Asymmetric effects of corporate income tax changes. Business Cycle and Distributional implications in a panel data approach*

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Short Version

March, 2025

Abstract

This paper studies the effects of Corporate Income Tax Rate changes on economic growth, demonstrating asymmetric effects on tax rises and cuts while considering different states of economic inequality. Although increases in the tax rate lead to a decline in output performance, tax cut effects will depend on the state of the economy in terms of the business cycle and the distributional income setting. I use a panel data approach exploiting non-linear local projections to identify the impact of tax cuts on growth. I found that tax cuts will positively affect output growth when the economy faces a recession and that a highly unequal economy will diminish any positive effect of tax cuts in the long run.

*Replication code can be found on https://github.com/Jfherreras/Assymetric-Tax-Changes

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1 Introduction

Changes in the corporate income tax rate (henceforth CITR) have been traditionally thought to have symmetrical effects on economic growth (Lee and Gordon, 2005; Romer and Romer, 2010; Shuai and Chmura, 2013), in detail, increases in the CITR will lead to a decrease in economic performance, and cuts of the tax rate will translate into a better economic output. The former statement follows from an increase in costs, and the latter affirmation is explained due to a reduction of costs (Shuai and Chmura, 2013; Gale and Samwick, 2017; William and Andrew, 2014; Zellner and Ngoie, 2015). In particular, a more specific branch of the literature suggests that cutting CITR will lead to economic growth shifts, as firms will hire more workers now that their costs are lower (Shuai and Chmura, 2013; Gale and Samwick, 2017; William and Andrew, 2014; Zellner and Ngoie, 2015). Employment growth translates into greater income and, thus, consumption by economic agents. Hence, greater demand will lead to economic growth.

However, these results are far from being an economic law. In this document, the following question is one of the main analysis axes: *are CITR changes symmetrical*, or framed in another way, *do the tax cuts affect output growth differently than tax rises?*

The latter question is relevant as fiscal policy has come into the academic debate of economic cycles since Kydland and Prescott (1982); Galí et al. (2007); Zubairy (2014) and the relevance of fiscal multipliers (Blanchard and Perotti, 2002; Romer and Romer, 2010). All of these studies have relevant considerations in the fiscal policy formulation, as the hypothesis of symmetrical effects of CITR changes leads policy institutions to cut tax rates to achieve economic growth. Thus, testing the symmetrical hypothesis is crucial for formulating public policy.

Recently, some literature has started considering the role of the business cycle in tax changes. For example, Ljungqvist and Smolyansky (2014) found that tax cuts do not affect economic growth in economic expansions, but the same reductions in recessions will boost growth. Derived from these results, I test the following theoretical approach: tax cuts can be translated into more firm profits but not necessarily into more labour demand. Thus, it could have no effect on economic growth but affect the distributional state of the economy:

Hypothesis 1. *CITR reductions will increase the firms' profit rate and do not affect wages, increasing the inequality among agents that own firms and workers.*

This hypothesis is tested by running a panel regression of inequality as a function of CITR and controlling by the economy profit rate, wages and unemployment rate. The analysis found symmetrically increases (cuts) in the CITR will lead to less (more) inequality.

As a second analysis, tax cut effects can be more complex than a direct effect independent of the economic state. The business cycle could play a determinant role; as Ljungqvist and Smolyansky (2014) state, tax cut effects depend on the business cycle: if the economy is going through a recession, the tax policy will have a greater fiscal multiplier rather than if the economy is in a boom.

Hypothesis 2. *Corporate tax changes' effects on the output depend on the business cycle. Moreover, if the economy goes through a positive output gap, tax cuts won't positively affect the output. Meanwhile, the tax policy will increase GDP if there is a negative output gap.*

First, this hypothesis is tested using a panel regression of tax rises and cuts on economic growth controlled by profit rate, wages and unemployment rate. Then, the analysis is deepened using non-linear local projections. Results show that, in the short run, during economic recessions, tax cuts lead to more output growth, and tax increases produce growth reduction.

