Rent Creation and Rent Sharing: New Measures and Impacts on Productivity

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Purpose & plan of the paper

1. We propose new cross-country-industry measures of:
   - mark-up rate (rent creation), relaxing the usual assumption of perfect labor markets
   - workers' share of rents (rent sharing)

   We use these measures to approxymate for competition and workers' bargaining power
2. We assess the relationship between our new measures and OECD product and labor market regulation indicators
3. We investigate the Total Factor Productivity (TFP) impact of competition and workers' bargaining power - and of regulations changing them
   We use the Instrumental Variable estimator on a panel of 14 OECD countries and 19 industries over the 1985-2005 period

Literature review

Why we need measures of rent creation and sharing?

- There is an abundant literature on the impact of competition on productivity drawing on anti-competitive Product Market Regulations (PMR) OECD indicators and cross-country-industry panel data
  see, for instance, Conway et al. (2006), Barone & Cingano (2011), Cette, Lopez & Mairesse (2016),...
- A few papers have also investigated the impact of Employment Protection Legislation (EPL) OECD indicators on productivity
  see, for instance, Bassanini, Nunziata & Venn (2009)
- Our rent creation and sharing measures enable investigating the channels between regulations and productivity

Which channels? A theoretical framework

- Regulations effects on rent creation and rent sharing:
  see Blanchard & Giavazzi (2003)
  - rent creation (lack of competition) results from product market regulations
  - workers' share of rent (bargaining power) is influenced by labor market regulations
- Rent creation and rent sharing effects on incentives to improve efficiency:
  - lack of competition reduces the rent difference between innovative and non-innovative firms
    see Aghion et al. (2005)
  - workers' bargaining power reduces the firms' share of this rent difference
    see Grout (1984)

Why we need a **new** measure of mark-up rates?

- Consistency with a measure of workers' bargaining power
- Few papers assume imperfect labor markets when calculating mark-up rates
  Dobbelaere & Mairesse (2010, 2013, 2018) on french firm-level data
- Our mark-up rate measure is inspired by Dobbelaere & Mairesse (2010), but with very different definitions because of data availability and for cross-country comparability

New measures of rent creation and sharing

Main assumptions

1. Product and service market imperfections ⇒ rent creation
2. To measure rent creation, we calculate a mark-up rate[1], approximating marginal costs by average variable costs
3. Labor market imperfections ⇒ rent sharing
   Worker's rent is the difference between observed wages and the wages that would prevailed if there were no workers' bargaining power
4. For a given country, year and skill level, our measure of this counterfactual wage is equal to 90% of the minimum value observed (on our industry level data)

[1] Mark-up rate: the difference between selling price and marginal cost, in % of marginal cost

