# The Great Divergence(s)

Giuseppe Berlingieri (OECD, ESSEC, CEP)
Patrick Blanchenay (U. of Toronto)
Chiara Criscuolo (OECD, CEP)

CompNet $13^{th}$ Annual Conference
European Commission, Brussels
30 June 2017

Section 1

# Motivation

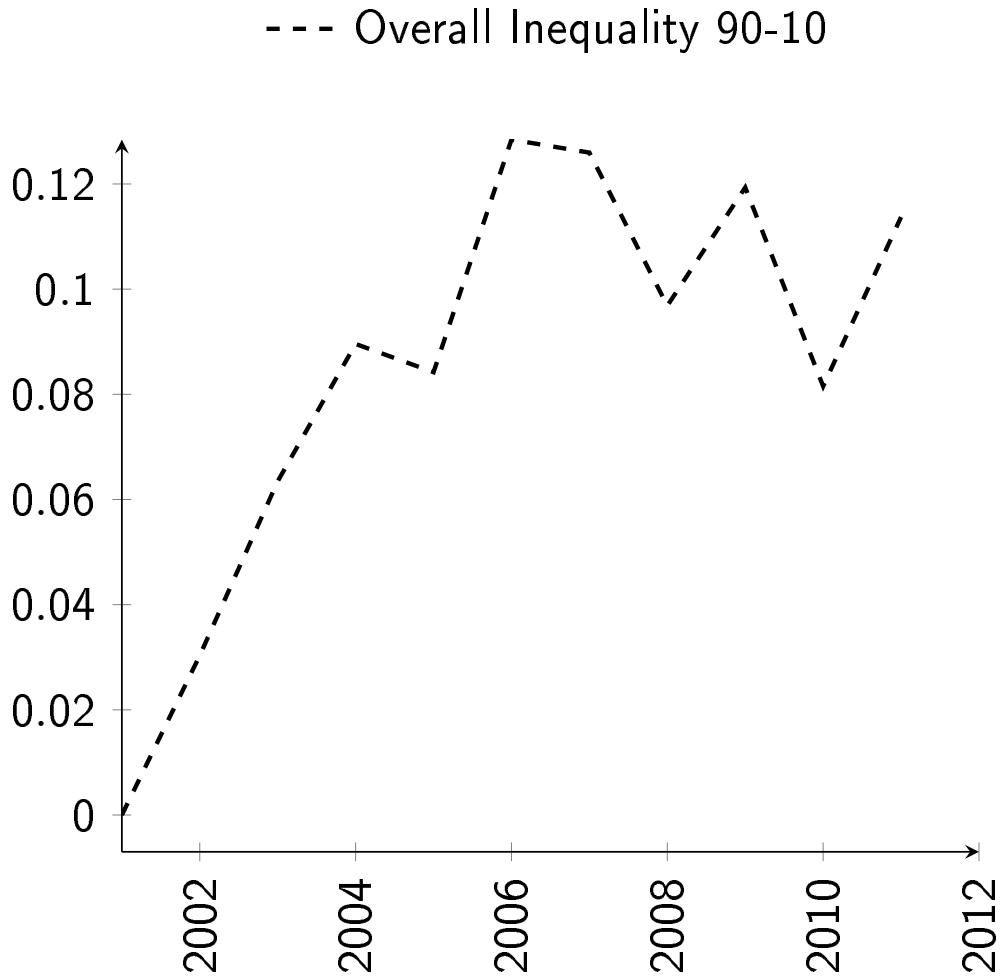
# Motivation

## Increasing divergence(s)

- Economies have observed increasing divergence(s):
  - In earnings amongst workers;
  - Amongst business: between high and low performing firms (OECD, 2015).
- Rising earnings inequality largely driven by an increase in the wage differentials between firms:
  - US (Dunne et al., 2004; Barth et al., 2014; Song et al., 2015; Haltiwanger and Spletzer, 2017);
  - Brazil (Helpman, Itskhoki, Muendler, et al., 2017);
  - Denmark (Bagger et al., 2013);
  - Germany (Baumgarten, 2013; Card, Heining, et al., 2013; Goldschmidt and Schmieder, 2015);
  - Italy (Card, Devicienti, et al., 2014);
  - Portugal (Card, Cardoso, et al., 2016);
  - Sweden (Håkanson et al., 2015);
  - UK (Faggio et al., 2010).

# Motivation

## The "Great Divergence" of wages




Year dummy estimates of a regression of between-firm log-wage dispersion ($90^{th}$ to $10^{th}$ percentiles ratio) within country-sector pairs. Within country for overall inequality in earnings.

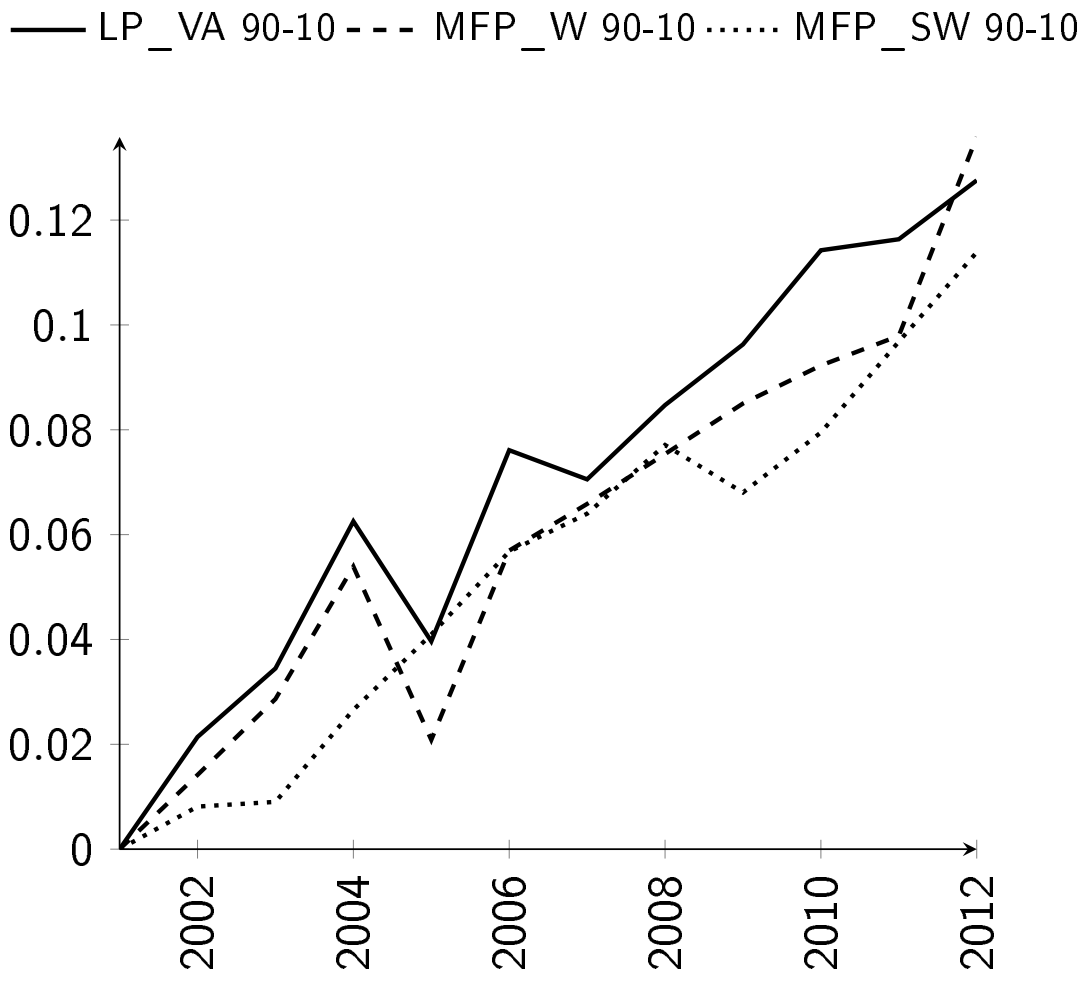
# Motivation

## The "Great Divergence" of wages


Year dummy estimates of a regression of between-firm log-wage dispersion ($90^{th}$ to $10^{th}$ percentiles ratio) within country-sector pairs. Within country for overall inequality in earnings.

