Online complements

Labour Share Developments in OECD Countries Over the Past Two Decades

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C1 – Firm-Level Analysis: Supporting Technical Material

C2 – Industry-Level Analysis: Supporting Technical Material

Online complement C1 – Firm-Level Analysis: Supporting Technical Material

Country Groups

In the second section, the sample is split into a group of countries with declining labour share over 2001-2015 and a group in which they are increasing. Labour share developments over this period are reported in **Erreur ! Source du renvoi introuvable.**.

Table C1-I
Changes in labour share between 2001 and 2015 (%)

Countries with declines in labour share		Countries with increases in labour share	
Belgium	-3.3	Austria	0.6
Denmark	-2.1	Estonia	6.0
Germany	-2.7	Finland	8.2
Ireland	-3.6	France	5.6
Korea	-4.2	Italy	7.7
Netherlands	-2.1	Spain	1.5
Sweden	-1.4		
United Kingdom	-1.7		
United States	-5.6		

Notes: Excluding the primary, housing and non-market industries.
Start year is two-year average of 2000-2001. End year is average of 2014-2015 except for Ireland (2013-2014).
Sources: OECD National Accounts Database, OECD STAN Database, OECD Annual Labour Force Statistics Database and EU KLEMS Database.

Characteristics of Leading Firms

In countries that experienced declines in labour share, technologically leading firms were on average seven times more productive than the other firms (**Erreur ! Source du renvoi introuvable.**, Panel A). While they were also paying higher real wages, the difference with other firms was less pronounced, implying lower labour shares in leading firms. Value added, sales and capital intensity were higher in leading firms, but the average number of employees was lower than that of other firms. Similar conclusions hold for countries that experienced increases in labour share (**Erreur ! Source du renvoi introuvable.**, Panel B), although the differences between leaders and other firms were less pronounced.

Firms entering the technological frontier were on average twice as capital intensive as those that exited it, while capital intensity was similar to that of incumbent leaders (**Erreur ! Source du renvoi introuvable.**). The share of young and small firms was higher among firms entering the technological frontier (14%, **Erreur ! Source du renvoi introuvable.**) than for exiters and incumbents (7%-8%), suggesting that higher capital intensity in entering firms partly reflected innovation rents.

Table C1-II

Mean firm characteristics in 2015

	Panel A: Countries with declines in labour share		Panel B: Countries with increases in labour share	
	Leaders	Others	Leaders	Others
Labour productivity*	392.4 (341.4)	59.9 (49.7)	233.3 (182.0)	50.0 (35.0)
Real wages**	114.7 (99.8)	40.9 (34.4)	88.4 (68.1)	39.3 (24.4)
Labour share***	38.5 (25.1)	71.5 (21.9)	46.1 (24.8)	79.1 (17.2)
Real value added****	24.9 (40.1)	5.8 (8.8)	9.2 (14.5)	2.6 (3.6)
Real revenue****	83.5 (146.1)	21.9 (36.7)	29.5 (54.3)	8.4 (13.1)
Capital-labour ratio*	187.2 (434.3)	30.3 (56.7)	148.7 (310.9)	21.0 (40.0)
Number of employees	62.8 (91.1)	96.5 (125.5)	39.3 (60.1)	53.0 (57.2)
N	4,284	89,498	6,808	134,068

Notes: Standard deviations in brackets. The set of firms is restricted to a sample where all variables reported in the table are jointly available. Productivity is defined the ratio of real value added to the number of employees. Capital-labour ratio is defined as the ratio of capital stock to the number of employees.

* In thousands of 2005 USD (using PPP conversions) per employee; ** in thousands of 2005 USD (using PPP conversions); *** in %; **** in millions of 2005 USD (using PPP conversions).

Sources: OECD calculations based on OECD-ORBIS.

