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Revisiting Fiscal Responsibility norms: a cross country analysis of the impact of Covid-19

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Abstract

In this paper, we have reviewed the Covid induced shock to the debt and deficit profiles of 10 of the largest economies by size of GDP in 2019 referred to in this paper as the Big-10 economies. There is a sharp upsurge in their government debt-GDP ratios because their policy responses to the Covid induced recession have been large fiscal stimuli based on borrowing. With low and often negative growth rates and high fiscal deficit, the debt-GDP ratios are projected to rise sharply in these economies. As normalcy is restored, these countries may attempt to sharply reduce their borrowing levels relative to GDP. However, we argue that before this is done, individual countries may do well to reassess their sustainability norms whether cast in terms of agreements such as the Maastricht Treaty or country level Fiscal Responsibility Legislations (FRLs) or other similar norms. This revision is called for because of the longer-term trends in these economies of rising money supply, falling nominal interest rates and nominal growth rate. The contribution of this article lies in highlighting that the existing FRL norms have become dated in the European and other similar economies because of significant changes in macro parameters such as the interest rate, the long-term growth rate and the government debt-GDP profiles of these countries as compared to the time when these norms were originally determined. There is thus a need now to redetermine these norms which may be higher than their current levels. Even though, some recent literature suggests that the sustainability benchmarks may have shifted upwards, we argue that the post Covid debt-GDP ratios have exceeded these revised benchmarks by significant margins in the case of a number of the Big-10 economies.

Purpose: In this paper, we examine the Covid induced shock to the debt and deficit profiles of 10 of the largest economies in the world. By projecting the increase in government debt-GDP ratios for selected countries we evaluate the resultant debt-GDP ratios in the context of their fiscal responsibility commitments.

Design/Methodology/Approach: Change in the government debt-GDP ratio in a country has need decomposed into three factors namely, (1) increased fiscal deficit, (2) real growth rate and (3) inflation rate

Findings: Existing FRL norms have become dated in the European and other similar economies due to significant changes in their macro parameters such as the interest rate, the long-term growth rate and the government debt-GDP profiles as compared to the time when these norms were originally determined.

Practical Implications: Governments in these countries may now need to redetermine the fiscal responsibility norms which may be higher than their current levels.

Originality/Value: This paper attempts to address the following research gaps in the existing literature on sustainability of government debt (a) in spite of major changes in the long term trends concerning growth and interest rates, the validity of existing FRL norms have not been reassessed, (b) highlight that many of the Big-10 economies do not have suitable fiscal responsibility legislations, (c) assessment of the extent to which the post Covid government debt-GDP levels would exceed current or revised sustainability norms.

Keywords: Covid-19, Government Debt, Growth, Inflation, 2008 Economic Crisis

Paper Type: Research Paper

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Introduction

In order to keep their government debt-GDP ratios at sustainable levels, many countries have undertaken Fiscal Responsibility Legislations (FRLs) specifying debt-GDP targets consistent with sustainability conditions. An overview of evolution of government debt-GDP ratio indicates that it experiences a one-time upsurge as a result of an economic crisis and tends to remain at the higher level. Policy efforts to bring it down have not been effective particularly because of asymmetry in managing countercyclical fiscal deficit. Fiscal deficit may be increased in crisis years as part of stimulus initiatives in economic downswings, but it is often difficult to bring it adequately down in economic upswings. The impact of Covid-19 on government debt-GDP ratio for most countries is likely to be quite large. It would take considerable reduction in fiscal deficits of future years if the government debt-GDP ratio is to be brought down back to sustainable levels. If governments chose to let their debt-GDP ratios remain at unsustainably high levels, their capacity to deal with future economic crises would be significantly impaired. In this paper, we project the increase in government debt-GDP ratios for selected countries and evaluate the resultant debt-GDP ratios in the context of their fiscal responsibility commitments. We then specify fiscal deficit adjustment paths that would be needed in order to bring the debt-GDP ratios back to sustainable levels. For this purpose, we have selected the following 10 countries: the US (USA), People's Republic of China (PRC), Japan (JPN), Germany (DEU), India (IND), the UK (GBR), France (FRA), Italy (ITA), Brazil (BRA) and Canada (CAN). This group comprises 3 EU economies and 7 non-EU economies. Together, these constitute the largest economies of the world, accounting for a share of 67.5% (2019) in global GDP (at market exchange rates). We refer to these as the Big-10 group of countries in the rest of the paper.

From the viewpoint of sustainability of government debt relative to GDP in the major global economies, there is a significant research gap pertaining to the following aspects: (a) in spite of major changes in the long term trends concerning growth and interest rates, the validity of existing FRL norms have not been reassessed in the literature; (b) many of the Big-10 economies do not have suitable fiscal responsibility legislations; and (c) there is no assessment of the extent to which the post Covid government debt-GDP levels would exceed current or revised sustainability norms and the implications of the impact of Covid on global government indebtedness. In partially addressing this research gap, we have argued that the existing FRL norms have become dated in the European and other similar economies because of significant changes in macro parameters such as the interest rate, the long-term growth rate and the government debt-GDP profiles of these countries as compared to the time when these norms were originally determined. There is thus a need now to redetermine these norms which may be higher than their current levels. Even though, some recent literature suggests that the sustainability benchmarks may have shifted upwards, we argue that the post Covid debt-GDP ratios have exceeded these revised benchmarks by significant margins in the case of a number of the Big-10 economies.

Evolution of government debt: 1996 to 2019

In this section, we look at the comparative position of countries with respect to the evolution of their government debt to GDP ratio. This analysis is in terms of debt-GDP ratios where both debt and GDP are in local currency units (LCU). Data for this analysis has been drawn from the International Monetary Fund (IMF)[1]. For the period 1996 to 2019, except Canada, the government debt-GDP ratio increased for all selected countries (Table 1). Notably sharp increases were observed for Japan (136.9% points), followed by Brazil (46.3% points), the UK (41.5% points), and the US (40.4% points). The increase in the government-debt GDP ratio was mild for Germany (1.7% points) and India (6.4% points).

In 1996, three countries, namely Italy, Japan and Canada already had a government debt to GDP ratio which was higher than 100%. Other countries like the UK, Brazil, Germany, France, India and the US had a government debt-GDP ratio in the range of 43.2% to 68.2%. People's Republic of China's government debt-GDP ratio[2] at 21.4% was the lowest amongst the selected set of countries. As economies went through different phases of economic crisis and responded to these through fiscal stimulus based on an increase in their fiscal

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[1] Global debt database, IMF; https://www.imf.org/external/datamapper/datasets/GDD

[2] A large part of public sector borrowing in People's Republic of China is undertaken through non-financial state-owned enterprises which is not included in the government debt as given by the IMF. In 2018, the debt-GDP ratio of People's Republic of China's non-financial state-owned enterprises was over 200%.

deficits, their government debt to GDP ratio kept increasing. The average government debt to GDP ratio for the Big-10 group of countries was 68.1% in 1996.

Table 1: Government debt-GDP ratio of selected major economies: 1996 to 2019

Countries	1996	2005	2010	2013	2019	2019-1996 (% points)
BRA	43.2	68.6	63.0	60.2	89.5	46.3
CAN	100.2	70.6	81.2	86.1	88.6	-11.6
PRC	21.4	26.3	33.9	37.0	52.6	31.2
DEU	57.8	67.3	82.4	78.7	59.5	1.7
FRA	60.0	67.4	85.3	93.4	98.1	38.1
GBR	43.8	39.6	74.6	84.2	85.4	41.5
IND	66.0	80.9	66.0	67.4	72.3	6.4
ITA	119.1	106.6	119.2	132.5	134.8	15.7
JPN	101.0	176.6	207.7	232.2	238.0	136.9
USA	68.2	65.5	95.5	104.9	108.7	40.4
Average	68.1	76.9	90.9	97.7	102.7	34.7

Source (basic data): IMF
Brazil (BRA), Canada (CAN), People's Republic of China (PRC), Germany (DEU), France (FRA), United Kingdom (GBR), India (IND), Italy (ITA), Japan (JPN), United States (USA).

By 2005, while the government debt-GDP ratio remained above 100% for Japan and Italy, there was a sharp decline of 29.6% points in this ratio for Canada. In India's case, the government debt relative to GDP increased from 66% in 1996 to 80.9% in 2005. People's Republic of China's government debt-GDP ratio increased only marginally by 4.9% points in 2005.

By 2010, the government debt-GDP ratio surged to 207.7% for Japan and 119.2% for Italy. For the US, there was a massive jump from 65.5% in 2005 to 95.5% in 2010, an increase of 30% points. Some of the other western economies like France, Canada, the UK and Germany also experienced an increase in their government debt to GDP ratios. These countries had borne the brunt of the 2008 crisis. India, however experienced an improvement in its government debt-GDP ratio which fell from 80.9% in 2005 to 66% in 2010, a fall of nearly 15% points. This showed the effect of adherence to the Fiscal Responsibility and Budget Management Act (FRBMA) which was adopted by both the central and state governments during 2003 to 2010.

By 2013, except for Brazil and Germany, there was an increase in the government debt-GDP ratio of all countries. There were sharp increases in the case of Japan, Italy, the UK and the US and relatively milder increases in the case of India, People's Republic of China and Canada. The government debt-GDP ratio for the US crossed 100%, reaching a level of 104.9%.

By 2019, government debt to GDP ratio had continued to surge in the case of Japan and Italy, reaching a level of 238.0% and 134.8% respectively. There was a sharp increase of 29.3% points and 15.6% points in the government debt-GDP ratio of Brazil and People's Republic of China. As discussed earlier, the period from 2014 to 2019 was characterized by crises in both these economies.