# Motivation

## The "Great Divergence" in productivity




Year dummy estimates of a regressions of log-productivity dispersion ($90^{th}$ to $10^{th}$ percentiles ratio of log-productivity) within country-sector pairs.

# The Questions

- Are these trends intertwined?
- Is increasing earnings inequality linked to growing productivity dispersion among firms?
- The objective: build a picture across countries and over time of
  - Wage dispersion $\Uparrow$
  - Productivity dispersion $\Uparrow$
  - The link between the two
- Role of structural factors (i.e. globalisation, digitalisation)?
- Role of policies (min. wage, EPL, union, coordinated wage setting)?
- The task requires data representative for the entire distribution of firms: MultiProd project, 21 countries so far and more to come.

# The Framework

- Several reasons why wages would be higher in more productive firms:
  - Rent-sharing from:
    - Asymmetric information
    - Wage bargaining
  - Sorting and assortative matching
- Why? Usual suspects:
  - Technology (skilled-biased, complementarities)
  - Trade (selection)
  - Winner-takes-all dynamics
  - Institution and framework conditions

# Section 2

# Data

# Data: The OECD MultiProd project

- Harmonized Stata routine sent to NSOs with access to confidential (administrative) firm-level longitudinal data
- Characteristics of firms (average, std. dev., percentiles), e.g.:
  - Productivity (Lab. Prod. & MFP)
  - Wage bill
  - Size (employees, output)
- Wage-productivity correlations
- In addition: aggregate productivity, concentration and granularity, misallocation and allocative efficiency, etc...

Coverage:

- 21 countries (and expanding): 16 countries in this paper.
- Data at the 2-digit sector level, further refined by: i) productivity quantiles (e.g. frontier); ii) firm size; iii) firm age; iv) ownership.
- Whole economy. In this paper focus on Manufacturing and Non-financial Market Services.

# Data: The OECD MultiProd project (2)

This paper: focus on cross-sectional analysis over time.

Longitudinal data also allows to compute & collect:

- Firm-level growth rates for size, productivity, etc.;
- Entry and exit, job creation/destruction;
- Dynamic decomposition of OP-gap (Melitz and Polanec, 2015);
- Decomposition of aggregate MFP growth (Petrin and Levinsohn, 2012);
- Distributed regressions.

# Representativeness (1)

| Country | Years | Firms | Employees |
|---|---|---|---|
| Australia | 2002-2012 | 68,499 | 761,602 |
| Austria | 2008-2012 | 255,701 | 2,258,626 |
| Belgium | 2003-2011 | 102,574 | 1,804,465 |
| Canada | 2000-2012 | 509,460 | 8,058,557 |
| Chile | 2005-2012 | 339,492 | 5,273,453 |
| Denmark | 2000-2012 | 80,030 | 1,281,035 |
| Finland | 1995-2012 | 85,038 | 981,772 |
| France | 1995-2012 | 812,850 | 11,453,356 |
| Hungary | 1998-2012 | 191,064 | 1,786,685 |
| Italy | 2001-2012 | 312,057 | 1,893,156 |
| Japan | 1994-2011 | 25,786 | 10,552,236 |
| Luxemburg | 2003-2012 | 1,136 | 105,252 |
| Netherlands | 2000-2012 | 39,375 | 332,449 |
| Norway | 1995-2012 | 63,593 | 890,001 |
| New Zealand | 2000-2011 | 90,973 | 992,208 |
| Sweden | 2002-2012 | 176,652 | 1,889,764 |

# Representativeness (2) ▸ Eurostat

- Typically have whole population of firms
- For countries with partial data (production survey)
  - Reweight using Business Register population weights (if available)
  - Compute nb of firms by year / 4- (or 3-) digit industry / 7 size classes (with thresholds at 5, 10, 20, 50, 100 and 250)
- This is done variable by variable, to limit systematic variation on some variables (important for growth rates)
- Reweighting cannot correct for zero coverage: e.g. at present data for Japan does not cover firm below 50 employees

# Representativeness (3)

Back

MultiProd data vs Eurostat:

| | Share of firms (%) | Share of employment (%) |
|---|---|---|
| Austria | 69 | 92 |
| Belgium | 70 | 97 |
| Denmark | 100 | 115 |
| Finland | 100 | 100 |
| France | 100 | 107 |
| Hungary | 92 | 99 |
| Italy | 11 | 52 |
| Netherlands | 5 | 44 |
| Norway | 71 | 89 |
| Sweden | 96 | 87 |

# Measures of productivity

- LP_VA: Labour Productivity (VA per worker)
- MFP_W: Wooldridge (2009) GMM estimation of MFP:
  - Production function estimation
  - Extension of Levinsohn and Petrin (2003)
  - Use lagged inputs as instruments for the change in variable inputs

(For robustness:)

- MFP_SW: Solow-type residual, using sector-specific factor shares (median across countries)

Section 3

# The "Great Divergence" of wages

# Increase in wage dispersion

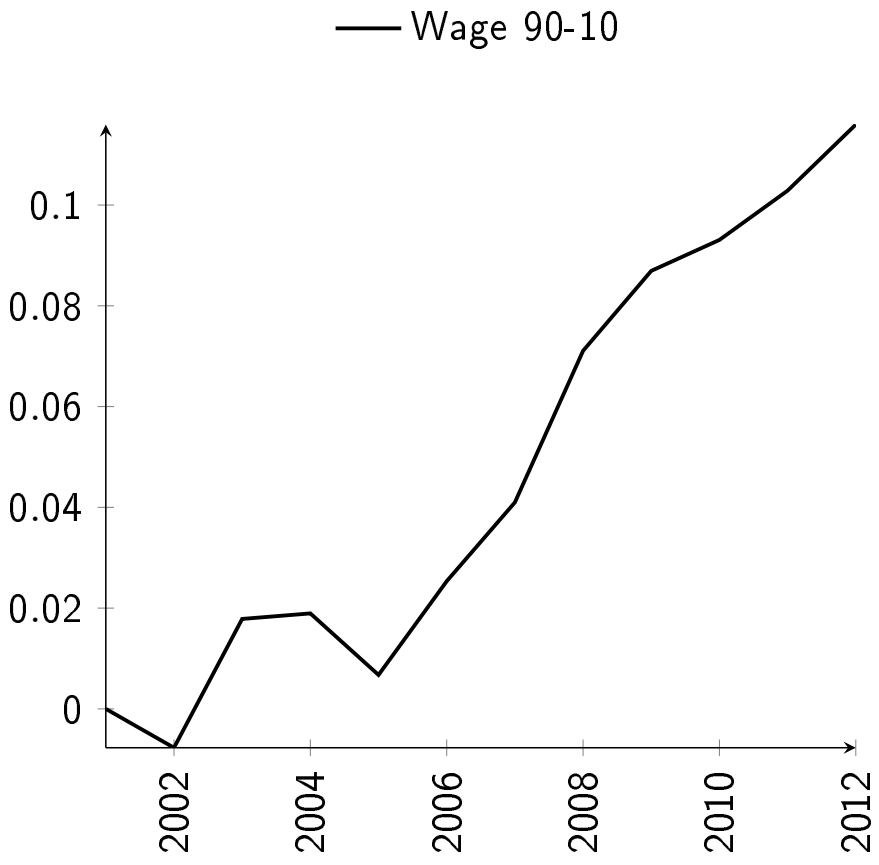
We look at evolution of dispersion *within* 2-digit sectors by estimating:

