SUPPLEMENTARY APPENDIX
(FOR ONLINE PUBLICATION)

FISCAL POLICY AND INCOME INEQUALITY IN MIDDLE- AND HIGH-INCOME COUNTRIES: REDISTRIBUTIVE EFFECTS OF TAX AND SPENDING SHOCKS

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ACCEPTED VERSION AT MACROECONOMIC DYNAMICS: MARCH 2024

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Appendix A. Literature, Method and Data

A.1 Literature on developing countries

Table (A1) Related Studies

Study	Geographical Coverage	Time Period	Methodology	Fiscal Policy	Findings	Observation
Ospina (2010)	19 Latin American countries	1980-2000	2SLS and GMM	Social Spending	Government spending on healthcare results in a more equal income distribution.	The time dimension is greater than the cross-sections, meanwhile, the GMM technique is more applicable to short panels.
Martinez et al. (2012)	150 Developed and Developing countries across the globe	1970-2009	Difference GMM	Taxes and social spending	The income distribution becomes more egalitarian due to progressive taxes and social spending	Does not evaluate the impact of the fiscal policy variables on different income percentiles.
Claus et al. (2012)	150 Developed, Developing and Transition economies	1970-2009	Difference GMM	Public spending and taxation	Inequality decreases with a rise in the GDP share of government spending (particularly social sectors).	Does not examine the impact of government spending on different income percentiles.
Anyanwu et al. (2016)	17 West African nations (Comprising Middle and Low-Income Countries)	1970-2011	System GMM	Government spending	Inequality increases with an increase in total public expenditure on public goods and redistributive policies.	Use of the GMM technique is more suitable for short panels, rather than long ones, as employed in the study
Bergh et al. (2020)	140 Countries across varying income levels	1970-2010	Fixed Effect and system GMM estimator	Social spending	In the face of globalisation, all types of social security examined are ineffective at reducing inequality.	Does not consider the dynamic effect of public spending shocks on income inequality.
Furceri et al. (2022)	103 Developing countries across the world	1990-2015	Local Projection Method	Fiscal consolidation through public spending	The economic divide widens persistently, following the implementation of austerity measures within developing countries	Local projection estimators tend to have a relatively high bias as well as variance, often leading to inaccurate confidence intervals.
Howie and Atakhanova (2014)	Kazakhstan	1996-2009	Dynamic panel data model	Health spending	While public health programmes have no detectable effect on the lowest half of the distribution, they do reduce inequality in rural regions.	Does not consider the long-run effects of the health programmes on income inequality.
Lustig (2016)	28 Low and Middle-income countries	2010	Commitment to Equity (CEQ) methodology	Health spending	Public healthcare expenditure fails to close the income gap in the presence of healthcare services which disproportionally benefit the wealthy.	Long-term redistributive effect of publicly sponsored health programmes are not examined.
Furceri and Li (2017)	79 Developing countries	1990-2013	Local Projection Method	Public investment	Income inequality falls, following a rise in public investment	Inequality measure employed focuses on the Gini index.

Table (1) Continued: Related Studies

Study	Geographical Coverage	Time Period	Methodology	Fiscal Policy	Findings	Observation
Rudra (2004)	Developing (35) and industrialized countries (11)	1972-1996	Instrumental Variables methods	Health spending	In less developed countries, government spending on healthcare fails to lower income inequality.	Focuses on the Gini index without examining alternative inequality measures.
Coady and Dizioli (2018)	103 Advanced and Emerging countries across several regions	1990–2005	OLS, SURE, Fixed Effects and GMM.	Education spending	Inequality declines in developing nations when the average number of years spent in education increases for adults aged 25.	Does not analyse the response of the income distribution to education expenditure shocks.
Battistón et al. (2014)	18 Latin American countries	1990-2009	Microsimulation using individual earnings equations.	Education spending	Expenditures raising school enrolment tend to exacerbate economic disparity.	The effect of public education spending on the percentile income shares of various income categories is not examined.
Castelló and Doménech (2014)	146 Countries across different income levels	1950–2010	OLS, Fixed Effects and some Instrumental Variables techniques.	Education spending	In situations in which having a higher education enhances the odds of earning a better pay, increasing the average number of years spent in school promotes inequality.	Does not examine the impact of education spending on different income percentiles.
Sauer et al. (2020)	73 countries across the world	1981-2010	Fixed Effects	Taxation	Taxation as well as imports from low-income nations help offset the disequalizing impacts of falling labour income shares.	Focuses on Gini index and does not explore alternative inequality measures
Alavuotunki et al. (2019)	138 Developed and Developing Countries	1975–2010	Fixed Effects OLS Model	Taxation	Due to the tax programmes considered, income inequality has worsened.	Does not examine the impact of tax shocks on the economic divide.
Duncan and Sabirianova (2016)	Large sample of developed and developing countries	1981-2005	Instrumental Variables	Taxation	As the tax system becomes more progressive, inequality in observed income declines. Meanwhile, progressive tax systems exhibit notably less pronounced impacts on actual inequality.	Long-term redistributive effect of publicly sponsored health programmes are not examined
Hollar and Cubero (2010)	Central America	Integrates data from existing tax and public expenditure studies (typically ranging between 1995-2003)	GMM	Tax and social spending	While taxation is regressive, social spending tends to be equalizing, meanwhile, the distribution and total amount of social spending Central America is not enough to reduce inequality in the region	Does not examine the impact of tax shocks on the economic divide

A.2 Additional Technical Information

In arriving at equation (**??**), we begin with the structural VAR models in equations (1) to (3) below:

$$GS_{it} = \beta_{10} + \beta_{12}Tax_{it} + \beta_{13}Gini_{it} + \gamma_{11}GS_{it-1} + \gamma_{12}Tax_{it-1} + \gamma_{13}Gini_{it-1} + U_{GSit} \quad (1)$$

$$Tax_{it} = \beta_{20} + \beta_{22}GS_{it} + \beta_{23}Gini_{it} + \gamma_{21}GS_{it-1} + \gamma_{22}Tax_{it-1} + \gamma_{23}Gini_{it-1} + U_{Taxit} \quad (2)$$

$$Gini_{it} = \beta_{30} + \beta_{32}GS_{it} + \beta_{33}Tax_{it} + \gamma_{31}GS_{it-1} + \gamma_{32}Tax_{it-1} + \gamma_{33}Gini_{it-1} + U_{Giniit} \quad (3)$$

Equations (1) to (3) represent the structural VAR equations. The reverse-causality/contemporaneous feedback in the structural VAR models above results in endogeneity bias; and as such we transform the structural VAR in order to eliminate the feedback. For this purpose, we move the contemporaneous variables in equations (1) to (3) to the left-hand side of each equation and thus obtain equations (4) to (6) below:

$$GS_{it} - \beta_{12}Tax_{it} - \beta_{13}Gini_{it} = \beta_{10} + \gamma_{11}GS_{it-1} + \gamma_{12}Tax_{it-1} + \gamma_{13}Gini_{it-1} + U_{GSit} \quad (4)$$

$$-\beta_{22}GS_{it} + Tax_{it} - \beta_{23}Gini_{it} = \beta_{20} + \gamma_{21}GS_{it-1} + \gamma_{22}Tax_{it-1} + \gamma_{23}Gini_{it-1} + U_{Taxit} \quad (5)$$

$$-\beta_{32}GS_{it} - \beta_{33}Tax_{it} + Gini_{it} = \beta_{30} + \gamma_{31}GS_{it-1} + \gamma_{32}Tax_{it-1} + \gamma_{33}Gini_{it-1} + U_{Giniit} \tag{6}$$

Using matrices, equations (4) to (6) can be denoted as:

$$\begin{pmatrix} 1 & -\beta_{12} & -\beta_{13} \\ -\beta_{22} & 1 & -\beta_{23} \\ -\beta_{32} & -\beta_{33} & 1 \end{pmatrix} \begin{pmatrix} GS_{it} \\ Tax_{it} \\ Gini_{it} \end{pmatrix} = \begin{pmatrix} \beta_{10} \\ \beta_{20} \\ \beta_{30} \end{pmatrix} + \begin{pmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} \end{pmatrix} \begin{pmatrix} GS_{it-1} \\ Tax_{it-1} \\ Gini_{it-1} \end{pmatrix} + \begin{pmatrix} U_{GSit} \\ U_{Taxit} \\ U_{Giniit} \end{pmatrix} \tag{7}$$

and with matrix algebra, equation (7) can be simplified as:

$$BY_{it} = \Gamma_0 + \Gamma_1 Y_{t-1} + U_t \tag{8}$$

$$where\ \ B = \begin{pmatrix} 1 & -\beta_{12} & -\beta_{13} \\ -\beta_{22} & 1 & -\beta_{23} \\ -\beta_{32} & -\beta_{33} & 1 \end{pmatrix}, Y_{it} = \begin{pmatrix} GS_{it} \\ Tax_{it} \\ Gini_{it} \end{pmatrix}, \Gamma_0 = \begin{pmatrix} \beta_{10} \\ \beta_{20} \\ \beta_{30} \end{pmatrix}, \Gamma_1 = \begin{pmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} \end{pmatrix}, U_t = \begin{pmatrix} U_{GSit} \\ U_{Taxit} \\ U_{Giniit} \end{pmatrix} \tag{9}$$

To solve for Y_{it} in equation (8) above, we multiply both sides by B^{-1}, and this gives:

$$Y_{it} = A_0 + A_1 Y_{it-1} + e_{it} \tag{10}$$

$$where\ \ A_0 = B^{-1}\Gamma_0, A_1 = B^{-1}\Gamma_1\ and\ e_{it} = B^{-1}U_t \tag{11}$$

Equation (10) can be further simplified as follows:

$$GS_{it} = \alpha_{10} + \alpha_{11}GS_{it-1} + \alpha_{12}Tax_{it-1} + \alpha_{13}Gini_{it-1} + e_{GSit} \tag{12}$$

$$Tax_{it} = \alpha_{20} + \alpha_{21}GS_{it-1} + \alpha_{22}Tax_{it-1} + \alpha_{23}Gini_{it-1} + e_{Taxit} \tag{13}$$

$$Gini_{it} = \alpha_{30} + \alpha_{31}GS_{it-1} + \alpha_{32}Tax_{it-1} + \alpha_{33}Gini_{it-1} + e_{Giniit} \tag{14}$$

It is noteworthy that we do not report the constant term in our results for brevity. Also, in each equation, we account for the country and time fixed effects by including country and time specific dummies (denoted as μ_i and θ_t respectively in our baseline equation).

A.3 Panel Unit Root and Stability Tests

As part of our analysis, we conduct unit root tests. As observed by Blundell and Bond (1998), the instruments employed by the GMM estimator tend to be weak if the variables being modelled suffer from unit root. We thus conduct the Levin-Lin-Chu test (Levin et al., 2002). The null hypothesis of the test assumes the panels contain unit roots. We do not employ Fisher-type tests (i.e., Augmented Dickey-Fuller and Phillips-Perron tests) since they are designed for panels with long time-spans, whereas we utilize a short panel of ten years from 2004 to 2014 in our present research. Our test results below suggest that we can reject the null hypothesis of unit root for all the variables.