A. Composition of debt: share of government debt in total debt

In this section, we undertake a review of the composition of total debt as divided between government debt and private debt for individual countries.

Table 2 shows that in the Big-10 group of countries, in 1996, the share of government debt in total debt was the highest for India at 71.6%, followed by Italy at 63.8% and Canada at 40.8%. At the lower end, the lowest share of government debt in total debt was for People's Republic of China at 20.5%, followed by the UK at 27.5%. The average share of government debt in total debt for the selected set of countries was 40.6% in 1996.

By 2005, seven out of ten selected countries experienced a decline in their share of government debt in total debt as compared to that in 1996. However, in the case of Japan, Brazil, and Germany, this share increased by 19.5% points, 10.5% points and 1.7% points respectively in 2005. The average share of government debt in total debt for the selected countries fell to 39.6% in 2005.

Table 2: Share of government debt in total debt of selected major economies: 1996 to 2019

Countries	1996	2005	2010	2013	2019	2019-1996 (% points)
BRA	49.2	59.7	52.0	46.7	54.7	5.5

Countries	1996	2005	2010	2013	2019	2019-1996 (% points)
CAN	40.8	32.2	31.3	31.2	29.2	-11.6
PRC	20.5	19.5	19.7	19.3	21.4	1.0
DEU	33.3	35.0	41.7	41.6	34.2	0.9
FRA	31.6	31.1	33.1	34.0	31.4	-0.2
GBR	27.5	19.4	27.9	31.9	34.2	6.8
IND	71.6	65.3	54.2	53.1	56.7	-14.9
ITA	63.8	52.0	48.8	51.6	55.1	-8.6
JPN	32.2	51.7	55.9	59.1	59.3	27.1
USA	36.1	30.3	36.4	41.1	42.0	5.9
Average	40.6	39.6	40.1	41.0	41.8	1.2
Memo: Total debt to GDP ratio						
Average	174.3	196.9	227.6	235.7	248.1	73.8

Source (basic data): IMF

By 2010, the effect of the 2008 global economic and financial crisis had become visible. The share of government debt in total debt increased in the US, the UK, Japan, Germany, France and People's Republic of China. However, in Brazil, Italy and Canada, this share fell indicating that the 2008 crisis had led to an even greater increase in private debt. In India also, the share of government debt in total debt fell because of a fall in government debt-GDP ratio and an increase in private debt-GDP ratio.

In 2013, the average share of government debt in total debt increased marginally by 0.9% points to 41%, with five countries showing a decline in this ratio and the remaining five showing an increase. Among selected countries, the sharpest increase of 4.7% points was shown by the US and the sharpest decline of 5.3% points was shown by Brazil.

The composition of debt in 2019 shows that the relative share of government debt increased for seven out of 10 countries as compared to their 2013 levels. Countries which experienced a decline in their share of government debt in 2019 include Germany, France and Canada.

Thus, over the period from 1996 to 2005, there was an increase in the overall debt-GDP ratio of countries in general, but this increase was relatively more for private sector debt whereas the share of government debt in total debt had shown some decline. Between 2005 and 2019, the overall debt-GDP ratio continued to surge, but in this period, the share of government debt in total debt increased on average.

Projecting Covid's impact on government debt-GDP ratio: 2020 and 2021

In this section, we consider decomposing the change in the government debt-GDP ratio in a country into three factors namely, (1) increased borrowing (fiscal deficit), (2) real growth rate and (3) inflation rate. Change in government debt amounts to a country's fiscal deficit which is one of the main instruments through which a stimulus is injected in order to overcome an economic crisis.

Change in the government debt-GDP ratio in any year *t* may be defined as:

$$b_t - b_{t-1} = f_t - b_{t-1}\left[\frac{g_t^n}{(1 + g_t^n)}\right] \qquad (1)$$

Here, b_t and b_{t-1} denote the debt-GDP ratio in the year *t* and *t-1* respectively. f_t is the fiscal deficit to GDP ratio in year *t* which is defined as change in the level of debt relative to the level of nominal GDP, that is, $f_t = \frac{B_t - B_{t-1}}{Y_t}$.

g_t^n refers to the nominal growth rate which can be expanded as the sum of real growth rate and the inflation rate, that is, $g_t^n = g_t + \pi_t + g_t\pi_t$

Equation (1) can be written as follows after ignoring the interaction term ($g_t\pi_t$):

$$b_t - b_{t-1} = f_t - b_{t-1}\left[\frac{g_t + \pi_t}{(1 + g_t + \pi_t)}\right] \qquad (2)$$

Or,

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$$b_t - b_{t-1} = f_t - b_{t-1}.(g_t + \pi_t).(1 + g_t + \pi_t)^{-1} \qquad (3)$$

$$b_t = f_t + b_{t-1}.[1 - g_t - \pi_t + g_t^2 + \pi_t^2 + 2.g_t.\pi_t] \qquad (4)$$

Utilizing equation (4), we project the government debt-GDP levels for 2020 and 2021, using independent projections of fiscal deficit to GDP ratio, real GDP growth and inflation rate in these years. Real GDP growth and inflation forecasts are taken from the October 2020 issue of IMF's World Economic Outlook (WEO). The fiscal deficit to GDP ratio has been derived by using government debt to GDP ratio and the nominal GDP for these two years as projected by the IMF in its WEO (October 2020). The relevant values of these three determinants over the period from 1997 to 2021 are given in Tables 3 and Annexure 2.

Table 4: Estimated fiscal deficit relative to GDP: 1997 to 2021

Year	BRA	CAN	PRC	DEU	FRA	IND	ITA	JPN	GBR	USA
1997	6.6	0.2	1.3	2.2	3.3	8.3	2.7	7.2	1.5	1.6
1998	14.2	1.4	1.4	2.2	2.6	9.0	2.1	10.0	-0.4	0.3
1999	14.7	1.9	2.4	1.9	1.3	9.3	2.7	11.3	0.2	0.1
2000	4.4	-0.6	3.2	0.3	1.6	8.6	1.8	8.5	-0.7	-2.3
2001	10.3	3.7	3.8	0.6	1.7	10.7	5.1	8.0	-1.4	1.6
2002	16.9	1.5	3.6	2.4	3.7	9.7	1.2	8.0	1.6	4.1
2003	5.5	0.2	3.9	4.0	5.7	10.3	2.5	5.7	3.1	5.6
2004	5.3	0.6	3.6	3.1	4.3	9.5	3.8	10.6	4.6	11.1
2005	5.4	3.1	3.6	3.1	3.8	7.8	4.4	6.1	3.3	3.5
2006	4.1	2.8	3.1	2.1	0.2	7.5	4.2	0.6	3.0	2.4
2007	5.8	0.5	8.4	0.3	3.0	7.6	1.3	0.6	3.0	3.3
2008	6.2	4.3	2.4	2.7	5.9	7.2	3.7	4.3	8.9	10.2
2009	7.3	7.7	9.7	4.8	12.3	7.9	6.4	5.9	12.6	11.7
2010	6.9	6.5	4.5	12.8	4.7	6.9	5.1	11.2	13.4	11.9
2011	5.2	5.5	5.1	1.4	5.2	9.5	3.2	10.4	8.1	7.7
2012	6.6	6.0	4.1	2.8	4.0	7.7	5.0	8.4	5.6	7.5
2013	4.0	4.1	5.9	-0.5	4.0	7.5	5.1	7.3	4.2	5.1
2014	6.8	3.5	5.8	0.1	2.9	6.1	4.1	8.4	5.6	4.1
2015	12.5	5.4	4.2	-1.0	2.8	8.3	2.2	3.3	3.2	4.2
2016	8.9	2.1	5.8	-0.5	3.9	7.2	2.7	6.9	3.3	4.8
2017	9.1	3.8	6.5	-1.5	3.1	7.6	2.5	2.6	2.6	3.5
2018	7.1	2.6	6.8	-1.5	2.4	7.0	2.9	2.5	2.4	6.6
2019	6.8	2.0	7.7	-0.4	2.7	7.5	1.6	4.3	2.4	5.9
Average (1997 to 2019)	**7.9**	**3.0**	**4.6**	**1.8**	**3.7**	**8.2**	**3.3**	**6.6**	**3.9**	**5.0**
2020	**9.5**	**20.0**	**10.6**	**11.2**	**12.1**	**12.1**	**12.8**	**15.8**	**16.1**	**19.2**
2021	**7.3**	**8.7**	**10.5**	**3.2**	**6.9**	**10.1**	**5.9**	**4.6**	**9.5**	**9.1**

Source (basic data): IMF World Economic Outlook, October 2020

Table 4 shows the sharp increase in the government debt-GDP ratio in the pandemic affected year of 2020 over 2019. The largest increase is for Japan at 28.2% points, followed by Italy at 27.0% points, Canada at 26.0% points, the UK at 22.7% points and the USA at 22.5% points. The average increase in the government debt-GDP ratio for selected countries in 2020 is estimated at 19.9% points, twice as compared to an increase of 9.7% points following the 2008 global economic and financial crisis.

In a recent paper Ramos-Herrera, and Prats (2020) have estimated the sustainable debt-GDP ratio for the European economies at 93% (table 4 of the paper). This is based on a Panel-ARDL estimation approach and a Dynamic Panel-Threshold model[3]. In the threshold model a common threshold of 93% was estimated. Table 3 shows that in 2021 except for Germany the European economies as well as Brazil, Japan and USA are well above this threshold. India is very close to it while China is well below it.