$$\left(\log \frac{W_{90}}{W_{10}}\right)_{cjt} = \alpha + \boldsymbol{\beta}_t \boldsymbol{y}_t + \boldsymbol{z}_{cj} + \varepsilon_{cjt}$$

Rationale: most of the variance comes from within sectors

## Results:

- Estimated $\boldsymbol{\beta}_t$ are increasing over time
- "Great Divergence" of wages
- Heterogeneity across countries



# Wage dispersion comes mostly from the bottom of the wage distribution

Compare year fixed effects for divergence at

- top (90-50 wage ratio)
- bottom (50-10 wage ratio)

of wage distribution.

## Result

- Divergence more pronounced for the bottom half of the wage distribution

Section 4

# The "Great Divergence" of Productivity

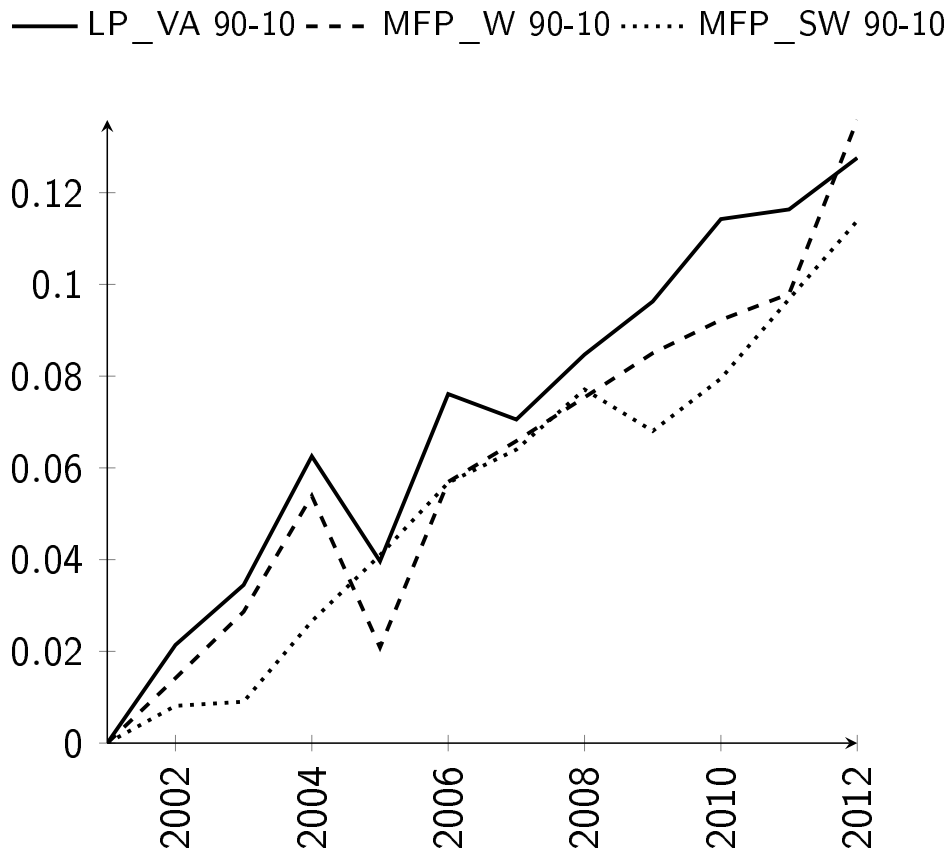
# Increase in productivity dispersion

Look at productivity dispersion *within* 2-digit sectors by estimating:

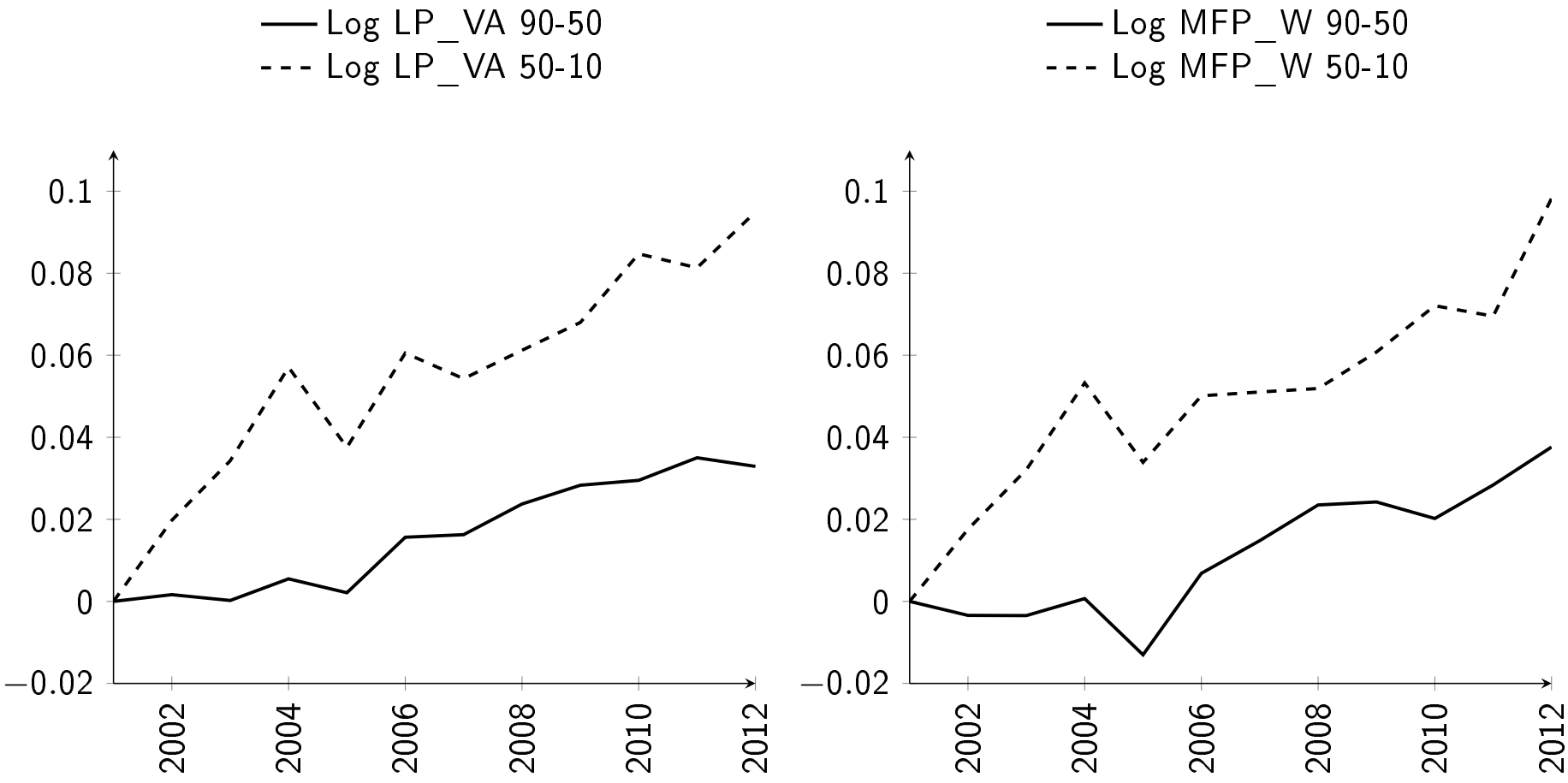
$$\left(\log \frac{P_{90}}{P_{10}}\right)_{cjt} = \alpha + \boldsymbol{\beta}_t \boldsymbol{y}_t + \boldsymbol{z}_{cj} + \varepsilon_{cjt}$$

