

Insights Using the Public Finances in Modern History Database: Evolution of Government Gross Debt, Interest Expense, Primary Expenditure, Total Expenditure, and Revenue Around the World

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Insights Using the Public Finances in Modern History Database



- We use the Public Finances in Modern History Database assembled by Paolo Mauro, Rafael Romeu, Ariel J Binder and Asad Zaman to analyze the evolution of key public finance variables over time.
- Fiscal variables include government gross debt, interest expense, primary expenditure, total expenditure, and revenue, all as percentage of GDP.
- Using the whole database, Panel data regressions show that government gross debt is positively correlated with interest expense and primary expenditure, while it is negatively correlated with revenue and real GDP growth.
- Meanwhile, with the Panel data regression, primary expenditure is negatively correlated with interest expense and real GDP growth, while it is positively correlated with revenue and gross government debt.
- In addition, we show how government gross debt, interest expense, primary expenditure, total expenditure, and revenue behaved in the 1970 to 2021 period.
- We show mean and median values for each variable, and we show the evolution of percentage ranges over time for 1970, 1980, 1990, 2000, 2010 and 2021.
- We provide information on the number of countries in which each variable increased or decreased from 1970 to 1980, from 1980 to 1990, from 1990 to 2000, from 2000 to 2010 and from 2010 to 2021.
- In addition, for each country in the sample, we show how each variable compared in 2000, 2010 and 2021.

Insights Using the Public Finances in Modern History Database (cont.)



- We observe that after an important reduction from 2000 to 2010, gross government debt has been increasing over time, especially in the 2019 to 2021 period in response to the fiscal deficits due to COVID-19. From 2000 to 2021, gross government debt, as a percentage of GDP, increased in 93 countries, while it decreased in 49.
- According to Eichengreen et al. (2019)*, debt in the 20th century resulted from major wars, recessions, banking panics, and financial crises and the public-policy responses to those events, and from increasing economic development initiatives led by national governments.
- Government interest expense rose from 1970 to 1990, but decreased in 2000 and 2010, while for 2021, despite the presence of negative long-term real interest rates, it increased mainly due to the larger debt. From 2000 to 2021, government interest expense, as a percentage of GDP, increased in 50 countries, while it decreased in 92.
- Primary expenditure has been increasing overtime in line with Yared (2019)** that points out that in the last four decades, debt has increased because of an aging population, rising political polarization, and rising electoral uncertainty that have pushed towards granting pensions, health care, and other often unfunded social services. From 2000 to 2021, primary expenditure, as a percentage of GDP, increased in 123 countries, while it decreased in 19.
- The augmenting effect of primary expenditure has caused that from 2000 to 2021, total expenditure as percentage of GDP, increased in 116 countries and decreased in 27.
- Government revenue has also been increasing over time. From 2000 to 2021, government revenue, as a percentage of GDP, increased in 88 countries, while it decreased in 55 countries.
- Therefore, the public sector has been increasing its relative size in the economy.

* Eichengreen, Barry, El-Ganaiyu Asmaa, Pedro Esteves Rui and Mitchener Kris James (2019). Public Debt through the Ages in S. Ali Abbas, Alex Pienkowski and Kenneth Rogoff, editors, *Sovereign Debt: A Guide for Economists and Practitioners*, Oxford University Press.

** Yared, Pierre (2019). Rising Government Debt: Causes and Solutions for a Decades-Old Trend. *Journal of Economic Perspectives*, 33: 2.



Overview of Public Finances in Modern History Database

Paolo Mauro, Rafael Romeu, Ariel J Binder and Asad Zaman

144 countries in the 1800 to 2021 span (up to 31,968 datapoints per variable)

Variable, Units (# of observations)	Mean	Std. Dev.	Min	1%	5%	10%	25%	50%	75%	90%	95%	99%	Max
Government Gross Debt, % of GDP (8,577)	51.45	41.42	0.00	2.56	7.47	12.18	22.16	41.03	67.82	103.01	132.46	203.95	495.20
Government Interest Expense, % of GDP (7,889)	2.23	2.18	0.00	0.03	0.16	0.30	0.75	1.61	2.97	4.77	6.36	10.34	24.61
Government Primary Expenditure, % of GDP (7,835)	23.16	17.55	0.56	1.54	4.83	6.45	12.01	20.40	31.88	42.70	48.08	61.37	587.11
Government Expenditure, % of GDP (8,752)	24.06	17.76	0.68	1.95	5.17	7.07	12.42	20.85	33.13	44.95	50.94	63.00	594.77
Government Revenue, % of GDP (8,731)	21.73	14.42	0.51	2.27	4.70	6.24	10.81	18.50	29.95	42.44	48.39	60.33	153.37
Government Primary Balance, % of GDP (7,835)	-0.23	11.00	-549.84	-14.44	-6.45	-4.30	-1.81	0.13	1.98	4.28	6.46	13.90	47.77
Real Long-Term Interest Rate, % (3,441)	2.49	5.67	-47.06	-15.98	-5.04	-2.08	0.47	2.54	4.84	7.52	10.02	16.60	75.60
Real GDP Growth Rate, % (11,542)	3.53	7.03	-58.68	-14.12	-5.33	-2.28	1.05	3.59	6.10	8.99	11.30	19.61	246.87

Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

Correlates of Debt and Primary Expenditure (both as % of GDP) from 1800 to 2021



	Debt (% of GDP) OLS	Debt (% of GDP) Random-Effects GLS	Debt (% of GDP) Fixed-Effects GLS	Primary Expenditure (% of GDP) OLS	Primary Expenditure (% of GDP) Random-Effects GLS	Primary Expenditure (% of GDP) Fixed-Effects GLS
Constant	33.40 *** (0.77)	35.10 *** (1.83)	34.26 *** (0.77)	-0.10 (0.30)	0.47 (0.49)	0.18 (0.34)
Interest Expense (% of GDP)	10.03 *** (0.18)	9.04 *** (0.19)	8.99 *** (0.19)	-0.34 *** (0.07)	-0.20 ** (0.08)	-0.16 * (0.09)
Primary Expenditure (% of GDP)	0.36 *** (0.03)	0.30 *** (0.03)	0.29 *** (0.03)			
Revenue (% of GDP)	-0.40 *** (0.04)	-0.33 *** (0.04)	-0.32 *** (0.04)	0.94 *** (0.01)	0.93 *** (0.01)	0.93 *** (0.01)
Real GDP Growth Rate (%)	-0.70 *** (0.07)	-0.64 *** (0.05)	-0.63 *** (0.05)	0.05 ** (0.02)	-0.06 *** (0.02)	-0.09 *** (0.02)
Debt (% of GDP)				0.04 *** (0.004)	0.05 *** (0.004)	0.05 *** (0.004)
R-squared	0.3340	0.3339	0.3339	0.6105	0.6086	0.6078
Prob > F OLS and FE GLS, Prob > chi2 RE GLS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observations	7,576	7,576	7,576	7,576	7,576	7,576

Note: Standard errors in parenthesis. *, **, and *** denote that the coefficient is statistically significant different from zero at the 90%, 95% and 99% confidence interval.

Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

How did these key public finance variables behave from 1970 to 2021? Median over decades.



Variable, Units	Mean	1970	1980	1990	2000	2010	2021
	Median						
Government Gross Debt, % of GDP	Mean	28.50	37.46	59.81	59.03	45.92	69.35
	Median	20.49	33.86	53.82	54.19	38.17	62.95
Government Interest Expense, % of GDP	Mean	1.38	2.42	3.70	3.02	1.85	2.00
	Median	1.01	2.02	3.00	2.41	1.33	1.74
Government Primary Expenditure, % of GDP	Mean	22.36	26.92	28.12	26.21	30.47	31.67
	Median	21.30	22.38	23.40	23.49	28.35	29.41
Government Expenditure, % of GDP	Mean	22.55	28.86	31.64	29.14	32.32	33.67
	Median	20.50	24.71	26.64	25.62	31.14	32.20
Government Revenue, % of GDP	Mean	20.98	25.66	26.84	27.80	29.55	29.38
	Median	17.62	22.07	22.09	23.67	26.92	26.63
Government Primary Balance, % of GDP	Mean	-0.05	-0.88	-1.14	1.67	-0.92	-2.29
	Median	0.04	-0.76	0.80	0.81	-0.89	-2.59
Real Long-Term Interest Rate, %	Mean	3.30	-0.79	4.69	2.61	2.14	-0.40
	Median	2.83	0.32	6.00	3.13	1.93	-0.84
Real GDP Growth Rate, %	Mean	6.15	3.97	2.81	4.63	4.05	5.43
	Median	5.79	3.12	3.20	4.07	3.98	4.86

Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>



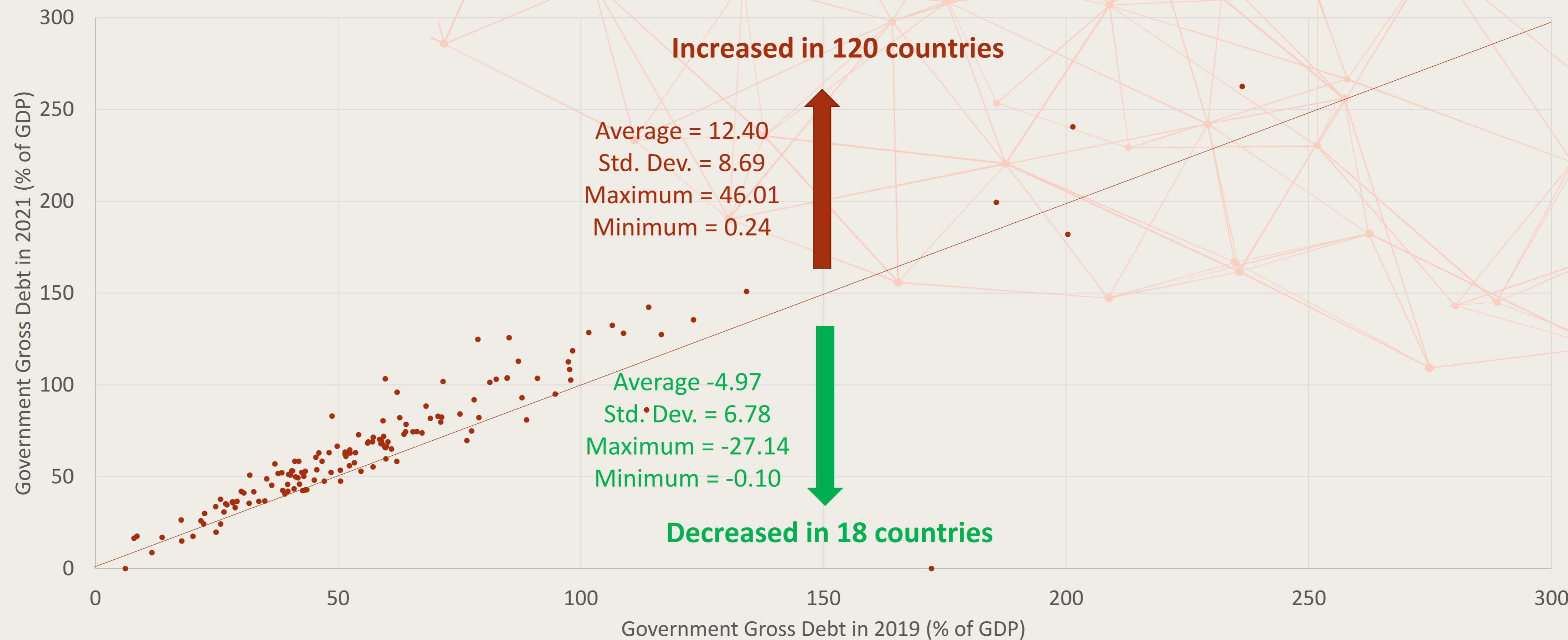
How do these key public finance variables behave from 1970 to 2021?

Number of countries for which the variable increased or decreased over decades.