Going further, the idea that impacts of income distributional changes can affect economic growth comes from post-Keynesian theories (Pasinetti, 1962; Voitchovsky, 2005). This statement can be tested in the framework of non-linearities that are exploited in this paper:

Hypothesis 3. *Controlling by the economic business cycle, tax cuts might have asymmetrical effects on output depending on the distributional state of the economy.*

When testing this hypothesis via non-linear local projections, this analysis founds that, controlled by the economic cycle, a highly unequal economy can diminish any positive effect of tax cuts on economic growth in the long run.

By testing these hypotheses, the overall result implies that while increases in the tax rate lead to a decline in output performance, tax cut effects will depend on the state of the economy in terms of the business cycle (consistent with Ljungqvist and Smolyansky (2014)) and the distributional income setting, which is a result that has not been exposed yet using a structural approach that has validity also for developing countries as well.

The paper is divided as follows: section 2 describes the data used, section 3 explains the methodological setting, section 4 presents results and section 5 ends with concluding remarks.

2 Data description

I used annual frequency data for a panel of 38 OECD economies[1] from 2000 to 2019. Data includes real output, unemployment rate, CITR, constant wages in parity purchase power, and profit rate following Trofimov (2022) computed as the ratio of net operating surplus to the net capital stock, with these variables coming from the OECD database. Gini's coefficient on a scale of 100 data comes from the World Bank database. Descriptive statistics are shown in table 1.

3 Methodology

As presented above, the centre of this discussion is the symmetric assumption of the CITR changes. First, I estimate the following equation:

$$Growth_{i,t} = \beta_{CITR} CITR_{i,t} + X_t + +\delta_t + u_i + \varepsilon_{it} \tag{1}$$

[1] Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States

Where the dependent variable is the output growth of the country i in year t, and is a function on the CITR and vector of control variables X_t that contains the profit rate, wages, and unemployment rate, δ_t and u_i account for time and country fixed effects respectively, and, lastly, ε_{it} is the error term.. As seen in table 2, when controlling for country and time-fixed effects, the results are unclear as there is no statistical significance for the effect of CITR on economic growth.

To estimate the direct effect of the asymmetry, one alternative is to use the tax increases and tax cuts as derived variables from the CITR. Moreover, the set of equations to model this is described as follows:

$$Growth_{i,t} = \beta_i + \beta_t + \beta_{TaxInc} TaxInc_{i,t} + X_t + \varepsilon_t \tag{2}$$

$$Growth_{i,t} = \beta_i + \beta_t + \beta_{TaxCut} TaxCut_{i,t} + X_t + \varepsilon_t \tag{3}$$

Where $TaxInc$ stands for the percentage points of CITR increase year-over-year for country i in year t. Analogously, $TaxCut$ stands for the percentage points of CITR cuts year-over-year. Coefficients β_i and β_t capture country and time-fixed effects. The estimated results of equations (2) and (3) are presented in tables 3 and 4 respectively.

To establish a relationship between CITR cuts and economic growth (hypothesis 2), the business cycle must be taken into account (Ljungqvist and Smolyansky, 2014), and to test this hypothesis, I exploit the local projection (Jordà, 2005) approach using Newey and West (1987) robust standard errors as an identification method in a non-linear panel data setting, similar to Auerbach and Gorodnichenko (2013) by estimating the following equation[2]:

[2]For more details see Auerbach and Gorodnichenko (2013) and Auerbach and Gorodnichenko (2012).

$$
\begin{aligned}
\frac{Y_{i,t+h}-Y_{i,t-1}}{Y_{i,t-1}} =& \alpha_{E,h}F(z_{i,t-1})CITRShock_{it} + \alpha_{R,h}(1-F(z_{i,t-1}))CITRShock_{it} \\
&+\sum_{s=1}^{m}\beta_{E,hs}F(z_{i,t-1})\frac{\Delta Y_{i,t-s}}{Y_{i,t-s-1}} + \sum_{s=1}^{m}\beta_{R,hs}(1-F(z_{i,t-1}))\frac{\Delta Y_{i,t-s}}{Y_{i,t-s-1}} \\
&+\sum_{s=1}^{m}\delta_{E,hs}F(z_{i,t-1})PR_{i,t-s} + \sum_{s=1}^{m}\delta_{R,hs}(1-F(z_{i,t-1}))PR_{i,t-s} \\
&+\sum_{s=1}^{m}\gamma_{E,hs}F(z_{i,t-1})W_{i,t-s} + \sum_{s=1}^{m}\gamma_{R,hs}(1-F(z_{i,t-1}))W_{i,t-s} \\
&+\sum_{s=1}^{m}\xi_{E,hs}F(z_{i,t-1})UR_{i,t-s} + \sum_{s=1}^{m}\xi_{R,hs}(1-F(z_{i,t-1}))UR_{i,t-s} \\
&+\phi_{hi} + \mu_{ht} + u_{iht}
\end{aligned}
\tag{4}
$$