## Results:

- Estimated $\boldsymbol{\beta}_t$ are increasing over time, for all three measures of productivity
- "Great Divergence" of productivity
- Heterogeneity across countries



# Productivity divergence more marked at the bottom of the distribution




Year fixed-effects of a regression of log-LP_VA and log-MFP_W dispersion, within country-sector pairs.

Section 5

# The link between wage and productivity divergences

# The link between productivity divergence and wage divergence

Econometric approach to establish the link between wage dispersion ($WD$) and productivity dispersion ($PD$):

$$WD_{cjt} = \alpha + \beta \cdot PD_{cjt} \quad (+\gamma \cdot \text{Controls}_{cjt}) + \boldsymbol{y}_t + \boldsymbol{z}_{cj} + \varepsilon_{cjt}$$

- Year fixed effects $\boldsymbol{y}_t$ and country-sector fixed effects $\boldsymbol{z}_{cj}$
- Captures the variation over time of wage and productivity dispersions within narrow country-sector pairs
- Can control for changes in workforce skill composition

Coefficient $\beta$ captures correlation between the two divergences.

# The Great Divergence(s)

▸ Skill Composition ▸ Correlation by Quantiles

| | (1) log Wage (90-10) | (2) log Wage (90-10) | (3) log Wage (90-10) |
|---|---|---|---|
| log LP (90-10) | 0.358*** | | |
| | (0.069) | | |
| log MFP_W (90-10) | | 0.224** | |
| | | (0.058) | |
| log MFP_SW (90-10) | | | 0.047* |
| | | | (0.040) |
| N | 3739 | 3624 | 3712 |
| Adj. R-Square | 0.987 | 0.986 | 0.986 |
| Year FE | YES | YES | YES |
| Country-sector FE | YES | YES | YES |
| Nb Sectors | 22 | 22 | 22 |
| Nb Countries | 14 | 14 | 14 |

Standardised beta coefficients; Errors are clustered at the country-sector level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Countries: AUS, AUT, BEL, CHL, DNK, FIN, FRA, HUN, ITA, JPN, NLD, NOR, NZL, SWE.

Section 6

# The drivers of the "Great Divergence(s)"

# Structural Factors

Is the link between wage dispersion and productivity dispersion is strenghten by certain structural factors? And globalisation and digitalisation in particular? (or better their proxies...)

$$WD_{cjt} = \alpha + \beta \cdot (PD_{cjt} \times F_{cjt}) + \gamma \cdot PD_{cjt} + \delta \cdot F_{cjt} + \boldsymbol{y}_t + \boldsymbol{z}_{cj} + \varepsilon_{cjt}$$

where $F$ stands for:

- Import levels, Export levels, or Openness to Trade (OECD STAN)
- Share of ICT (OECD Nat. Acc.)
- Share of high-skilled workers (WIOD)

Coefficient $\beta$ on interaction term captures extent to which these factors strengthen/weaken relationship between productivity dispersion and wage dispersion.

# Divergence(s) and structural factors (MFP)

## Dependent var.: Wage 90-10 ratio

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Log MFP_W (90-10) | 0.802*** | 0.795*** | 0.810*** | 0.351** | 0.171* | 0.664*** |
| | (0.132) | (0.125) | (0.128) | (0.143) | (0.100) | (0.147) |
| Log Import (goods) | 0.073 | | | | | |
| | (0.061) | | | | | |
| Log MFP_W (90-10) × Log Import (goods) | 0.290*** | | | | | |
| | (0.053) | | | | | |
| Log Export (goods) | | 0.191** | | | | |
| | | (0.078) | | | | |
| Log MFP_W (90-10) × Log Export (goods) | | 0.402*** | | | | |
| | | (0.071) | | | | |
| Log Openness | | | 0.149** | | | 0.092* |
| | | | (0.070) | | | (0.048) |
| Log MFP_W (90-10) × Log Openness | | | 0.355*** | | | 0.215*** |
| | | | (0.059) | | | (0.052) |
| Sh. of ICT in fixed assets | | | | 0.139** | | 0.074 |
| | | | | (0.063) | | (0.057) |
| Log MFP_W (90-10) × Sh. of ICT in fixed assets | | | | 0.028 | | 0.048 |
| | | | | (0.091) | | (0.097) |
| Sh. high-skilled (in total hours) | | | | | -0.057 | |
| | | | | | (0.049) | |
| Log MFP_W (90-10) × Sh. high-skilled (in total hours) | | | | | 0.042 | |
| | | | | | (0.060) | |
| N | 1779 | 1779 | 1779 | 1917 | 2190 | 1051 |
| Adj. R-Square | 0.919 | 0.922 | 0.921 | 0.962 | 0.969 | 0.946 |
| Country-sector year FE | YES | YES | YES | YES | YES | YES |
| Num. Countries | 12 | 12 | 12 | 8 | 11 | 8 |

# The Role of Policies

We examine how policies affect wage dispersion and its link with productivity dispersion.

$$WD_{cjt} = \alpha + \beta \cdot (PD_{cjt} \times G_{ct}) + \gamma \cdot PD_{cjt} + \delta \cdot G_{ct} + \boldsymbol{y}_t + \boldsymbol{z}_{cj} + \varepsilon_{cjt}$$

where $G$ stands for:

- Minimum wage (OECD)
- Employment Protection Legislation (OECD)
- Trade union density (OECD and ICTWSS)
- Coordination in wage setting (ICTWSS)

