

The Taxing Deed of Globalization

Peter H. Egger^{1,2,3}

Sergey Nigai^{1,2}

Nora Strecker¹

¹ETH Zurich, KOF ²CESifo ³CEPR, WIFO

December 2015

Motivation



Figure: TAXATION IN THE GLOBAL ECONOMY

Globalization and taxation

Globalization and taxation

Obs. 1 Government spending is positively correlated with globalization

- ▶ Workers demand insurance from external shocks (Rodrik, 1998)
- ▶ Trade makes public spending cheaper (Epifani and Gancia, 2009)
- ▶ Globalization induces inequality which calls for redistribution

Globalization and taxation

Obs. 1 Government spending is positively correlated with globalization

- ▶ Workers demand insurance from external shocks (Rodrik, 1998)
- ▶ Trade makes public spending cheaper (Epifani and Gancia, 2009)
- ▶ Globalization induces inequality which calls for redistribution

Obs. 2 Factors become internationally mobile

- ▶ Stiffer international tax competition (Devereux, M. Lockwood, B. and M. Redoano, 2008)
- ▶ More opportunities to avoid taxation (est. 20 trillion \$, Economist in 2013)

Globalization and taxation

Obs. 1 Government spending is positively correlated with globalization

- ▶ Workers demand insurance from external shocks (Rodrik, 1998)
- ▶ Trade makes public spending cheaper (Epifani and Gancia, 2009)
- ▶ Globalization induces inequality which calls for redistribution

Obs. 2 Factors become internationally mobile

- ▶ Stiffer international tax competition (Devereux, M. Lockwood, B. and M. Redoano, 2008)
- ▶ More opportunities to avoid taxation (est. 20 trillion \$, Economist in 2013)

How do governments around the globe accomplish (1) given (2) ?

Globalization and Corporate Tax Rates

Globalization and Corporate Tax Rates

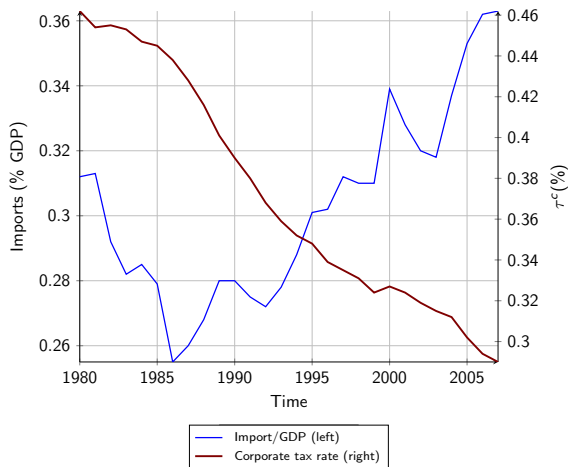


Figure: AVERAGE COUNTRY (65 BIGGEST ECONOMIES)

Globalization and Employee-Borne Tax Rates

Globalization and Employee-Borne Tax Rates



Figure: AVERAGE COUNTRY (65 BIGGEST ECONOMIES)

What we do

What we do

- ▶ Employ unique dataset for 65 biggest economies and 28 years (1980-2007).

What we do

- ▶ Employ unique dataset for 65 biggest economies and 28 years (1980-2007).
- ▶ Develop an instrument for globalization based on insights from structural gravity models.

What we do

- ▶ Employ unique dataset for 65 biggest economies and 28 years (1980-2007).
- ▶ Develop an instrument for globalization based on insights from structural gravity models.
- ▶ Estimate the effect of globalization (across different countries and time periods) on:
 - ▶ Relative size of government revenues
 - ▶ Composition of tax revenues
 - ▶ Contribution to tax revenues (and tax rates) by different groups of population

Instrument for openness

Define two measures of *globalization*:

- ▶ *trade* the share of exports and imports in domestic consumption of manufacturing
- ▶ *mig*, the share of migrants in total population

We can't use these measures to identify causal effect:

- ▶ Globalization measures are endogenous to taxes via demand (expenditure) and supply (cost) channels.
- ▶ To identify causality need to get rid of both channels.
- ▶ Employ new trade models featuring structural gravity models.

Instrument for openness cont.

Instrument for openness cont.