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[3] Seo, M.H.; Shin, Y. 2016., Dynamic panels with threshold effect and endogeneity. J. Econom, 195, 169–186.

Table 3: Projected government debt relative to GDP: 2020 and 2021

Country	2019	2020	2021	2020 *minus* 2019	2021 *minus* 2020
BRA	89.5	101.4	102.8	**11.9**	1.4
CAN	88.6	114.6	115.0	**26.0**	0.3
PRC	52.6	61.7	66.5	**9.1**	4.8
DEU	59.5	73.3	72.2	**13.8**	-1.1
FRA	98.1	118.7	118.6	**20.6**	-0.2
GBR	85.4	108.0	111.5	**22.7**	3.5
IND	72.3	89.3	89.9	**17.0**	0.5
ITA	134.8	161.8	158.3	**27.0**	-3.5
JPN	238.0	266.2	264.0	**28.2**	-2.2
USA	108.7	131.2	133.6	**22.5**	2.5
Average	**102.7**	**122.6**	**123.2**	**19.9**	**0.6**

Source (basic data): IMF, OECD

Prospects of deficit and debt: implications for Fiscal Responsibility Legislations (FRLs)

A. Departures from country-wise deficit and debt norms under FRLs/ benchmarks

Most countries under study have FRLs specifying debt or fiscal deficit limits. These may be under statutory arrangements or other kinds of agreements to ensure sustainability of deficit and debt. For some countries, where such numbers are not available, we will utilize a notional benchmark for debt-GDP ratio as equal to 60% in line with those relevant for the EU countries under the Maastricht Treaty norms. Table 5 summarizes the salient features of FRLs for individual countries under study. It is clear that in the post-Covid situation, most countries would have departed significantly from the relevant debt-GDP norms.

Table 5: Salient features of Fiscal responsibility legislations: selected countries

#	Country	Statutory basis for FRL	Salient features
1	Germany	Fiscal deficit and debt targets are determined by the Maastricht criteria	• General government fiscal deficit targeted at 3% of GDP • Public debt targeted at 60% of GDP • Supplemented by the Stability and Growth Pact - country-specific medium-term budgetary objectives (MTOs) were set; the fiscal compact establishes a structural deficit floor for the MTO of 0.5% of GDP for countries with debt above 60% of GDP and of 1% of GDP for countries with debt significantly below 60% of GDP[4]. • The extent of annual adjustment for achieving the MTO depends on the economy's cyclical position, debt level and the risks to public finance sustainability. • Governance reform (Six Pack) in 2011 imposed stricter financial penalties on countries for inaction to correct a significant deviation from the MTO
2	Italy		
3	France		

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4 For details on EU fiscal rules see https://ec.europa.eu/info/sites/info/files/2019-09-10-assessment-of-eu-fiscal-rules_en.pdf and https://ec.europa.eu/info/sites/info/files/file_import/ip021_en_2.pdf

#	Country	Statutory basis for FRL	Salient features
4	India	Fiscal Responsibility and Budget Management Act - 2003 (last amended in 2018)	• General government debt targeted at 60% of GDP and Union government debt targeted at 40% of GDP • Debt targets are to be achieved by fiscal year ending March 2025-26 • Fiscal deficit at 3% of GDP as operational target - to be achieved by fiscal year ending March 2021 • Revenue deficit target was omitted in the 2018 amendment
5	UK	Charter of Budget Responsibility (CBR) – 2016 autumn update	• To reduce the cyclically adjusted public sector net borrowing to below 2% of GDP by 2020-21 • Supplementary debt target and a welfare spending cap was specified: o *public sector net debt as a percentage of GDP to be falling in 2020-21* o *expenditure on welfare in 2021-22 is contained within a predetermined cap and margin*
		Fiscal rules as per Budget 2020	• The current budget is to be brought in balance by the third year of the rolling five-year forecast period • The public sector net investment (PSNI) should not exceed 3% of GDP on average over the rolling five-year forecast period • If the debt interest to revenue ratio is forecast to remain over 6% for a sustained period, the government would take action to ensure a decline in government debt-to-GDP ratio
6	US	No FRL - Congress sets spending and revenue targets in the annual budget resolution	• The last debt ceiling was introduced on 2 March 2019 at US$21.9 trillion (102.6% of the 2019 US nominal GDP) • This public debt limit was suspended in August 2019 until 31 July 2021 (Bipartisan Budget Act of 2019)
7	Japan	Fiscal Management Strategy of 2010	• Stable reduction in the public debt to GDP ratio for both national and local governments shall be maintained from FY2021 onwards • Corresponding targets for fiscal balance include o *Primary deficit to GDP ratio to be halved from its level in FY2010 by FY2015 at the latest, and a surplus to be achieved by FY2020 at the latest* o *In and after FY2021, efforts for fiscal consolidation to be continued taking into account, the progress in achieving the debt target*
		Basic Policy on Economic and Fiscal Management and Reform (2018)	• Postponed the achievement of a primary surplus by general government (central and local), by five years, to FY2025 from FY2020

#	Country	Statutory basis for FRL	Salient features
			• Continue to target a steady reduction in government debt-to-GDP ratio
8	Brazil	Fiscal Responsibility Law (May 2000)	• Senate sets debt limits for all levels of government. • There was never an agreement reached on the limit for the central government • Numerical multiyear targets are specified for the budget balance (*for the current year and indicative targets for the next two years*), expenditure and debt • Constitution mandates a "golden rule" principle (*new borrowing should be at most equal to public investment*) • Expenditure limits – o *For federal government personnel expenditure limit set at 50% of net current revenue* o *For states and municipalities these are set at 60% of net current revenue*
9	Canada	No FRL – political commitment to reduce debt[5]	• No explicit deficit and debt targets • Consistent decline in the debt-GDP ratio appears to be a soft anchor
10	People's Republic of China	No FRL	…

Source (basic data): IMF, authors' compilation

B. Departures from benchmark norm of 60% with respect to end-2021 government debt-GDP ratios

Table 6 captures the excess of the projected end 2021 government debt-GDP ratio over the benchmark norm of 60%. The largest deviation is that for Japan at 204.0% points followed by Italy at 98.3% points and the US at 73.6% points. The lowest departure is seen in the case of People's Republic of China at 6.5% points followed by Germany at 12.2% points and India at 29.9% points.

Table 6: Deviation of projected government debt-GDP ratio from benchmark norm

#	Country	Projected debt-GDP ratio at end-2021 (%)	Excess of end-2021 debt-GDP ratio over benchmark norm of 60% (% point)
1	BRA	102.8	42.8
2	CAN	115.0	55.0
3	PRC	66.5	6.5
4	DEU	72.2	12.2
5	FRA	118.6	58.6
6	IND	89.9	29.9
7	ITA	158.3	98.3
8	JPN	264.0	204.0
9	GBR	111.5	51.5

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5 See Lledó, V., et.al (2017) – Fiscal rules at a glance
https://www.imf.org/external/datamapper/fiscalrules/Fiscal%20Rules%20at%20a%20Glance%20-%20Background%20Paper.pdf

| 10 | USA | 133.6 | 73.6 |

Restoring sustainability: macro trends and simulations

In this section, we consider policy options available to different countries in order to reach sustainability levels from the projected debt-GDP ratios at the end of 2021. In this context, we consider two simulations. For this purpose, we will utilize alternative paths for the three determinants of the government debt-GDP ratio over the forecast period which extends from 2022 to 2050. These three determinants are (1) fiscal deficit-GDP ratio, (2) real GDP growth rate, and (3) GDP deflator-based inflation rate.

Simulation 1: In this case, fiscal deficit to GDP ratio, real growth rate and inflation are all kept equal to the average level during the period 2012 to 2019. These conditions indicate the situation of individual countries prior to the Covid crisis but after the 2008 global economic and financial crisis had subsided. The simulation is carried forward up to 2050. The resultant debt-GDP ratio at the end of 2050 is given in Table 8. It is shown that no country other than Germany is able to reach a benchmark level of 60% which is consistent with the Maastricht Treaty norms even after a period of 30 years. In some cases, the departures are quite massive such as Japan (240.4% points), Italy (139.9% points), France (76.7% points), and the US (73.9% points). This indicates that without significant policy changes, much lower fiscal deficits than what has been maintained during 2012 to 2019 would be called for in order to move towards sustainability. In the case of Germany, a less than 60% debt-GDP ratio is reached because there were only two instances of a fiscal deficit during this period and on average, there was a fiscal surplus of 0.3% points of GDP. In fact, if Germany were to incur fiscal deficit as per the Maastricht Treaty norms, its debt position will also become unsustainable. This is shown in Simulation 2.

Simulation 2 has been carried out with the average levels of growth and inflation rates over 2012 to 2019 but the fiscal deficit to GDP ratio has been modified in line with FRL norms or comparable norms in the case where the relevant legislations are not available. Thus, for the European countries, in our study namely, France, Germany, and Italy, it has been kept at 3% of GDP. For other developed countries also, where corresponding norms are not available, we have kept it at 3% of GDP. These countries are Canada, Japan, the UK and the US. For the three emerging market economies namely, Brazil, People's Republic of China and India, we have kept it at 6% of GDP which is consistent with India's FRBM. People's Republic of China and Brazil do not have corresponding norms, but a fiscal deficit to GDP ratio of 6% is close to their average levels over the period 2011 to 2019[6]. The resultant debt-GDP ratio at the end of 2050 for Simulation 2 is summarized in Table 8. It is shown that in this case also, no country is able to reach the benchmark debt-GDP ratio of 60%. In India's case, it comes close to 60% but still exceeds it.