Where t index denotes time, i country, R recession, and E expansion, Y is the real GDP, PR is the profit rate, W are the real wages, and UR is the unemployment rate. Impulse responses for the tax cut in the expansion are computed by $\{\alpha_{E,h}\}_{h=0}^{H}$ and in economic recession by $\{\alpha_{R,h}\}_{h=0}^{H}$. Furthermore, to identify the non-linearity in the local projection $F(z_{i,t})$ can be interpreted as a measure of the probability of a recession in country i for the year t based on the state of business cycle (Auerbach and Gorodnichenko, 2013), and it is constructed using the logistic setting $F(z_{i,t}) = exp(-\gamma z_{i,t})/[1+exp(-\gamma z_{i,t})]$, with $z_{i,t}$ normalised to zero mean and unit variance and fix $\gamma = 10$ according to annual data. This $z_{i,t}$ is computed by removing low-frequency movements in the data using the Hodrick-Prescott filter ($\lambda = 6.25$) (Hodrick and Prescott, 1997). Finally, $\phi_{i,t}$ and $\mu_{i,t}$ are country and time-fixed effects, and u_{iht} is the error term.

As the last hypothesis evaluation, I first tested an OLS regression of CITR effects on Inequality:

$$
Inequality_{i,t} = \beta_i + \beta_t + \beta_{CITR}CITR_{i,t} + X_t + \varepsilon_{i,t} \tag{5}
$$

Where $Inequality_{i,t}$ is the Gini coefficient for country i in year t. X_t is the same set of control variables used in equation (1). With this specification, the relationship between CITR and inequality can be captured. However, to establish a relationship between CITR-inequality-growth, the second step (inequality causing growth) might present endogeneity, and thus I estimated an instrumental variable specification where CITR affects inequality and inequality determines economic growth:

$$growth_{i,t} = \beta_i + \beta_t + \beta_{ineq} inequality_{i,t} + u_{i,t} \tag{6}$$

$$inequality_{i,t} = \beta_i + \beta_t + \beta_{CITR} CITR_{i,t} + v_{i,t} \tag{7}$$

Moreover, for robustness in the analysis of how the income distribution inequality affects output growth, I tested the same specification as equation (4), controlled by the business cycle, for high and low inequality, states:

$$\begin{aligned}\frac{Y_{i,t+h}-Y_{i,t-1}}{Y_{i,t-1}} =& \alpha_{H,h} H_{it} CITRShock_{it} + \alpha_{L,h}(1-H_{it}) CITRShock_{it} \\ &+ \sum_{s=1}^{m} \beta_{H,hs} H_{it} \frac{\Delta Y_{i,t-s}}{Y_{i,t-s-1}} + \sum_{s=1}^{m} \beta_{L,hs}(1-H_{it}) \frac{\Delta Y_{i,t-s}}{Y_{i,t-s-1}} \\ &+ \sum_{s=1}^{m} \delta_{H,hs} H_{it} PR_{i,t-s} + \sum_{s=1}^{m} \delta_{L,hs}(1-H_{it}) PR_{i,t-s} \\ &+ \sum_{s=1}^{m} \gamma_{H,hs} H_{it} W_{i,t-s} + \sum_{s=1}^{m} \gamma_{L,hs}(1-H_{it}) W_{i,t-s} \\ &+ \sum_{s=1}^{m} \xi_{H,hs} H_{it} UR_{i,t-s} + \sum_{s=1}^{m} \xi_{L,hs}(1-H_{it}) UR_{i,t-s} \\ &+ \sum_{s=1}^{m} \varphi_{H,hs} H_{it} cycle_{i,t-s} + \sum_{s=1}^{m} \varphi_{L,hs}(1-H_{it})) cycle_{i,t-s} \\ &+ \phi_{hi} + \mu_{ht} + u_{iht}\end{aligned} \tag{8}$$

Where $H_{i,t}$ is a dummy variable that equals one if the Gini coefficient in year t is above the median value of this variable for each country i. Thus, in this equation, there is no need for a logistic function to establish the smoothing transitions in the two states of the desired variable. Also, $cycle_{i,t}$ is the output gap computing using the same specification of the Hodrick-Prescott filter used in equation (4). The remaining variables and fixed effects remain the same.