# The Great Divergence(s) and Policy (MFP)

▸ Quantiles

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Log MFP_W (90-10) | 0.075* | 0.063 | 0.437** | 0.370*** | 0.285** |
| | (0.043) | (0.041) | (0.173) | (0.121) | (0.121) |
| Real Min Wage (hour) | -0.369*** | | | | |
| | (0.077) | | | | |
| Log MFP_W (90-10) × Real Min Wage (hour) | 0.054* | | | | |
| | (0.028) | | | | |
| Relative Min Wage (wrt av) | | -0.124*** | | | |
| | | (0.038) | | | |
| Log MFP_W (90-10) × Relative Min Wage (wrt av) | | 0.059*** | | | |
| | | (0.020) | | | |
| EPL (indiv. and coll.) | | | -0.091** | | |
| | | | (0.036) | | |
| Log MFP_W (90-10) × EPL (indiv. and coll.) | | | -0.152 | | |
| | | | (0.107) | | |
| Trade union density | | | | -0.361*** | |
| | | | | (0.062) | |
| Log MFP_W (90-10) × Trade union density | | | | 0.016 | |
| | | | | (0.085) | |
| Wage Setting | | | | | -0.103*** |
| | | | | | (0.021) |
| Log MFP_W (90-10) × Wage Setting | | | | | -0.132*** |
| | | | | | (0.050) |
| N | 1804 | 1804 | 3456 | 3456 | 3456 |
| Adj. R-Square | 0.970 | 0.967 | 0.966 | 0.968 | 0.966 |
| Country-sector year FE | YES | YES | YES | YES | YES |
| Num. Countries | 7 | 7 | 13 | 13 | 13 |

Clustered standard errors at the country-sector level in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Section 7

# Conclusions and Next Steps

# Conclusions

1. Increase in between-firm wage dispersion, stronger at the bottom, and at the top only since 2005 for services.

2. Increase in productivity (LP and MFP) dispersion, driven by increase at the bottom, at the top since 2005.

3. Wage dispersion is linked to productivity dispersion within country-sector over time.

4. Increased globalisation and digitalisation associated with wage divergence, and stronger productivity–wage dispersion link.

5. 
   - Increases in minimum wages, unionization, EPL, wage coordination are linked with lower wage inequality.
   - Minimum wage strengthens link between productivity and wage dispersions.
   - Unionization and centralized wage bargaining weakens the link, but less so in sectors more exposed to import competition.

# Next Steps

The main directions to extend the work could include:

1. Theoretical framework to better discipline the empirical exercise (e.g., Helpman, Itskhoki, and Redding, 2010). Structurally estimate using moments from the data?
2. Data and empirics:
   - New additional countries (e.g. Indonesia, Portugal);
   - Improve our measures of structural factors for both globalisation and digitalisation;
   - Adding additional dimensions at the firm level (e.g.: age, size, skill/occupation);
   - Matched employer-employee data.
3. Policy: Extend the set of policies analysed, e.g., product market regulation (entry and barriers to trade and investment), policies that affect the top of the distribution (the tax treatment of stock options, deferred compensation).

THANK YOU!

All comments and questions are welcome

Section 8

# Appendix

# Between-firm versus overall earnings inequality: Comparing MultiProd data with aggregate OECD earnings data

# Overall vs between-firm inequality

## Correlation cross-country and over time

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Agriculture, Forestry and Fishing [A] | 0.051*** | | | | | | |
| | (0.014) | | | | | | |
| Mining and quarrying [B] | | 0.045*** | | | | | |
| | | (0.005) | | | | | |
| Manufacturing [C] | | | 0.055*** | | | | |
| | | | (0.008) | | | | |
| Electricity, gas, water, and waste [D-E] | | | | 0.055*** | | | |
| | | | | (0.011) | | | |
| Construction [F] | | | | | 0.065*** | | |
| | | | | | (0.010) | | |
| Non-Financial Market Services [G-N] | | | | | | 0.045*** | |
| | | | | | | (0.007) | |
| Non Market Services [O-U] | | | | | | | 0.050*** |
| | | | | | | | (0.008) |
| N | 118 | 152 | 163 | 154 | 145 | 163 | 162 |
| Adj. R-Square | 0.097 | 0.281 | 0.189 | 0.194 | 0.173 | 0.184 | 0.214 |
| Num. Countries | 11 | 14 | 16 | 15 | 15 | 16 | 15 |

Robust standard errors in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The dependent variable is the inequality in earnings (90-10 percentile ratio) from the OECD Earnings Distribution database.

The regressor is the between-firm wage inequality (90-10 percentile ratio) in the relevant sector.

# Overall vs between-firm inequality

## Within-country changes

Back

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Agriculture, Forestry and Fishing [A] | 0.016 | | | | | | |
| | (0.013) | | | | | | |
| Mining and quarrying [B] | | 0.003 | | | | | |
| | | (0.016) | | | | | |
| Manufacturing [C] | | | 0.038 | | | | |
| | | | (0.063) | | | | |
| Electricity, gas, water, and waste [D-E] | | | | -0.009* | | | |
| | | | | (0.005) | | | |
| Construction [F] | | | | | 0.065*** | | |
| | | | | | (0.015) | | |
| Non-Financial Market Services [G-N] | | | | | | 0.057*** | |
| | | | | | | (0.011) | |
| Non Market Services [O-U] | | | | | | | 0.014*** |
| | | | | | | | (0.004) |
| N | 51 | 69 | 69 | 69 | 51 | 69 | 69 |
| Adj. R-Square | 0.932 | 0.944 | 0.944 | 0.945 | 0.946 | 0.959 | 0.948 |
| Country FE | 3 | 4 | 4 | 4 | 3 | 4 | 4 |

Robust standard errors in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

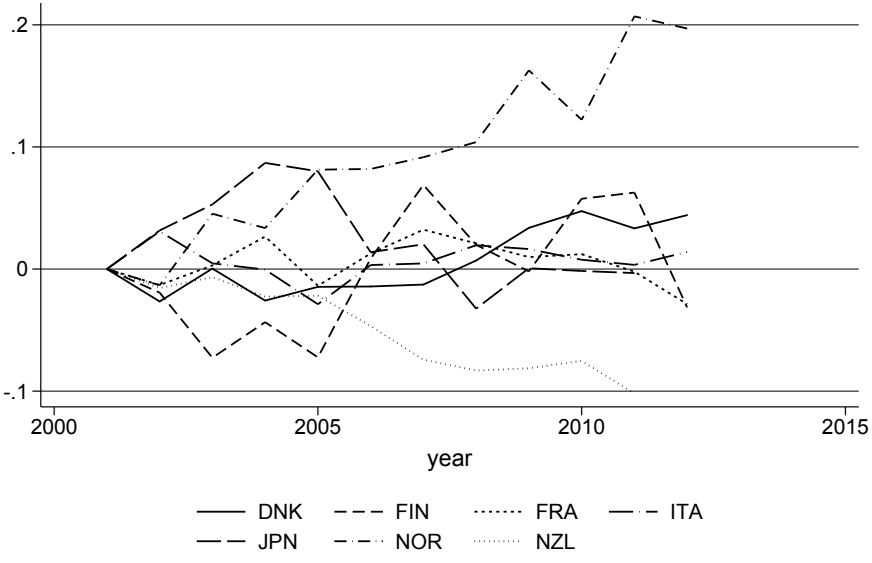
The dependent variable is the inequality in earnings (90-10 percentile ratio) from the OECD Earnings Distribution database.

The regressor is the between-firm wage inequality (90-10 percentile ratio) in the relevant sector.