Table 7: Average fiscal deficit-GDP ratio, real GDP growth and deflator-based inflation (%)

Country	1997 to 2019			2012-2019		
	Fiscal deficit to GDP ratio	Real GDP growth	GDP deflator-based inflation	Fiscal deficit to GDP ratio	Real GDP growth	GDP deflator-based inflation
BRA	7.9	2.3	7.4	7.7	0.3	6.3
CAN	3.0	2.4	1.9	3.7	1.9	1.4
PRC	4.6	8.9	3.0	5.9	7.1	2.2
DEU	1.8	1.4	1.2	-0.3	1.4	1.7
FRA	3.7	1.6	1.3	3.2	1.2	0.9
IND	8.2	6.9	5.1	7.3	6.6	4.3
ITA	3.3	0.6	1.8	3.3	0.0	1.0
JPN	6.6	0.8	-0.5	5.5	1.1	0.4
GBR	3.9	2.1	1.9	3.7	1.9	1.8
USA	5.0	2.4	1.9	5.2	2.4	1.7

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[6] The average fiscal deficit-GDP ratio during 2011-2019 for People's Republic of China was 5.8%. For Brazil, this average was 6.8% excluding a one-time surge in the fiscal deficit in 2015 at 12.5%.

Table 8: Departure of projected debt-GDP ratio by end-2050 from the norm of 60% under simulations 1 and 2

Country	Debt level at end 2050		Departure from Norm (60%)	
	Simulation 1	Simulation 2	Simulation 1	Simulation 2
BRA	122.4	98.7	62.4	38.7
CAN	115.1	102.2	55.1	42.2
PRC	69.3	70.9	9.3	10.9
DEU	23.3	88.2	-36.7	28.2
FRA	136.7	131.7	76.7	71.7
GBR	106.9	94.5	46.9	34.5
IND	76.4	63.3	16.4	3.3
ITA	199.9	193.2	139.9	133.2
JPN	300.4	242.2	240.4	182.2
USA	133.9	94.9	73.9	34.9

Source (basic data): IMF

These two simulations indicate that the FRLs in their present form would leave major global economies with much higher debt-GDP ratios than what can be considered consistent with sustainable levels. This is true of the Maastricht Treaty norms as well as India's FRBM. In other countries where explicit FRLs do not exist, there is a clear need to consider a policy framework to bring the respective debt-GDP ratios to sustainable levels in the post-Covid world.

In fact, it can be shown that the Maastricht Treaty norms of combining 3% of fiscal deficit-GDP ratio with 60% of debt-GDP ratio had already become outdated even prior to the onset of Covid. With the disturbance caused by Covid, there is hardly any chance for any of these economies to remain consistent with the Maastricht Treaty norms. What will now be required is a modification of the Maastricht Treaty norm itself. The reason is that the real growth rate and the GDP deflator-based inflation rate in historical experience for many of the important European economies have become inconsistent with the implied nominal GDP growth rate of the Maastricht Treaty norms. For examining this, we consider the following framework:

A sustainable combination of debt-GDP ratio (b^*) and fiscal deficit to GDP ratio (f^*) implies a certain nominal growth rate (g^n) which is given by the following relationship:

$$\frac{b^*}{f^*} = \frac{(1 + g^n)}{g^n} \qquad (5)$$

Using $b^* = 60\%$ and $f^* = 3\%$, this equation can be solved for deriving the value of $g^n = 5.26\%$.

With European countries having moved into low real GDP growth and low inflation regimes, most countries show a nominal growth rate which is less than the threshold of 5.26%. This is shown in Table 9. In fact, based on the level of historically achieved growth rates, we can divide our sample group of countries into two groups: (a) developed countries, and (b) emerging market economies. The latter group includes Brazil, People's Republic of China and India.

Table 9: Real GDP growth, inflation and estimated nominal GDP growth (2012 to 2019)

	Real GDP growth	GDP deflator-based inflation	Nominal growth rate (derived)
Group 1			
CAN	1.93	1.37	3.33
DEU	1.40	1.72	3.14
FRA	1.21	0.86	2.08
ITA	0.00	1.03	1.03
JPN	1.09	0.42	1.51
GBR	1.90	1.75	3.68
USA	2.36	1.70	4.10
Average	**1.41**	**1.26**	**2.70**
Group 2			
BRA	0.30	6.26	6.57
PRC	7.07	2.21	9.43
IND	6.61	4.28	11.17

|	Real GDP growth	GDP deflator-based inflation	Nominal growth rate (derived)
Average	4.66	4.25	9.06

Source (basic data): IMF

Clearly, the developed countries have moved into a growth and inflation regime which is much different from earlier years. The average nominal growth rate for the countries included in the sample here is only 2.7% during 2012 to 2019. This calls for a reconsideration of the Maastricht Treaty norms and recalibration of country-wise sustainable fiscal deficit and debt combinations. With respect to the European countries, if the benchmark nominal growth rate is kept at 3%, and the fiscal deficit to GDP ratio is also kept at 3%, we can derive the sustainable level of debt-GDP ratio using equation (5) as below:

$$b^* = f^* \left(\frac{1 + g^n}{g^n} \right) = 103\%$$

Thus, the European countries should consider debt sustainability as an issue if they are unable to reach even this higher threshold. Here sustainability implies that for a given nominal growth rate, if a fiscal deficit relative to GDP at a given level is repeated year after year, the debt-GDP ratio will remain stable at the level of b^*.

Considering the more general case of developed countries in our sample, we may provide a higher threshold for fiscal deficit to GDP ratio at 4%, noting that the average fiscal deficit to GDP ratio for the group of developed countries excluding Germany during 2012 to 2019 was 4.1%. In this case, $b^* = 137.3\%$. Thus, countries that are able to show somewhat higher nominal growth rate may fix their debt-GDP ratio at a higher level.

Figure 1: Alternative combinations of b^* and f^* for different values of g^n.
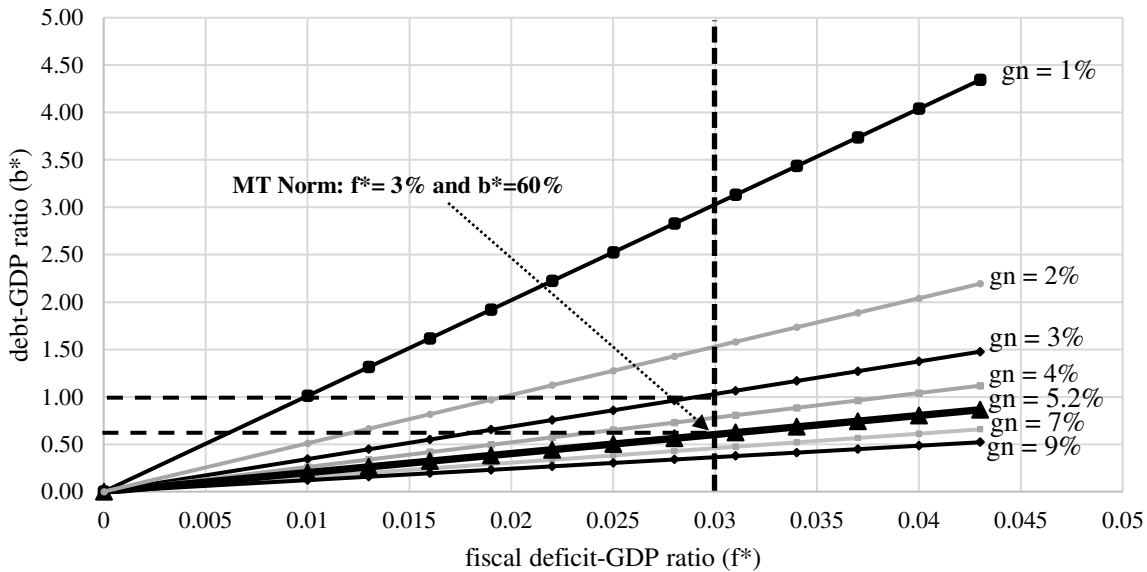
Source: Authors' presentation

In the case of emerging market economies however, the fiscal deficit to GDP ratio is higher on average and their nominal growth rate is also higher. This leads to somewhat different results. For the group of three emerging market economies in our sample, the average fiscal deficit to GDP ratio during 2012 to 2019 is 7%, and the average nominal growth is 9.1%. Using 7% for fiscal deficit to GDP ratio, and 9% for nominal growth, $b^* = 84.8\%$. Thus, these countries should consider uplifting their target debt-GDP ratios from their present levels although keeping it below the target for the group of developed countries.

Figure 1 shows alternative paths of combinations of b^* and f^* for different values of g^n. These are straight lines passing through the origin. If b^* is represented on the Y-axis and f^* is represented on the X-axis, the slope of the line would be given by:

$$\frac{db^*}{df^*} = \frac{(1 + g^n)}{g^n} \qquad (6)$$

For any given positive value of the nominal growth rate, the RHS will be a constant and higher than 1. As g^n is increased, the straight line would shift closer towards the X-axis.

The current Maastricht Treaty benchmark is depicted by the points of intersection of the horizontal line at the debt-GDP ratio of 60% and the vertical line drawn from a fiscal deficit to GDP ratio of 3%. It is shown that if the nominal GDP growth rate in terms of its long-term value has become lower at 3% (real growth of 1% and inflation rate of 2%) as compared to its level for sustainability at 5.2%, then the sustainable combination of fiscal deficit and debt relative to GDP would be given by 3% and 100% respectively. In other words, if many of the developed economies have moved to lower growth and lower inflation trajectories, it would be appropriate to revise the relevant norms under the Maastricht Treaty, or comparable FRLs.