Local Projections with narrative shock as IV

This section extends on Mertens and Ravn (2013), who did a local projection analysis for income tax cuts and their effects on aggregates by using narrative shock identification à la (Romer and Romer, 2010) for US data. They found that CITR cuts positively affect growth. However, their approach does not account neither for business cycle regime-switching nor for different states of income inequality. I extend their analysis using these two lasts features to see if the standard local projections results hold.

Since this is an LP-IV approach, equations (3) and (4) change by replacing the narrative shock as the exogenous variable of interest instead of the CITR cuts.

As an extra remark, since Gini coefficient data is only available annually and Mertens and Ravn (2013) data is on a quarterly frequency, I extrapolate the Gini data using cubic spline interpolation.

4 Results

4.1 Asymmetric effects of CITR

The first direct result comes from estimating equations (1), (2), and (3). As shown in table 2, CITR cannot explain economic growth when simply analysing the tax rate level. However, when the CITR is split into tax raises, this variable negatively affects economic growth, a similar result as (Ljungqvist and Smolyansky, 2014; Lee and Gordon, 2005). Moreover, an increase of 1% in the CITR explains, on average, 0.45% of growth decrease.

Nevertheless, when the tax cut is analysed, this tax change is not significant in explaining growth. With the unexplained relationship between tax cuts and output growth, interesting results arise by considering the business cycle. The non-linear local projection of equation (4) describes a cumulative Impulse Response of a shock on CITR cut accounting for the business cycle shown in figure 1. When considering an economic expansion, tax cuts have a negative effect on economic growth; in the short run, a cut of 1% in the tax rate leads to a decline of 0.25% in economic growth. It must be noted that the long-run effect is not significant. Conversely, when economic slacks are considered, a cut of 1% in the tax rate produces an increase of around 0.2% in the short run; moreover, the long-run effect is still positive and significant after 12 years.

4.2 Asymmetric effects accounting for inequality

First of all, to identify the effect of CITR changes on inequality, I estimated equation (5) and results are shown in table 5. CITR increases of 1% translate into a reduction of the Gini index on 0.12 (on a scale of 100). Furthermore, to establish a relationship between CITR, inequality and economic growth, I estimated equations (6) and (7) as an instrumental variable approach and found that CITR is a strong instrument on inequality based on the Kleibergen-Paab statistic, with the same effect shown before (0.12 coefficient). However, the second stage of economic growth as a function of inequality does not appear significant.

To overcome the issue of inequality and economic growth identification, the non-linear local projection of equation (8) as a cumulative Impulse response of a shock on CITR cut on economic growth considering high and low states of inequality on the economy. The results in figure 2 show that in a high inequality economy, tax cuts can cause a depletion of economic growth in the long run on a maximum of 0.4%, but the same tax cut will not affect output growth in a low inequality state of the economy. Overall, tax cuts have no noticeable effects on growth in the short run.

Finally, the results hold when replicating the narrative shock methodology from Mertens and Ravn (2013) paper, accounting for different states of income inequality. Figure 3 shows that on impact, within a highly unequal state of the US economy, growth is negatively affected by the tax cut shock, the effect then dissipates. In a low unequal state there is no differential effect.

5 Concluding Remarks

Previously, the literature (Lee and Gordon, 2005; Shuai and Chmura, 2013) established that CITR changes were thought to have a symmetrical effect as increasing the tax rate will lead to unequivocal depletion of economic growth as firms are unwilling to increase their production and job creation as the marginal costs rise. However, CITR cuts do not have a simple and direct outcome as was thought before (Shuai and Chmura, 2013; Gale and Samwick, 2017; William and Andrew, 2014; Zellner and Ngoie, 2015). When considering the business cycle, tax cuts can lead to better economic performance if the economy is going through a recession, as firms are willing to hire more workers, and the unemployment reduction causes a shift in economic growth (Ljungqvist and Smolyansky, 2014). But when the economy is going through periods of expansion, firms will maintain their costs and labour inputs and rather increase their profit rate, causing an increase in inequality that leads to a decrease in output performance in the long run.