Variable, Units	Direction of Change	1970 vs 1980	1980 vs 1990	1990 vs 2000	2000 vs 2010	2010 vs 2021	2000 vs 2021
Government Gross Debt, % of GDP	Increased	27	40	46	49	124	93
	Decreased	21	10	42	94	18	49
Government Interest Expense, % of GDP	Increased	36	39	44	31	86	50
	Decreased	3	7	50	112	57	92
Government Primary Expenditure, % of GDP	Increased	33	21	46	120	92	123
	Decreased	6	25	46	23	51	19
Government Expenditure, % of GDP	Increased	41	28	51	108	96	116
	Decreased	9	23	42	36	47	27
Government Revenue, % of GDP	Increased	42	35	57	88	78	88
	Decreased	8	16	36	56	65	55
Government Primary Balance, % of GDP	Increased	20	25	52	84	68	89
	Decreased	19	21	40	59	75	53
Real Long-Term Interest Rate, %	Increased	12	12	6	10	46	33
	Decreased	9	13	24	35	13	11
Real GDP Growth Rate, %	Increased	60	52	58	72	79	81
	Decreased	60	70	67	72	64	62

Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

Government Gross Debt in 2019 and 2021 (% of GDP)



Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

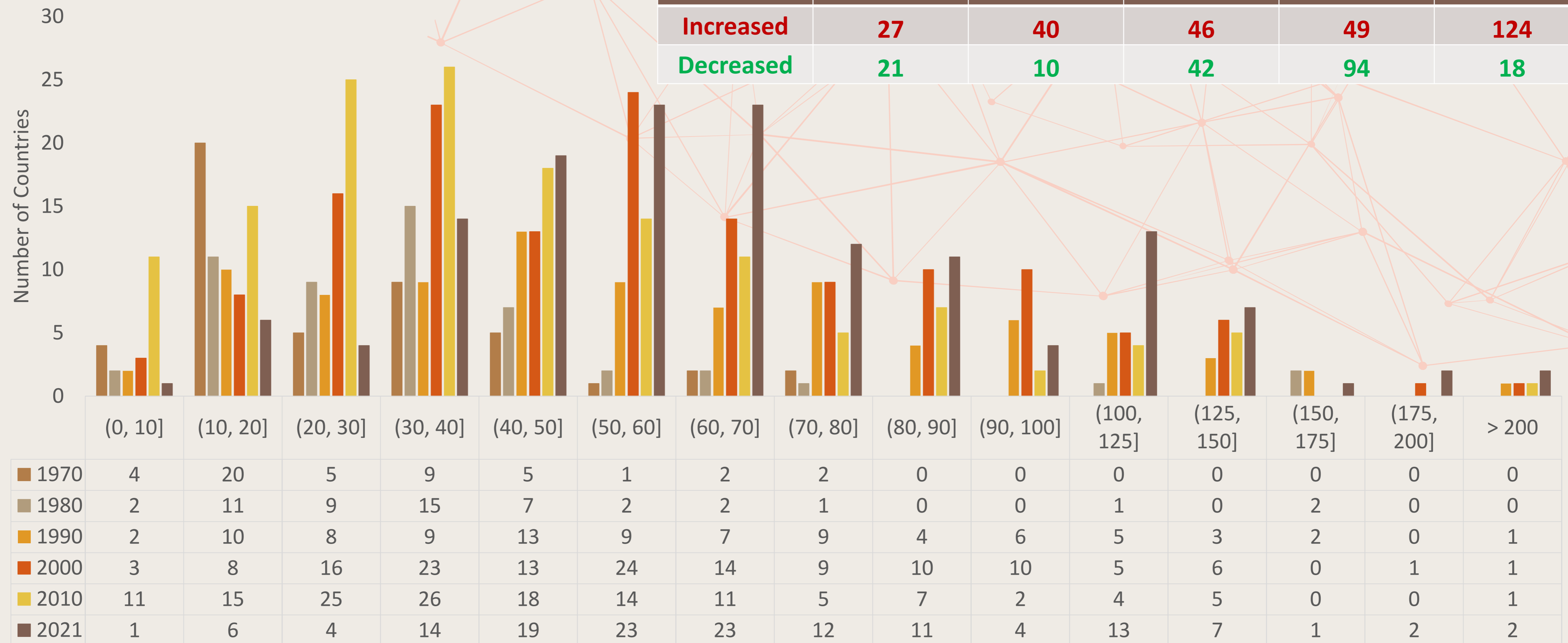
Government Gross Debt (% of GDP)

Evolution of Ranges Across Decades 1970, 1980, 1990, 2000, 2010 and 2021



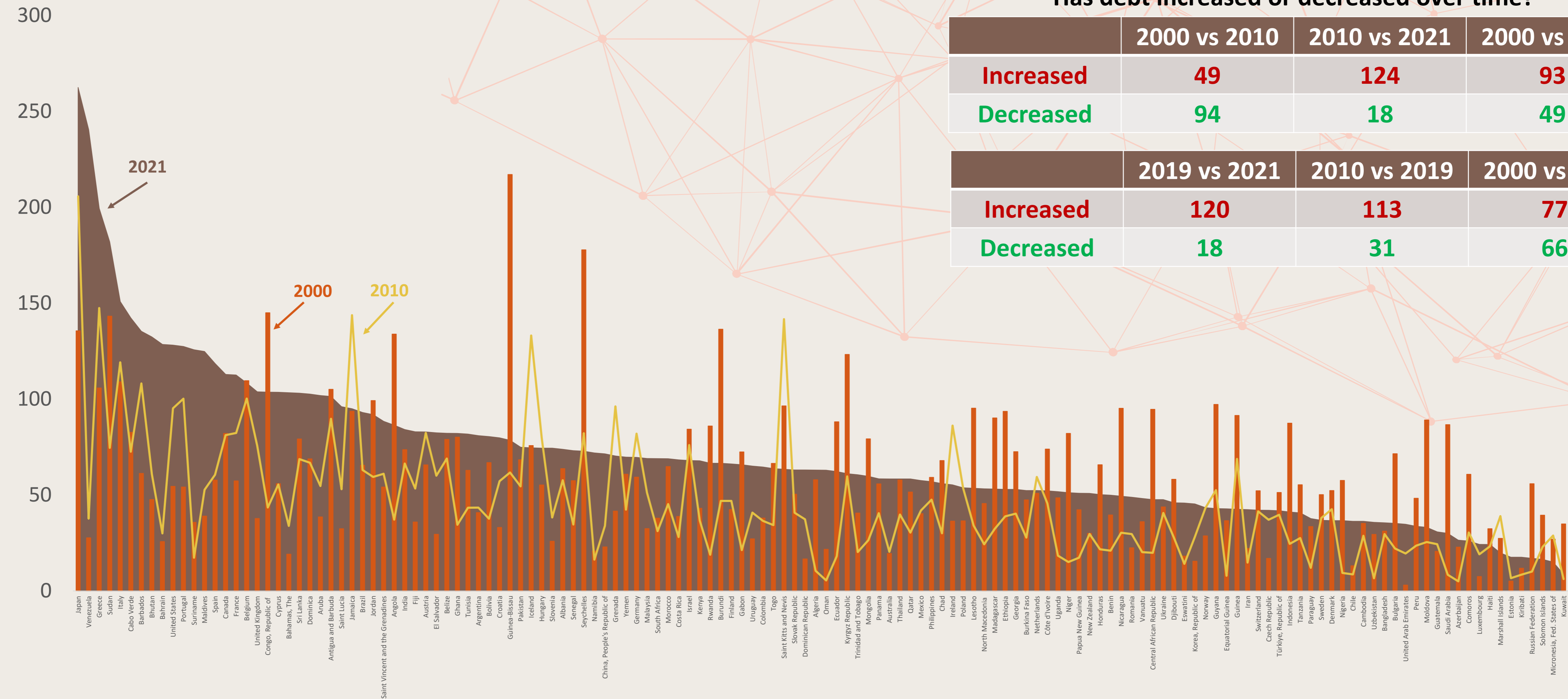
Has debt increased or decreased over time?