Descriptive analysis

Chart 1: Mark-up rate and workers' share of rent

Kernel density estimation of the probability density function

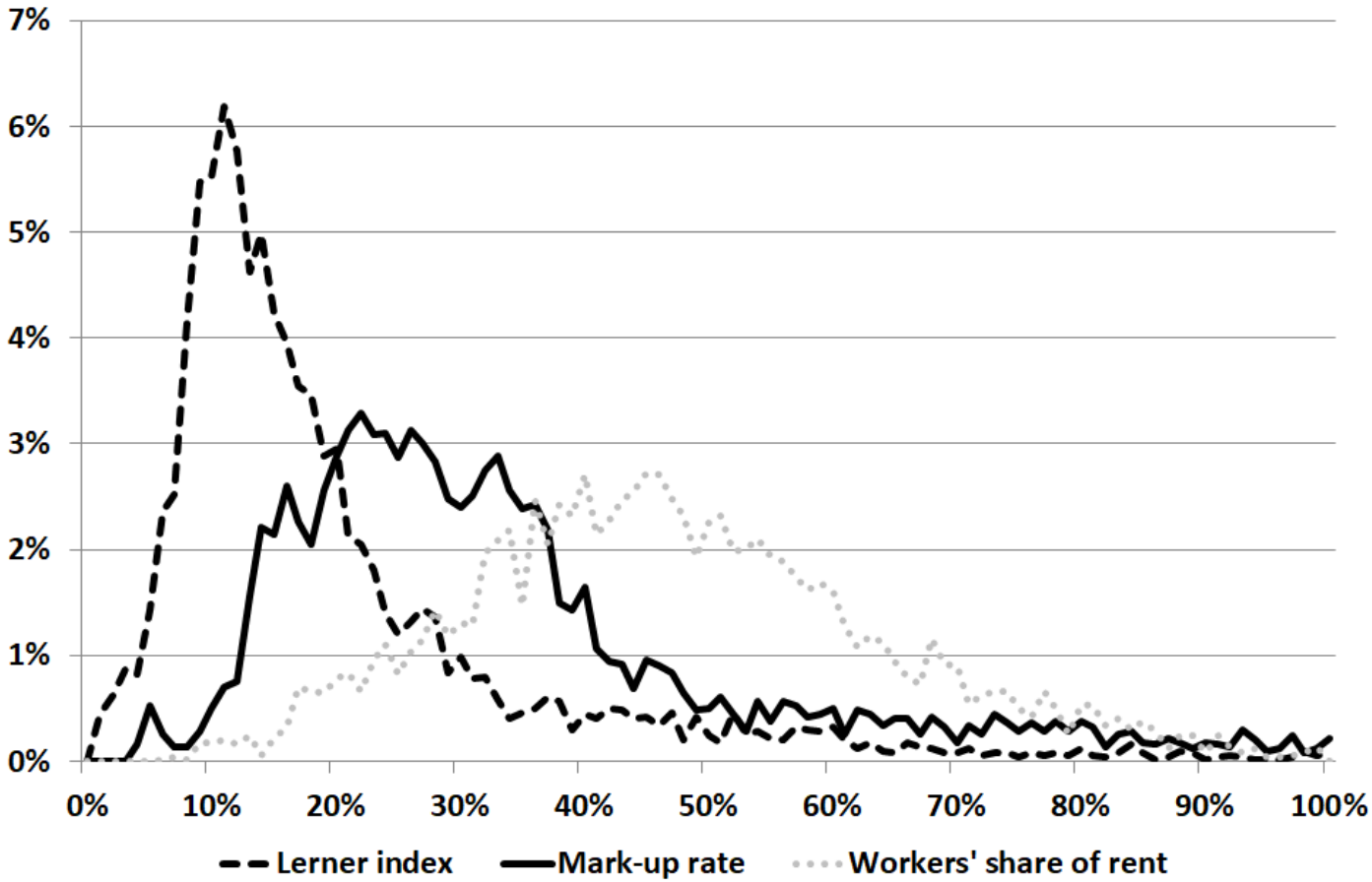
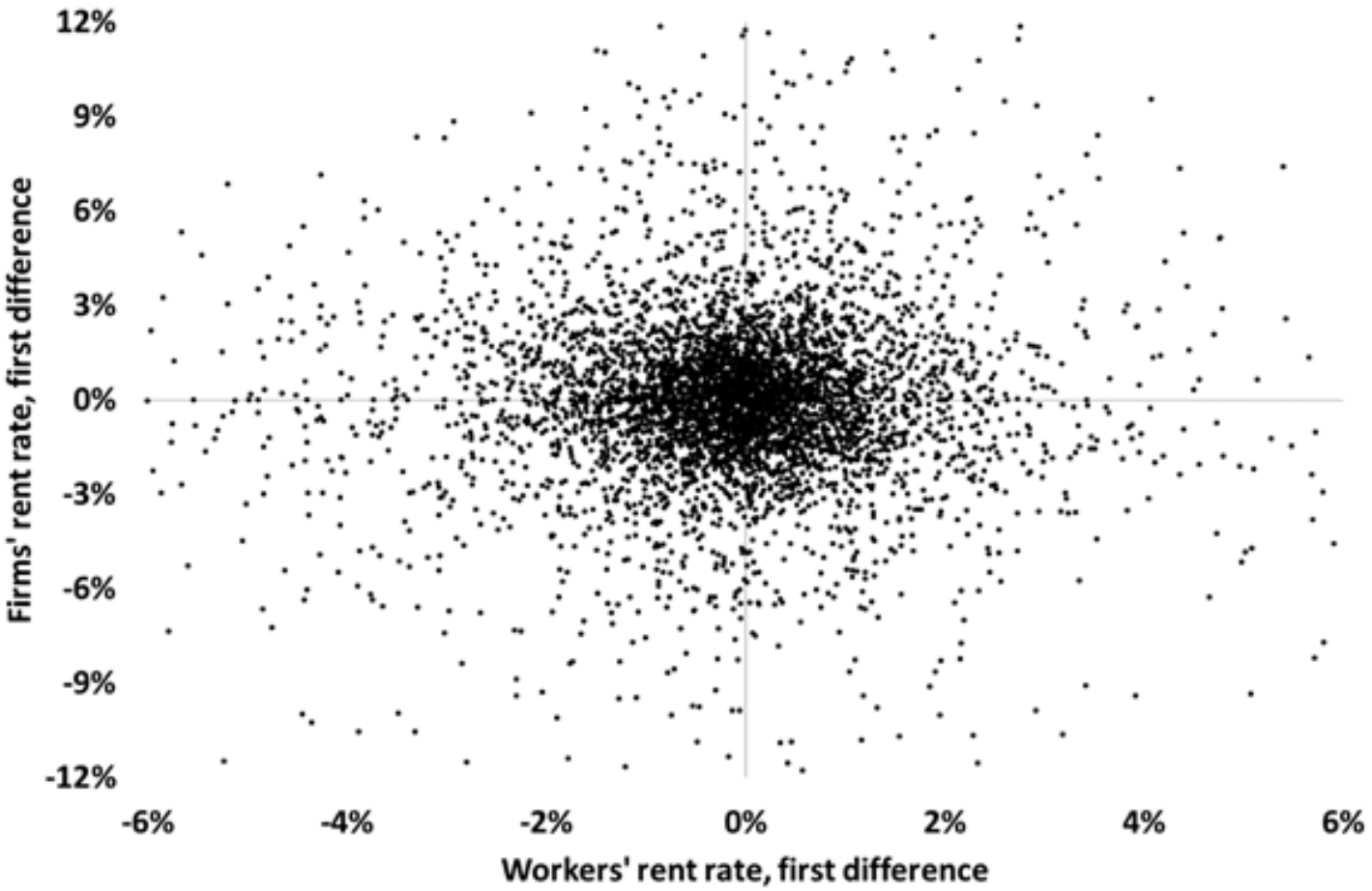