The higher debt-GDP ratio would also be justified by recognizing that the long-term nominal interest rates have also moved down in many of the developed countries including the European economies. This is shown by Figure 2. It shows the downward movement of long-term nominal annual interest rates for the Euro area and selected individual European economies. For the Euro area, in the early 1990s, the nominal interest rate was averaging close to 10%. It has now fallen to close to 0.6%.

Figure 2: Long-term interest rates: annual
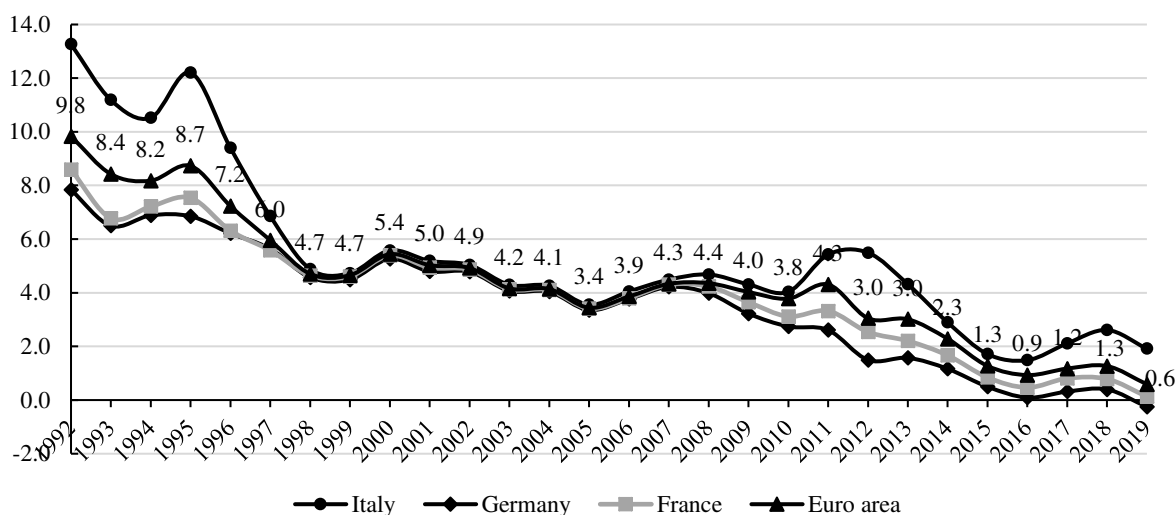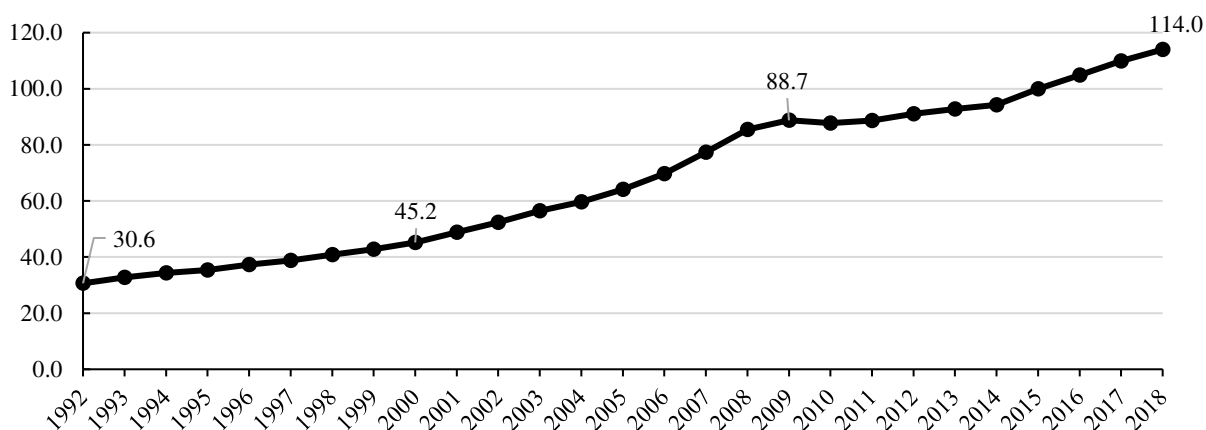

Source (basic data): OECD

This long-term trend may be affected by a number of factors, but a primary determinant is the steadily expanding money supply in the Euro area. In Figure 3, this is represented by a seasonally adjusted index of broad money, which has increased from a level of 30.6 in 1992 to 114 by 2018 (Index value was 100 in 2015).

Figure 3: Broad money: Euro area

Review of recent literature on debt sustainability

Recent literature on debt sustainability may be broadly divided into two parts. One group of papers focusses on econometric methodologies for assessing debt sustainability with or without some country applications. The second group consists of individual country/country group studies where debt sustainability legislations and empirical trends have been studied.

An important early study by Tapsoba (2012) highlighted the importance of fiscal rules in affecting the fiscal policy behaviour of the governments. This paper analyses the effect of National Numerical Fiscal Rules (FRs) upon fiscal discipline in 74 developing countries over the period 1990–2007. The study assesses the impact of FRs on budgetary outcomes while controlling for the self-selection problem by using a variety of propensity scores matching methods. The authors find that the effect of FRs on structural fiscal balance is significantly positive, robust to a variety of alternative specifications, and varies with the type of FRs. They also find that the treatment effect differs according to countries' characteristics such as number of FRs, time length since FRs adoption, presence of supranational FRs, government fractionalisation and government stability. This paper suggests that the introduction of rule-based fiscal policy frameworks is a credible remedy for governments in developing countries against fiscal indiscipline. Further, simple adoption of FRs is not sufficient to guarantee fiscal credibility and fiscal discipline. Their adoption must be accompanied with a set of other measures such as fiscal transparency, fiscal responsibility, enforcement mechanisms, sanctions and independent fiscal institutions (fiscal councils).

Jacobs et. al. (2019) have estimated a causal relationship between public debt ratios and economic growth rates for 31 EU and OECD countries for the period from 1995 to 2013. The authors estimate a panel VAR model that incorporates the long-term real interest rate on government bonds as a vehicle to transmit shocks in both the public debt to GDP ratio and the economic growth rate. It is found that there is no causal link from public debt to growth, irrespective of the levels of the public debt ratio. Rather, there is a causal relationship from growth to public debt. In high-debt countries, the direct negative impact of growth on public debt is enhanced by an increase in the long-term real interest rate, which in turn decreases interest-sensitive demand and leads to a further increase in the public debt ratio.

There are only a few studies relating to debt sustainability in the case of Japan. One such study by Hansen et. al. (2016) emphasizes that Japan's net debt to output ratio at nearly 150% is a significant fiscal burden. In addition, an aging Japanese society implies that public expenditures and transfers payments relative to output are projected to continue to rise until at least 2050. In this paper, the authors use a standard growth model to measure the size of this burden in the form of additional taxes required to finance these projected expenditures and to stabilize government debt. The fiscal adjustment needed is large in the range of 30-40% of total consumption expenditures. It is established that using a distorting tax such as the consumption tax or the labour income tax requires either tax to rise to unprecedented highs. This highlights the importance of considering alternatives that attenuate the projected increases in public spending and/or enlarge the tax base.

Continuing with the case of Japan, Sakuragawa et. al. (2020) have considered the issue of fiscal sustainability in Japan. The authors investigated whether a simulation conducted under the political constraint imposed by a fiscal reaction function supports the official projection and debt sustainability. The methodology involves two steps. First, Japan's fiscal reaction function is obtained by estimating the response of the primary surpluses to the past debt for a panel data set of 23 OECD countries. Second, political feasibility of the official projection is investigated using the estimated reaction function. The authors find that when the official criterion is used for the debt-to-GDP ratio, the government can attain the policy target of non-negative fiscal surpluses and realize fiscal sustainability. Notably, the negative growth-adjusted bond yield and the high growth rate contribute to this finding. The projected growth rate, growth-adjusted bond yield, and the possible fiscal fatigue in the reaction function influence the findings. It is established that the moderately high growth rate (the baseline scenario) is not enough to support the target of non-negative primary surpluses or to sustain debt. Debt sustainability requires the government to make further efforts to decrease the fiscal deficit at the level of debt over 220%.

Aldama and Creel (2019) examined the long-term sustainability of public debt in the US under two broad specifications (a) Constant-parameter fiscal policy rules and (b) Markov-switching fiscal rule. Estimates based

on constant-parameter fiscal rules for the period covering 1940 to 2016, indicated that the government debt was unsustainable in the US. The key reason for such an outcome was attributed to the instability of government's behaviour over time. Their sustainability estimates using Markov-switching fiscal rule identified the presence of two regimes. Under regime 1, the response of primary surplus to lagged public debt was found to be non-significant but positive while under regime 2, there was a strong positive response of primary surplus to lagged public debt indicating fiscal consolidation efforts by the government. However, the sustainable regime appeared less persistent with an expected duration of only 5.7 years as compared to 12.5 years under the unsustainable regime. Their results concluded that the government debt in the US is sustainable in the long run despite persistent unsustainable fiscal regimes.

Cossia (2017) analysed the evolution of public debt across European countries, before and after the monetary unification, that is, from 1995 to 2000 and from 2001 to 2014. Using a simple linear regression estimation, the study compared the dynamics of public debt and of general government deficit of selected European countries individually as well as aggregated into two broad groups namely, (a) countries that are part of the European Monetary Union (EMU) and (b) countries outside the EMU. It found a high degree of asymmetry in the evolution of public debt across countries within as well as outside EMU. The study concluded that the asymmetric paths of public debt and of government deficits may have been an important contributor to the rising uncertainties surrounding the growth prospects of the European economies.