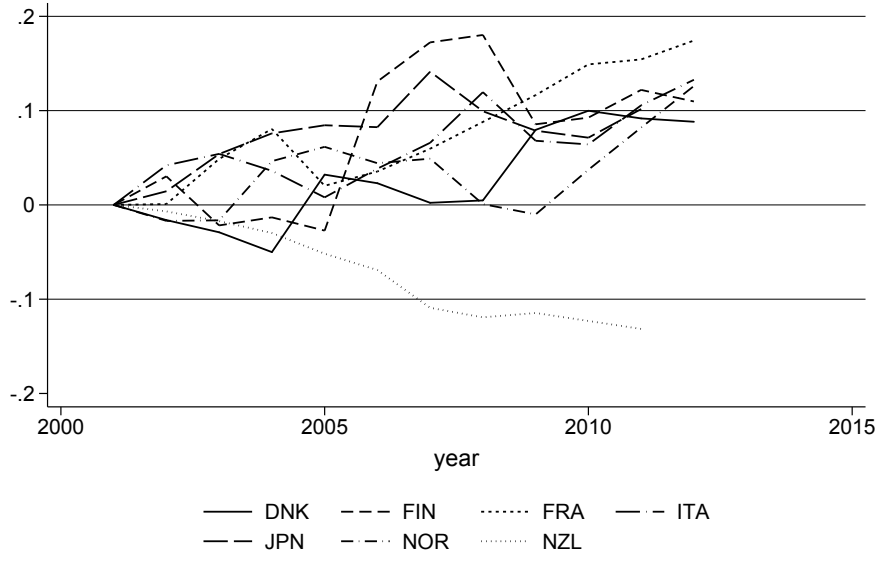
# Wage dispersion: country heterogeneity

(Figure 2) Back

(a) Manufacturing




(b) Services




Change in the 90-10 difference of log wages, normalised at 0 in 2001 and averaged across 2-digit sectors weighted by employment.

# Between- versus within-sector variance

Wage variance can be decomposed into variance that occurs between firms of the same sectors ("within") and from differences between sector averages ("between").

$$\text{Var}\, W_t = \underbrace{\sum_j \frac{L_{jt}}{L_t} \sum_{i \in j} \frac{L_{it}}{L_{jt}} \left(W_{it} - \overline{W}_{jt}\right)^2}_{\text{Within-sector}} + \underbrace{\sum_j \frac{L_{jt}}{L_t} \left(\overline{W}_{jt} - \overline{W}_t\right)^2}_{\text{Between-sector}}$$

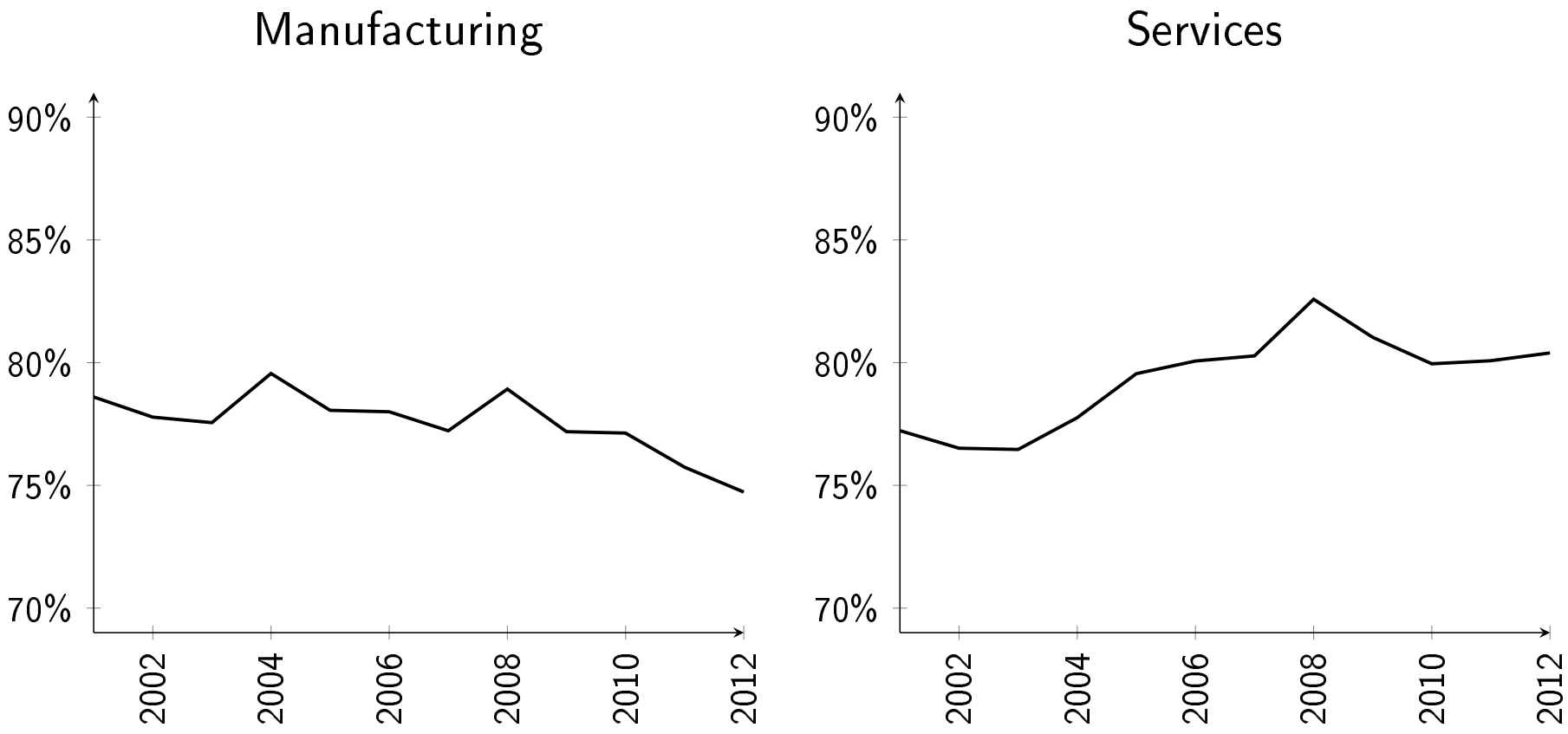
The decomposition helps us answering two questions:

1. Does it make sense to focus on the within (country-sector) variation? Full results in Table A.5 of the paper. ▸ Details
2. Which are the sectors that contribute the most to overall variance? Top three sectors reported in Tables A.6 and A.7 of the paper.