Table (A2) Panel VAR Results: Gini Index

	Levin-Lin-Chu test	
	Adjusted t*	p-value
GS	-4.956	0.000
Tax	-8.050	0.000
SPS	-1.795	0.036
HS	-12.723	0.000
ES	-6.309	0.000
Inflation	-9.628	0.000
Gini	-14.099	0.000
Tenth	-9.151	0.000
Twentieth	-7.764	0.000
Fortieth	-8.402	0.000
Fiftieth	-15.658	0.000
Eightieth	-10.890	0.000
Ninetieth	-8.948	0.000
Theil	-12.146	0.000
Atkinson	-7.070	0.000
	H0: Panels contain unit roots Ha: Panels are stationary	

Likewise, we evaluate the stability condition of our panel VAR model. As noted by Lütkepohl (2005) and Hamilton (2020) , all the moduli of the companion matrix have to be less than one for the fitted VAR model to be considered stable. Graphically, this implies that the roots of the companion matrix must lie within the unit circle. When a panel VAR model is not stable, no known interpretation can be given to its impulse response functions and variance decompositions.

A.4 Panel VAR Identification

As is well-known, in orthogonalized impulse response analysis like ours here, the contemporaneous relationship among the endogenous variables is determined by the order in which variables are entered into the VAR system. When a variable precedes another, the former is assumed to be capable of exhibiting a contemporaneous impact on the latter, while the reverse is not the case.

The order in which our variables enter the VAR system is based on a variety of theoretical and empirical findings. First, we assume that public spending impacts on the contemporaneous value of taxation revenue. The rationale behind this assumption is that government spending affects economic activities, which in turn determine taxation revenue (Blanchard and Perotti, 2002). Moreover, the usual delays in the implementation of tax rates implies that taxation revenue would likely impact on government expenditure with a time-lag (Narayan and Narayan, 2006; Ramos and Roca-Sagales, 2008). Second, the effect of taxation on the Gini index is likely to be contemporaneous. This assumption is based on the Jakobsson–Fellman theorem, which suggests that redistribution of income represents a core objective of taxation, and this in turn impacts the degree to which the income distribution is egalitarian (Jakobsson, 1976; Fellman, 1976). While the Gini index impacts on other variables with a time lag, the rest of the variables can exhibit a contemporaneous impact on the Gini index. Therefore, our variables enter the VAR system in the following order:

$$Y_{it} = [Spending, Tax, Gini,]' \tag{15}$$

We construct the impulse response functions using the VAR estimates and generate their standard errors and confidence intervals through 200 Monte Carlo simulations from the distribution of the panel VAR model. Likewise, we report the (forecast error) variance decompositions, which show the percentage of the variation in the respective dependent variable that arises from its own shocks as compared to shocks to the other variables in the system.

In determining the order (or time lag) of our panel VAR model, we rely on the Model and Moment Selection Criteria (MMSC) proposed by Andrews and Lu (2001) for models estimated with the GMM method.[5] In all our regressions, we utilize a panel VAR model of order one as this yields the lowest MAIC, MBIC and MQIC. In constructing our instrument matrix, we employ the approach of Holtz-Eakin et al. (1988), which replaces missing values with zeros, and thus minimizes the loss of degrees of freedom as more instrument lags are added.[6]

A.5 Transformation of the Baseline Model Through Forward Orthogonal Deviations

The reverse-causality/contemporaneous feedback in structural VAR results in endogeneity bias. In time-series VAR, the feedback is eliminated by transforming the VAR and subsequently estimating same, equation by equation using OLS. However, in panel VAR – particularly given a short time-span (as is the case in this paper)[7] – we are unable to employ the OLS method due to the presence of country fixed effects which are correlated with the regressors (i.e., lagged explanatory variables) in the VAR system. In addressing this difficulty, we methodically transform our models using the forward orthogonal deviations transformation of Arellano and Bover (1995). This approach is computed in two steps. First, for each panel, we subtract the average of all available future observations (which will always be defined even in the presence of missing observations) from the observation available for the relevant period. Second, the resulting value is multiplied by a scale factor. Accordingly, every observation can be transformed through forward orthogonal deviations, except that of the last period. Mathematically, the forward orthogonal deviation for variable w is computed with the formula:

$$c_{it}(w_{it} - \frac{1}{T}\sum w_{is}) \tag{16}$$

where w_{it} denotes the contemporaneous value of w for country i. Also, w_{is} captures all future observations ahead of w_{it}. Likewise, T_{it} represents the number of future observations from period t within country i. Similarly, c_{it} is a scale factor computed as:

$$c_{it} = \sqrt{\frac{T_{it}}{(T_{it}+1)}} \tag{17}$$

[5] The MMSC is similar to a number of model selection criteria, such as Akaike information criteria (AIC) (Akaike, 1969), Bayesian information criteria (BIC) (Schwarz, 1978) and the Hannan–Quinn information criteria (HQIC) (Hannan and Quinn, 1979).

[6] We do not adopt the Anderson-Hsiao approach (Anderson and Hsiao, 1982) because it reduces the observations available for regression with every additional instrument lag.

[7] As the timespan tends towards infinity, the endogeneity bias reduces, and the fixed effects estimator can be used (Nickell, 1981). Nonetheless, we do not experiment with the fixed effects estimator since we employ a relatively short time span.

Appendix B. Baseline Results

Table (B1) Panel VAR Results: Gini Index

Regressors	Regressands											
	GS, Tax and Gini			SPS, Tax and Gini			HS, Tax and Gini			ES, Tax and Gini		
	GS	Tax	Gini	SPS	Tax	Gini	HS	Tax	Gini	ES	Tax	Gini
L.GS	0.565***	-0.127**	-0.100***									
	(0.080)	(0.051)	(0.029)									
L.SPS				0.188	0.413	-0.187*						
				(0.224)	(0.560)	(0.112)						
L.HS							0.555***	-0.281	0.051			
							(0.142)	(0.754)	(0.163)			
L.ES										0.450**	-0.761	-0.384
										(0.177)	(0.775)	(0.277)
L.Tax	0.151	0.641***	0.065	-0.172***	0.539**	-0.024	-0.018	0.786***	0.026	-0.033	0.637**	0.052
	(0.147)	(0.123)	(0.058)	(0.066)	(0.229)	(0.053)	(0.021)	(0.197)	(0.049)	(0.051)	(0.248)	(0.081)
L.Gini	0.008	-0.663***	0.625***	0.138	-2.200***	0.480***	-0.158***	-2.014***	0.396***	-0.064	-0.011	0.518***
	(0.221)	(0.159)	(0.122)	(0.104)	(0.353)	(0.125)	(0.045)	(0.330)	(0.121)	(0.112)	(0.326)	(0.198)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (B2) Panel VAR Results: Tenth Percentile

Regressors	Regressands											
	GS, Tax and Tenth			SPS, Tax and Tenth			HS, Tax and Tenth			ES, Tax and Tenth		
	GS	Tax	Tenth	SPS	Tax	Tenth	HS	Tax	Tenth	ES	Tax	Tenth
L.GS	0.800***	-0.172**	0.008**									
	(0.161)	(0.083)	(0.004)									
L.SPS				0.235	0.356	0.041***						
				(0.228)	(0.386)	(0.014)						
L.HS							0.651***	-0.288	-0.005			
							(0.155)	(0.333)	(0.014)			
L.ES										0.779***	-0.753	0.029*
										(0.271)	(0.513)	(0.017)
L.Tax	-0.293	0.749***	0.004	-0.289***	1.056***	0.007	-0.077***	0.539***	0.003	-0.017	0.567***	-0.001
	(0.279)	(0.225)	(0.007)	(0.076)	(0.198)	(0.005)	(0.024)	(0.177)	(0.005)	(0.081)	(0.156)	(0.005)
L.Tenth	-10.736	4.851	0.642***	0.020	2.417	0.538***	-0.244	1.838	0.589***	1.240	-0.004	0.602***
	(7.091)	(3.233)	(0.193)	(1.761)	(3.173)	(0.143)	(0.619)	(2.123)	(0.132)	(1.821)	(3.239)	(0.133)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (B3) Panel VAR Results: Fiftieth Percentile

Regressors	Regressands											
	GS, Tax and Fiftieth			SPS, Tax and Fiftieth			HS, Tax and Fiftieth			ES, Tax and Fiftieth		
	GS	Tax	Fiftieth	SPS	Tax	Fiftieth	HS	Tax	Fiftieth	ES	Tax	Fiftieth
L.GS	0.691***	-0.199**	0.011**									
	(0.114)	(0.093)	(0.005)									
L.SPS				0.166	0.809	-0.005						
				(0.255)	(0.507)	(0.013)						
L.HS							0.454***	0.036	0.033*			
							(0.136)	(0.323)	(0.018)			
L.ES										0.795***	-0.536	0.072***
										(0.221)	(0.491)	(0.025)
L.Tax	0.067	0.699***	-0.004	-0.154**	0.892***	0.004	-0.026	0.611***	0.001	0.019	0.801***	0.000
	(0.215)	(0.171)	(0.006)	(0.077)	(0.243)	(0.005)	(0.026)	(0.183)	(0.005)	(0.055)	(0.155)	(0.007)
L.Fiftieth	-2.702	7.952***	0.502***	1.181	0.659	0.608***	1.133*	4.633*	0.522**	0.224	-0.756	0.541***
	(3.464)	(2.720)	(0.156)	(1.539)	(3.806)	(0.199)	(0.635)	(2.732)	(0.204)	(1.020)	(2.463)	(0.180)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (B4) Panel VAR Results: Ninetieth Percentile

Regressors	Regressands											
	GS, Tax and Ninetieth			SPS, Tax and Ninetieth			HS, Tax and Ninetieth			ES, Tax and Ninetieth		
	GS	Tax	Ninetieth	SPS	Tax	Ninetieth	HS	Tax	Ninetieth	ES	Tax	Ninetieth
L.GS	0.588***	-0.011	0.003									
	(0.074)	(0.050)	(0.006)									
L.SPS				0.113	0.439	-0.024						
				(0.224)	(0.602)	(0.028)						
L.HS							0.511***	-0.225	0.101***			
							(0.142)	(0.559)	(0.037)			
L.ES										1.044***	-0.839	0.093**
										(0.170)	(0.591)	(0.040)
L.Tax	0.234	0.997***	-0.009	-0.252***	1.048***	-0.002	-0.055**	0.775***	0.002	0.027	0.798***	0.001
	(0.181)	(0.165)	(0.010)	(0.058)	(0.192)	(0.010)	(0.024)	(0.234)	(0.011)	(0.044)	(0.191)	(0.012)
L.Ninetieth	-1.108	1.347	0.649***	-0.174	1.478	0.453***	0.520***	1.639	0.526***	1.318**	0.658	0.774***
	(1.311)	(0.861)	(0.170)	(0.522)	(2.214)	(0.117)	(0.163)	(1.541)	(0.192)	(0.547)	(1.438)	(0.203)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (B5) Panel VAR Results: Twentieth Percentile