In a recent paper Ramos-Herrera, and Prats (2020) have estimated the sustainable debt-GDP ratio for the European economies at 93%. This is based on a Panel-ARDL estimation approach and a Dynamic Panel-Threshold model[7]. In the threshold model a common threshold of 93% was estimated.

Dirk and Paetz (2021) argue that the Covid-19 pandemic has revealed the shortcomings of the Euro area, which were already evident after the global financial crisis of 2008-09. The suspension of the stability and growth pact (SGP) and recent measures of the European Central Bank (ECB) have given some flexibility to the national governments and the central bank to bring about reforms. The three major reform proposals recommended by the authors are: (1) increased investment by the national governments in the ecological reconstruction of their industrial base, (2) reform of the SGP and the Maastricht Treaty, and (3) making government bonds generally risk-free in the Euro area. In the context of reforming the SGP and the Maastricht Treaty, they recommend that the debt-to-GDP ratios could be increased if the ECB secures the solvency of the Euro Area member states. Further, it is observed that deficits are not controlled by national governments and the existing rules bear the risk of a pro-cyclical fiscal policy.

Reconsidering policy options

Four major theoretical positions have informed policy makers in regard to macro-stabilizing policy initiatives and issues of debt sustainability. These are (i) Ricardian equivalence (ii) Neo-Classical school, (iii) Keynesian paradigm in its conventional or modern forms and (iv) the 'tax and spend' school. Barro, Robert (1989), Bernheim, B. D. (1989), Von Furstenberg, et.al. (1986), and Eisner, R. (1989) provide an analytical review of the assumptions and the relative merits of these schools of thought. Rangarajan. C and Srivastava, D. K. (2005) have examined this issue in terms of the theories involved and also provided an application in India's context. Views of economists has remained divided so far. But in practical terms faced with major economic crises, most policy makers become Keynesian in their approach. As shown in our earlier analysis, this becomes quite clear by the noticeable one-time jumps in the fiscal deficit to GDP ratio in crises years.

Empirically, policy makers look at the issue of sustainability of debt by reference to the likely long-term path of primary surpluses. One method of looking at the primary surplus is to make reference to the stream of interest payments. The higher is the interest payment to GDP ratio, the higher is the primary surplus or the lower is the primary deficit relative to GDP given the same level of fiscal deficit. If the long- term trends indicate that the nominal interest rate has fallen over time, then for the same level of debt and fiscal deficit, interest payment to GDP ratio would have fallen and primary deficit relative to GDP would have increased. Thus, the sustainability consideration can be linked to the likely contours of interest payment to GDP ratio. The sustainability conditions giving combination of fiscal deficit and debt relative to GDP can be defined in an equivalent manner by making reference to either primary deficit/surplus to GDP ratio or interest payment to GDP ratio (see Rangarajan, C., & Srivastava, D. K. (2004) for a discussion on this).

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[7] Seo, M.H.; Shin, Y. 2016., Dynamic panels with threshold effect and endogeneity. J. Econom, 195, 169–186.

One implication of combining a lower interest rate with a higher debt relative to GDP is that the interest burden on the government as measured by total interest payment on government debt (IP_t) relative to GDP may be kept at a given level. The ratio, $\frac{IP_t}{Y_t}$ is determined by the product of the average nominal interest rate (i) and the debt-GDP ratio (b_t). Thus, $ip_t = i * b_t$ can be defined by a rectangular hyperbola where debt-GDP ratio is on the Y-axis and the nominal interest rate is depicted on the X-axis (Figure 4). These curves as shown in chart 4 depict the same level of interest payment relative to GDP. They shift upwards for higher values of ip_t. When the debt-GDP targets are moved up, for example, from 60% to 100%, the ip_t burden can remain the same by moving along the curve from A to B. At point B, the interest rate would have fallen to 1% but this can be combined with a debt-GDP ratio of 100%.

Figure 4: Alternative combinations of b^* and i for different values of ip_t
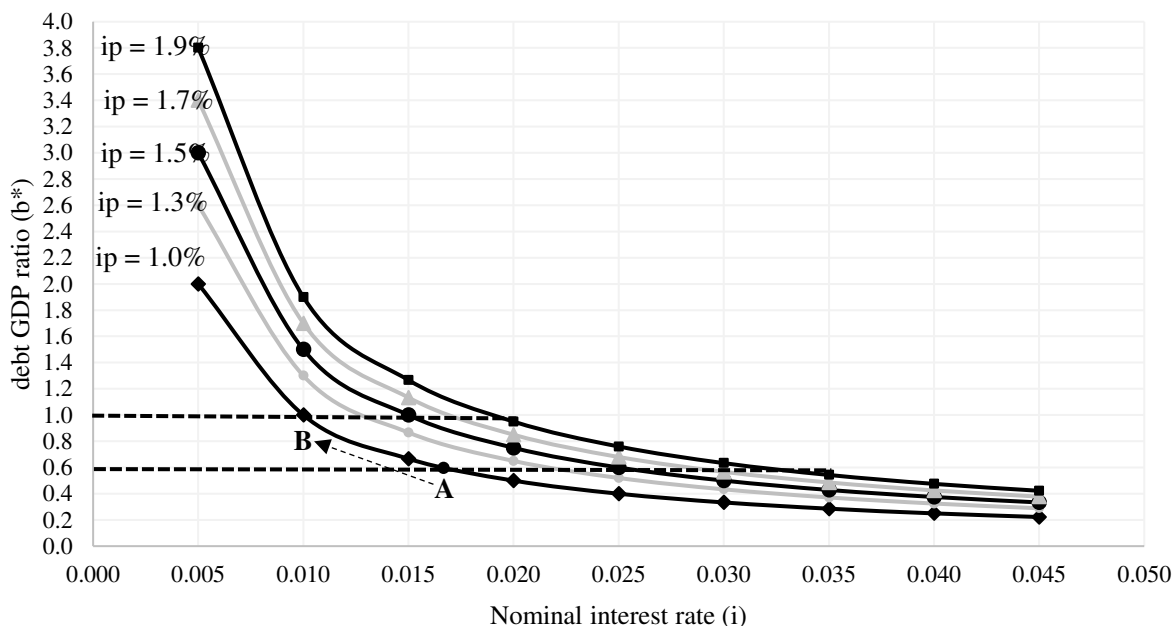
In conclusion, it may be said that the impact of Covid-19 has resulted in a major upsurge in the debt-GDP ratios of most countries. Their post-Covid debt-GDP ratios have departed significantly away from the relevant sustainability norms such as the Maastricht Treaty norms, India's FRL, and similar benchmarks for other Big-10 countries. However, before making an effort to bring down the debt-GDP ratios to the defined benchmark levels, it would be appropriate to examine whether the sustainable levels of debt-GDP ratios should be revised above the current norms. The reason for this is that long-term movements for major economies indicate a lowering of real growth rate, inflation rate, and nominal interest rate. Different countries may reassess their positions in this regard.

Summary

In this paper, we have reviewed the Covid induced shock to the debt and deficit profiles of the Big-10 economies. There is a clear upsurge in their government debt-GDP ratios because policy responses of these countries to the Covid induced recession has been large fiscal stimulus based on borrowing. With low growth and high fiscal deficit, the debt-GDP ratios are projected to rise sharply in these economies in 2020 and 2021. As normalcy is restored, these countries may attempt to sharply reduce their borrowing levels relative to GDP. However, we argue that before this is done, individual countries may do well to reassess their sustainability norms whether cast in terms of agreements such as the Maastricht Treaty or country level FRLs or other similar guidelines. This revision is called for because of the longer-term trends in these economies of rising money supply, falling nominal interest rate and nominal growth rate.

Appendix 1: Fiscal Responsibility Legislations and debt limits

The status of FRLs of the Big-10 countries (except People's Republic of China) may be summarised as follows:

1. In the European Union countries namely, Germany, Italy and France, the fiscal deficit and debt targets are determined by the Maastricht criteria. The Maastricht criteria include a limit of 3% of GDP for the general government fiscal deficit and 60% of GDP for public debt. These criteria were supplemented by the Stability and Growth Pact (SGP) agreement in 2005. In the SGP, country-specific medium-term budgetary objectives (MTOs) were set for the individual EU members. The fiscal compact establishes a structural deficit floor for the MTO of 0.5% of GDP for countries with debt above 60% of GDP and of 1% of GDP for countries with debt significantly below 60% of GDP. The extent of annual adjustment for achieving the MTO depends on the economy's cyclical position, debt level and the risks to public finance sustainability. As per the 2011 governance reform (Six Pack), lack of action to correct a significant deviation from the MTO can lead to the imposition of financial penalties.

2. India's Fiscal Responsibility and Budget Management Act 2003[8] underwent a third amendment in March 2018, since its inception. As per the 2018 amendment, the general government and Union Government debt-GDP ratios have been targeted at 60% and 40% of GDP respectively to be achieved by fiscal year ending March 2025-26. The former fiscal deficit target of 3% of GDP for the union government has now become an operational target which is to be achieved by fiscal year ending March 2021. The Union Government has been mandated to prescribe the annual targets for reduction of fiscal deficit for the period beginning from the date of commencement of the act and ending on 31 March 2021. The revenue deficit target has been given up.