Chart 2: Changes in firms' and workers' rent rates

For convenience, the extreme values are excluded from this chart



Regulations, rent creation and rent sharing

OECD indicators of regulations

- They are based on detailed information on laws, rules and market settings
- PMR indicator measure the extent to which competition and firm choices are restricted for 5 industries: Energy, transport, communication, retail services and professional services
- EPL indicator measure the procedures and cost involved in dismissing individual workers with regular contracts and regulations on temporary contracts
- In the estimated specifications, we use:
  - 'PMR - State', on State control
  - 'PMR - Entry', on barriers to entry
  - 'EPL - Impact': the product of EPL with the intensity of use of labour in the US in 2000

Estimated specifications

$$\begin{aligned} log(y_{cit}) &= \theta_1 \times PMR^E_{cit} + \theta_2 \times PMR^S_{cit} \\ &\quad + \theta_3 \times (\lambda_i \times EPL_{ct}) + \phi_{ci} + \phi_{ct} + u_{cit} \end{aligned} \tag{1}$$

Where:

- Our dependant variables 'y' are our *MUR* and *WSR* measures, but also their components
- λ is the intensity of use of labour in the US
- c, i, t the country, industry and time indices
- ϕ fixed effects and u the estimation residuals

Estimation results

Table 1: Impact of regulation indicators on mark-up and workers' share of rent

	(1)	(2)=(3)+(4)-(1)	(3)	(4)
Dep. var. (log)	**Mark-up rate**	**Workers' share of rent**	**Workers' rent per hour**	**Intensity of use of labour**
PMR – Entry	0.0516***	**0.0644*** **	0.0510***	0.0641***
	[0.0107]	[0.0105]	[0.0111]	[0.00600]
PMR - State	0.0229**	0.00546	-0.00696	0.0350***
	[0.0112]	[0.0110]	[0.0100]	[0.00650]
EPL - impact	0.0124	**-0.161**	**0.375*** **	**-0.487*** **
	[0.0889]	[0.103]	[0.0950]	[0.0566]
Observations	4,988	4,988	4,988	4,988
R-squared	0.949	0.875	0.981	0.965

Country*industry and country*year fixed effects included
Newey-West standard errors in brackets - $***p < 0.01$, $**p < 0.05$, $*p < 0.1$

Table 2: Impact of regulation indicators, by skill

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var. (log)	**Workers' rent per hour**			**Intensity of use of labour**		
Skills	**High**	**Medium**	**Low**	**High**	**Medium**	**Low**
PMR - Entry	0.0467***	0.0476***	0.0416**	0.0683***	0.0701***	0.0789***
	[0.0157]	[0.0154]	[0.0167]	[0.00903]	[0.00714]	[0.00863]
PMR - State	-0.0301*	-0.0197	0.00710	-0.025***	0.0272***	0.0268***
	[0.0156]	[0.0142]	[0.0148]	[0.00978]	[0.00773]	[0.00934]
EPL - impact	**0.100**	**0.545*** **	**0.528*** **	**-0.0172**	**-0.562*** **	**-1.031*** **
	[0.131]	[0.112]	[0.152]	[0.0852]	[0.0674]	[0.0814]
Observations	4,988	4,988	4,988	4,988	4,988	4,988
R-squared	0.970	0.977	0.977	0.981	0.965	0.992

Country*industry and country*year fixed effects included
Newey-West standard errors in brackets - $***p < 0.01$, $**p < 0.05$, $*p < 0.1$

Impact of rent creation and rent sharing on TFP

Estimated specification

$$\begin{aligned} log(TFP_{cit}) &= \rho \times log(TFP^{US}_{it-1}) \\ &+\alpha \times log(MUR_{cit-1}) + \gamma \times log(WSR_{cit-1}) \\ &+\xi_{ci} + \xi_{ct} + \epsilon_{cit} \end{aligned} \tag{2}$$