Furthermore, when analysing the role of inequality in economic growth, I have shown that it is also asymmetrical. When the economy is going through periods of high inequality, a decrease in economic performance will decline in the long run. And when the economy is in a low inequality state, the tax cuts do not affect economic performance.

This fully empirical approach shown in this paper has the advantage of establishing shock identification through local projections without establishing an associated economic theoretical framework. Moreover, the analysis is developed for a panel of developing and developed countries as a generalised average effect. However, to expand the analysis for a specific country where a theoretical framework such as the New Keynesian can be applied, a more specific tool such as the burgeoning Heterogeneous Agents New Keynesian (HANK) models (Kaplan et al., 2018; Acharya et al., 2020; Sims et al., 2022; Alves et al., 2020) will be useful, as the income heterogeneity will be explicitly taken into account via distribution calibration and distributional changes after tax shocks. This tool will enrich the literature as these models have been applied around monetary policy and not so much for fiscal analysis.

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Figures and Tables

Figures

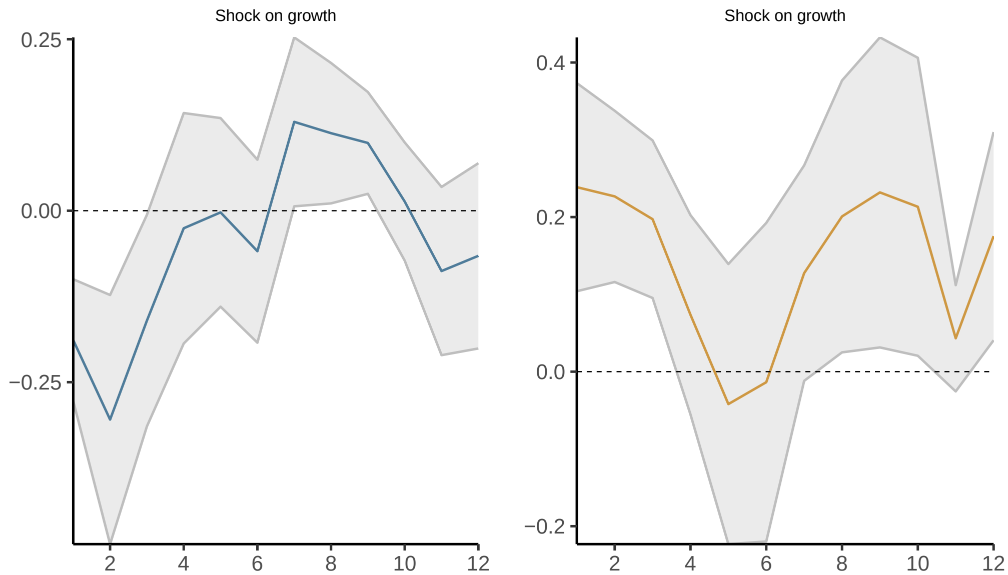


Figure 1: Local Projections for a CITR cut shock on growth accounting for business cycle

Note: This figure displays the non-linear panel data IRF for equation 4, that is, the effect of a CITR tax cut on economic growth during periods of economic expansions (left panel) and slacks (right panel). The IRF presented is a cumulative function. The analysis controls for country and time fixed effects. Confidence bands are computed using a statistic significance of 5%. The period frequency is years.