	1970 vs 1980	1980 vs 1990	1990 vs 2000	2000 vs 2010	2010 vs 2021
Increased	27	40	46	49	124
Decreased	21	10	42	94	18



Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

Government Gross Debt (% of GDP) in 2000, 2010 and 2021 Around the World



Has debt increased or decreased over time?

	2000 vs 2010	2010 vs 2021	2000 vs 2021
Increased	49	124	93
Decreased	94	18	49

	2019 vs 2021	2010 vs 2019	2000 vs 2019
Increased	120	113	77
Decreased	18	31	66

Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

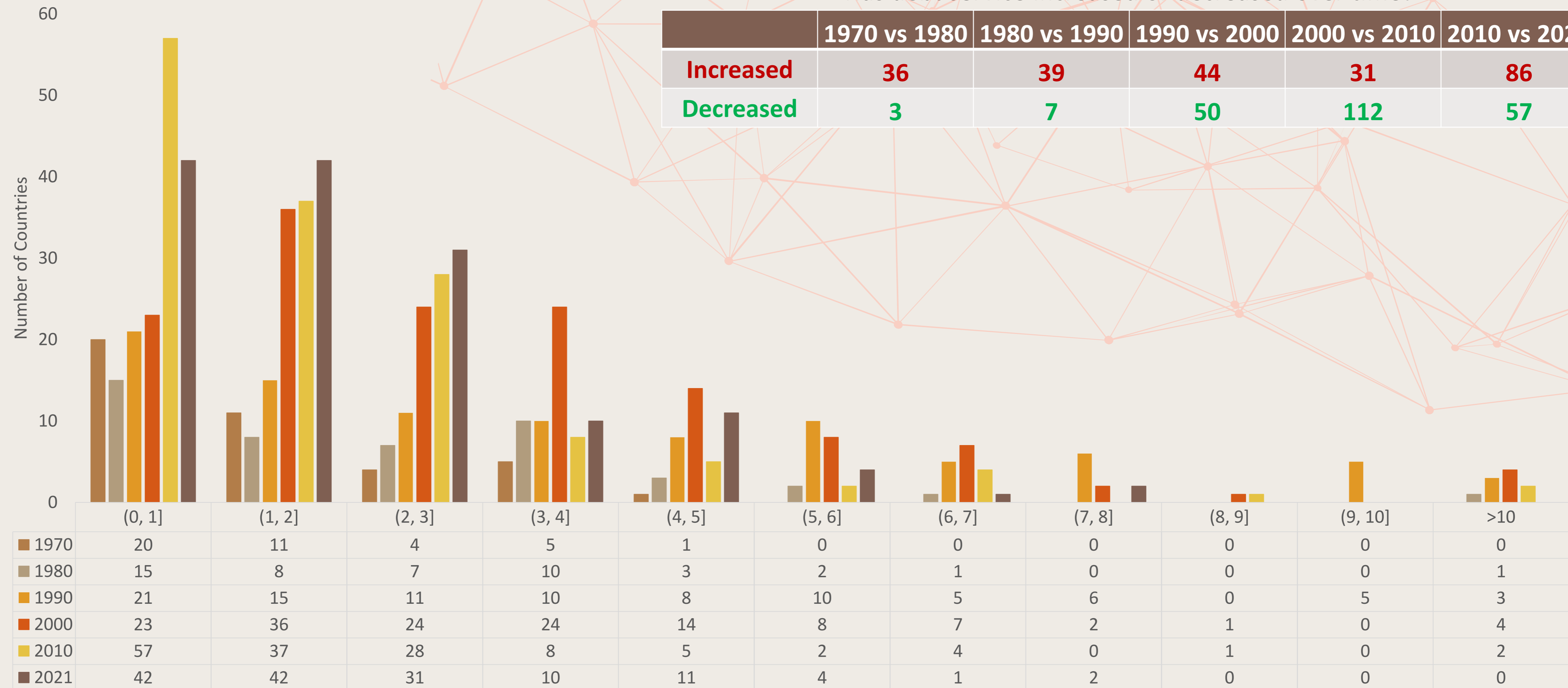
Government Interest Expense (% of GDP)

Evolution of Ranges Across Decades 1970, 1980, 1990, 2000, 2010 and 2021



Has debt service increased or decreased over time?