# Share of within-sector wage variance

(Figure A.12)

Back



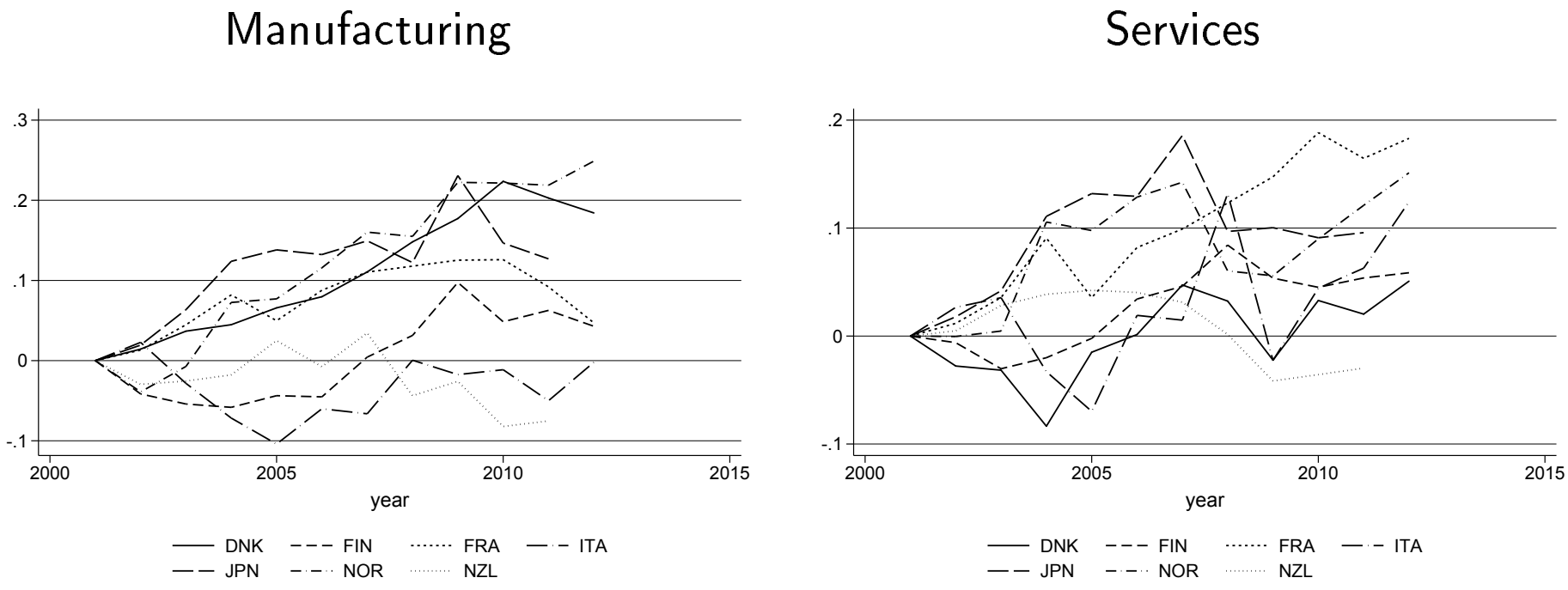
# Share of within-sector wage variance

(Table A.5) Back

| | Share wage dispersion | |
|---|---|---|
| | Manufacturing | Services |
| Australia (2012) | 0.87 | 0.75 |
| Austria (2012) | 0.76 | 0.84 |
| Belgium (2011) | 0.62 | 0.73 |
| Chile (2012) | 0.69 | 0.86 |
| Denmark (2012) | 0.85 | 0.73 |
| Finland (2012) | 0.65 | 0.74 |
| France (2012) | 0.74 | 0.77 |
| Hungary (2012) | 0.69 | 0.84 |
| Italy (2012) | 0.8 | 0.83 |
| Japan (2011) | 0.79 | 0.8 |
| Netherlands (2012) | 0.71 | 0.96 |
| Norway (2012) | 0.87 | 0.82 |
| Sweden (2012) | 0.77 | 0.79 |

# LP dispersion: country heterogeneity

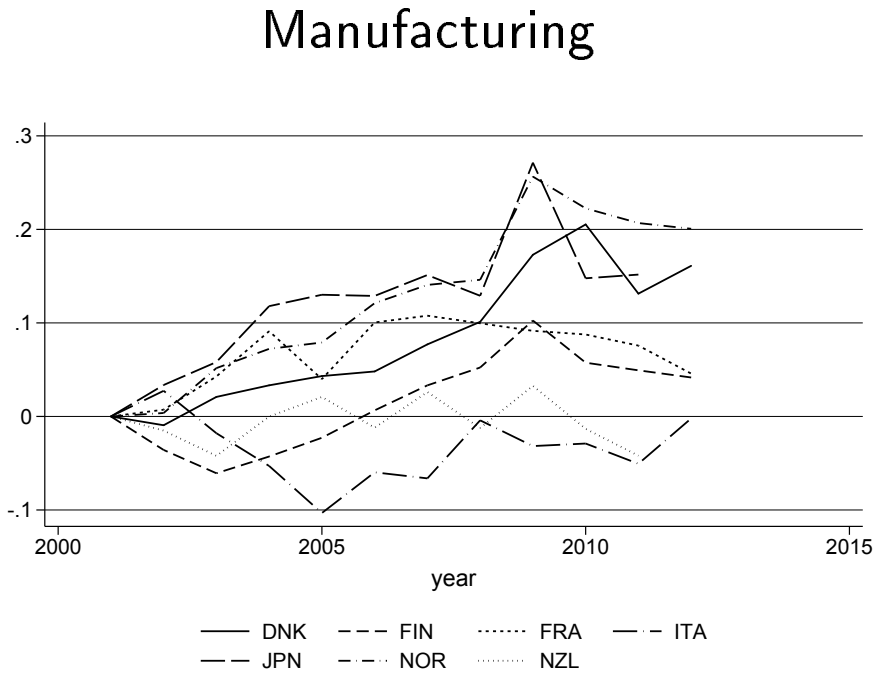
## (Figure 5)

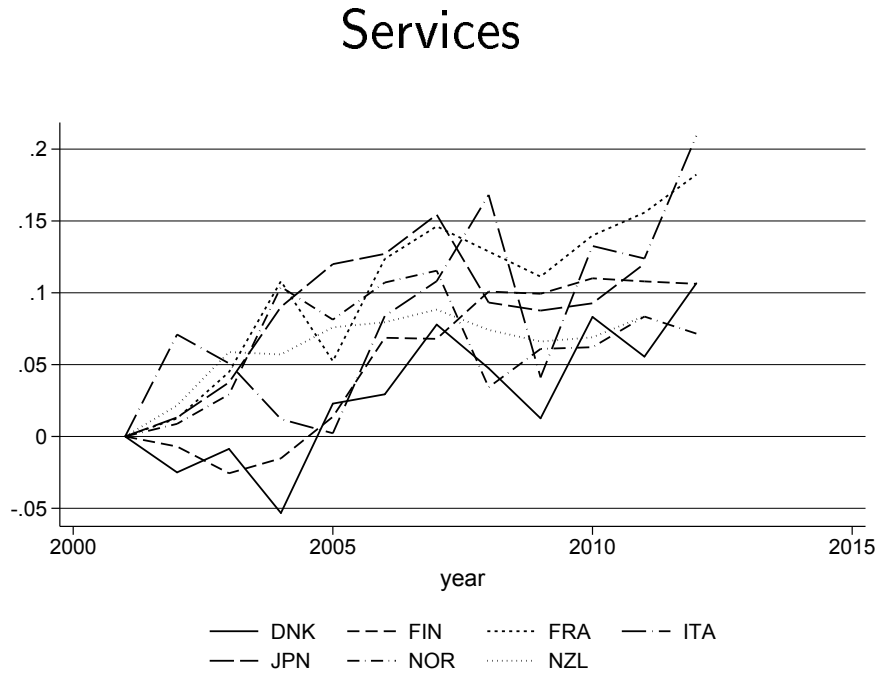


# MFP dispersion: country heterogeneity

(Figure 6)

Back



# Firm-level correlation Wage-Productivity in 2001

(Table 7)

| | corr(W,LP) | | corr(W,MFP) | |
|---|---|---|---|---|
| | Manuf. | Services | Manuf. | Services |
| Denmark | 0.64 | 0.66 | 0.56 | 0.53 |
| Finland | 0.23 | 0.29 | 0.29 | 0.30 |
| France | 0.56 | 0.50 | 0.58 | 0.61 |
| Hungary | 0.48 | 0.30 | 0.60 | 0.49 |
| Italy | 0.42 | 0.36 | 0.51 | 0.48 |
| Japan | 0.72 | 0.73 | 0.63 | 0.61 |
| Netherlands | 0.46 | 0.53 | 0.51 | 0.56 |
| New Zealand | 0.20 | 0.17 | 0.47 | 0.44 |
| Norway | 0.49 | 0.50 | 0.61 | 0.58 |

*Note*: Firm-level correlation between wage and productivity, averaged across 2-digit sectors weighted by employment. Countries with data starting after 2001or for which data is only available at the macro-sector level are not included.