Table C1-III

Capital intensity across firms 2002-2015

	Countries with decreases in labour share			Countries with increases in labour share		
Ratio of capital intensity	Mean	Median	St. dev.	Mean	Median	St. dev.
(Entrants into frontier) / (Exiters)	1.9	1.5	1.5	2.3	1.8	2.2
(Entrants into frontier) / (Incumbent leaders)	0.9	0.8	0.5	0.9	0.8	0.5

Notes: Within each country group in each industry and year, cells with less than 10 firms are dropped. Capital intensity is measured by the capital-labour ratio.

Sources: OECD calculations based on OECD-ORBIS.

Table C1-IV

Share of young and small firms at the frontier 2001-2015

	Countries with decreases in labour share			Countries with increases in labour share		
	Entrants	Exiters	Incumbents	Entrants	Exiters	Incumbents
Number of young and small firms	4,741	1,465	2,619	6,895	2,473	3,301
Total number of firms	34,252	19,394	39,773	52,850	29,931	55,915
Share of young and small firms (in %)	13.8	7.6	6.6	13.0	8.3	5.9

Notes: Small and young firms are defined as firms with less than 100 employees and in existence no more than 5 years.

Sources: OECD calculations based on OECD-ORBIS.

Decomposition of Labour Productivity and Real Wage Growth in Leading Firms

Contributions to labour productivity and real wage growth at the frontier can be decomposed as follows Baily *et al*. (1992):

$$\Delta X = \underbrace{\left[s_2^{stay} X_2^{stay} - s_1^{stay} X_1^{stay}\right]}_{Contibution\ of\ incumbents} + \underbrace{\left[s_2^{entry} X_2^{entry} - s_1^{exit} X_1^{exit}\right]}_{Contribution\ of\ net\ entry} \quad (1)$$

where X denotes the logarithm of labour productivity or real wages; s denotes the share of each group of firms in the total number of leading firms; superscripts denote groups of firms; and subscripts denote the period.

Equation (**1**) can also be written as follows:

$$\Delta X = \left[\overline{s^{stay}} \Delta X^{stay}\right] + \left[\overline{s^{net\ entry}} \left(X_2^{entry} - X_1^{exit}\right)\right] + \varepsilon \quad (2)$$

where $\overline{s^{stay}} = \frac{s_1^{stay} + s_2^{stay}}{2}$, $\overline{s^{net\ entry}} = \frac{s_1^{exit} + s_2^{entry}}{2}$

and $\varepsilon = \frac{X_1^{stay} + X_2^{stay}}{2} \Delta s^{stay} + \frac{X_1^{exit} + X_2^{entry}}{2} \left(s_2^{entry} - s_1^{exit}\right)$

The numerator of s_1^{stay} and s_2^{stay} is the number of firms staying at the frontier from year *1* to year *2* and the denominator the total number of leading firms in years *1* and *2*. The total number of firms at the frontier is held constant over the period 2001-2013 (Andrews *et al*., 2016) so that $s_1^{stay} = s_2^{stay}$.[1]

Since $s_1^{stay} + s_1^{exit} = 1$ and $s_2^{stay} + s_2^{entry} = 1$, $s_1^{stay} = s_2^{stay}$ implies that $s_1^{exit} = s_2^{entry}$ and $\varepsilon = 0$.

As a consequence, equation (**2**) can be simplified as follows:

$$\Delta X = \underbrace{\left[s_1^{stay} \Delta X^{stay}\right]}_{Contribution\ of\ incumbents} + \underbrace{\left[s_1^{exit} \left(X_2^{entry} - X_1^{exit}\right)\right]}_{Contribution\ of\ net\ entry} \quad (3)$$

[1] Andrews *et al*. (2016) define the technological frontier as the top 5% of a fixed number of firms, where the fixed number of firms is the median number of firms in each industry over the period 2001-2013.