	1970 vs 1980	1980 vs 1990	1990 vs 2000	2000 vs 2010	2010 vs 2021
Increased	36	39	44	31	86
Decreased	3	7	50	112	57



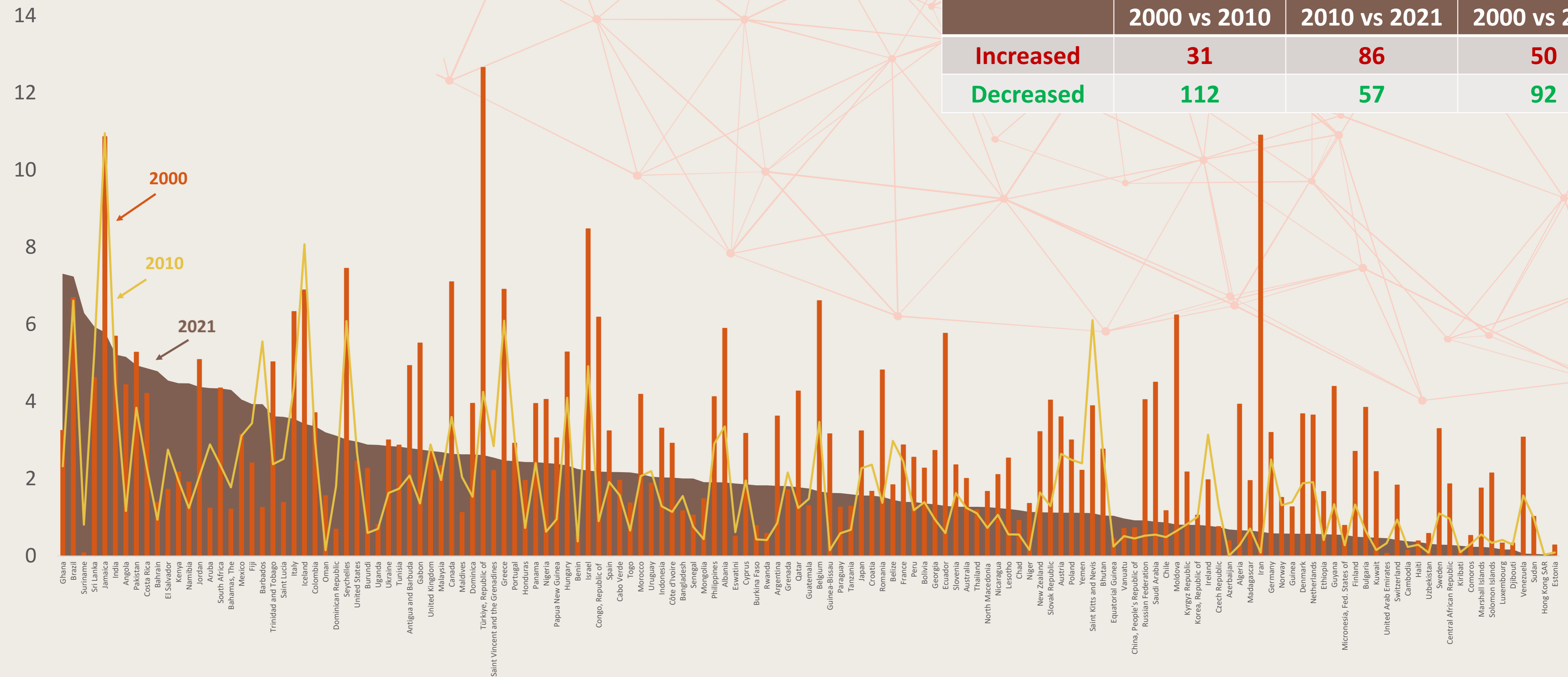
Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

Government Interest Expense (% of GDP) in 2000, 2010 and 2021 Around the World



Has debt service increased or decreased over time?

	2000 vs 2010	2010 vs 2021	2000 vs 2021
Increased	31	86	50
Decreased	112	57	92



Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

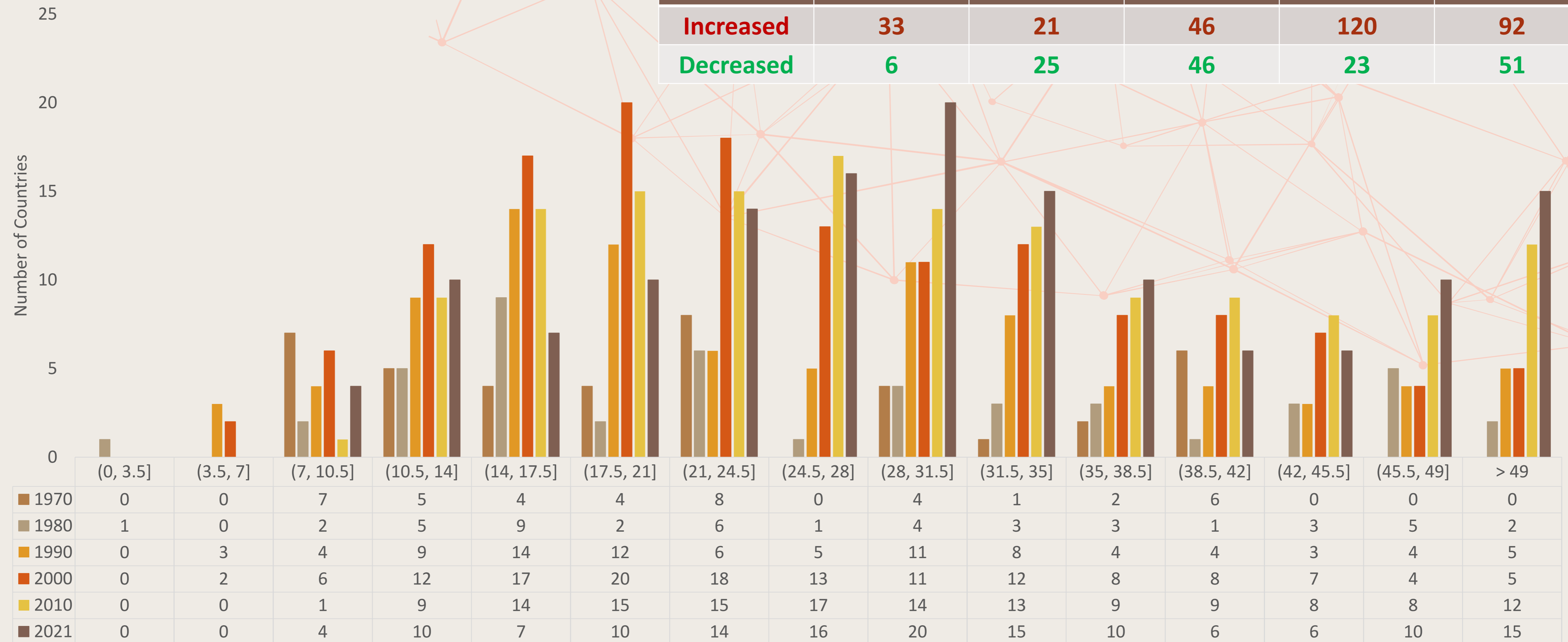
Government Primary Expenditure (% of GDP)

Evolution of Ranges Across Decades 1970, 1980, 1990, 2000, 2010 and 2021



Has government primary expenditure increased or decreased over time?