Regressors	Regressands											
	GS, Tax and Twentieth			SPS, Tax and Twentieth			HS, Tax and Twentieth			ES, Tax and Twentieth		
	GS	Tax	Twentieth	SPS	Tax	Twentieth	HS	Tax	Twentieth	ES	Tax	Twentieth
L.GS	0.714***	-0.254**	0.013***									
	(0.136)	(0.112)	(0.003)									
L.Tax	0.034	0.936***	-0.002	-0.157**	0.901***	0.002	-0.049	0.623***	0.002	-0.019	0.733***	-0.001
	(0.225)	(0.231)	(0.007)	(0.075)	(0.213)	(0.006)	(0.031)	(0.178)	(0.005)	(0.067)	(0.154)	(0.006)
L.SPS				0.049	0.694	0.023*						
				(0.251)	(0.461)	(0.013)						
L.HS							0.559***	-0.163	0.005			
							(0.149)	(0.338)	(0.015)			
L.ES										0.684***	-0.964**	0.041*
										(0.235)	(0.476)	(0.021)
L.Twentieth	-5.073	8.236**	0.485***	3.509*	1.193	0.561***	0.524	1.363	0.753***	1.139	-0.192	0.632***
	(4.888)	(3.753)	(0.141)	(1.852)	(3.798)	(0.198)	(0.807)	(3.363)	(0.167)	(1.350)	(2.629)	(0.160)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (B6) Panel VAR Results: Fortieth Percentile

Regressors	Regressands											
	GS, Tax and Fortieth			SPS, Tax and Fortieth			HS, Tax and Fortieth			ES, Tax and Fortieth		
	GS	Tax	Fortieth	SPS	Tax	Fortieth	HS	Tax	Fortieth	ES	Tax	Fortieth
L.GS	0.737***	-0.221**	0.013***									
	(0.124)	(0.099)	(0.005)									
L.SPS				0.325	0.489	0.007						
				(0.201)	(0.507)	(0.010)						
L.HS							0.516***	0.052	0.014			
							(0.129)	(0.304)	(0.015)			
L.ES										0.724***	-0.595	0.061**
										(0.219)	(0.475)	(0.024)
L.Tax	0.025	0.720***	-0.004	-0.196***	0.867***	0.006	-0.018	0.629***	0.002	0.011	0.775***	-0.001
	(0.216)	(0.172)	(0.006)	(0.059)	(0.154)	(0.005)	(0.026)	(0.151)	(0.004)	(0.056)	(0.153)	(0.007)
L.Fortieth	-3.976	8.605***	0.503***	1.964	-1.344	0.692***	1.082*	-0.014	0.517**	0.636	-1.378	0.573***
	(3.904)	(3.019)	(0.160)	(1.625)	(3.688)	(0.142)	(0.650)	(3.079)	(0.206)	(1.096)	(2.586)	(0.178)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (B7) Panel VAR Results: Eightieth Percentile

Regressors	Regressands											
	GS, Tax and Eightieth			SPS, Tax and Eightieth			HS, Tax and Eightieth			ES, Tax and Eightieth		
	GS	Tax	Eightieth	SPS	Tax	Eightieth	HS	Tax	Eightieth	ES	Tax	Eightieth
L.GS	0.586***	-0.023	0.002									
	(0.080)	(0.057)	(0.004)									
L.SPS				0.003	0.907	-0.027						
				(0.296)	(0.648)	(0.026)						
L.HS							0.479***	-0.397	0.059**			
							(0.145)	(0.514)	(0.025)			
L.ES										0.755***	-0.739	0.073***
										(0.195)	(0.538)	(0.027)
L.Tax	0.241	0.871***	-0.007	-0.232**	0.929***	0.002	-0.033	0.705***	-0.003	-0.027	0.725***	-0.005
	(0.205)	(0.184)	(0.007)	(0.095)	(0.282)	(0.009)	(0.023)	(0.235)	(0.007)	(0.052)	(0.173)	(0.009)
L.Eightieth	-0.517	2.167*	0.669***	-1.081	1.003	0.468***	0.791**	5.557**	0.475***	0.454	0.238	0.681***
	(2.115)	(1.296)	(0.172)	(1.023)	(3.681)	(0.152)	(0.311)	(2.351)	(0.183)	(0.758)	(1.424)	(0.217)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Figure (B1) Stability Condition: Gini Index