Online complement C2 – Industry-Level Analysis: Supporting Technical Material

Decomposition of Changes in Labour Share

The decomposition of the changes in labour share for the total economy in **Erreur ! Source du renvoi introuvable.** is obtained as follows:

$$\Delta\overline{LS_{tot,t}} = \sum_{industry\ i}\left[\underbrace{\left(\frac{\overline{\omega_{i,t_0}}+\overline{\omega_{i,t}}}{2}\right)\Delta\overline{LS_{i,t}} + \left(\frac{\overline{LS_{i,t_0}}+\overline{LS_{i,t}}}{2} - LS^*\right)\Delta\overline{\omega_{i,t}}}_{Contribution\ of\ industry\ i} + \underbrace{R_{i,t}}_{Residual}\right] \quad (4)$$

with:

$\omega_{i,t} = \frac{VA_{i,t}}{VA_{tot,t}}$

$\Delta\overline{LS_t} = \overline{LS_t} - \overline{LS_{t0}} = \frac{LS_{t-1} + LS_t}{2} - \frac{LS_{t_0-1} + LS_{t_0}}{2}$

$LS^* = \frac{LS_{tot,t_0} + LS_{tot,t_0-1} + LS_{tot,t} + LS_{tot,t-1}}{4}$

$\Delta\overline{\omega_t} = \overline{\omega_t} - \overline{\omega_{t0}} = \frac{\omega_{t-1}+\omega_t}{2} - \frac{\omega_{t_0-1}+\omega_{t_0}}{2}$

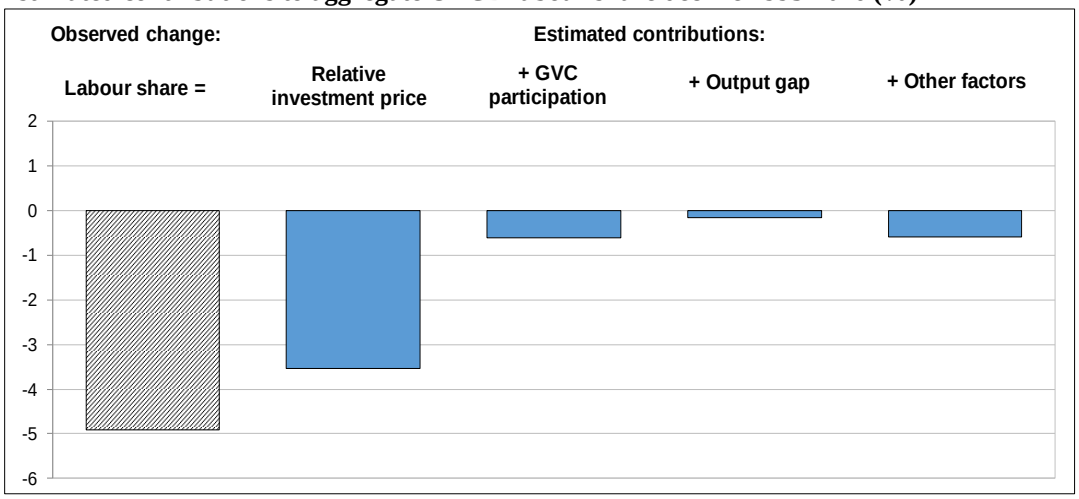
$R_{i,t} = \frac{\omega_{i,t}-\omega_{i,t-1}}{2} \times \frac{LS_t - LS_{t-1}}{2} - \frac{\omega_{i,t0}-\omega_{i,t0-1}}{2} \times \frac{LS_{t0}-LS_{t0-1}}{2} + LS^*\left(\overline{\omega_{i,t}} - \overline{\omega_{i,t_0}}\right)$

The contribution of industry *i* takes into account the evolution of industry *i*'s labour share and the evolution of industry *i*'s value added share between the initial and final dates. A reference labour share level LS^* is introduced in the decomposition in order to account for the fact that an increase in the value added share of an industry whose labour share is below the average labour share in the economy (e.g. the housing industry) contributes negatively to the evolution of the aggregate labour share. In practice, the average of the total economy labour share in periods (t_0–1), t_0, (t–1) and t as the reference labour share level LS^* is used. The residual term is negligible for all countries. Note that this residual term only appears because the initial and final labour shares are defined as averages over two consecutive years (e.g. 1994-1995 and 2016-2017 for Australia).