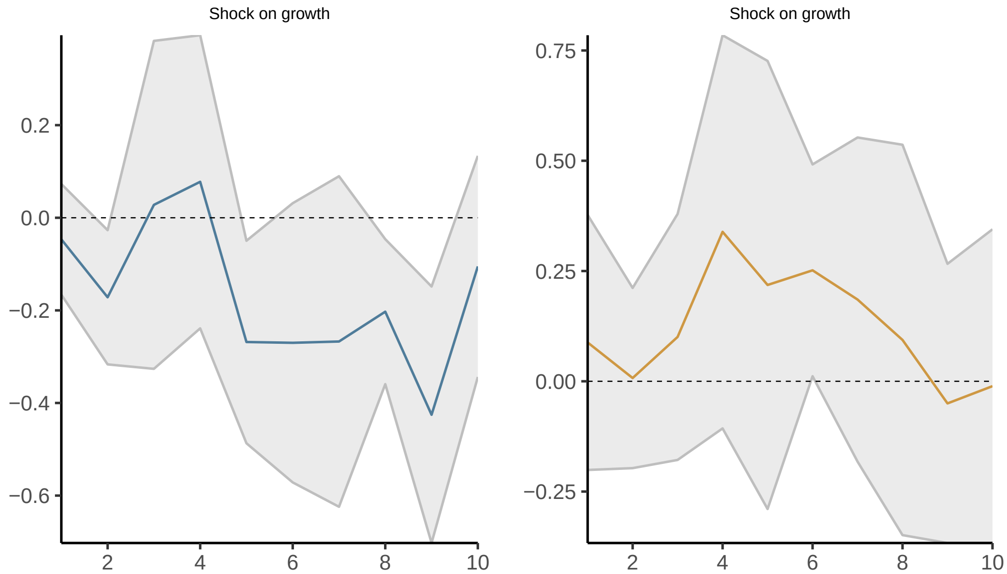
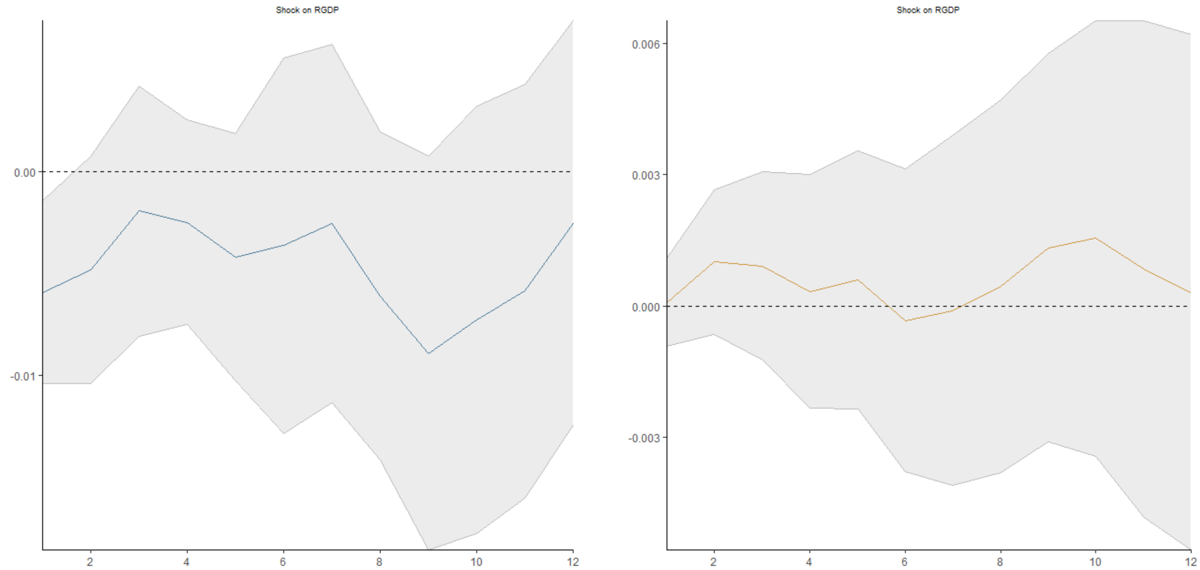


Figure 2: Local Projections for a CITR cut shock on growth accounting for inequality income

Note: This figure displays the non-linear panel data IRF for equation 8, that is, the effect of a CITR tax cut on economic growth during periods of high (left panel) and low (right panel) inequality. The IRF presented is a cumulative function. The analysis controls for country and time fixed effects. Confidence bands are computed using a statistic significance of 5%. The period frequency is years.



(a) High inequality

(b) Low inequality

Figure 3: Local IV Projections for a CITR cut (narrative) shock on growth accounting for inequality income

Note: This figure displays the non-linear IRF for the Mertens and Ravn (2013) with inequality regime-switching, that is, the effect of a CITR tax cut on economic growth during periods of high (left panel) and low (right panel) inequality (Gini coefficient after taxes above the median vs below the median). The IRF presented is a cumulative function. Confidence bands are computed using a statistic significance of 5%. Sample is US data in a quarterly frequency.