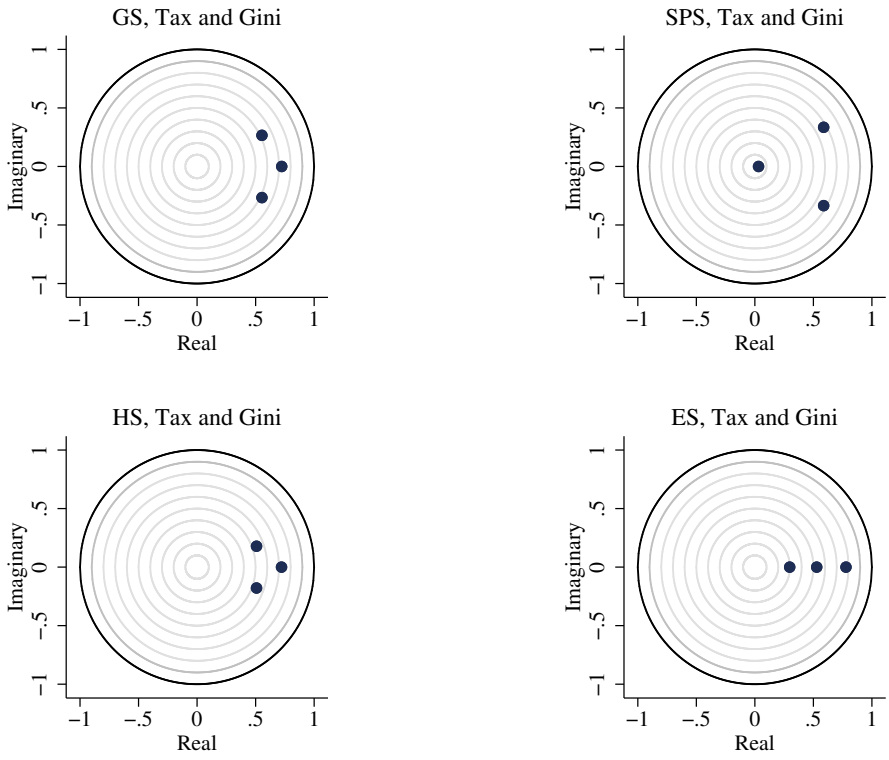


Figure (B2) Stability Condition: Tenth, Fiftieth and Ninetieth Percentiles

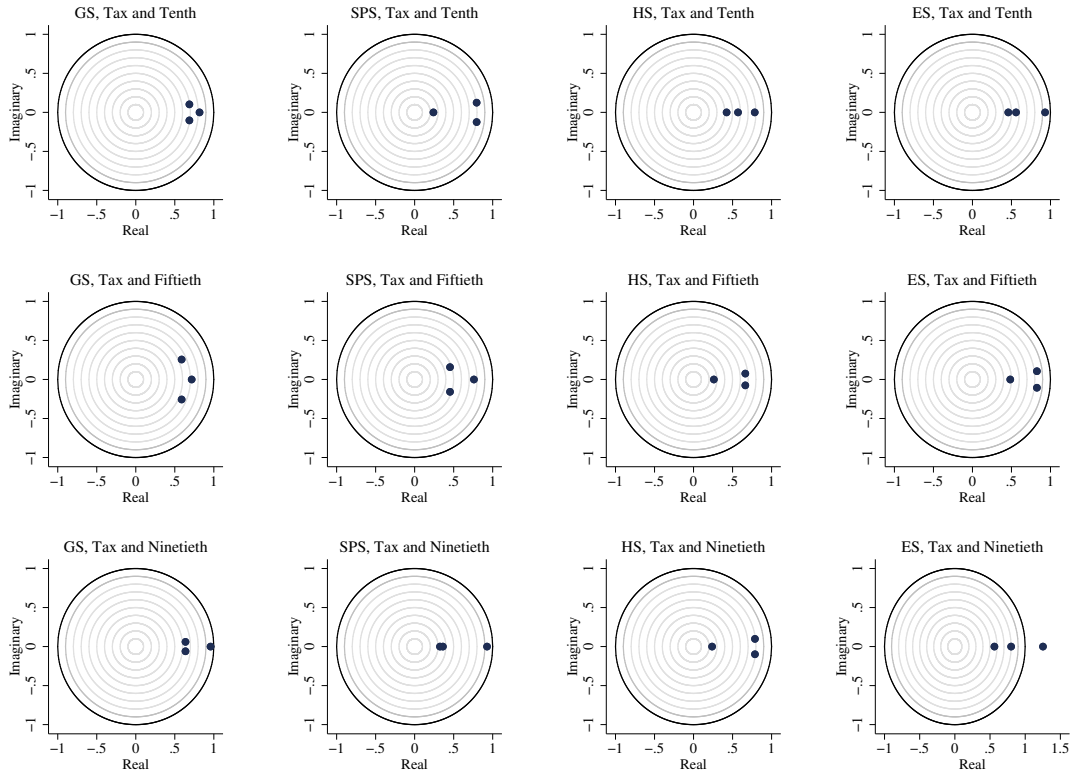


Figure (B3) Stability Condition: Twentieth, Fortieth and Eightieth Percentiles

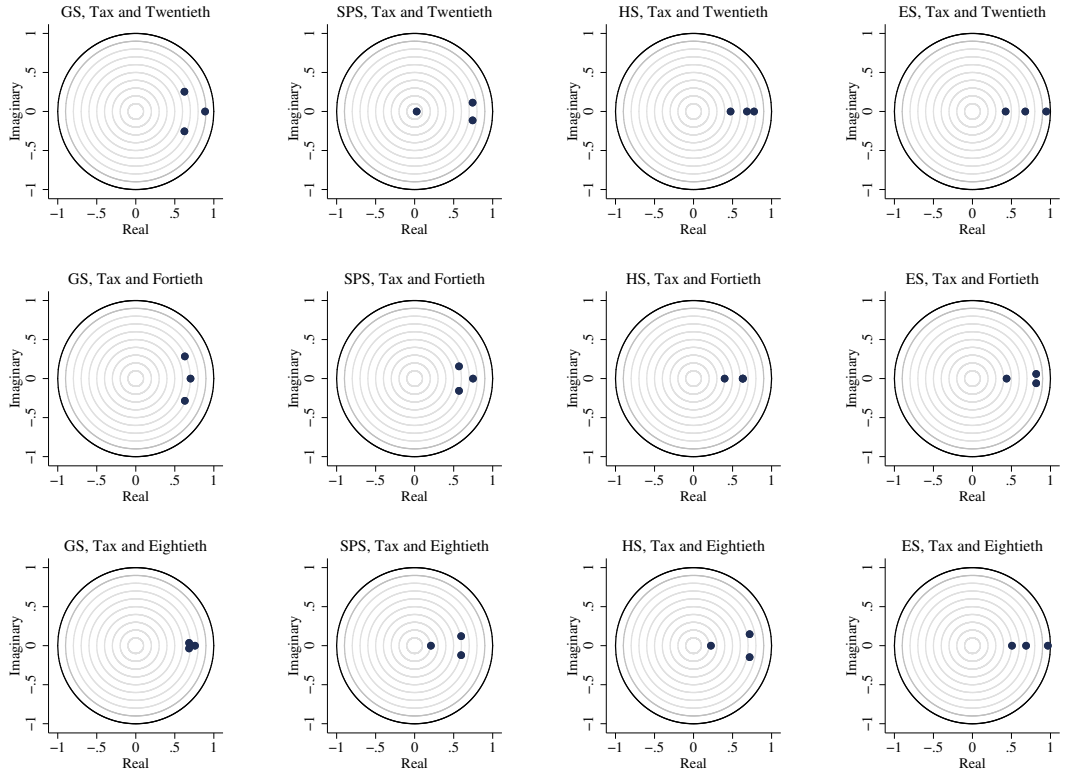
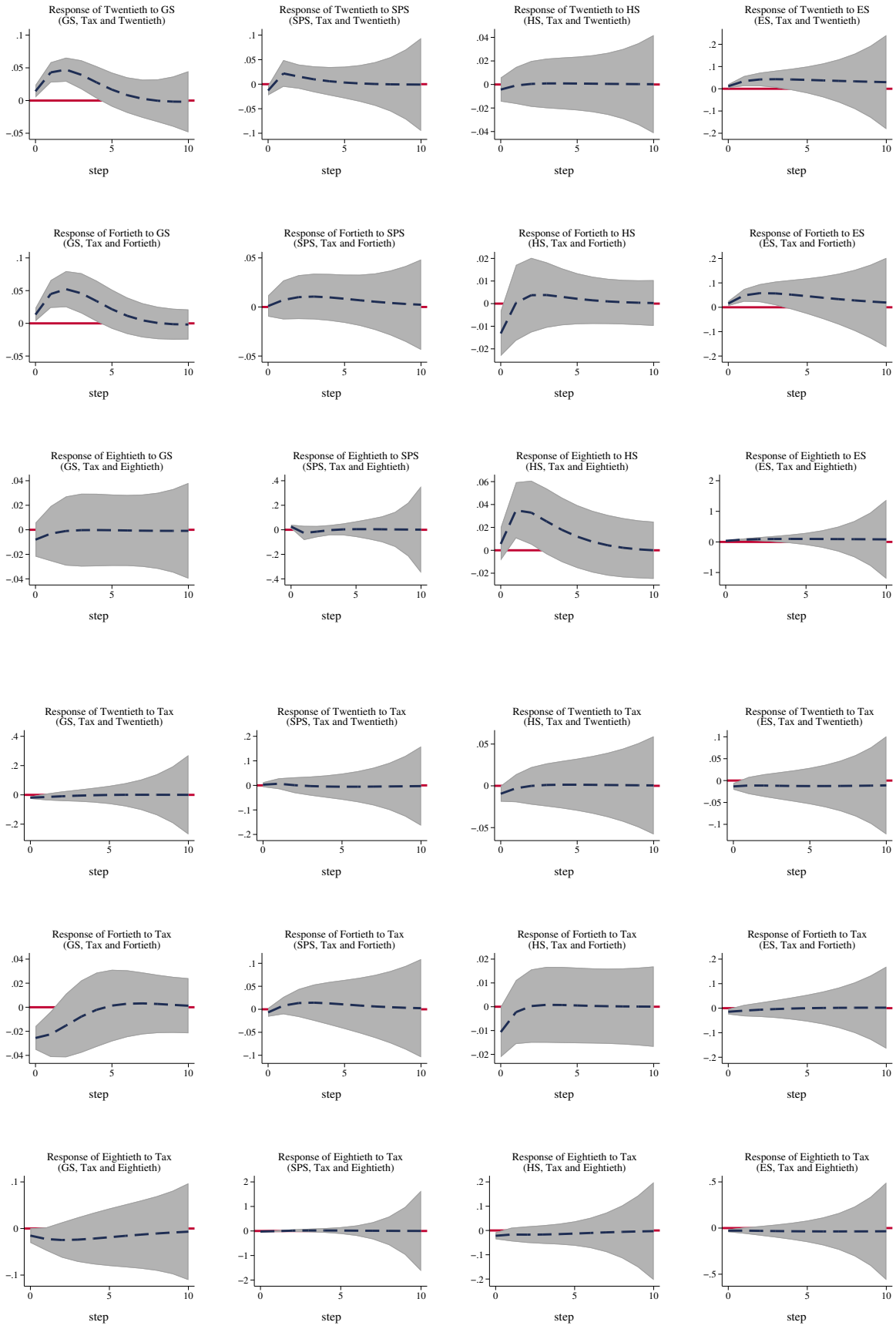


Figure (B4) Impulse Responses: Spending and Tax Shocks on the Twentieth, Fortieth and Eightieth Percentiles



Note: The dashed blue lines denote the point estimates of the response of the relevant income distribution variable to the respective government spending shocks. The shaded regions represent the corresponding 90 percent confidence intervals.

Table (B8) Variance Decomposition: Twentieth, Fortieth and Eightieth Percentiles

Twentieth Percentile												
Response variable and periods ahead	Impulse variable											
	GS, Tax, and Twentieth			SPS, Tax, and Twentieth			HS, Tax, and Twentieth			ES, Tax, and Twentieth		
Twentieth	GS	Tax	Twentieth	SPS	Tax	Twentieth	HS	Tax	Twentieth	ES	Tax	Twentieth
1	0.015	0.026	0.959	0.012	0.001	0.987	0.001	0.007	0.991	0.011	0.014	0.975
2	0.111	0.030	0.859	0.036	0.003	0.961	0.001	0.005	0.994	0.073	0.017	0.911
3	0.203	0.031	0.766	0.043	0.003	0.954	0.001	0.004	0.995	0.137	0.019	0.844
4	0.257	0.030	0.713	0.045	0.003	0.952	0.001	0.004	0.995	0.191	0.022	0.787
5	0.279	0.029	0.692	0.046	0.004	0.950	0.001	0.004	0.996	0.233	0.025	0.742
Fortieth Percentile												
Response variable and periods ahead	Impulse variable											
	GS, Tax, and Fortieth			SPS, Tax, and Fortieth			HS, Tax, and Fortieth			ES, Tax, and Fortieth		
Fortieth	GS	Tax	Fortieth	SPS	Tax	Fortieth	HS	Tax	Fortieth	ES	Tax	Fortieth
1	0.011	0.041	0.948	0.000	0.003	0.997	0.011	0.007	0.981	0.015	0.013	0.972
2	0.098	0.052	0.850	0.002	0.005	0.993	0.009	0.006	0.985	0.113	0.013	0.874
3	0.192	0.054	0.754	0.006	0.011	0.983	0.009	0.006	0.985	0.208	0.012	0.780
4	0.252	0.052	0.696	0.009	0.017	0.974	0.010	0.006	0.985	0.279	0.011	0.710
5	0.280	0.050	0.670	0.012	0.022	0.966	0.010	0.006	0.984	0.327	0.010	0.663
Eightieth Percentile												
Response variable and periods ahead	Impulse variable											
	GS, Tax, and Eightieth			SPS, Tax, and Eightieth			HS, Tax, and Eightieth			ES, Tax, and Eightieth		
Eightieth	GS	Tax	Eightieth	SPS	Tax	Eightieth	HS	Tax	Eightieth	ES	Tax	Eightieth
1	0.002	0.007	0.991	0.022	0.015	0.963	0.001	0.015	0.984	0.038	0.024	0.938
2	0.001	0.015	0.984	0.035	0.014	0.952	0.031	0.019	0.950	0.122	0.029	0.849
3	0.001	0.024	0.975	0.038	0.018	0.945	0.054	0.024	0.923	0.207	0.035	0.758
4	0.001	0.032	0.967	0.037	0.028	0.934	0.066	0.029	0.905	0.279	0.041	0.680
5	0.001	0.039	0.960	0.037	0.039	0.924	0.072	0.034	0.894	0.336	0.047	0.617

B.1 Further Discussions on Baseline Results

The parameter estimates from our VAR models provide information about how the income distribution variables are affected by changes in the fiscal policy variables, meanwhile, the impulse responses show the dynamic response of the income distribution variables to a shock imposed on the fiscal policy variables. As a corollary, the impulse responses and estimated coefficients do not generally capture the same information. Interestingly however, our Panel VAR results largely follow the same pattern as our impulse responses (see online Appendix Table B1 - B7). As such, in situations in which we observe a negative (positive) impulse response for our income distribution variables, we generally observe a similar response for our estimated coefficients obtained from the Panel VAR. Further, online Appendix Figures B1 - B3 show that the roots of the companion matrix often lie within the unit circle, for the VAR models. Consequently, our VAR models generally satisfy the stability condition.

B.2 Further Discussions on the 20th, 40th and 80th Percentiles

Online Appendix Figure B4 reveals that the income shares held by the 20th and 40th percentiles increase in the year of impact (by 0.014 and 0.013 percentage points respectively) when there is a positive shock to public expenditure. The greatest increase in the 40th percentile occurs in the second year for both scenarios (0.052 percentage points). For the 80th percentile, however, a government expenditure shock has little effect. The impact is greatest in the second year, with a rise of 0.052 percentage points in the 40th percentile being the highest. Meanwhile, the 80th percentile are not significantly impacted by a public expenditure shock.

As before, the income share held by the 20th, 40th, and 80th percentiles rises instantaneously when there is a shock to education expenditure (Online Appendix B4). In most cases, the effects peaks in the second year. The shock's effect on the 80th and 20th percentiles fades in the third and fourth years respectively.

Also, a social protection shock raises the 80th percentile by 0.026 percentage points in the year of impact. Nonetheless, a shock to social protection expenditure generally has no statistically significant impact on 20th and 40th percentiles.

In line with previous results, the 20th and 40th percentiles are not significantly impacted by health expenditure shock. Nonetheless, after a positive health spending shock, the 80th percentile income share rises only after a year (Online Appendix Figure B4). The impact however ceases to be statistically insignificant by the third year. Consistent with earlier results, a positive shock to tax generally does not benefit the 20th, 40th and 80th percentiles (Online Appendix Figure B4). In many cases, a tax shock has a negative effect on the percentiles in the year of impact, which often fades away by the third year.