Contributions to Changes in Labour Share

Taking the estimated elasticities of the baseline model at face value, the contribution of each explanatory variable to the aggregate labour share decline is assessed as the estimated elasticity multiplied by the change in the variable over the period 1995-2016 (Figure C2-I). Industry-level elasticities can plausibly be assumed to be similar to aggregate elasticities because within-industry labour share developments explain aggregate developments (Schwellnus *et al*., 2018) and the regression analysis weights industries by shares in value added.

Figure C2-I
Estimated contributions to aggregate OECD labour share decline 1995-2016 (%)



Note: GDP weighted average of 20 OECD countries. 1995-2015 for GVC participation.
Source: See **Erreur ! Source du renvoi introuvable.**.

Industry Exposure to Policy Reforms

Choosing exposure variables that vary only across industries and are defined for a benchmark country and a benchmark period ensures that the estimated coefficients reflect the effects of changes in policies rather than changes in the exposure variable.[2]

Pro-competition product market reforms can plausibly be assumed to have a larger impact on the labour share in industries characterised by high rates of firm turnover. Economy-wide product market reforms such as reductions in the administrative burden on start-ups can be expected to primarily affect industries in which competition is structurally feasible. In industries in which there are natural barriers to competition, such as natural monopolies, most economy-wide product market reforms will have little impact on productivity and wages and thus the labour share. In the below empirical analysis, the structural feasibility of competition is proxied by the firm turnover rate.

Reforms of employment protection legislation can plausibly be assumed to have larger effects on the labour share in industries with high worker reallocation rates. Reducing the strictness of employment protection legislation reduces labour costs by reducing layoff costs, particularly so in industries that require high flexibility in layoff decisions, implying particularly large capital-labour substitutability in these industries.

Changes in active labour market spending can be assumed to have a larger impact on the labour share in industries with high shares of low-skilled workers. Such changes are likely to be concentrated in industries with high shares of low-skilled workers since low-skilled workers are overrepresented in OECD unemployment (Escudero, 2018; Oesch, 2010).

Changes in the minimum wage and in collective bargaining institutions can plausibly be assumed to have larger effects in industries with high shares of low-wage workers. In these industries, the minimum wage is likely to be binding for a higher proportion of workers so that an increase will raise the average wage in the industry by more than in other industries. Whether this raises or reduces the labour share is an empirical question. In the short term, the increase in wages tends to raise the labour share if the employment response is modest (Card & Krueger, 1994; Card & Krueger, 2000; Neumark *et al*., 2014), but in the medium term, which is the focus of the present paper, the increase in wages triggers capital-

[2] See
Table for further details on the exposure variables.

labour substitution (Lordan & Neumark, 2017). If the elasticity of substitution between capital and labour is above unity, this may raise labour productivity by more than the initial increase in wages so that the labour share declines. Similarly, collective bargaining institutions typically set wage floors at the national, industry, occupation or firm levels so that an increase in coverage or centralisation typically benefits low-wage workers more than other workers.[3]

Table C2-II
Exposure variables

Policy reform	Industry exposure	Definition	Benchmark country	Benchmark period	Source
Product market regulation	Firm turnover	Sum of industry-level entry and exit rates. The entry rate is defined as the ratio of new firms to the total number of active firms in a given year. The exit rate is defined as the ratio of firms exiting the market in a given year to the total number of active firms in the previous year.	United States	1987-1997	Bartelsman *et al.* (2009)
Employment protection legislation	Worker reallocation	Sum of hiring and separation rates. The hiring rate is defined as the ratio of workers with less than one year of tenure to the average industry employment in *t*–1 and *t*. The separation rate is the difference between the hiring rate and rate of change in employment.	United States	2000-2007	Bassanini & Garnero (2013)
Active labour market policies	Share of low-skilled workers	Average of share of adults with low literacy skills (under level 2), low numeracy skills (under level 2) and low problem solving skills (under level 3)	Average over the 20 countries of the sample	2012	OECD PIAAC
Collective bargaining coverage	Share of low-wage workers	Share of wage and salary employees working at least 30 hours per week with gross monthly wages less than two thirds of the median wage of all workers	United Kingdom	1994-1999	Bassanini *et al.* (2010)
Collective bargaining decentralisation					
Minimum wage					
Tax wedge	Labour intensity	Ratio of labour expenditure to capital expenditure	United States	2002	Bravo-Biosca *et al.* (2013)
Corporate tax	Relative profitability	Ratio of profits to gross value added normalised by the ratio in the median industry	United States	1997	Schwellnus & Arnold (2008)