Tables

	Correlations						Statistics		
	(1)	(2)	(3)	(4)	(5)	(6)	Mean	SD	Obs
(1): Output Growth	1.00						2.58	3.08	760
(2): Unemployment Rate	-0.11	1.00					7.66	4.08	758
(3): Gini's Coefficient	0.13	0.20	1.00				33.85	6.96	583
(4): CITR	-0.07	0.06	0.30	1.00			24.99	7.00	760
(5): Constant Wages (divided by 1000)	0.09	-0.22	-0.09	-0.05	1.00		1.63	6.20	694
(6): Profit Rate	0.21	0.08	0.34	-0.18	-0.05	1.00	9.04	4.31	587

Table 1: Descriptive Statistics

This table displays descriptive statistics for the variables used in the analysis: output growth in percentage, the unemployment rate in percentage, Gini's coefficient (scale of 100), real wages in parity purchase power, and profit rate computed as Trofimov (2022). The correlation matrix is shown in the first six columns. And the mean, standard deviation and the number of observations are presented on the table's right panel.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Growth							
CITR	-0.0589***	-0.0460**	0.1424***	0.1179***	-0.1218***	-0.1079***	-0.0065	0.0043
	(0.0210)	(0.0207)	(0.0362)	(0.0346)	(0.0170)	(0.0170)	(0.0383)	(0.0370)
Profit Rate		0.1576***		0.6122***		0.1040***		0.3749***
		(0.0330)		(0.1132)		(0.0252)		(0.0887)
Wages		0.0345		0.1429		0.0360**		0.0095
		(0.0213)		(0.2267)		(0.0162)		(0.1754)
Unemplyoment Rate		-0.1147***		-0.1825***		-0.0667***		-0.1251***
		(0.0312)		(0.0468)		(0.0247)		(0.0393)
Observations	571	571	571	571	571	571	571	571
R-squared	.014	.078	.164	.263	.464	.492	.555	.591
Country F.E.	×	×	✓	✓	×	×	✓	✓
Time F.E.	×	×	×	×	✓	✓	✓	✓

*** p<0.01, ** p<0.05, * p<0.1

Table 2: CITR Effects on Growth

This table displays the regression of equation (1), where the dependent variable is the output growth and the exogenous variables are the CITR, profit rate, wages and unemployment rate. Odd columns report the direct regression of growth as a function of CITR. Meanwhile, even columns include the set of control variables as well. Columns (3), (4), (7) and (8) report country fixed effects, and columns (5), (6), (7) and (8) report time-fixed effects. Unit of observation is country times year. Standard errors are clustered by country.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Growth				
Tax increase	-0.6151***	-0.4873**	-0.5898***	-0.4457**	-0.5601***	-0.4887***	-0.5264***	-0.4476***
	(0.1989)	(0.1954)	(0.1961)	(0.1865)	(0.1575)	(0.1547)	(0.1462)	(0.1426)
Profit Rate		0.1642***		0.6700***		0.1286***		0.3813***
		(0.0327)		(0.1127)		(0.0255)		(0.0878)
Wages		0.0405*		0.0722		0.0483***		-0.0087
		(0.0212)		(0.2271)		(0.0165)		(0.1735)
Unemplyoment Rate		-0.0987***		-0.1562***		-0.0471*		-0.1073***
		(0.0315)		(0.0474)		(0.0257)		(0.0392)
Observations	571	571	571	571	571	571	571	571
R-squared	.017	.08	.154	.255	.428	.465	.566	.598
Country F.E.	×	×	✓	✓	×	×	✓	✓
Time F.E.	×	×	×	×	✓	✓	✓	✓