	1970 vs 1980	1980 vs 1990	1990 vs 2000	2000 vs 2010	2010 vs 2021
Increased	33	21	46	120	92
Decreased	6	25	46	23	51



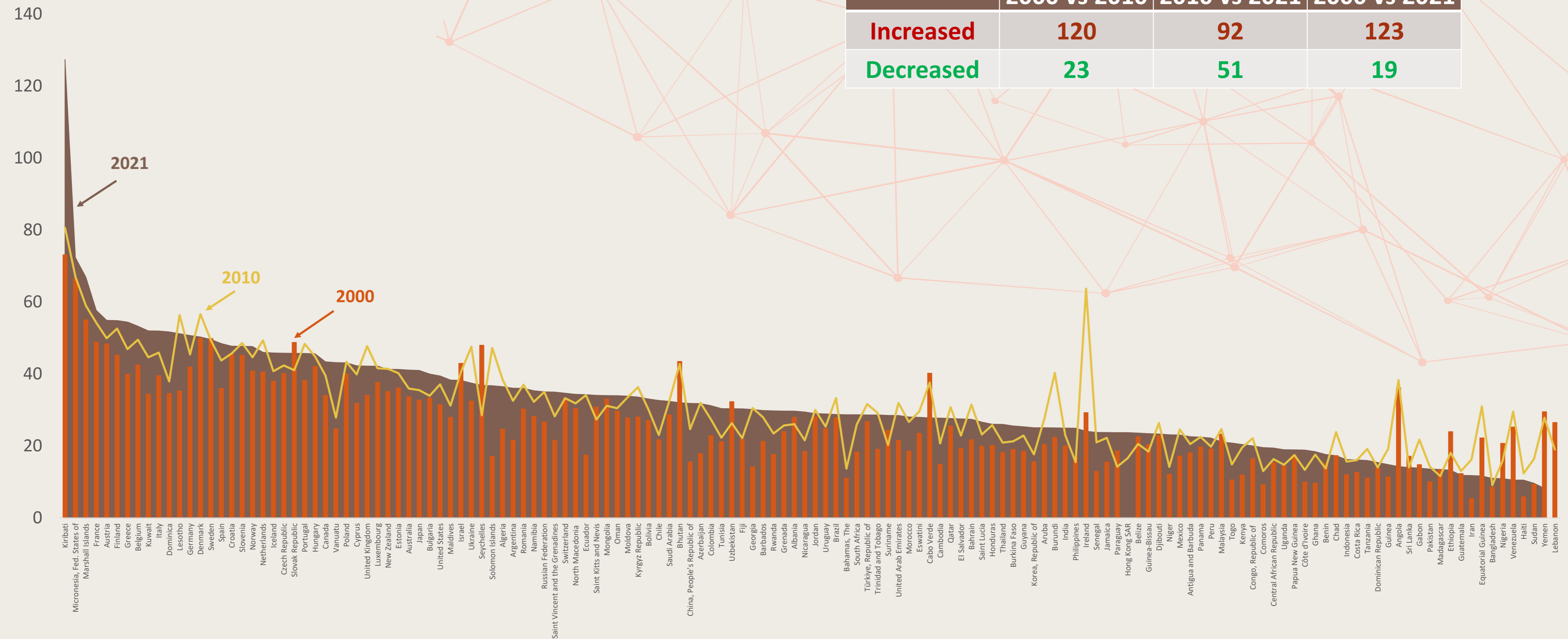
Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

Government Primary Expenditure (% of GDP) in 2000, 2010 and 2021 Around the World



Has government primary expenditure increased or decreased over time?

	2000 vs 2010	2010 vs 2021	2000 vs 2021
Increased	120	92	123
Decreased	23	51	19



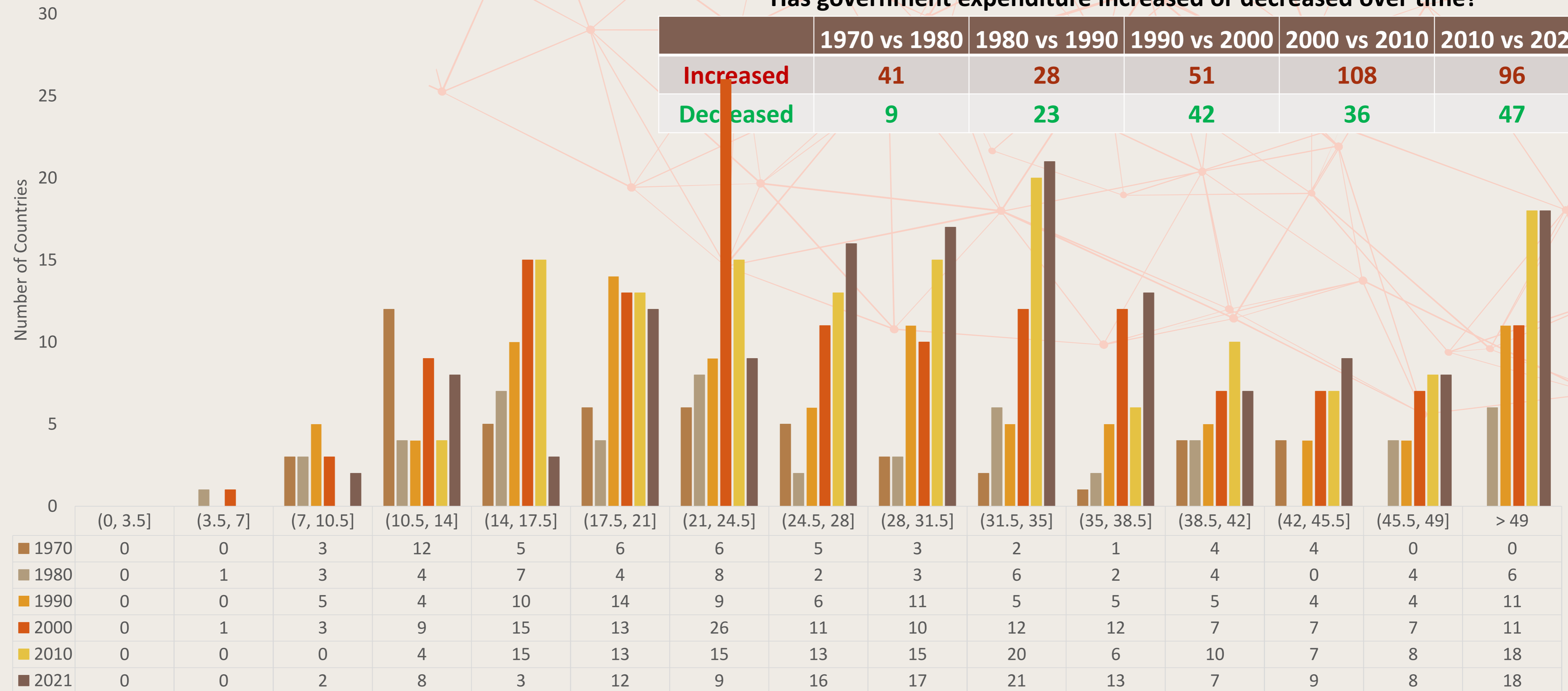
Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