Consider a structural gravity equation as in Eaton and Kortum (2002), Anderson and van Wincoop (2003), Melitz (2003):

$$X_{ij,t} = \frac{c_{j,t} \beta_{ij,t}}{\sum_{\ell} c_{i\ell,t} \beta_{i\ell,t}} Y_{i,t}$$

Instrument for openness cont.

Consider a structural gravity equation as in Eaton and Kortum (2002), Anderson and van Wincoop (2003), Melitz (2003):

$$X_{ij,t} = \frac{c_{j,t}\beta_{ij,t}}{\sum_{\ell} c_{i\ell,t}\beta_{i\ell,t}} Y_{i,t}$$

1. Eliminating demand-side link:

$$\frac{X_{ij,t}}{Y_{i,t}} \equiv \pi_{ij,t} = \frac{c_{j,t}\beta_{ij,t}}{\sum_k c_{k,t}\beta_{ik,t}}$$

Instrument for openness cont.

Consider a structural gravity equation as in Eaton and Kortum (2002), Anderson and van Wincoop (2003), Melitz (2003):

$$X_{ij,t} = \frac{c_{j,t} \beta_{ij,t}}{\sum_{\ell} c_{i\ell,t} \beta_{i\ell,t}} Y_{i,t}$$

1. Eliminating demand-side link:

$$\frac{X_{ij,t}}{Y_{i,t}} \equiv \pi_{ij,t} = \frac{c_{j,t} \beta_{ij,t}}{\sum_k c_{k,t} \beta_{ik,t}}$$

2. Eliminating supply-side link:

$$\frac{\pi_{ij,t}}{\pi_{ii,t}} \frac{\pi_{ji,t}}{\pi_{jj,t}} = \beta_{ij,t} \beta_{ji,t}$$

Instrument for openness cont.

Consider a structural gravity equation as in Eaton and Kortum (2002), Anderson and van Wincoop (2003), Melitz (2003):

$$X_{ij,t} = \frac{c_{j,t} \beta_{ij,t}}{\sum_{\ell} c_{i\ell,t} \beta_{i\ell,t}} Y_{i,t}$$

1. Eliminating demand-side link:

$$\frac{X_{ij,t}}{Y_{i,t}} \equiv \pi_{ij,t} = \frac{c_{j,t} \beta_{ij,t}}{\sum_k c_{k,t} \beta_{ik,t}}$$

2. Eliminating supply-side link:

$$\frac{\pi_{ij,t}}{\pi_{ii,t}} \frac{\pi_{ji,t}}{\pi_{jj,t}} = \beta_{ij,t} \beta_{ji,t}$$

3. Specifying theory-consistent instrument for $\pi_{i,t} = \sum_{j \neq i} \pi_{ij,t}$:

$$\beta_{i,t} = \sum_{j \neq i} \beta_{ij,t} \beta_{ji,t}$$

Globalization and total tax revenues

To identify the effect of globalization on total tax revenues, we run:

$$100 \times \frac{TR_{i,t}}{GDP_{i,t}} = \text{const}^{tot} + \gamma^{tot} \ln(\pi_{i,t}) + \Gamma^{tot} Z_{i,t} + \lambda_t^{tot} + \mu_i^{tot} + u_{i,t}^{tot},$$

where $\ln(\pi_{i,t})$ is instrumented.

Globalization and total tax revenues

To identify the effect of globalization on total tax revenues, we run:

$$100 \times \frac{TR_{i,t}}{GDP_{i,t}} = \text{const}^{tot} + \gamma^{tot} \ln(\pi_{i,t}) + \Gamma^{tot} Z_{i,t} + \lambda_t^{tot} + \mu_i^{tot} + u_{i,t}^{tot},$$

where $\ln(\pi_{i,t})$ is instrumented.

Vector of controls, $Z_{i,t}$, includes:

- ▶ Skill composition in country/year
- ▶ Political regime and political orientation of parliamentary majority
- ▶ Population, real GDP per capita, interaction term

Globalization and tax revenue composition

We consider several types of tax revenues revenues:

- ▶ Corporate taxes (*corp*)
- ▶ Employer-based social security contributions (*sscer*)
- ▶ Employee-based taxes (*employee*): labor income taxes and employee-based social security contributions
- ▶ Goods and services taxes (*goods*): value added taxes, sales taxes and other forms of taxes on goods and services
- ▶ All remaining taxes (*other*)

Globalization and tax revenue composition

We consider several types of tax revenues revenues:

- ▶ Corporate taxes (*corp*)
- ▶ Employer-based social security contributions (*sscer*)
- ▶ Employee-based taxes (*employee*): labor income taxes and employee-based social security contributions
- ▶ Goods and services taxes (*goods*): value added taxes, sales taxes and other forms of taxes on goods and services
- ▶ All remaining taxes (*other*)

Then, we run the following regressions:

$$100 \times \frac{R_{i,t}^q}{GDP_{i,t}} = \text{const}^q + \gamma^q \ln(\pi_{i,t}) + \Gamma^q Z_{i,t} + \lambda_t^q + \mu_i^q + u_{i,t}^q. \quad (1)$$

for $q = \{\text{corp}, \text{sscer}, \text{employee}, \text{goods}, \text{other}\}$.

Different country groups and time periods

We split the sample into four different groups:

- ▶ **OECD vs. non-OECD**
 - ▶ Countries differ significantly in terms of social protection, involvement in global competition for tax base etc.
 - ▶ Sending/receiving migrants
- ▶ **1980-1993 vs. 1994-2007**
 - ▶ Major liberalization in mid-nineties, e.g., Maastricht Treaty (1992), NAFTA (1994), Schengen Area (1995)
 - ▶ Formal structural break tests point to 1994

Table: Trade & composition of tax revenues: OECD-Time-Split

	OECD '80-'93	OECD '94-'07	NonOECD '80-'93	NonOECD '94-'07
$\hat{\gamma}_{trade}^{total}$	1.221 (1.013)	6.214*** (1.924)	0.892 (0.850)	1.406** (0.641)
R^2	0.973	0.972	0.906	0.934
Obs	353	364	385	473
$\hat{\gamma}_{trade}^{corp}$	1.672*** (0.555)	-0.363 (0.609)	0.453 (0.512)	0.724* (0.425)
R^2	0.802	0.800	0.874	0.782
Obs	330	350	316	397
$\hat{\gamma}_{trade}^{sscer}$	4.100*** (1.138)	-0.974 (1.026)	0.094 (0.218)	-0.325** (0.162)
R^2	0.946	0.939	0.879	0.940
Obs	362	364	403	484
$\hat{\gamma}_{trade}^{employee}$	1.984* (1.148)	5.404*** (1.317)	0.227 (0.276)	0.743*** (0.249)
R^2	0.962	0.918	0.953	0.954
Obs	338	350	316	389
$\hat{\gamma}_{trade}^{goods}$	1.201* (0.666)	5.756*** (0.657)	0.523 (0.402)	0.865 (0.594)
R^2	0.947	0.965	0.907	0.830
Obs	353	364	366	451
$\hat{\gamma}_{trade}^{other}$	-0.973** (0.448)	-3.328*** (0.814)	-0.895 (0.809)	-1.315** (0.518)
R^2	0.929	0.765	0.704	0.854
Obs	330	350	311	383

Table: Trade & composition of tax revenues: OECD-Time-Split

	OECD '80-'93	OECD '94-'07	NonOECD '80-'93	NonOECD '94-'07
$\hat{\gamma}_{trade}^{total}$	1.221 (1.013)	6.214*** (1.924)	0.892 (0.850)	1.406** (0.641)
R^2	0.973	0.972	0.906	0.934
Obs	353	364	385	473
$\hat{\gamma}_{trade}^{corp}$	1.672*** (0.555)	-0.363 (0.609)	0.453 (0.512)	0.724* (0.425)
R^2	0.802	0.800	0.874	0.782
Obs	330	350	316	397
$\hat{\gamma}_{trade}^{sscer}$	4.100*** (1.138)	-0.974 (1.026)	0.094 (0.218)	-0.325** (0.162)
R^2	0.946	0.939	0.879	0.940
Obs	362	364	403	484
$\hat{\gamma}_{trade}^{employee}$	1.984* (1.148)	5.404*** (1.317)	0.227 (0.276)	0.743*** (0.249)
R^2	0.962	0.918	0.953	0.954
Obs	338	350	316	389
$\hat{\gamma}_{trade}^{goods}$	1.201* (0.666)	5.756*** (0.657)	0.523 (0.402)	0.865 (0.594)
R^2	0.947	0.965	0.907	0.830
Obs	353	364	366	451
$\hat{\gamma}_{trade}^{other}$	-0.973** (0.448)	-3.328*** (0.814)	-0.895 (0.809)	-1.315** (0.518)
R^2	0.929	0.765	0.704	0.854
Obs	330	350	311	383