*** p<0.01, ** p<0.05, * p<0.1

Table 3: CITR Increase Effects on Growth

This table displays the regression of equation (2), where the dependent variable is the output growth and the exogenous variables are the CITR increases, computed as the tax change when positive and 0 in other cases, profit rate, wages and unemployment rate. Odd columns report the direct regression of growth as a function of CITR. Meanwhile, even columns include the set of control variables as well. Columns (3), (4), (7) and (8) report country fixed effects, and columns (5), (6), (7) and (8) report time-fixed effects. Unit of observation is country times year. Standard errors are clustered by country.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Growth				
Tax cut	0.0174	0.0214	0.0367	0.0275	-0.0346	-0.0243	-0.0180	-0.0069
	(0.0789)	(0.0764)	(0.0759)	(0.0712)	(0.0636)	(0.0616)	(0.0576)	(0.0554)
Profit Rate		0.1671***		0.6665***		0.1315***		0.3750***
		(0.0329)		(0.1133)		(0.0257)		(0.0886)
Wages		0.0397*		0.0810		0.0473***		0.0106
		(0.0213)		(0.2283)		(0.0167)		(0.1751)
Unemplyoment Rate		-0.1112***		-0.1713***		-0.0591**		-0.1246***
		(0.0313)		(0.0472)		(0.0256)		(0.0392)
Observations	571	571	571	571	571	571	571	571
R-squared	8.6e-05	.07	.14	.248	.415	.455	.555	.591
Country F.E.	×	×	✓	✓	×	×	✓	✓
Time F.E.	×	×	×	×	✓	✓	✓	✓

*** p<0.01, ** p<0.05, * p<0.1

Table 4: CITR Cut Effects on Growth

This table displays the regression of equation (3), where the dependent variable is the output growth and the exogenous variables are the CITR cuts, computed as the absolute value of tax change when negative and 0 in other cases, profit rate, wages and unemployment rate. Odd columns report the direct regression of growth as a function of CITR. Meanwhile, even columns include the set of control variables as well. Columns (3), (4), (7) and (8) report country fixed effects, and columns (5), (6), (7) and (8) report time-fixed effects. Unit of observation is country times year. Standard errors are clustered by country.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Inequality				
CITR	0.1005***	0.1338***	-0.0597***	-0.0607***	0.0976***	0.1339***	-0.1156***	-0.1196***
	(0.0298)	(0.0280)	(0.0195)	(0.0201)	(0.0324)	(0.0308)	(0.0246)	(0.0242)
Profit Rate		0.2827***		0.0631		0.2805***		-0.0063
		(0.0434)		(0.0646)		(0.0449)		(0.0664)
Wages		0.0253		0.2587		0.0279		0.2278
		(0.0406)		(0.2587)		(0.0417)		(0.2579)
Unemplyoment Rate		0.2574***		0.0967***		0.2764***		0.1157***
		(0.0426)		(0.0225)		(0.0463)		(0.0248)
Observations	442	442	442	442	442	442	442	442
R-squared	.025	.181	.91	.914	.041	.198	.916	.921
Country F.E.	×	×	✓	✓	×	×	✓	✓
Time F.E.	×	×	×	×	✓	✓	✓	✓

*** p<0.01, ** p<0.05, * p<0.1

Table 5: CITR Effects on Inequality

This table displays the regression of equation (5), where the dependent variable is the Gini's coefficient (Income inequality) and the exogenous variables are the CITR, profit rate, wages and unemployment rate. Odd columns report the direct regression of growth as a function of CITR. Meanwhile, even columns include the set of control variables as well. Columns (3), (4), (7) and (8) report country fixed effects, and columns (5), (6), (7) and (8) report time-fixed effects. Unit of observation is country times year. Standard errors are clustered by country.

	(1)	(2)	(3)	(4)
		Growth		Inequality
	OLS	Reduced form	IV	First Stage
Gini	-0.0709		-0.0112	
	(0.132)		(0.697)	
CITR		0.00130		-0.116***
		(0.0807)		(0.0361)
Observations	442	442	442	442
R-squared	0.585	0.585	0.000	0.916
Adjusted R-squared	0.534	0.533	-0.049	0.906
Estimation	OLS	OLS	IV	OLS
Country F.E	✓	✓	✓	✓
Year F.E.	✓	×	×	×
Instrument	-	-	CITR	-
Kleibergen-Paap F			-	10.256

Table 6: CITR Effects on Inequality and Growth

This table reports the regression of economic growth on inequality. Column (1) displays the OLS regression, column (2) reports the reduced form of the IV estimation, column (3) shows the IV results, and column (4) reports the first stage. I use as an instrument the CITR. All estimations include country and time-fixed effects. First-stage estimates report the Kleibergen-Paap F statistic to detect weak instruments. Unit of observation is country times year. Standard errors are clustered by country.