Where ξ are fixed effects and ϵ the estimation residuals

We may provide more information on TFP computation if needed

Table 3: Impact on TFP

Dependant variable: TFP, in log

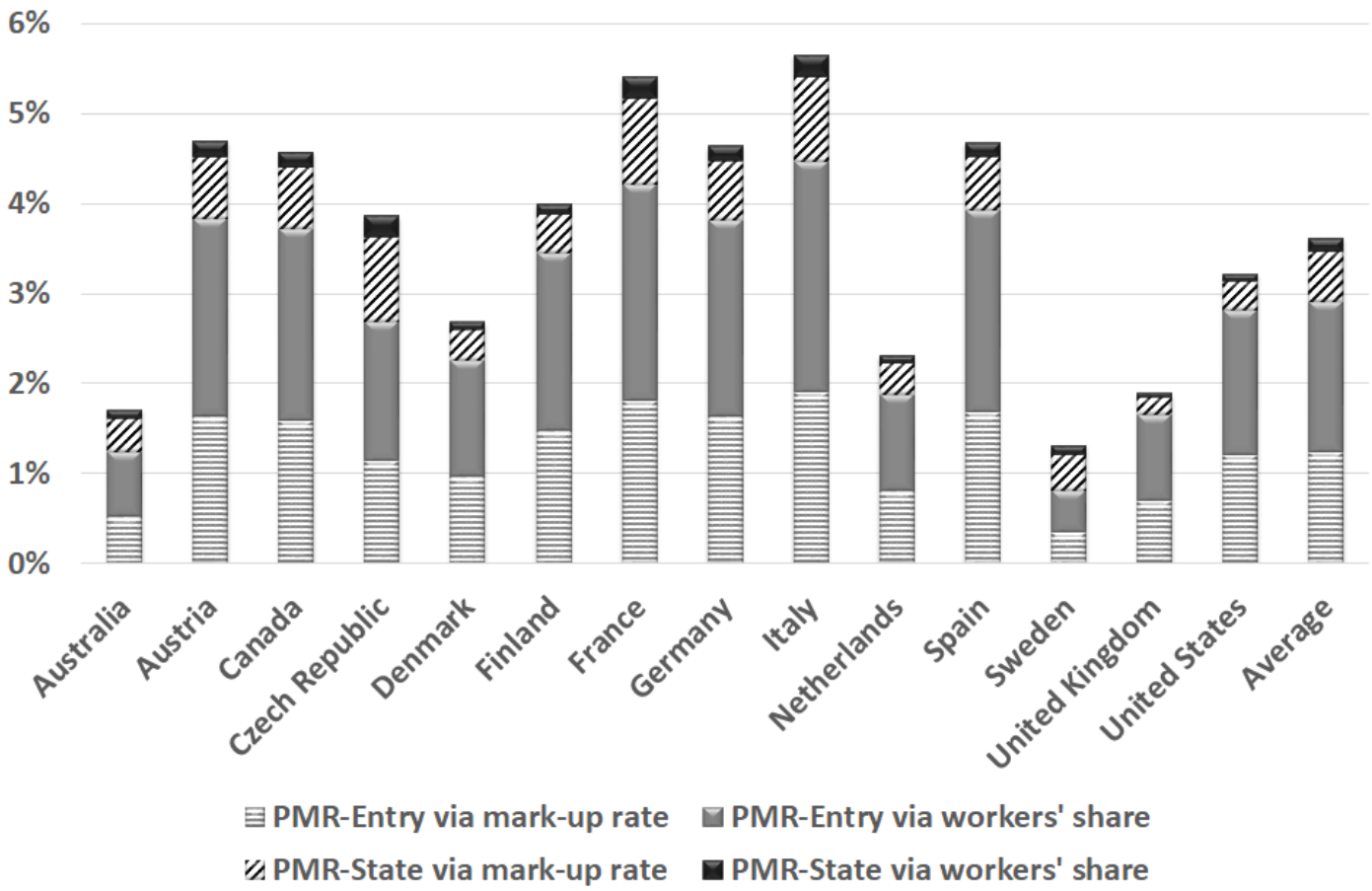
	(1)	(2)	(3)	(4)	(5)	(6)
Estimator		**OLS**			**IV**	
US TFP (log), lagged	0.855***	0.854***	0.851***	0.783***	0.883***	0.833***
	[0.0194]	[0.0183]	[0.0188]	[0.0210]	[0.0155]	[0.0188]
Mark-up rate, lagged	0.0227		-0.0377	-1.053***		**-0.557*** **
	[0.0225]		[0.0255]	[0.158]		[0.160]
Workers' share of rent, lagged		-0.0954***	-0.113***		-0.936***	**-0.593*** **
		[0.0198]	[0.0233]		[0.122]	[0.137]
Observations	3,573	3,573	3,573	3,573	3,573	3,573
R-squared	0.805	0.808	0.809	0.443	0.550	0.724

