

*Significantly different from zero at the 10 percent level; **5 percent level; *1 percent level.

Table 4. Contemporaneous Effects of GDP Growth on Fiscal Consolidations
(Two-Stage Least Squares with Three Instruments for GDP Growth)

	Fiscal Consolidation (Tax and Expenditure)	Fiscal Consolidation (Tax and Expenditure)	Fiscal Consolidation (Tax)	Fiscal Consolidation (Tax)	Fiscal Consolidation (Expenditure)	Fiscal Consolidation (Expenditure)
	(1)	(2)	(3)	(4)	(5)	(6)
	Whole Sample	Excluding Large Economies	Whole Sample	Excluding Large Economies	Whole Sample	Excluding Large Economies
GDP Growth, t	-0.07** (0.02)	-0.08*** (0.03)	-0.05** (0.02)	-0.05** (0.02)	-0.03** (0.01)	-0.03* (0.02)
Cragg Donald F-Stat	19.7	13.9	19.7	13.9	19.7	13.9
Kleibergen Paap F-Stat	17.0	13.7	17.0	13.7	17.0	13.7
Hansen J, p-value	0.99	0.75	0.87	0.79	0.63	0.37
First Stage Estimates for GDP Growth, t						
GDP Growth of Trading Partners, t	2.21*** (0.51)	2.13*** (0.52)	2.21*** (0.51)	2.13*** (0.52)	2.21*** (0.51)	2.13*** (0.52)
Commodity Price Index, t	0.17** (0.07)	0.14* (0.07)	0.17** (0.07)	0.14* (0.07)	0.17** (0.07)	0.14* (0.07)
Temperature Change, t	0.71*** (0.22)	0.71*** (0.26)	0.71*** (0.22)	0.71*** (0.26)	0.71*** (0.22)	0.71*** (0.26)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	850	670	850	670	850	670
Countries	29	24	29	24	29	24

Note: The method of estimation is two-stage least squares. Huber robust standard errors (shown in parentheses) are clustered at the country level. Columns (1), (3), and (5) show estimates for the whole sample; columns (2), (4), and (6) show estimates for the sub-sample that excludes France, Germany, Japan, United Kingdom, and United States.

*Significantly different from zero at the 10 percent level; **5 percent level; *1 percent level.

The Negative Effect of Contemporaneous GDP Growth on Action-Based Fiscal Consolidations

A theoretical explanation for why contemporaneous GDP growth has a negative effect on the magnitude of action-based fiscal consolidations are automatic stabilizers.

Due to institutional design contemporaneous GDP growth has automatically a positive effect on the government's budget balance. Consequently, for any given increase in the budget balance that a policy maker desires to achieve: an increase in the contemporaneous GDP growth rate requires a smaller increase in tax rates (tax-based consolidation); a smaller decrease in government expenditures (expenditure-based consolidation). On the following slides I formalize this explanation.

The Budget

The budget, B , is the difference between tax revenues (R) and expenditures (E), i.e. $B=R - E$.

For a given tax rate, τ , and discretionary government expenditures, g , automatic stabilizers imply that an increase in GDP growth has a positive effect on the budget.

Totally differentiating the budget with respect to GDP, y , yields

$$dB=(R_y - E_y)dy > 0, \text{ where } R_y \equiv \partial R/\partial y > 0 \text{ and } E_y \equiv \partial E/\partial y < 0.$$

The definition of an action-based fiscal consolidation is that tax rates increase (tax-based consolidation), or that discretionary government expenditures decrease (expenditure-based consolidation).

For a tax-based consolidation, totally differentiating the budget with respect to y and τ yields $dB=(R_y - E_y)dy + R_\tau d\tau$, where $R_\tau \equiv \partial R / \partial \tau$. It follows that

$$d\tau/dy = (R_y - E_y)/-R_\tau$$

If the economy is to the left-side of the peak of the Laffer curve then $R_\tau > 0$. I assume that this is the relevant case since the policy maker's aim is to consolidate the budget, i.e. raise tax revenues by increasing the tax rate.

Hence,

$$d\tau/dy = (R_y - E_y)/-R_\tau < 0.$$

This mathematical expression means that the faster is GDP growth ($dy > 0$) the smaller the increase in the tax rate has to be for consolidating the budget. The result is symmetric: in order to consolidate the budget, the policy maker has to increase the tax rate more the slower is GDP growth ($dy < 0$).

Now consider an expenditure-based consolidation.

Totally differentiating the budget with respect to y and g yields

$$dB = (R_y - E_y)dy - E_g dg$$

where $E_g \equiv \partial E / \partial g > 0$. It follows that

$$dg/dy = (R_y - E_y) / E_g > 0.$$

The faster is GDP growth ($dy > 0$), the less the policy maker has to reduce discretionary expenditures in order to consolidate the budget. The result is symmetric: the slower is GDP growth ($dy < 0$), the more discretionary expenditures have to be reduced by the policy maker in order to consolidate the budget.

The Positive Effect of Action-Based Fiscal Consolidations on GDP Growth

Yared (2019) provides a discussion of the literature on optimal government debt and political economy forces that affect debt dynamics.

When a policy maker's type with regard to the extent of present-bias is exogenous (i.e. an innate characteristic of the particular policy maker) and private information, a fiscal consolidation acts as a signal: a policy maker who chooses to consolidate the budget is likely to have a smaller present-bias. The larger the present-bias of the policy maker, the more distortionary is fiscal policy.

Models that demonstrate the possibility of a positive effect of fiscal consolidations go back at least to the early 1990s, i.e. Giavazzi and Pagano (1990) and Blanchard (1990). Giavazzi and Pagano (1990) develop a model where an expenditure-based fiscal consolidation can have a positive effect on GDP growth. Blanchard (1990) shows that a positive effect on GDP growth is also possible for a tax-based fiscal consolidation.