Sources: Pak & Schwellnus (2019)

Changes in corporate and labour taxes directly change the cost of capital relative to labour. The reduction in the cost of capital implied by a reduction in the corporate tax rate can be expected to induce capital-labour substitution and a decline in the labour share. The implied reduction in the relative cost of capital

[3] If centralisation of collective bargaining has a negative impact on the wages of high-wage workers, as suggested by a number of empirical studies (Dahl *et al.*, 2013; Leonardi *et al.*, 2015), the estimated coefficient on the interaction between the share of low-wage workers and collective bargaining decentralisation measures a differential rather than an aggregate effect of collective bargaining decentralisation.

and the associated capital-labour substitution should be larger in industries in which profitability is high. Similarly, the increase in the relative cost of labour implied by an increase in taxes weighing directly on labour – i.e. an increase in the tax wedge – should lead to capital-labour substitution. The implied increase in the relative cost of labour should be larger in labour intensive industries.

Public Policies with Non-Significant Effect on the Labour Share

The coverage and centralisation of collective bargaining, the tax wedge and corporate taxes do not appear to affect the labour share (Table). The effects of these policies typically remain non-significant when the baseline model is augmented with the interaction between the preferred exposure variable and another policy.

Table C2-III
The effect of public policies on the labour share 1995-2011

	(1)	(2)	(3)	(4)
Controlling for:	Change in CB coverage × EXPO: Low-wage workers	Change in CB decentralisation × EXPO: Low-wage workers	Change in tax wedge × EXPO: Labour intensity	Change in corporate tax × EXPO: Relative profitability
(1) Change in CB coverage × EXPO	**-0.05**	-0.28	0.07	-0.41
	(0.04)	(0.21)	(0.07)	(0.30)
(2) Change in CB decentralisation × EXPO	-0.07	**-0.23**	0.10	-0.14
	(0.05)	**(0.18)**	(0.10)	(0.28)
(3) Change in tax wedge × EXPO	-0.05	-0.17	**0.07**	-0.27
	(0.04)	(0.19)	**(0.07)**	(0.27)
(4) Change in corporate tax × EXPO	-0.09**	-0.12	0.09	**-0.27**
	(0.04)	(0.21)	(0.07)	**(0.27)**
(5) Change in PMR × EXPO	-0.05	-0.22	0.09	-0.25
	(0.04)	(0.17)	(0.08)	(0.23)
(6) Change in EPL × EXPO	-0.05	-0.20	0.06	-0.34
	(0.04)	(0.18)	(0.06)	(0.30)
(7) Change in ALMP × EXPO	-0.04	-0.23	0.06	-0.40
	(0.04)	(0.16)	(0.06)	(0.32)
(8) Change in minimum wage × EXPO	-0.06	-0.16	0.13	-0.19
	(0.04)	(0.16)	(0.10)	(0.15)

Notes: Selected OECD countries. PMR stands for product market regulation; EPL for employment protection legislation; ALMP for active labour market policies; CB for collective bargaining; and EXPO for exposure variable. The table reports the estimated coefficients on the interaction term in the column heading, with each row reporting the estimate when controlling for the interaction term in the row heading. Coefficients in bold font show the baseline estimates in Pak & Schwellnus (2019). Public policies and institutions denote 5-year differences. Standard errors are clustered at the country level. Weighted OLS, with the share of industry-level value added in total value as weights. *, **, *** denote statistical significance at the 10%, 5% and 1% levels.
Sources: Pak & Schwellnus (2019).