Country*industry and country*year fixed effects included - Leads and lags of US TFP first differences included
Newey-West standard errors in brackets - $***p < 0.01$, $**p < 0.05$, $*p < 0.1$
Instruments: PMR-Entry, PMR-State and PMR-Entry $\times$ PMR-States
Weak instrument, Sargan and DWH tests confirm the quality of our instruments and the endogeneity of our mark-up rate and workers' share of rent measures

Simulation

- We compute the expected impact on TFP of a PMR reform
- This reform is the adoption of the lowest PMR in 2013
- This impact is calculated using Table 1 column (1) & (2) and Table 3 column (6) estimation results

Chart 3: Long-term TFP gains from a switch to the lowest PMR values



Conclusion

- Firms' rent differs strongly from total rent
- We confirm the theoretical framework:
  - Anticompetitive PMR influence positively rent creation
  - EPL has no impact on rent and boost wage per hour
  - Lack of competition and Workers' bargaining power has substantial negative effects on TFP
- But with interesting differences:
  - PMR influence positively the workers' share of rent
  - The positive impact of EPL on wages is offset by a negative impact on the intensity of use of labor
  - EPL effects are more pronounced for low skilled workers

Thank You!

Appendix

Definitions of our new measures

Main measure assumptions

1. Product and service market imperfections, leading to:

$$P_i = (1 + MUR_i) \times C_i$$

where P_i is the relative production price in industry i, MUR_i the Mark-Up Rate and C_i the marginal cost

2. Labor market imperfections: workers may capture part of the created rent

Empirical assumptions

- Variable costs approximate the marginal costs, so:

$$C_i = \frac{\sum_j [W_j^r N_{ij}] + M_i}{Q_i}$$

  where W_j^r is the 'reservation wage' per hour at skill level j, N_{ij} the number of hours worked, M_i the real intermediate input total cost and Q_i the production quantity
- Our measure of the 'reservation wage' is equal to 95% of the minimum (average) industry wage for a given country, year and skill level
  (Our results are robust to various choices)

It's important to note that our definition of the 'reservation wage' is not standard:
It's the wage that would be observed if there were no created rent or no workers' bargaining power

- Therefore, our mark-up rate (MUR) and workers' share of rent (WSR) are:

$$MUR_i = \frac{P_i - C_i}{C_i} = \frac{P_i Q_i - (W_i^r N_i + M_i)}{W_i^r N_i + M_i}$$

$$WSR_i = \frac{(W_i - W_i^r) N_i}{P_i Q_i - (W_i^r N_i + M_i)}$$

where $W_i^r N_i = \sum_j [W_j^r N_{ij}]$ and $W_i N_i = \sum_j [W_i j N_{ij}]$ are introduced to lighten the equations, with W_{ij} the observed wage for skill j in industry i

In order to investigate further our measures, we introduce:

- The firms' and workers' mark-up rates (MUR^f and MUR^l):

$$MUR_i^f = \frac{P_i Q_i - (W_i N_i + M_i)}{W_i^r N_i + M_i} \text{ and } MUR_i^l = \frac{(W_i - W_i^r) N_i}{N_i W_i^r + M_i}$$

  with $MUR = MUR^l + MUR^f$

- A breakdown of the workers' share of rent:

$$WSR_i = \frac{W_i - W_i^r}{W_i^r} \times \frac{N_i W_i^r}{N_i W_i^r + M_i} / MUR_i$$

  The first term is a measure of the workers' rent per hour and the second a measure of the intensity of use of labor. The product of both is the workers' mark-up rate (MUR^l)

- We use the OECD STAN and EUKLEMS databases to caculate these measures for a sample of 4,988 observations covering 14 OECD countries, 19 industries over the 1985-2005 period

OECD regulation indicators

Exemple of questionnaire: Telecom

Entry regulation:
What are the legal conditions of entry into the trunk telephony market?
What are the legal conditions of entry into the international market?
What are the legal conditions of entry into the mobile market?
Public ownership:
What percentage of shares in the Public Telecommunications Operator are owned by government?
What percentage of shares in the largest firm in the mobile telecommunications sector are owned by government?
Market structure:
What is the market share of new entrants in the trunk telephony market?
What is the market share of new entrants in the international telephony market?
What is the market share of new entrants in the mobile market?