Government Expenditure (% of GDP) Evolution of Ranges Across Decades 1970, 1980, 1990, 2000, 2010 and 2021



Has government expenditure increased or decreased over time?

	1970 vs 1980	1980 vs 1990	1990 vs 2000	2000 vs 2010	2010 vs 2021
Increased	41	28	51	108	96
Decreased	9	23	42	36	47



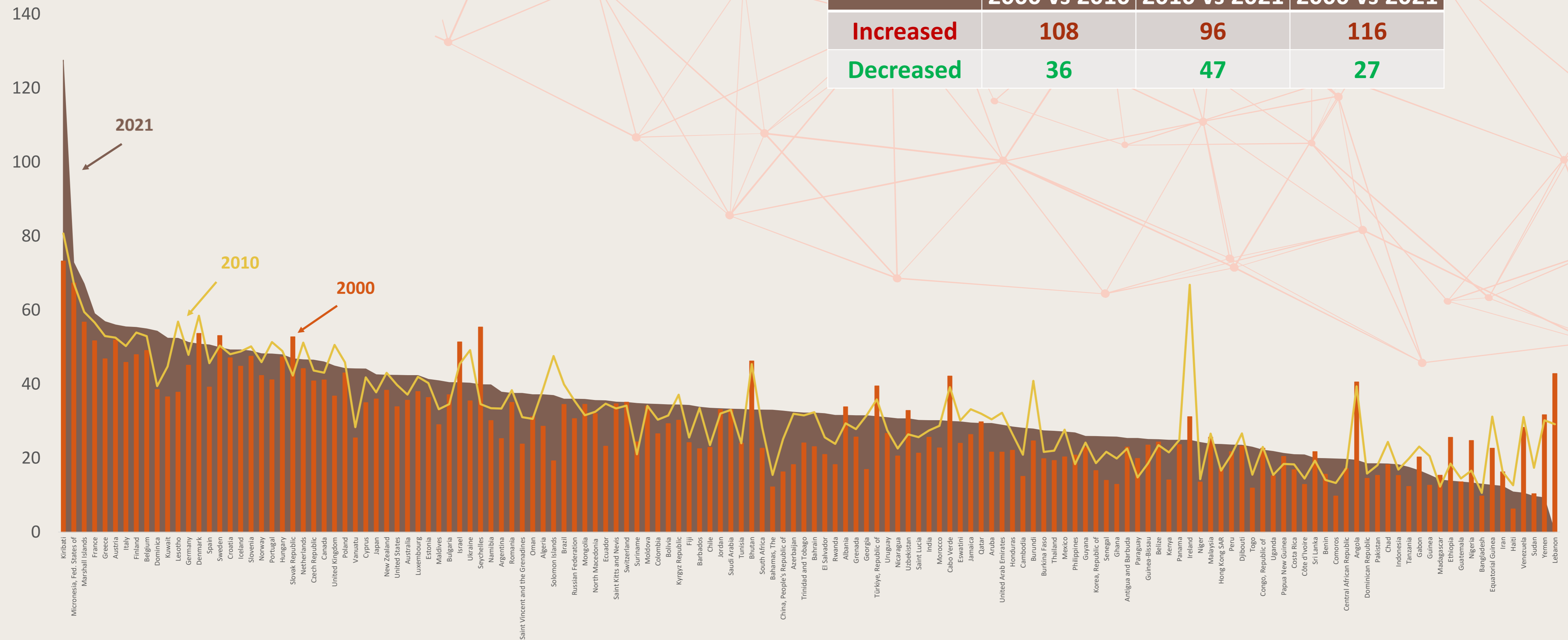
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Government Expenditure (% of GDP) in 2000, 2010 and 2021 Around the World



Has government expenditure increased or decreased over time?