Appendix C. Robustness Test: Replacing the Gini Index with Alternative Inequality Measures

Table (C1) Panel VAR Results: Atkinson Index

Regressors	Regressands											
	GS, Tax and Atkinson			SPS, Tax and Atkinson			HS, Tax and Atkinson			ES, Tax and Atkinson		
	GS	Tax	Atkinson	SPS	Tax	Atkinson	HS	Tax	Atkinson	ES	Tax	Atkinson
L.GS	0.678***	-0.206***	-0.166***									
	(0.104)	(0.068)	(0.044)									
L.SPS				0.277	0.036	-0.502**						
				(0.278)	(0.649)	(0.228)						
L.HS							0.574***	0.041	-0.160			
							(0.172)	(0.457)	(0.239)			
L.ES										0.573***	0.308	-0.365
										(0.178)	(0.630)	(0.292)
L.Tax	0.076	0.764***	0.071	-0.227**	0.745**	-0.093	-0.055*	0.573**	-0.018	-0.042	0.633***	-0.051
	(0.147)	(0.130)	(0.067)	(0.101)	(0.325)	(0.093)	(0.033)	(0.248)	(0.079)	(0.041)	(0.220)	(0.095)
L.Atkinson	0.302	-0.563***	0.530***	0.141	-0.547	0.535***	0.011	-0.163	0.714***	-0.073	0.203	0.826***
	(0.240)	(0.163)	(0.125)	(0.146)	(0.458)	(0.164)	(0.057)	(0.200)	(0.153)	(0.063)	(0.187)	(0.153)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (C2) Panel VAR Results: Theil Index

Regressors	Regressands											
	GS, Tax and Theil			SPS, Tax and Theil			HS, Tax and Theil			ES, Tax and Theil		
	GS	Tax	Theil	SPS	Tax	Theil	HS	Tax	Theil	ES	Tax	Theil
L.GS	0.669***	-0.164**	-0.001*									
	(0.122)	(0.075)	(0.001)									
L.SPS				0.172	0.318	-0.002						
				(0.204)	(0.300)	(0.002)						
L.HS							0.501***	-0.003	-0.006**			
							(0.134)	(0.290)	(0.002)			
L.ES										0.675***	-1.407***	-0.007***
										(0.182)	(0.373)	(0.002)
L.Tax	-0.127	0.549***	0.001	-0.186***	0.421***	0.001**	-0.038	0.527***	-0.000	0.070	0.487***	0.001
	(0.267)	(0.173)	(0.002)	(0.058)	(0.124)	(0.001)	(0.027)	(0.167)	(0.001)	(0.047)	(0.106)	(0.001)
L.Theil	39.090	-32.128**	0.775***	-8.966	-55.125***	0.908***	-3.517	-9.255	0.728***	-20.051***	5.205	0.706***
	(25.928)	(13.849)	(0.197)	(6.932)	(12.291)	(0.109)	(3.099)	(10.302)	(0.198)	(4.636)	(8.585)	(0.102)
Observations	437	437	437	387	387	387	404	404	404	404	404	404
Countries	56	56	56	56	56	56	56	56	56	56	56	56
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Figure (C1) Stability Condition: Atkinson Index

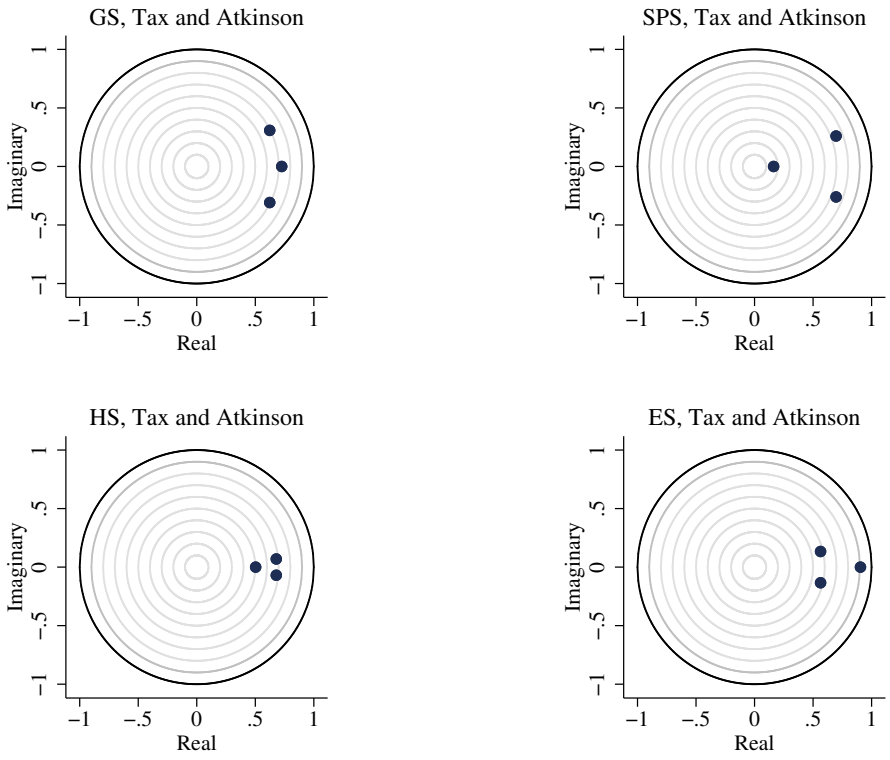


Figure (C2) Stability Condition: Theil Index

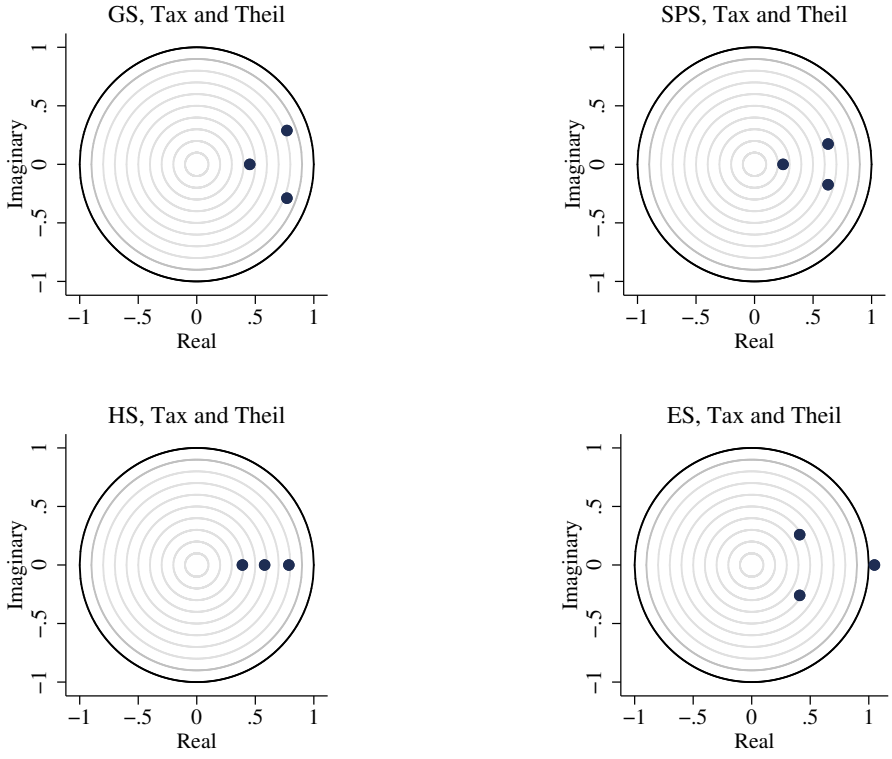
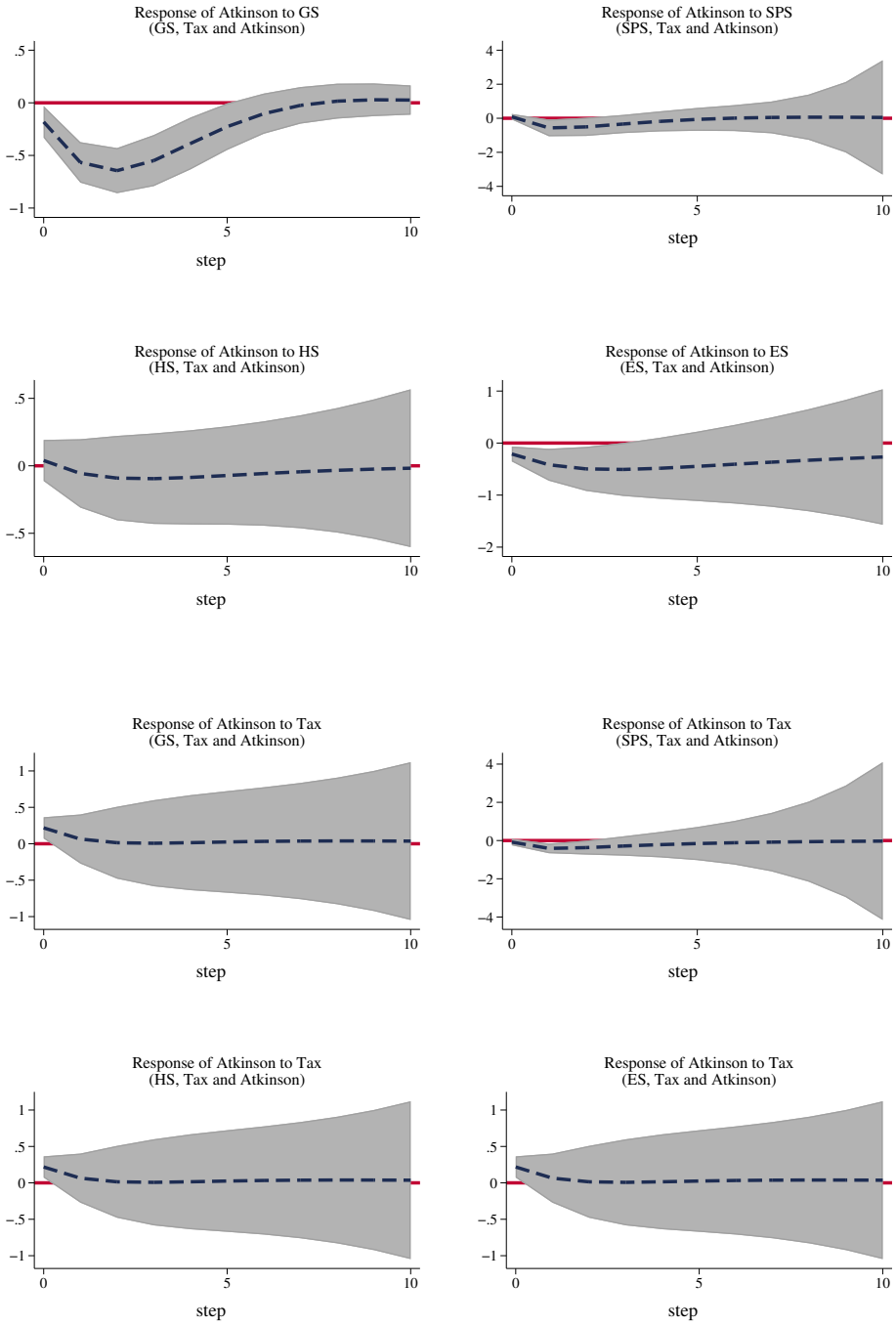
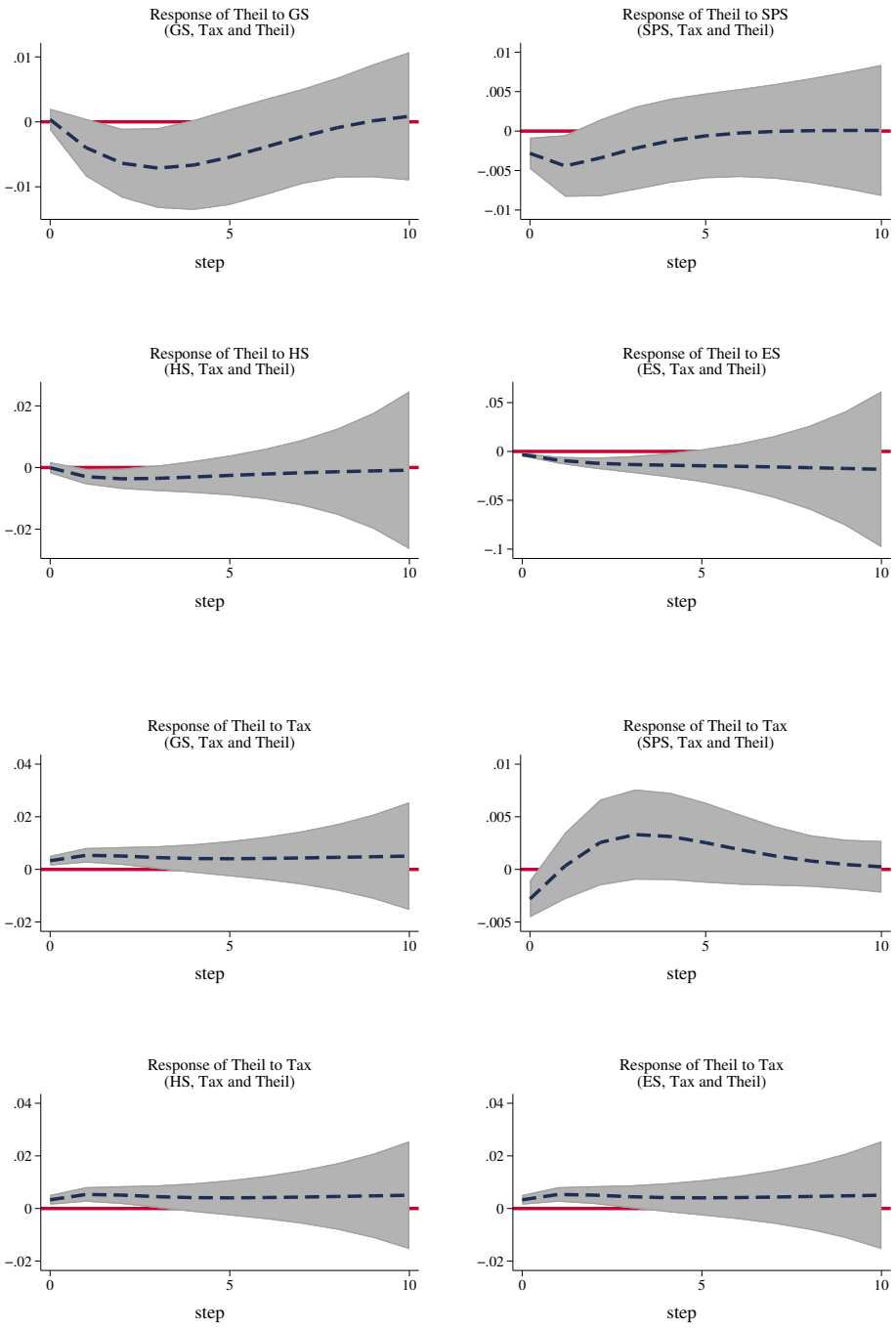