Table: Trade & composition of tax revenues: OECD-Time-Split

	OECD '80-'93	OECD '94-'07	NonOECD '80-'93	NonOECD '94-'07
$\hat{\gamma}_{trade}^{total}$	1.221 (1.013)	6.214*** (1.924)	0.892 (0.850)	1.406** (0.641)
R^2	0.973	0.972	0.906	0.934
Obs	353	364	385	473
$\hat{\gamma}_{trade}^{corp}$	1.672*** (0.555)	-0.363 (0.609)	0.453 (0.512)	0.724* (0.425)
R^2	0.802	0.800	0.874	0.782
Obs	330	350	316	397
$\hat{\gamma}_{trade}^{sscer}$	4.100*** (1.138)	-0.974 (1.026)	0.094 (0.218)	-0.325** (0.162)
R^2	0.946	0.939	0.879	0.940
Obs	362	364	403	484
$\hat{\gamma}_{trade}^{employee}$	1.984* (1.148)	5.404*** (1.317)	0.227 (0.276)	0.743*** (0.249)
R^2	0.962	0.918	0.953	0.954
Obs	338	350	316	389
$\hat{\gamma}_{trade}^{goods}$	1.201* (0.666)	5.756*** (0.657)	0.523 (0.402)	0.865 (0.594)
R^2	0.947	0.965	0.907	0.830
Obs	353	364	366	451
$\hat{\gamma}_{trade}^{other}$	-0.973** (0.448)	-3.328*** (0.814)	-0.895 (0.809)	-1.315** (0.518)
R^2	0.929	0.765	0.704	0.854
Obs	330	350	311	383

Table: Trade & composition of tax revenues: OECD-Time-Split

	OECD '80-'93	OECD '94-'07	NonOECD '80-'93	NonOECD '94-'07
$\hat{\gamma}_{trade}^{total}$	1.221 (1.013)	6.214*** (1.924)	0.892 (0.850)	1.406** (0.641)
R^2	0.973	0.972	0.906	0.934
Obs	353	364	385	473
$\hat{\gamma}_{trade}^{corp}$	1.672*** (0.555)	-0.363 (0.609)	0.453 (0.512)	0.724* (0.425)
R^2	0.802	0.800	0.874	0.782
Obs	330	350	316	397
$\hat{\gamma}_{trade}^{sscer}$	4.100*** (1.138)	-0.974 (1.026)	0.094 (0.218)	-0.325** (0.162)
R^2	0.946	0.939	0.879	0.940
Obs	362	364	403	484
$\hat{\gamma}_{trade}^{employee}$	1.984* (1.148)	5.404*** (1.317)	0.227 (0.276)	0.743*** (0.249)
R^2	0.962	0.918	0.953	0.954
Obs	338	350	316	389
$\hat{\gamma}_{trade}^{goods}$	1.201* (0.666)	5.756*** (0.657)	0.523 (0.402)	0.865 (0.594)
R^2	0.947	0.965	0.907	0.830
Obs	353	364	366	451
$\hat{\gamma}_{trade}^{other}$	-0.973** (0.448)	-3.328*** (0.814)	-0.895 (0.809)	-1.315** (0.518)
R^2	0.929	0.765	0.704	0.854
Obs	330	350	311	383

Who gets taxed by globalization?

Who gets taxed by globalization?

We analyze the effect of globalization on labor income taxes of different workers:

- ▶ Calibrate wage income of 100 percentiles in each country/year
 - ▶ Pareto and Log-normal assumptions & data on earnings Gini coefficients & average wage
 - ▶ Predictions fit well available (limited) micro data
- ▶ Feed wages into country/year specific tax codes to obtain effective tax rate

For each percentile $p = \{1, \dots, 100\}$, we run the following:

$$100 \times \frac{\tau_{i,t}^p w_{i,t}^p}{\sum_k \tau_{i,t}^k w_{i,t}^k} = \text{const}^p + \gamma^p \ln(\pi_{i,t}) + \Gamma^p Z_{i,t} + \lambda_t^p + \mu_i^p + u_{i,t}^p.$$