	2000 vs 2010	2010 vs 2021	2000 vs 2021
Increased	108	96	116
Decreased	36	47	27



Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

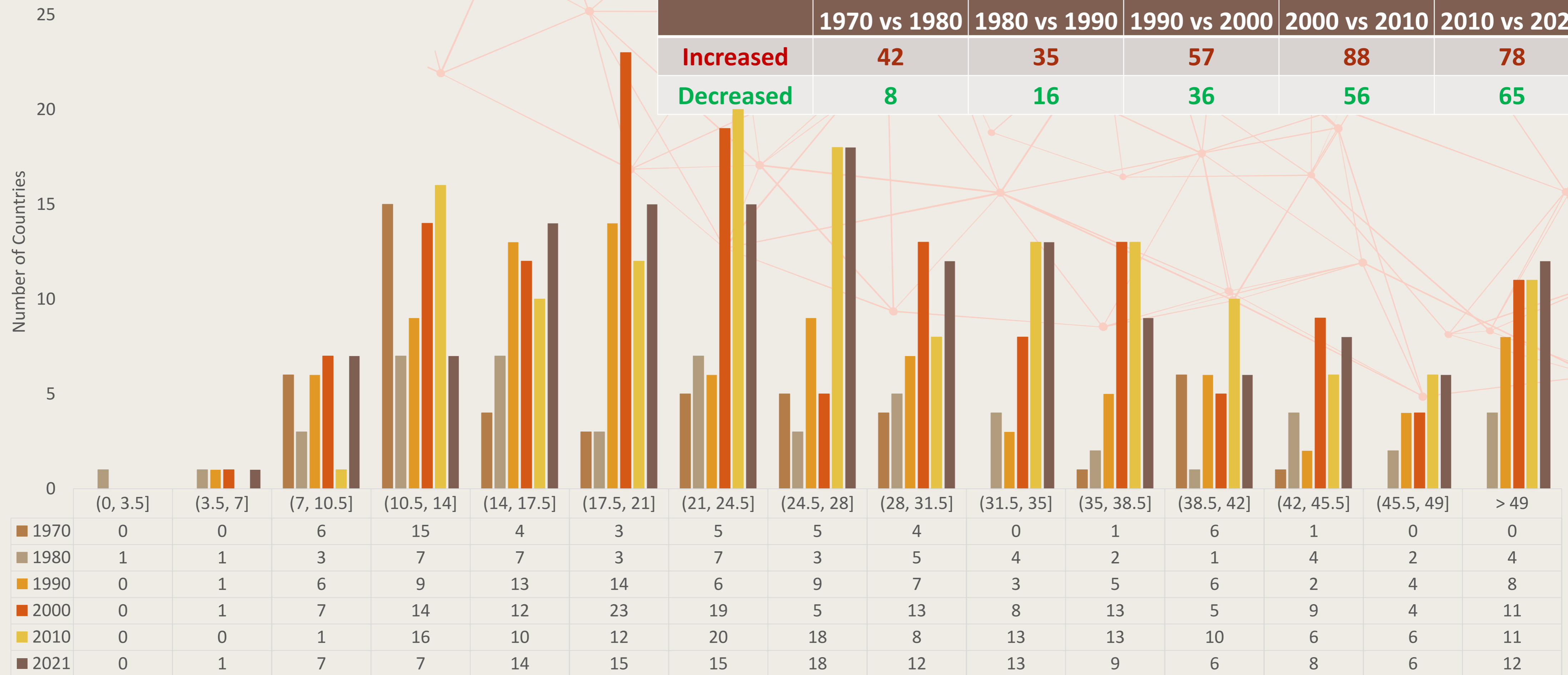
Government Revenue (% of GDP)

Evolution of Ranges Across Decades 1970, 1980, 1990, 2000, 2010 and 2021



Has government revenue increased or decreased over time?

	1970 vs 1980	1980 vs 1990	1990 vs 2000	2000 vs 2010	2010 vs 2021
Increased	42	35	57	88	78
Decreased	8	16	36	56	65



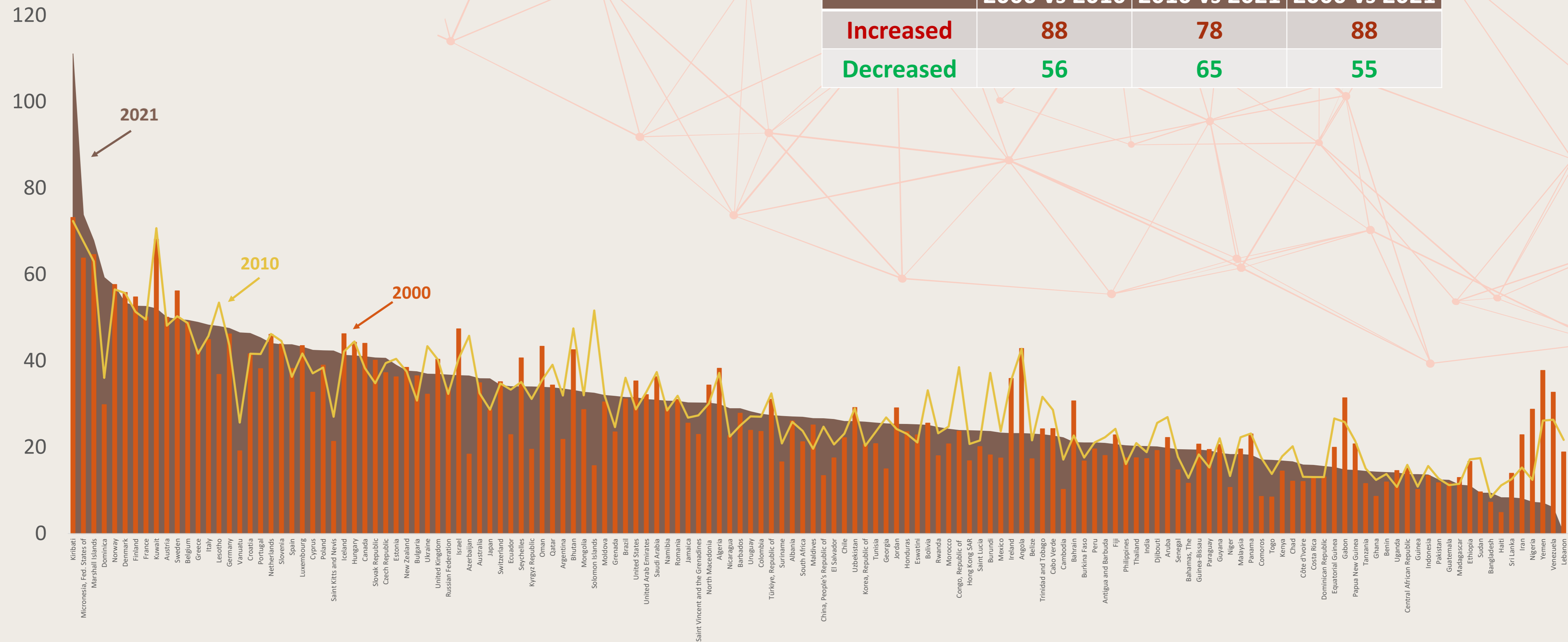
Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>

Government Revenue (% of GDP) in 2000, 2010 and 2021 Around the World



Has government revenue increased or decreased over time?

	2000 vs 2010	2010 vs 2021	2000 vs 2021
Increased	88	78	88
Decreased	56	65	55



Source: Own analysis using information from <https://www.imf.org/external/datamapper/datasets/FPP>