3. In the UK, the 'Charter of Budget Responsibility (CBR)'[9] sets out the framework for managing the public finances, the policy and operation of debt management. The 'Charter' also sets out the government's targets and the related rules. As per autumn 2016 update of the CBR [10] , the UK Treasury's objective for fiscal policy was to '*return the public finances to balance at the earliest possible date in the next Parliament*'. In order to meet this objective, the treasury was mandated to target '*to reduce the cyclically-adjusted public sector net borrowing to below 2% of GDP by 2020-21*'. Further, this mandate was supplemented by a debt target, that is, '*a target for public sector net debt as a percentage of GDP to be falling in 2020-21*' *and* a welfare spending cap. The 2020 budget[11] proposes to adhere to the fiscal rules:

   i.   The current budget is to be brought in balance by the third year of the rolling five-year forecast period
   ii. The public sector net investment (PSNI) should not exceed 3% of GDP on average over the rolling five-year forecast period
   iii. If the debt interest to revenue ratio is forecast to remain over 6% for a sustained period, the government would take action to ensure a decline in government debt-to-GDP ratio.

4. In the USA, there is no constitutional provision to guide fiscal decision-making. The US Constitution allows the Congress to make spending, taxing, and borrowing decisions. Further, the Congress sets spending and revenue targets in the annual budget resolution. Consequently, a debt ceiling has been set and changed extensively. Since 1960, Congress has modified the U.S. debt limit 78 times[12]. The last debt ceiling was introduced on 2 March 2019 at US$21.9 trillion, that is, 102.6% of the 2019 US nominal

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[8] After the enactment of the FRBM Act in 2003 and the related FRBM Rules in 2004, the target fiscal deficit to GDP ratio of 3% for the Union Government was achieved only once, in the year 2007-08, when it was 2.5% of GDP. Since then, that target has not been achieved again. The FRBM Act was amended in 2012 and again in 2015. The revisions in 2015 shifted the date for achieving the 3% (fiscal deficit to GDP) target for the Union Government to 2017-18. By this year, the amended revenue deficit target was put at 2% of GDP.
[9] The Charter has been changed on several occasions since its introduction in 2011. The latest version was proposed alongside Autumn Statement 2016 and came into force on Tuesday 24 January 2017 when the House of Commons approved it.
[10] http://budgetresponsibility.org.uk/download/charter-budget-responsibility/
[11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/871799/Budget_2020_Web_Accessible_Complete.pdf (page 21)
[12] https://home.treasury.gov/policy-issues/financial-markets-financial-institutions-and-fiscal-service/debt-limit

GDP (IMF). Eventually, this public debt limit was suspended in August 2019 until 31 July 2021 (Bipartisan Budget Act of 2019)[13].

5. In Japan, as per the Fiscal Management Strategy of 2010[14], a stable reduction in the public debt to GDP ratio for both national and local governments shall be maintained from FY2021 onwards. The corresponding fiscal balance targets have been defined as follows:

    i.   For the national and local governments, the primary deficit to GDP ratio shall be halved from its level in FY2010 by FY2015 at the latest, and a surplus shall be achieved by FY2020 at the latest.

    ii. In and after FY2021, efforts for fiscal consolidation shall be continued taking into account, the progress in achieving the debt target.

Recently, the 2018 Basic Policy on Economic and Fiscal Management and Reform[15] postponed the achievement of a primary surplus by general government (central and local), by five years, to FY2025 from FY2020. The reform however continues to target to steadily reduce the government debt-to-GDP ratio.

6. In Brazil, a Fiscal Responsibility Law was enacted for all tiers of the government in May 2000. This law mandates a number of fiscal targets:

    i.   The Senate sets debt limits for all levels of government. However, there was never an agreement reached on the limit for the central government. Thus, the only limits currently in place are for States and Municipalities. There are also limits set by the Senate for annual borrowing for States and Municipalities. The government sets numerical multiyear targets for the budget balance (for the current year and indicative targets for the next two years), expenditure and debt. In case of non-compliance, corrective measures need to be taken and can result in sanctions. Escape clauses exist for exceptional economic conditions and natural disaster but can only be invoked with Congressional approval. There is also the "golden rule" principle set in the Constitution (new borrowing should be at most equal to public investment).

    ii. Personnel expenditure is limited to 50% of net current revenue for the federal government, and 60% for states and municipalities. Within each level of government, the law further specifies limits for the executive, legislative, judiciary and other offices, where applicable,

    iii. permanent spending mandates cannot be created without permanent revenue increases or spending cuts

7. In Canada, in 1998, the debt repayment plan set out a "balanced budget or better" policy which, however, was not legislated at the federal level. A Contingency Reserve and an economic prudence factor were built into the federal budget and could be devoted to debt reduction. In 2006, the government abandoned the "balanced budget or better" rule with targets of C$3 billion debt reduction, coupled with eliminating net general government debt by 2021 and federal debt by 2013-14 (later changed to 2011-12). Currently, at the federal level, Canada does not have explicit deficit and debt targets. However, a consistent decline in the debt-GDP ratio appears to be a soft anchor.

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[13] https://www.rpc.senate.gov/legislative-notices/hr-3877_the-bipartisan-budget-act-of-2019
[14] https://www.cas.go.jp/jp/seisaku/npu/policy01/pdf/20100706/20100706_fiscalmanagement.pdf
[15] https://www5.cao.go.jp/keizai-shimon/kaigi/cabinet/2018/point_en.pdf

Appendix 2: Real GDP growth and deflator-based inflation rates

Table A1: Real GDP growth: 1997 to 2021

Year	BRA	CAN	PRC	DEU	FRA	IND	ITA	JPN	GBR	USA
1997	3.4	4.3	9.2	1.8	2.3	4.0	1.8	1.1	3.9	4.4
1998	0.3	3.9	7.8	2.0	3.6	6.2	1.8	-1.1	3.6	4.5
1999	0.5	5.2	7.7	1.9	3.4	8.5	1.6	-0.3	3.4	4.8
2000	4.4	5.2	8.5	2.9	3.9	4.0	3.8	2.8	3.4	4.1
2001	1.4	1.8	8.4	1.7	2.0	4.9	2.0	0.4	3.0	1.0
2002	3.1	3.0	9.1	-0.2	1.1	3.9	0.3	0.1	2.3	1.7
2003	1.1	1.8	10.0	-0.7	0.8	7.9	0.1	1.5	3.3	2.9
2004	5.8	3.1	10.2	1.2	2.8	7.8	1.4	2.2	2.4	3.8
2005	3.2	3.2	11.4	0.7	1.7	9.3	0.8	1.7	3.2	3.5
2006	4.0	2.6	12.7	3.8	2.4	9.3	1.8	1.4	2.8	2.9
2007	6.1	2.1	14.3	3.0	2.4	9.8	1.5	1.7	2.4	1.9
2008	5.1	1.0	9.7	1.0	0.3	3.9	-1.0	-1.1	-0.3	-0.1
2009	-0.1	-2.9	9.4	-5.7	-2.9	8.5	-5.3	-5.4	-4.2	-2.5
2010	7.5	3.1	10.6	4.2	1.9	10.3	1.7	4.2	1.9	2.6
2011	4.0	3.1	9.5	3.9	2.2	6.6	0.7	-0.1	1.5	1.6
2012	1.9	1.8	7.9	0.4	0.3	5.5	-3.0	1.5	1.5	2.2
2013	3.0	2.3	7.8	0.4	0.6	6.4	-1.8	2.0	2.1	1.8
2014	0.5	2.9	7.3	2.2	1.0	7.4	0.0	0.4	2.6	2.5
2015	-3.5	0.7	6.9	1.5	1.1	8.0	0.8	1.2	2.4	3.1
2016	-3.3	1.0	6.8	2.2	1.1	8.3	1.3	0.5	1.9	1.7
2017	1.3	3.2	6.9	2.6	2.3	7.0	1.7	2.2	1.9	2.3
2018	1.3	2.0	6.7	1.3	1.8	6.1	0.8	0.3	1.3	3.0
2019	1.1	1.7	6.1	0.6	1.5	4.2	0.3	0.7	1.5	2.2
Average (1997 to 2019)	**2.3**	**2.4**	**8.9**	**1.4**	**1.6**	**6.9**	**0.6**	**0.8**	**2.1**	**2.4**
2020	**-5.8**	**-7.1**	**1.9**	**-6.0**	**-9.8**	**-10.3**	**-10.6**	**-5.3**	**-9.8**	**-4.3**
2021	**2.8**	**5.2**	**8.2**	**4.2**	**6.0**	**8.8**	**5.2**	**2.3**	**5.9**	**3.1**

Source (basic data): IMF World Economic Outlook, October 2020

Table A2: GDP deflator-based inflation: 1997 to 2021

Year	BRA	CAN	PRC	DEU	FRA	IND	ITA	JPN	GBR	USA
1997	7.7	1.1	1.7	0.3	0.9	6.5	2.6	0.5	1.1	1.7
1998	4.9	-0.2	-1.0	0.7	1.0	8.0	2.4	0.0	1.0	1.1
1999	8.0	1.9	-1.3	0.3	0.2	3.4	1.5	-1.3	0.9	1.4
2000	5.6	4.3	2.1	-0.5	1.6	3.5	1.8	-1.4	1.9	2.2
2001	8.2	1.7	2.1	1.3	2.0	3.1	3.0	-1.1	1.0	2.2
2002	9.8	1.2	0.7	1.4	2.1	3.6	3.3	-1.5	2.1	1.6
2003	14.1	3.3	2.7	1.3	1.9	3.8	3.1	-1.6	2.3	1.9
2004	7.8	3.3	6.8	1.1	1.6	5.8	2.7	-1.1	2.5	2.7
2005	7.4	3.1	4.4	0.4	1.9	4.2	2.0	-1.0	2.5	3.1
2006	6.8	2.6	3.8	0.4	2.2	6.4	2.1	-0.9	2.8	3.0
2007	6.4	3.3	7.8	1.8	2.6	5.8	2.5	-0.7	2.6	2.7
2008	8.8	4.0	7.2	0.9	2.4	8.7	2.4	-1.0	2.9	1.9
2009	7.3	-2.3	-0.1	1.8	0.1	6.1	1.7	-0.6	1.7	0.8
2010	8.4	2.8	6.3	0.6	1.1	9.0	0.4	-1.9	1.5	1.2
2011	8.3	3.2	8.2	1.1	0.9	5.2	1.6	-1.7	2.0	2.1
2012	7.9	1.2	3.2	1.5	1.2	7.9	1.5	-0.8	1.7	1.9
2013	7.5	1.7	2.6	2.0	0.8	6.2	1.1	-0.3	1.9	1.8
2014	7.8	1.9	1.0	1.9	0.6	3.3	0.9	1.7	1.8	1.9