Percentile Shares in OECD, '80-'93

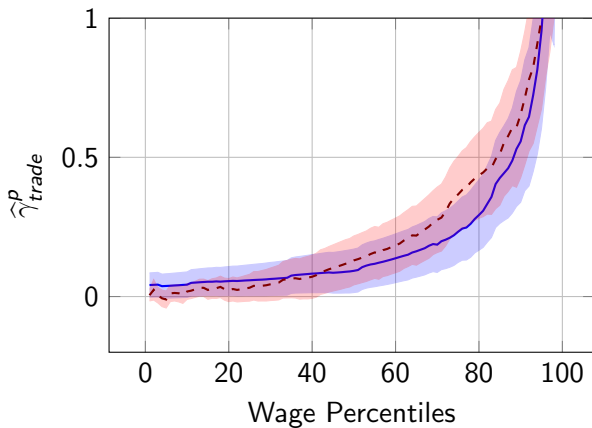


Figure: ESTIMATED COEFFICIENT & 10% CONFIDENCE BANDS

Percentile Shares in OECD, '94-'07

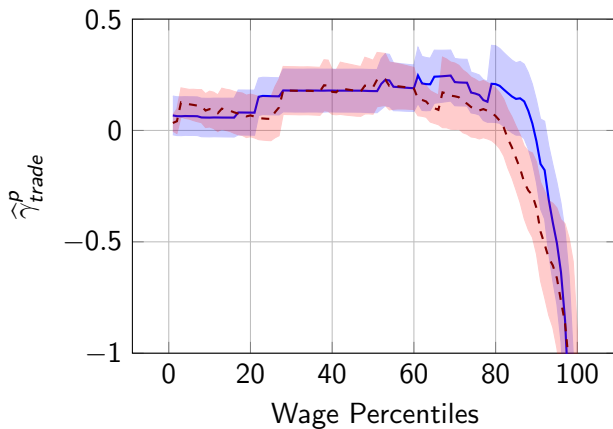


Figure: ESTIMATED COEFFICIENT & 10% CONFIDENCE BANDS

Percentile Shares in non-OECD, '80-'93

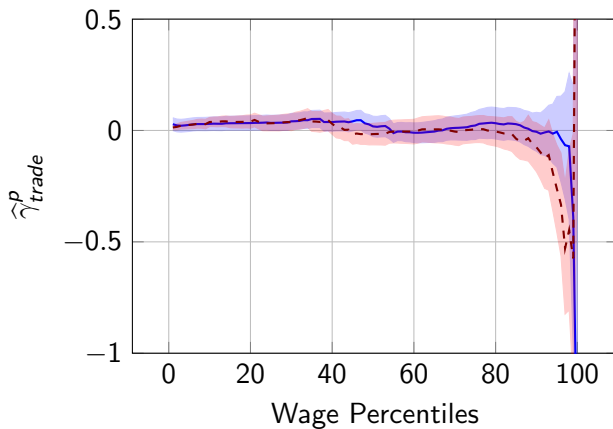


Figure: ESTIMATED COEFFICIENT & 10% CONFIDENCE BANDS

Percentile Shares in non-OECD, '94-'07

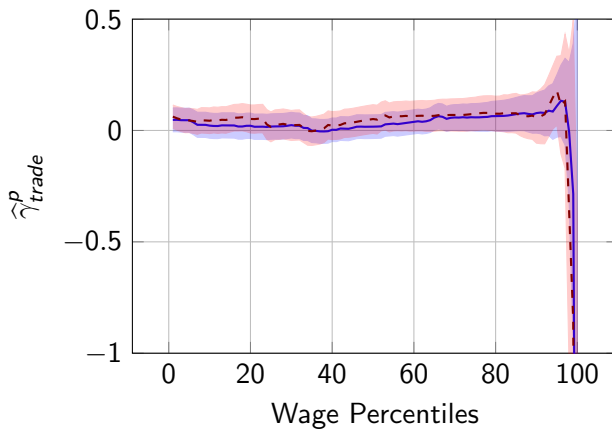


Figure: ESTIMATED COEFFICIENT & 10% CONFIDENCE BANDS

To check the effect of globalization, we also look at the effect on the effective tax rate by percentile.

$$100 \times \tau_{i,t}^P = \text{const}^P + \xi^P \ln(\pi_{i,t}) + \Gamma^P Z_{i,t} + \lambda_t^P + \mu_i^P + u_{i,t}^P$$