Chart A1: PMR-Entry OECD indicators

Scale: 0-6, with 0 for the most pro-competitive regulations

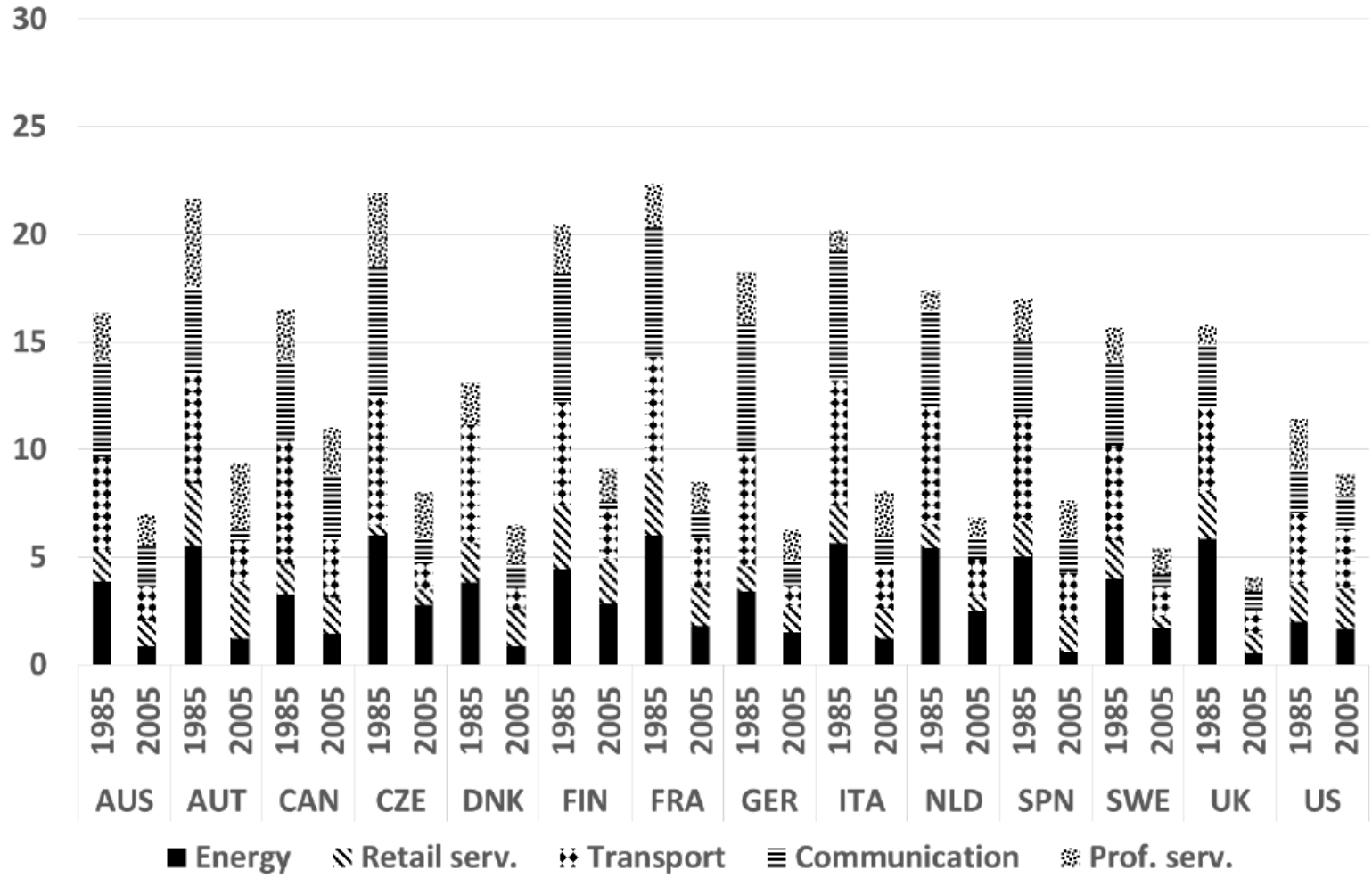


Chart A2: PMR-State OECD indicators