Figure (C3) Impulse Responses: Spending and Tax Shocks on the Atkinson Index



Note: The dashed blue lines denote the point estimates of the response of the relevant income distribution variable to the respective government spending shocks. The shaded regions represent the corresponding 90 percent confidence intervals.

Figure (C4) Impulse Responses: Spending and Tax Shocks on the Theil Index



Note: The dashed blue lines denote the point estimates of the response of the relevant income distribution variable to the respective government spending shocks. The shaded regions represent the corresponding 90 percent confidence intervals.

Table (C3) Variance Decomposition: Atkinson Index

Response variable and periods ahead	Impulse variable											
	GS, Tax and Atkinson			SPS, Tax and Atkinson			HS, Tax and Atkinson			ES, Tax and Atkinson		
Atkinson	GS	Tax	Atkinson	SPS	Tax	Atkinson	HS	Tax	Atkinson	ES	Tax	Atkinson
1	0.009	0.022	0.969	0.002	0.005	0.993	0.000	0.003	0.996	0.013	0.016	0.971
2	0.070	0.033	0.897	0.062	0.007	0.931	0.001	0.002	0.997	0.038	0.011	0.951
3	0.136	0.039	0.825	0.101	0.006	0.893	0.002	0.002	0.996	0.061	0.009	0.930
4	0.179	0.039	0.782	0.117	0.010	0.873	0.004	0.002	0.994	0.080	0.007	0.912
5	0.198	0.038	0.764	0.121	0.017	0.862	0.005	0.002	0.993	0.094	0.007	0.899

Table (C4) Variance Decomposition: Theil Index

Response variable and periods ahead	Impulse variable											
	GS, Tax, and Theil			SPS, Tax, and Theil			HS, Tax, and Theil			ES, Tax, and Theil		
Theil	GS	Tax	Theil	SPS	Tax	Theil	HS	Tax	Theil	ES	Tax	Theil
1	0.000	0.005	0.995	0.014	0.011	0.974	0.000	0.010	0.990	0.022	0.015	0.963
2	0.021	0.013	0.966	0.027	0.007	0.966	0.012	0.007	0.981	0.112	0.025	0.863
3	0.061	0.022	0.918	0.029	0.012	0.959	0.025	0.006	0.969	0.202	0.024	0.774
4	0.104	0.029	0.866	0.028	0.019	0.953	0.035	0.006	0.959	0.265	0.020	0.715
5	0.140	0.034	0.826	0.027	0.024	0.949	0.042	0.006	0.952	0.303	0.016	0.681

C.1 Further Details on the Atkinson Measure of Inequality and the Theil Index

The Atkinson index has a lower bound of zero, reflecting an equal distribution, and an upper bound of one. An important features of this measure of inequality is that it is the only one to explicitly (and not implicitly, as in all other standard measures of inequality) incorporate society's avertion to inequality and, therefore, the sensitivity of the implied social welfare losses arising from inequality.[8]

Also, the lower bound of the Theil index is zero, representing a society wherein the total income is equally distributed across the citizenry. Unlike the Gini coefficient and the Atkinson index which have an upper bound of one, the Theil index has no upper bound (Foster et al., 2013). Data on the Theil index is also sourced from the Global Consumption and Income Project Database. The database reports Theil's first and second measures of inequality (i.e., such that the orders of the generalized entropy measure are 1 and 0). We begin by conducting a panel unit root test on both the Theil index and the Atkinson inequality measure. Online Appendix Table A2 suggests that we can reject the null hypothesis of unit root for both inequality measures.

As seen in Online Appendix Tables C3 - C4, between the first and fifth years, the spending and tax variables account for a reasonable portion of the variations in both the Theil index and the Atkinson inequality measure (excluding their own shocks). As a result, the variance decomposition results are comparable to the baseline findings.

Further, Online Appendix Figures C1 and C2 reveals that for all VAR equations, the roots of the companion matrix are contained within the unit circle. Hence, our panel VAR models meet the criteria of stability.

[8] An aversion parameter of zero suggests a society has no aversion to inequality. Meanwhile, a society with an infinite aversion to inequality is assigned a parameter of infinity (∞). Data on the Atkinson index are sourced from the Global Consumption and Income Project Database. The database computes the Atkinson index with an aversion parameter of 2.

Appendix D. Brief Comparison between Middle- and High-Income Countries

Table (D1) Panel VAR Results: Gini Index

Regressors	Regressands											
	GS, Tax, and Gini			SPS, Tax, and Gini			HS, Tax, and Gini			ES, Tax, and Gini		
	GS	Tax	Gini	SPS	Tax	Gini	HS	Tax	Gini	ES	Tax	Gini
L.GS	0.678***	0.041	-0.055**									
	(0.088)	(0.026)	(0.026)									
L.SPS				0.380***	0.228	0.022						
				(0.116)	(0.165)	(0.076)						
L.HS							0.645***	1.551***	-0.050			
							(0.134)	(0.440)	(0.138)			
L.ES										0.683***	0.909***	-0.250**
										(0.083)	(0.199)	(0.098)
L.Tax	-0.120	0.631***	-0.112	0.054	0.722***	0.043	-0.131***	1.035***	-0.044	-0.109*	0.833***	-0.022
	(0.186)	(0.099)	(0.080)	(0.087)	(0.098)	(0.067)	(0.050)	(0.205)	(0.067)	(0.058)	(0.185)	(0.063)
L.Gini	0.037	-0.066	0.846***	0.361**	-0.239	0.926***	-0.109*	0.377	0.812***	-0.173**	0.423	0.792***
	(0.257)	(0.139)	(0.080)	(0.168)	(0.184)	(0.134)	(0.061)	(0.277)	(0.093)	(0.072)	(0.268)	(0.081)
Observations	379	379	379	362	362	362	362	362	362	362	362	362
Countries	43	43	43	43	43	43	43	43	43	43	43	43
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (D2) Panel VAR Results: Tenth Percentile

Regressors	Regressands											
	GS, Tax, and Tenth			SPS, Tax, and Tenth			HS, Tax, and Tenth			ES, Tax, and Tenth		
	GS	Tax	Tenth	SPS	Tax	Tenth	HS	Tax	Tenth	ES	Tax	Tenth
L.GS	0.869***	-0.095***	0.008***									
	(0.065)	(0.026)	(0.003)									
L.SPS				0.822***	-0.185*	-0.009						
				(0.129)	(0.097)	(0.019)						
L.HS							0.690***	0.188	-0.004			
							(0.193)	(0.130)	(0.016)			
L.ES										0.890***	0.344**	0.073**
										(0.159)	(0.175)	(0.031)
L.Tax	0.158	0.460***	-0.003	0.263**	0.760***	-0.021*	-0.132**	0.573***	0.002	-0.079*	0.672***	-0.006
	(0.160)	(0.091)	(0.011)	(0.104)	(0.083)	(0.012)	(0.056)	(0.072)	(0.012)	(0.042)	(0.087)	(0.015)
L.Tenth	0.250	-0.158	0.767***	0.263	0.995	0.720***	-0.396	0.316	0.821***	0.517	2.009***	0.821***
	(1.197)	(0.535)	(0.083)	(0.855)	(0.644)	(0.129)	(0.289)	(0.510)	(0.093)	(0.360)	(0.717)	(0.124)
Observations	379	379	379	362	362	362	362	362	362	362	362	362
Countries	43	43	43	43	43	43	43	43	43	43	43	43
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (D3) Panel VAR Results: Fiftieth Percentile