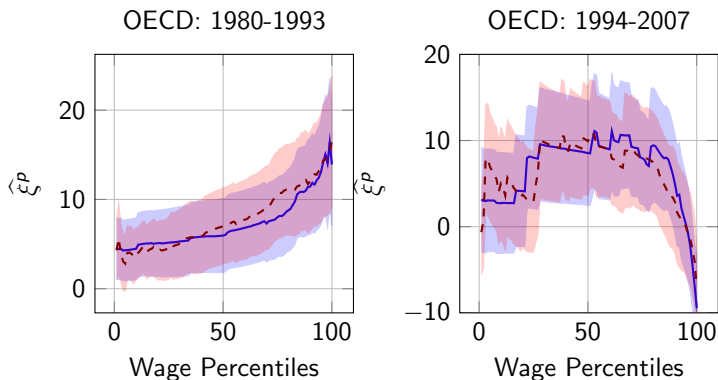


Figure: PERCENTILE-SPECIFIC TAX RATES: TRADE

Estimated effect on individual tax rates

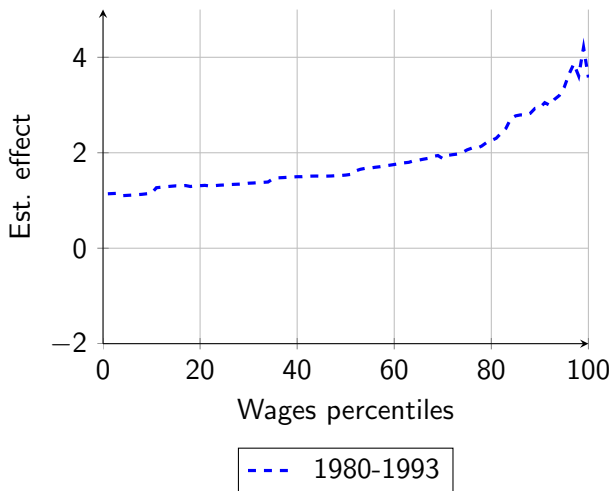


Figure: THE EFFECT OF OPENNESS ON TAX RATES FOR AN AVERAGE OECD COUNTRY

Estimated effect on individual tax rates

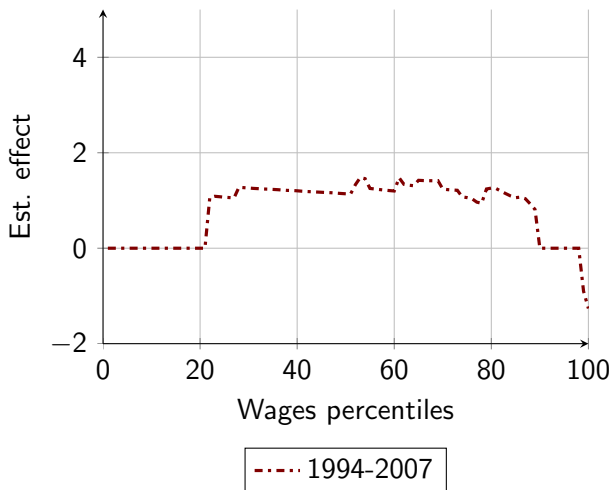


Figure: THE EFFECT OF OPENNESS ON TAX RATES FOR AN AVERAGE OECD COUNTRY

Estimated effect on individual tax rates

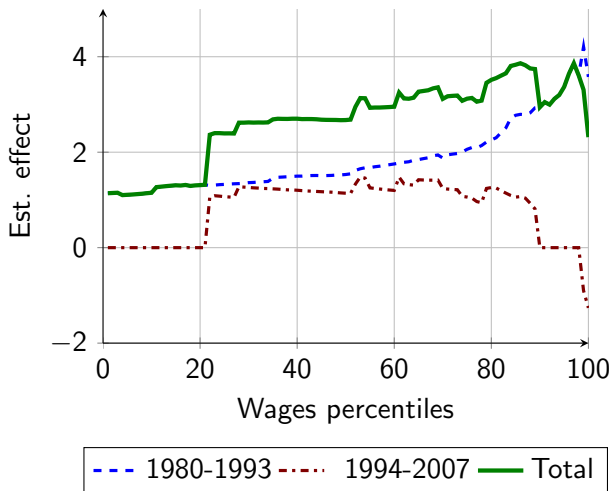


Figure: THE EFFECT OF OPENNESS ON TAX RATES FOR AN AVERAGE OECD COUNTRY

Thank you!