2015	7.6	-0.9	0.1	1.9	1.1	2.3	0.9	2.1	0.6	1.0
2016	8.1	0.8	0.9	1.3	0.5	3.2	1.1	0.3	2.1	1.0
2017	3.6	2.5	3.9	1.4	0.5	3.8	0.7	-0.2	1.9	1.9
2018	3.3	1.8	3.5	1.7	1.0	4.6	0.9	-0.1	2.1	2.4
2019	4.2	1.9	2.4	2.2	1.2	2.9	0.9	0.6	1.9	1.8
Average (1997 to 2019)	**7.4**	**1.9**	**3.0**	**1.2**	**1.3**	**5.1**	**1.8**	**-0.5**	**1.9**	**1.9**
2020	**3.4**	**0.8**	**1.1**	**2.0**	**2.0**	**4.4**	**1.2**	**0.3**	**2.9**	**1.4**
2021	**3.3**	**2.5**	**1.7**	**1.9**	**0.3**	**3.0**	**0.9**	**0.3**	**-0.1**	**2.2**

Source (basic data): IMF World Economic Outlook, October 2020

Appendix 3: Simulation results

Table 1: Simulation 1

Selected years (T)	Initial debt level (T-1)	Fiscal deficit	Real growth	Deflator based inflation	Projected debt (end of year T)	Initial debt level (T-1)	Fiscal deficit	Real growth	Deflator based inflation	Projected debt (end of year T)
	Brazil					**India**				
2020	89.5	9.5	-5.8	3.4	101.2	72.3	12.1	-10.3	4.4	88.9
2021	101.2	7.3	2.8	3.3	102.7	88.9	10.1	8.8	3.0	89.8
2022	102.7	7.7	0.3	6.3	104.1	89.8	7.3	6.6	4.3	88.5
2030	112.0	7.7	0.3	6.3	112.9	81.9	7.3	6.6	4.3	81.3
2040	118.6	7.7	0.3	6.3	119.1	78.0	7.3	6.6	4.3	77.7
2050	122.2	7.7	0.3	6.3	122.4	76.5	7.3	6.6	4.3	76.4
	Canada					**Italy**				
2020	88.6	20.0	-7.1	0.8	114.6	134.8	12.8	-10.6	1.2	161.5
2021	114.6	8.7	5.2	2.5	115.1	161.5	5.9	5.2	0.9	158.1
2022	115.1	3.7	1.9	1.4	115.1	158.1	3.3	0.0	1.0	159.8
2030	115.1	3.7	1.9	1.4	115.1	170.9	3.3	0.0	1.0	172.4
2040	115.1	3.7	1.9	1.4	115.1	185.5	3.3	0.0	1.0	186.9
2050	115.1	3.7	1.9	1.4	115.1	198.7	3.3	0.0	1.0	199.9
	People's Republic of China					**Japan**				
2020	52.6	10.6	1.9	1.1	61.7	238.0	15.8	-5.3	0.3	266.1
2021	61.7	10.5	8.2	1.7	66.7	266.1	4.6	2.3	0.3	263.9
2022	66.7	5.9	7.1	2.2	66.9	263.9	5.5	1.1	0.4	265.5
2030	68.1	5.9	7.1	2.2	68.2	275.6	5.5	1.1	0.4	277.0
2040	68.9	5.9	7.1	2.2	69.0	288.4	5.5	1.1	0.4	289.6
2050	69.3	5.9	7.1	2.2	69.3	299.4	5.5	1.1	0.4	300.4
	Germany					**UK**				
2020	59.5	11.2	-6.0	2.0	73.2	85.4	16.1	-9.8	2.9	107.7
2021	73.2	3.2	4.2	1.9	72.2	107.7	9.5	5.9	-0.1	111.2
2022	72.2	-0.3	1.4	1.7	69.7	111.2	3.7	1.9	1.8	111.0
2030	54.2	-0.3	1.4	1.7	52.2	109.6	3.7	1.9	1.8	109.4
2040	37.0	-0.3	1.4	1.7	35.6	108.1	3.7	1.9	1.8	107.9
2050	24.4	-0.3	1.4	1.7	23.3	107.0	3.7	1.9	1.8	106.9
	France					**USA**				
2020	98.1	12.1	-9.8	2.0	118.5	108.7	19.2	-4.3	1.4	131.1
2021	118.5	6.9	6.0	0.3	118.4	131.1	9.1	3.1	2.2	133.7
2022	118.4	3.2	1.2	0.9	119.2	133.7	5.2	2.4	1.7	133.7
2030	124.5	3.2	1.2	0.9	125.2	133.8	5.2	2.4	1.7	133.8
2040	131.0	3.2	1.2	0.9	131.5	133.9	5.2	2.4	1.7	133.9
2050	136.2	3.2	1.2	0.9	136.7	133.9	5.2	2.4	1.7	133.9

Source (basic data): IMF

Table 1: Simulation 2

Selected years (T)	Initial debt level (T-1)	Fiscal deficit	Real growth	Deflator based inflation	Projected debt (end of year T)	Initial debt level (T-1)	Fiscal deficit	Real growth	Deflator based inflation	Projected debt (end of year T)
	Brazil					**India**				
2020	89.5	9.5	-5.8	3.4	101.2	72.3	12.1	-10.3	4.4	88.9
2021	101.2	7.3	2.8	3.3	102.7	88.9	10.1	8.8	3.0	89.8
2022	102.7	6.0	0.3	6.3	102.4	89.8	6.0	6.6	4.3	87.1
2030	100.8	6.0	0.3	6.3	100.6	74.2	6.0	6.6	4.3	73.0
2040	99.5	6.0	0.3	6.3	99.4	66.3	6.0	6.6	4.3	65.9
2050	98.8	6.0	0.3	6.3	98.7	63.5	6.0	6.6	4.3	63.3
	Canada					**Italy**				
2020	88.6	20.0	-7.1	0.8	114.6	134.8	12.8	-10.6	1.2	161.5
2021	114.6	8.7	5.2	2.5	115.1	161.5	5.9	5.2	0.9	158.1

2022	115.1	3.0	1.9	1.4	114.4	158.1	3.0	0.0	1.0	159.5
2030	110.2	3.0	1.9	1.4	109.7	168.8	3.0	0.0	1.0	170.1
2040	105.7	3.0	1.9	1.4	105.4	181.1	3.0	0.0	1.0	182.2
2050	102.5	3.0	1.9	1.4	102.2	192.1	3.0	0.0	1.0	193.2
	People's Republic of China					**Japan**				
2020	52.6	10.6	1.9	1.1	61.7	238.0	15.8	-5.3	0.3	266.1
2021	61.7	10.5	8.2	1.7	66.7	266.1	4.6	2.3	0.3	263.9
2022	66.7	6.0	7.1	2.2	67.1	263.9	3.0	1.1	0.4	263.0
2030	69.0	6.0	7.1	2.2	69.2	256.9	3.0	1.1	0.4	256.1
2040	70.3	6.0	7.1	2.2	70.4	249.3	3.0	1.1	0.4	248.6
2050	70.9	6.0	7.1	2.2	70.9	242.8	3.0	1.1	0.4	242.2
	Germany					**UK**				
2020	59.5	11.2	-6.0	2.0	73.2	85.4	16.1	-9.8	2.9	107.7
2021	73.2	3.2	4.2	1.9	72.2	107.7	9.5	5.9	-0.1	111.2
2022	72.2	3.0	1.4	1.7	73.0	111.2	3.0	1.9	1.8	110.3
2030	78.1	3.0	1.4	1.7	78.7	104.8	3.0	1.9	1.8	104.1
2040	83.7	3.0	1.4	1.7	84.2	98.9	3.0	1.9	1.8	98.4
2050	87.8	3.0	1.4	1.7	88.2	94.8	3.0	1.9	1.8	94.5
	France					**USA**				
2020	98.1	12.1	-9.8	2.0	118.5	108.7	19.2	-4.3	1.4	131.1
2021	118.5	6.9	6.0	0.3	118.4	131.1	9.1	3.1	2.2	133.7
2022	118.4	3.0	1.2	0.9	119.0	133.7	3.0	2.4	1.7	131.5
2030	122.9	3.0	1.2	0.9	123.4	118.2	3.0	2.4	1.7	116.6
2040	127.6	3.0	1.2	0.9	128.0	104.7	3.0	2.4	1.7	103.6
2050	131.4	3.0	1.2	0.9	131.7	95.6	3.0	2.4	1.7	94.9

Source (basic data): IMF

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