Scale: 0-6, with 0 for the most pro-competitive regulations

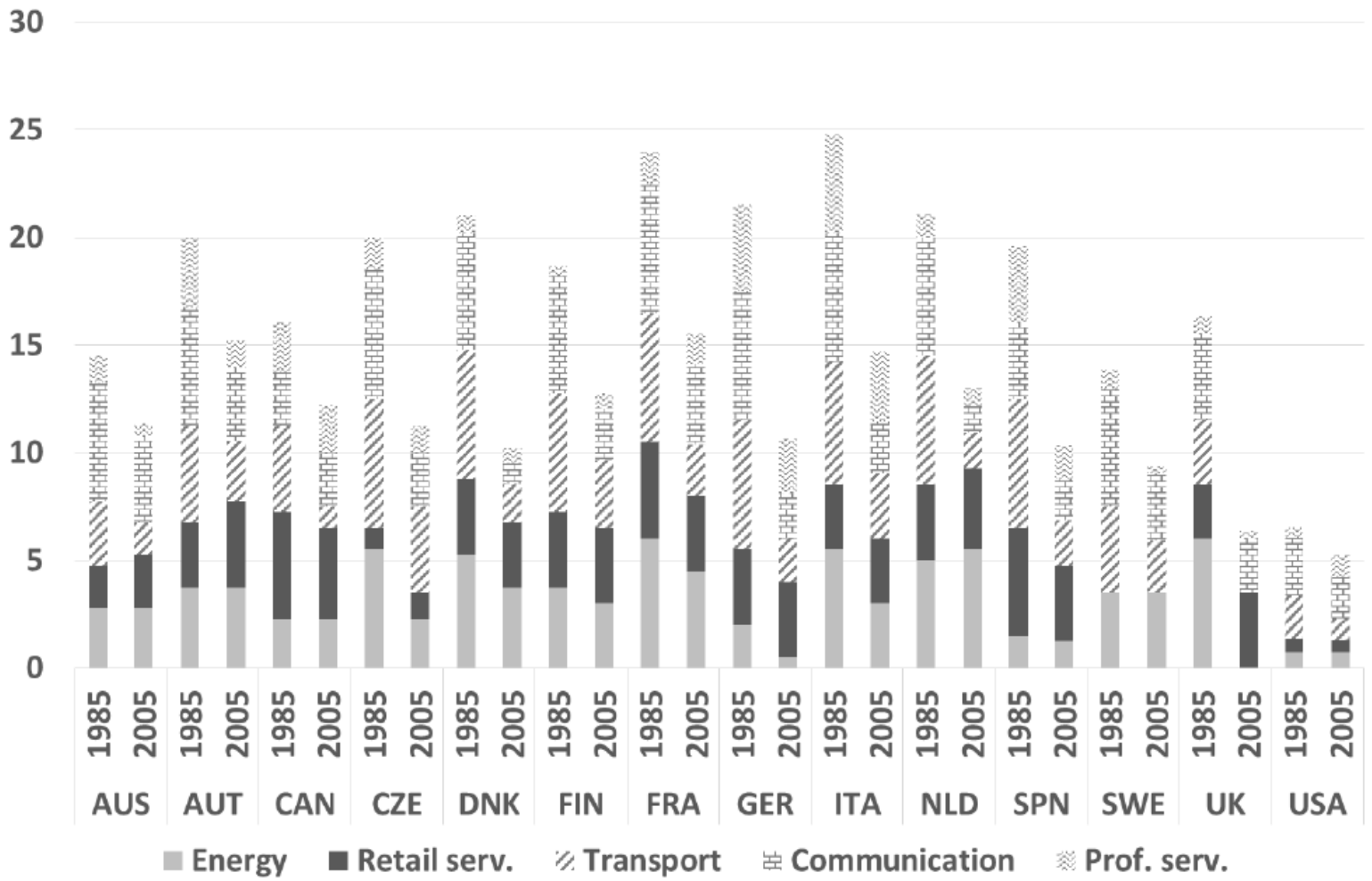
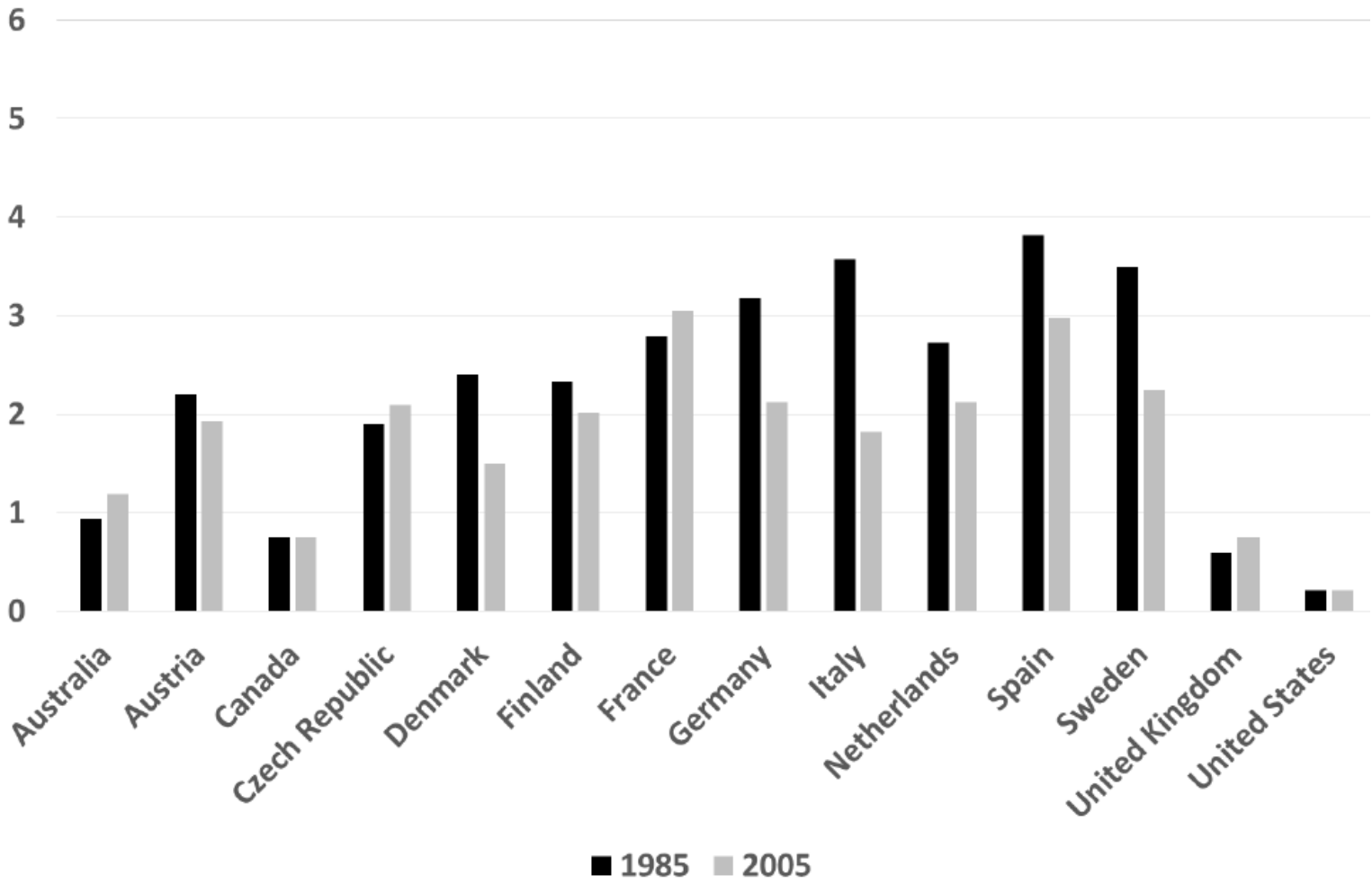