Regressors	Regressands											
	GS, Tax, and Fiftieth			SPS, Tax, and Fiftieth			HS, Tax, and Fiftieth			ES, Tax, and Fiftieth		
	GS	Tax	Fiftieth	SPS	Tax	Fiftieth	HS	Tax	Fiftieth	ES	Tax	Fiftieth
L.GS	0.427***	-0.020	0.007***									
	(0.087)	(0.022)	(0.003)									
L.SPS				-0.079	-0.397	-0.004						
				(0.322)	(0.247)	(0.026)						
L.HS							0.410**	0.403**	0.014			
							(0.194)	(0.187)	(0.022)			
L.ES										0.811***	0.408***	0.023
										(0.091)	(0.132)	(0.015)
L.Tax	-0.491**	0.689***	-0.000	0.214	0.808***	0.005	-0.132***	0.678***	-0.004	-0.063**	0.662***	-0.008
	(0.244)	(0.077)	(0.008)	(0.131)	(0.118)	(0.011)	(0.043)	(0.064)	(0.008)	(0.027)	(0.064)	(0.007)
L.Fiftieth	-12.738***	3.041***	0.793***	-3.104	1.037	0.391**	-0.940**	1.365***	0.725***	0.087	0.255	0.767***
	(1.583)	(0.478)	(0.057)	(1.897)	(1.593)	(0.160)	(0.368)	(0.487)	(0.077)	(0.188)	(0.604)	(0.056)
Observations	379	379	379	362	362	362	362	362	362	362	362	362
Countries	43	43	43	43	43	43	43	43	43	43	43	43
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (D4) Panel VAR Results: Ninetieth Percentile

Regressors	Regressands											
	GS, Tax, and Ninetieth			SPS, Tax, and Ninetieth			HS, Tax, and Ninetieth			ES, Tax, and Ninetieth		
	GS	Tax	Ninetieth	SPS	Tax	Ninetieth	HS	Tax	Ninetieth	ES	Tax	Ninetieth
L.GS	0.793***	-0.045*	-0.002									
	(0.128)	(0.026)	(0.004)									
L.SPS				0.503***	0.080	0.031						
				(0.180)	(0.111)	(0.021)						
L.HS							0.723***	0.602***	-0.029			
							(0.130)	(0.176)	(0.024)			
L.ES										0.693***	0.647***	0.074***
										(0.075)	(0.083)	(0.014)
L.Tax	0.094	0.631***	0.001	0.065	0.767***	0.010	-0.079*	0.732***	-0.028*	-0.031	0.600***	-0.012
	(0.140)	(0.098)	(0.016)	(0.160)	(0.090)	(0.019)	(0.048)	(0.108)	(0.016)	(0.022)	(0.065)	(0.013)
L.Ninetieth	-1.346	0.866	0.366**	3.518**	0.605	0.451***	-0.273	3.176***	-0.033	0.473*	0.844	0.340***
	(1.845)	(0.984)	(0.160)	(1.370)	(0.779)	(0.147)	(0.486)	(1.136)	(0.138)	(0.244)	(0.640)	(0.111)
Observations	379	379	379	362	362	362	362	362	362	362	362	362
Countries	43	43	43	43	43	43	43	43	43	43	43	43
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (D5) Panel VAR Results: Twentieth Percentile

Regressors	Regressands											
	GS, Tax, and Twentieth			SPS, Tax, and Twentieth			HS, Tax, and Twentieth			ES, Tax, and Twentieth		
	GS	Tax	Twentieth	SPS	Tax	Twentieth	HS	Twentieth	Twentieth	ES	Tax	Twentieth
L.GS	0.889***	-0.052***	0.000									
	(0.073)	(0.020)	(0.003)									
L.SPS				0.595***	-0.057	-0.020						
				(0.117)	(0.102)	(0.013)						
L.HS							0.860***	0.236**	-0.016			
							(0.154)	(0.100)	(0.015)			
L.ES										0.887***	0.357***	0.040***
										(0.096)	(0.099)	(0.015)
L.Tax	0.043	0.625***	-0.007	0.131	0.739***	-0.007	-0.097**	0.588***	-0.018*	-0.022	0.609***	-0.023**
	(0.162)	(0.072)	(0.013)	(0.082)	(0.093)	(0.009)	(0.045)	(0.072)	(0.010)	(0.033)	(0.081)	(0.011)
L.Twentieth	0.058	0.058	0.695***	-0.542	2.537**	0.714***	-0.444	0.473	0.919***	-0.195	0.254	0.916***
	(1.681)	(0.670)	(0.105)	(0.963)	(1.108)	(0.148)	(0.404)	(0.680)	(0.105)	(0.365)	(0.846)	(0.119)
Observations	379	379	379	362	362	362	362	362	362	362	362	362
Countries	43	43	43	43	43	43	43	43	43	43	43	43
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (D6) Panel VAR Results: Fortieth Percentile

Regressors	Regressands											
	GS, Tax, and Fortieth			SPS, Tax, and Fortieth			HS, Tax, and Fortieth			ES, Tax, and Fortieth		
	GS	Tax	Fortieth	SPS	Tax	Fortieth	HS	Tax	Fortieth	ES	Tax	Fortieth
L.GS	0.418***	-0.016	0.003									
	(0.081)	(0.020)	(0.003)									
L.SPS				0.213	-0.131	-0.030						
				(0.192)	(0.175)	(0.020)						
L.HS							0.742***	0.383***	-0.007			
							(0.167)	(0.135)	(0.015)			
L.ES										0.884***	0.366***	0.021
										(0.090)	(0.119)	(0.014)
L.Tax	-0.421*	0.727***	-0.014	0.175*	0.738***	0.009	-0.104**	0.641***	-0.010	-0.054*	0.671***	-0.012
	(0.249)	(0.077)	(0.008)	(0.094)	(0.104)	(0.011)	(0.042)	(0.061)	(0.007)	(0.028)	(0.069)	(0.008)
L.Fortieth	-12.276***	2.604***	0.790***	-2.872**	2.042	0.311*	-0.798**	1.266**	0.840***	-0.070	-0.308	0.837***
	(1.667)	(0.525)	(0.063)	(1.402)	(1.526)	(0.177)	(0.372)	(0.538)	(0.079)	(0.247)	(0.682)	(0.069)
Observations	379	379	362	362	362	362	362	362	362	362	362	362
Countries	43	43	43	43	43	43	43	43	43	43	43	43
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table (D7) Panel VAR Results: Eightieth Percentile

Regressors	Regressands											
	GS, Tax, and Eightieth			SPS, Tax, and Eightieth			HS, Tax, and Eightieth			ES, Tax, and Eightieth		
	GS	Tax	Eightieth	SPS	Tax	Eightieth	HS	Tax	Eightieth	ES	Tax	Eightieth
L.GS	0.796***	-0.093**	0.004									
	(0.100)	(0.041)	(0.003)									
L.SPS				0.791***	0.211	0.041						
				(0.221)	(0.237)	(0.037)						
L.HS							0.895***	0.583***	-0.103***			
							(0.087)	(0.213)	(0.027)			
L.ES										0.944***	0.629***	0.016
										(0.148)	(0.227)	(0.028)
L.Tax	0.005	0.734***	-0.019	-0.062	0.782***	-0.018	-0.021	0.620***	-0.015	-0.008	0.748***	-0.016
	(0.140)	(0.142)	(0.015)	(0.103)	(0.122)	(0.018)	(0.027)	(0.071)	(0.010)	(0.036)	(0.094)	(0.011)
L.Eightieth	-1.019	0.472	-0.244	1.032	1.662	0.059	0.243	2.193**	-0.053	0.941*	1.718	0.035
	(2.800)	(2.104)	(0.235)	(1.304)	(1.684)	(0.285)	(0.385)	(1.031)	(0.145)	(0.544)	(1.388)	(0.183)
Observations	379	379	379	362	362	362	362	362	362	362	362	362
Countries	43	43	43	43	43	43	43	43	43	43	43	43
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The Table provides the parameter estimates obtained from regressing the column variables on the row variables. The parentheses contain the standard errors. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Figure (D1) Stability Condition: Gini Index