# The Great Divergence(s) - Skill composition

Back

| | (1) log Wage (90-10) | (2) log Wage (90-10) | (3) log Wage (90-10) |
|---|---|---|---|
| log LP (90-10) | 0.288*** | | |
| | (0.081) | | |
| log MFP_W (90-10) | | 0.221* | |
| | | (0.058) | |
| log MFP_SW (90-10) | | | 0.074* |
| | | | (0.038) |
| % hrs by skilled workers | -0.201* | -0.165 | -0.156 |
| | (0.407) | (0.430) | (0.430) |
| N | 2265 | 2191 | 2250 |
| Adj. R-Square | 0.970 | 0.969 | 0.969 |
| Year FE | YES | YES | YES |
| Country-sector FE | YES | YES | YES |
| Nb Sectors | 22 | 22 | 22 |
| Nb Countries | 11 | 11 | 11 |

Standardised beta coefficients; Errors are clustered at the country-sector level: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Countries: AUS, AUT, BEL, DNK, FIN, FRA, HUN, ITA, JPN, NLD, SWE.

# Wage-productivity correlation by quantiles of productivity

Back

## LogLP_VA

| | (1) | (2) |
|---|---|---|
| 1.prod_percentile | -0.108*** | -0.106*** |
| | (0.008) | (0.024) |
| 2.prod_percentile | 0.108*** | 0.108*** |
| | (0.004) | (0.017) |
| 4.prod_percentile | 0.104*** | 0.108*** |
| | (0.002) | (0.013) |
| 5.prod_percentile | -0.080*** | -0.078*** |
| | (0.004) | (0.021) |
| Observations | 12626 | 12626 |
| Adj. R-Square | 0.366 | 0.648 |
| Country-sector FE | NO | YES |
| Year FE | YES | YES |
| Nb Countries | 10 | 10 |

The dependent variable is the firm-level correlation between wage and productivity.
Clustered standard errors at the country-sector level in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Countries: AUS AUT BEL DNK FIN HUN ITA JPN NLD NOR.

## LogMFP_W

| | (1) | (2) |
|---|---|---|
| 1.prod_percentile | -0.109*** | -0.090*** |
| | (0.010) | (0.026) |
| 2.prod_percentile | 0.076*** | 0.085*** |
| | (0.010) | (0.019) |
| 4.prod_percentile | 0.107*** | 0.103*** |
| | (0.005) | (0.017) |
| 5.prod_percentile | -0.045*** | -0.031 |
| | (0.010) | (0.025) |
| Observations | 11838 | 11838 |
| Adj. R-Square | 0.245 | 0.663 |
| Country-sector FE | NO | YES |
| Year FE | YES | YES |
| Nb Countries | 10 | 10 |

The dependent variable is the firm-level correlation between wage and productivity.
Clustered standard errors at the country-sector level in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Countries: AUS AUT BEL DNK FIN HUN ITA JPN NLD NOR.

Productivity quantiles: 0-10, 10-40, 40-60 (baseline), 60-90, 90-100.

# Minimum wage and the productivity distribution

To examine further the impact of minimum wage, we look at the wage-productivity correlation across the productivity distribution. How is this correlation affected by the minimum wage?

## Results

Minimum wage has a different impact at the top and the bottom of the productivity distribution:

- It lowers the wage-productivity correlation for low-productivity firms;
- Over time, it increases the correlation for the most productive firms.

# Minimum wage and the productivity distribution

## Econometric Approach

We estimate the impact of minimum wage $MW$ on the wage-productivity correlation at different quantiles $q$ of the LP distribution:

$$\text{Corr}(W, \text{LP\_VA})_{cjtq} = \alpha_q + \beta_q \cdot MW_{cjt} + \boldsymbol{y}_t + \boldsymbol{z}_{cj} + \varepsilon_{cjtq}$$

The $\beta_q$ coefficients represent for each quantile $q$ the impact of minimum wage on the wage-productivity correlation.

# Wage-productivity correlation and policy by quantiles of productivity

Back

| | (1) Corr W&LP_VA | (2) Corr W&LP_VA | (3) Corr W&MFP_W | (4) Corr W&MFP_W |
|---|---|---|---|---|
| Prod Perc 0-10 | -0.072*** | -0.067** | -0.085*** | -0.083* |
| | (0.006) | (0.023) | (0.006) | (0.038) |
| Prod Perc 10-40 | 0.093*** | 0.097** | 0.082*** | 0.083** |
| | (0.005) | (0.032) | (0.005) | (0.024) |
| Prod Perc 60-90 | 0.109*** | 0.110*** | 0.104*** | 0.100*** |
| | (0.005) | (0.016) | (0.008) | (0.017) |
| Prod Perc 90-100 | -0.099*** | -0.102*** | -0.025 | -0.019 |
| | (0.005) | (0.022) | (0.015) | (0.015) |
| Prod Perc 0-10 × Relative Min Wage (wrt av) | -0.093*** | -0.021 | -0.064*** | -0.029 |
| | (0.006) | (0.017) | (0.006) | (0.028) |
| Prod Perc 10-40 × Relative Min Wage (wrt av) | -0.079*** | -0.010 | -0.042*** | -0.010 |
| | (0.006) | (0.021) | (0.006) | (0.009) |
| Prod Perc 40-60 × Relative Min Wage (wrt av) | -0.057*** | 0.005 | -0.045*** | -0.014 |
| | (0.005) | (0.008) | (0.004) | (0.016) |
| Prod Perc 60-90 × Relative Min Wage (wrt av) | -0.102*** | -0.038 | -0.061*** | -0.025** |
| | (0.008) | (0.018) | (0.004) | (0.009) |
| Prod Perc 90-100 × Relative Min Wage (wrt av) | -0.005 | 0.056** | -0.018* | 0.051** |
| | (0.007) | (0.015) | (0.010) | (0.012) |
| N | 5531 | 5531 | 5085 | 5085 |
| Adj. R-Square | 0.469 | 0.626 | 0.307 | 0.536 |
| Year FE | YES | | YES | |
| Country-sector year FE | | YES | | YES |
| Num. Countries | 5 | 5 | 5 | 5 |

Clustered standard errors at the country-sector level in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The dependent variable is the correlation between wages and productivity.

All regressors are standardised and the coefficients can be interpreted as the effect at the mean.

The largest set of countries include: AUS BEL HUN JPN NLD.