Chart A3: EPL OECD indicator

Scale: 0-6, with 0 for the most flexible regulations



Alternative estimation results

Table 4: Impact of regulation indicators on mark-up and workers' share of rent

	(1)	(2) = (3)+(4)-(5)	(3)	(4)	(5)
Dep. var. (log)	**Mark-up rate (MUR)**	**Workers' share of rent (WSR)**	**Workers' rent per hour ($W - W^r$)**	**Hours worked per output unit (N/Q)**	**Rent per output unit ($P - C$)**
NMR – Entry (NMR^E)	0.0516***	0.0644***	0.0510***	0.0744***	0.0611***
	[0.0107]	[0.0105]	[0.0111]	[0.0141]	[0.0116]
NMR - State (NMR^S)	0.0229**	0.00546	-0.00696	0.0425***	0.0301**
	[0.0112]	[0.0110]	[0.0100]	[0.0156]	[0.0120]
EPL - impact ($\lambda_i \times EPL$)	0.0124	-0.161	0.375***	-0.787***	-0.250***
	[0.0889]	[0.103]	[0.0950]	[0.0961]	[0.0913]
Observations	4,988	4,988	4,988	4,988	4,988
R-squared	0.949	0.875	0.981	0.979	0.893
RMSE	0.146	0.158	0.154	0.161	0.173

Country*industry and country*year fixed effects included
Newey-West standard errors in brackets - $***p < 0.01$, $**p < 0.05$, $*p < 0.1$

Table 5: Impact of regulation indicators, by skill

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var. (log)	**Workers' rent per hour** $(W - W^r)$			**Hours worked per output unit** (N/Q)		
Skills	**High**	**Medium**	**Low**	**High**	**Medium**	**Low**
NMR - Entry	0.0467***	0.0476***	0.0416**	0.0778***	0.0796***	0.0884**
(NMR^E)	[0.0157]	[0.0154]	[0.0167]	[0.0130]	[0.0146]	[0.0161]
NMR - State	-0.0301*	-0.0197	0.00710	-0.0182	0.0344**	0.0340*
(NMR^S)	[0.0156]	[0.0142]	[0.0148]	[0.0140]	[0.0166]	[0.0183]
EPL - impact	0.100	0.545***	0.528***	-0.280**	-0.824***	-1.293***
$(\lambda_i \times EPL)$	[0.131]	[0.112]	[0.152]	[0.134]	[0.109]	[0.122]
Observations	4,988	4,988	4,988	4,988	4,988	4,988
R-squared	0.970	0.977	0.977	0.984	0.976	0.986
RMSE	0.211	0.169	0.178	0.195	0.177	0.194

Country*industry and country*year fixed effects included
Newey-West standard errors in brackets - $***p < 0.01$, $**p < 0.05$, $*p < 0.1$

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