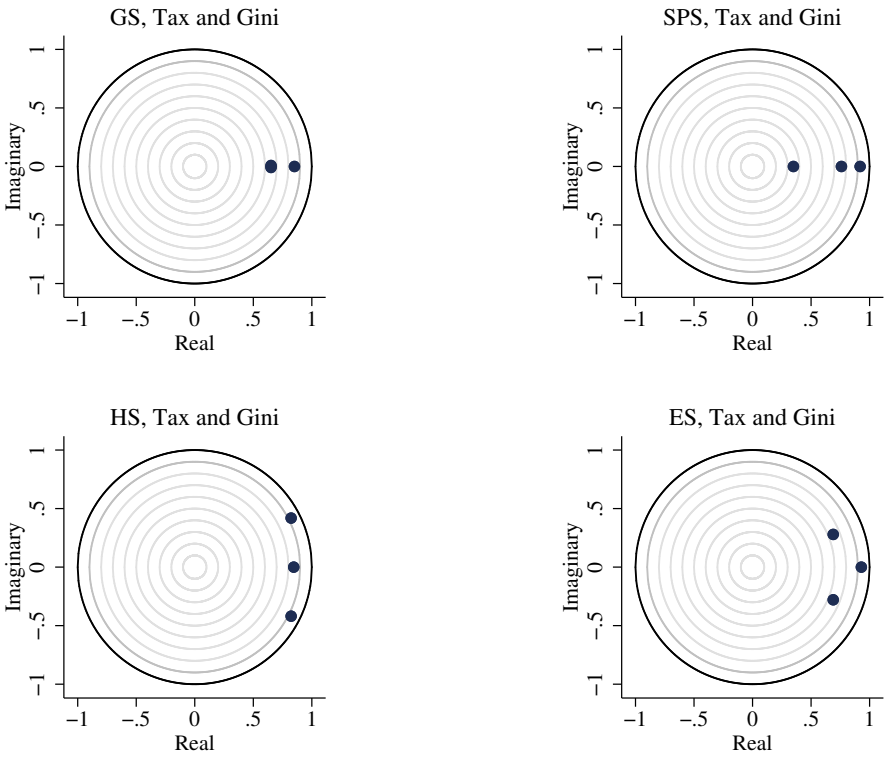


Figure (D2) Stability Condition: Tenth, Fiftieth and Ninetieth Percentiles

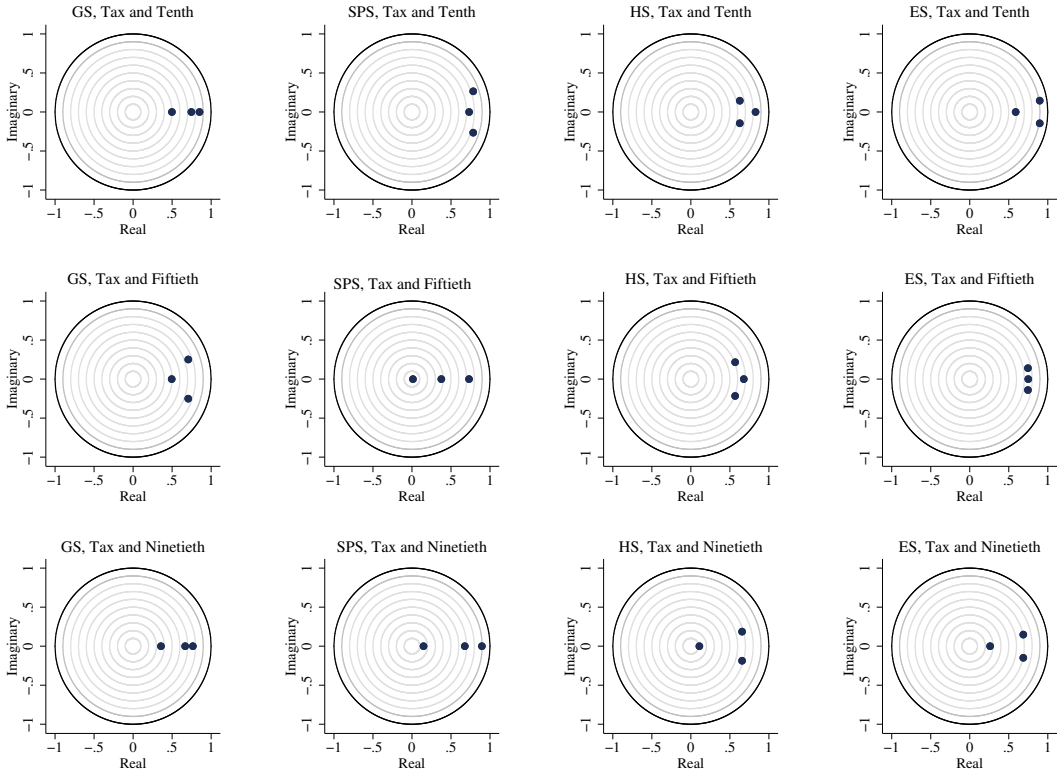


Figure (D3) Stability Condition: Twentieth, Fortieth and Eightieth Percentiles

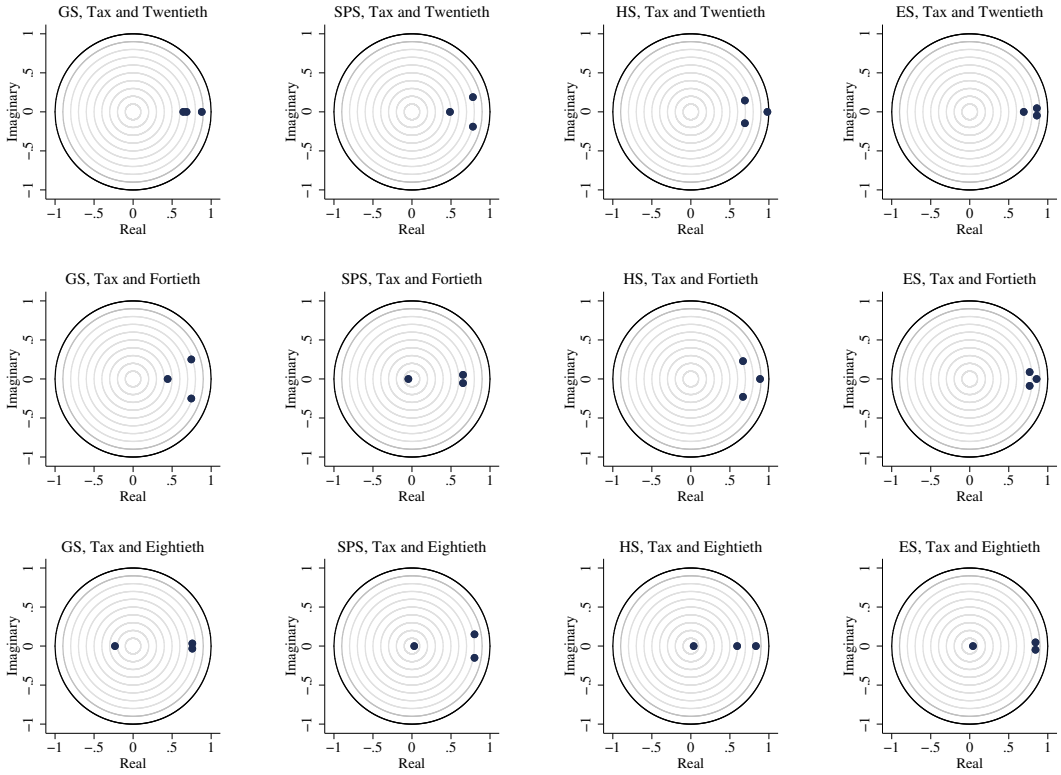
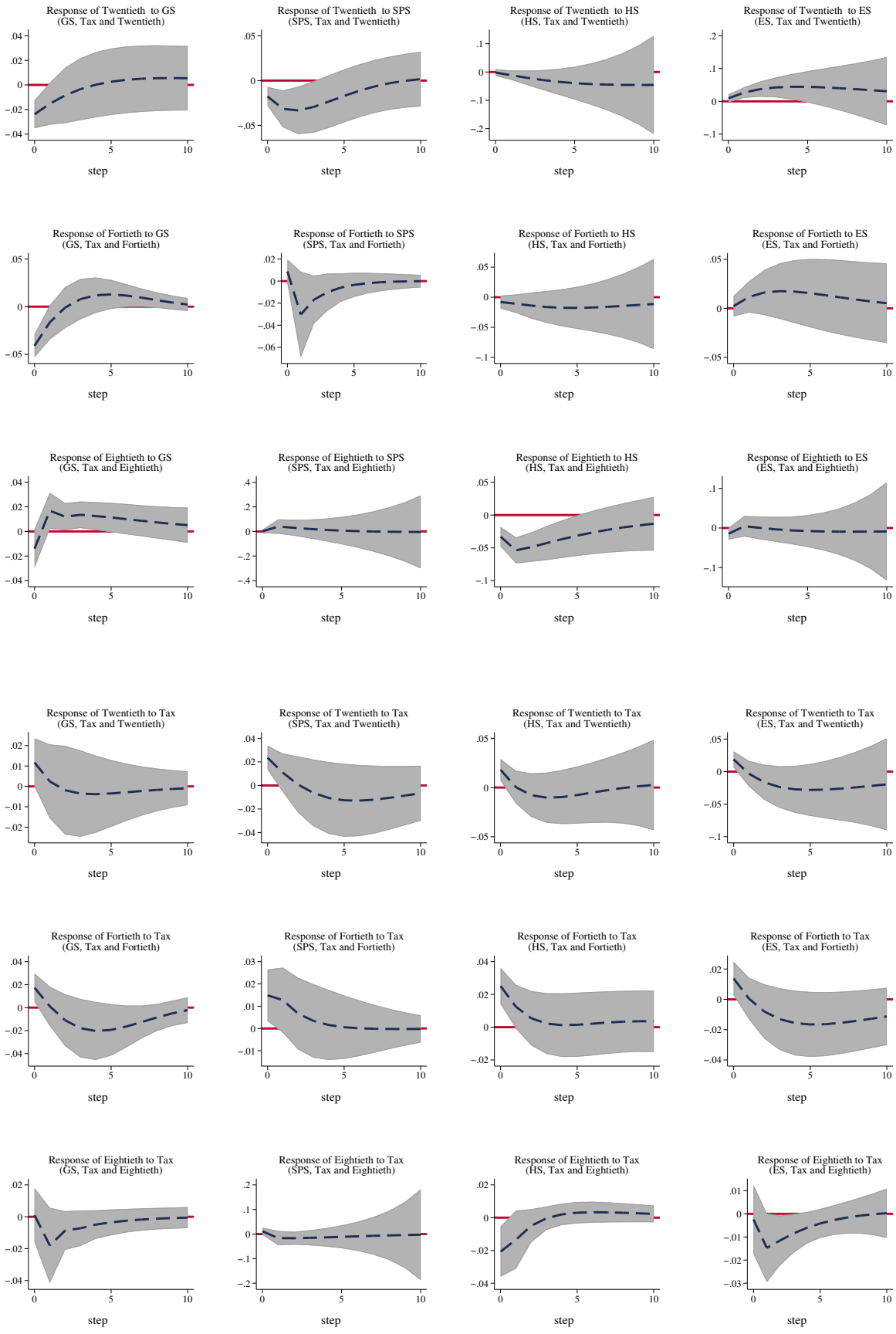


Figure (D4) Impulse Responses: Spending and Tax Shocks on the Twentieth, Fortieth and Eightieth Percentiles



Note: The dashed blue lines denote the point estimates of the response of the relevant income distribution variable to the respective government spending shocks. The shaded regions represent the corresponding 90 percent confidence intervals.

Table (D8) Variance Decomposition: Twentieth, Fortieth and Eightieth Percentiles

Twentieth Percentile												
Response variable and periods ahead	Impulse variable											
	GS, Tax and Twentieth			SPS, Tax and Twentieth			HS, Tax and Twentieth			ES, Tax and Twentieth		
Twentieth	GS	Tax	Twentieth	SPS	Tax	Twentieth	HS	Tax	Twentieth	ES	Tax	Twentieth
1	0.028	0.007	0.965	0.020	0.035	0.945	0.000	0.018	0.982	0.005	0.019	0.977
2	0.027	0.005	0.968	0.053	0.027	0.919	0.004	0.010	0.986	0.023	0.010	0.966
3	0.025	0.004	0.970	0.082	0.023	0.895	0.012	0.008	0.980	0.045	0.013	0.942
4	0.024	0.004	0.972	0.102	0.022	0.876	0.023	0.008	0.968	0.065	0.020	0.915
5	0.023	0.005	0.972	0.114	0.025	0.861	0.037	0.009	0.954	0.084	0.027	0.889
Fortieth Percentile												
Response variable and periods ahead	Impulse variable											
	GS, Tax and Fortieth			SPS, Tax and Fortieth			HS, Tax and Fortieth			ES, Tax and Fortieth		
Fortieth	**GS**	Tax	Fortieth	SPS	Tax	Fortieth	HS	Tax	Fortieth	ES	Tax	Fortieth
1	0.068	0.012	0.920	0.005	0.014	0.981	0.004	0.038	0.958	0.000	0.011	0.988
2	0.050	0.008	0.943	0.054	0.021	0.926	0.006	0.028	0.965	0.005	0.007	0.988
3	0.042	0.009	0.949	0.066	0.022	0.913	0.010	0.023	0.967	0.011	0.007	0.982
4	0.041	0.015	0.944	0.070	0.022	0.908	0.015	0.020	0.965	0.016	0.010	0.974
5	0.043	0.023	0.934	0.071	0.022	0.907	0.021	0.018	0.961	0.021	0.014	0.965
Eightieth Percentile												
Response variable and periods ahead	Impulse variable											
	GS, Tax and Eightieth			SPS, Tax and Eightieth			HS, Tax and Eightieth			ES, Tax and Eightieth		
Eightieth	**GS**	Tax	Eightieth	SPS	Tax	Eightieth	HS	Tax	Eightieth	ES	Tax	Eightieth
1	0.005	0.000	0.995	0.000	0.004	0.996	0.037	0.014	0.949	0.008	0.000	0.992
2	0.012	0.008	0.980	0.050	0.013	0.938	0.121	0.019	0.860	0.009	0.009	0.983
3	0.015	0.010	0.975	0.075	0.021	0.905	0.180	0.018	0.802	0.009	0.014	0.978
4	0.020	0.011	0.969	0.085	0.027	0.887	0.220	0.017	0.763	0.009	0.016	0.975
5	0.024	0.012	0.965	0.089	0.032	0.878	0.248	0.017	0.736	0.011	0.018	0.972

Appendix E. References

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