

Policies under many uncertainties

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Abstract: The causes of productivity slowdown and higher income inequality are uncertain. Possible causes include globalisation, technology, imperfect competition, other distortions and increased role of so called zombie firms. There is also much uncertainty how artificial intelligence (AI) affects the trends. Drawing on recent research, policies are considered assuming an economic environment where:

- Global firms drive trade and increasingly also economies more generally. These firms react relatively strongly to shocks and distortions.
- The use of AI by firms and households will improve market efficiency. This will further amplify the effects of shocks and distortions.
- Labour reallocation and skill renewal are relatively slow processes.

The following three policies are considered:

- i) General reduction in economic distortions to improve resource allocation facilitated with hiring and study subsidies.
- ii) A small benefit cut in unemployment benefit which is avoided with some work or participation in active labour market measures.
- iii) A cut in marginal wage tax rates financed by higher VAT (in practice a shift towards a destination-based corporate cash flow tax).

These policies facilitate labour reallocation and skill renewal. This, in turn, enhances employment, productivity and fiscal sustainability.

Introduction

In early 2008, economists had little idea how economies would develop later in 2008 or in the next 10 years.

- 1) Financial risks and their effects were underestimated.
- 2) Low productivity & income inequality trends were not seen.

Focus here is on trying to understand

- lower productivity growth & higher income inequality
- how policies could alleviate the trends & boost demand

Demand-boosting policies would facilitate monetary policy normalisation and hence help to reduce financial stability risks.

BIS Quarterly Review, December 2017, p. 1:

https://www.bis.org/publ/qtrpdf/r_qt1712.pdf

- *“As long-term yields remained extremely low, valuations across asset classes and jurisdictions stayed stretched, though to different degrees. Near-term implied volatility continued to probe new historical lows, while investors and commentators wondered when and how this calm would come to an end.”*

This presentation is organised as follows

1. Recent research is reviewed to understand drivers of observed trends and how growing use of AI in decision-making is likely to affect economies.
2. Three policies are considered to improve resource allocation, productivity, employment and demand.

Abstracts of relevant studies are provided in Appendix A.

Relevant research and premises of the policy analysis

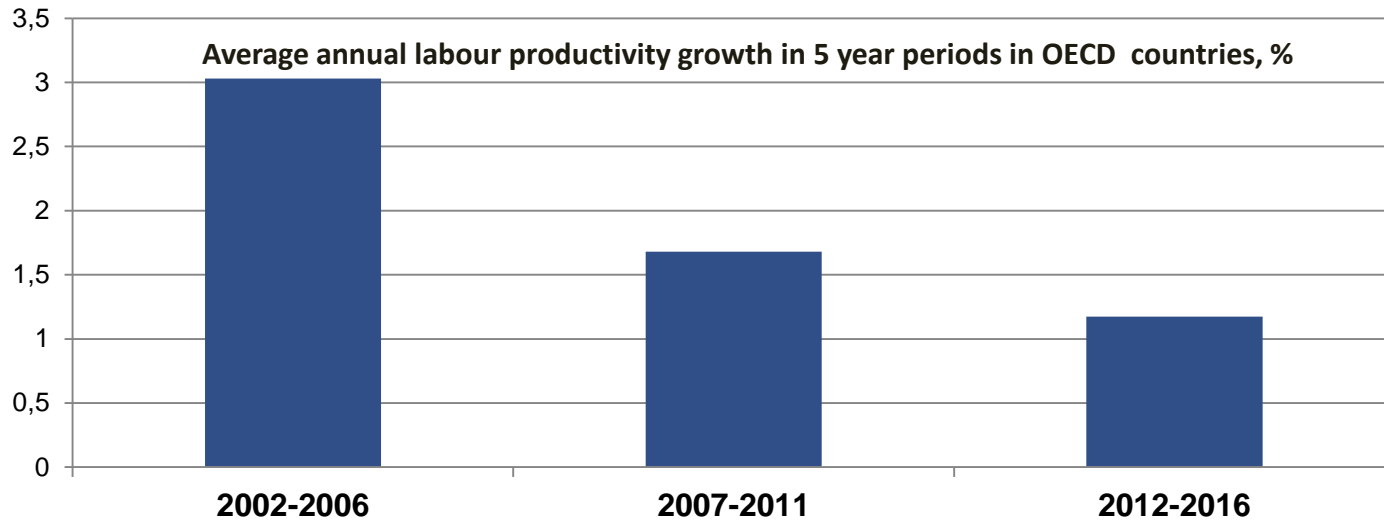
Relevant research

1. Advances in trade theory based on, e.g., Melitz (2003)*
2. Research on firms, resource allocation, productivity, e.g., Bernard et al (2018), OECD (2016), Baqaee & Farhi (2017)
3. 2008-2009 developments: e.g. Eaton et al (2017)
4. Zombie firms: e.g. Caballero et al (2008), OECD (2017)
5. Effects of productivity on inequality: Grossman et al (2017)
6. Effects of AI use: e.g. Varian (1995), Sandholm (2017)

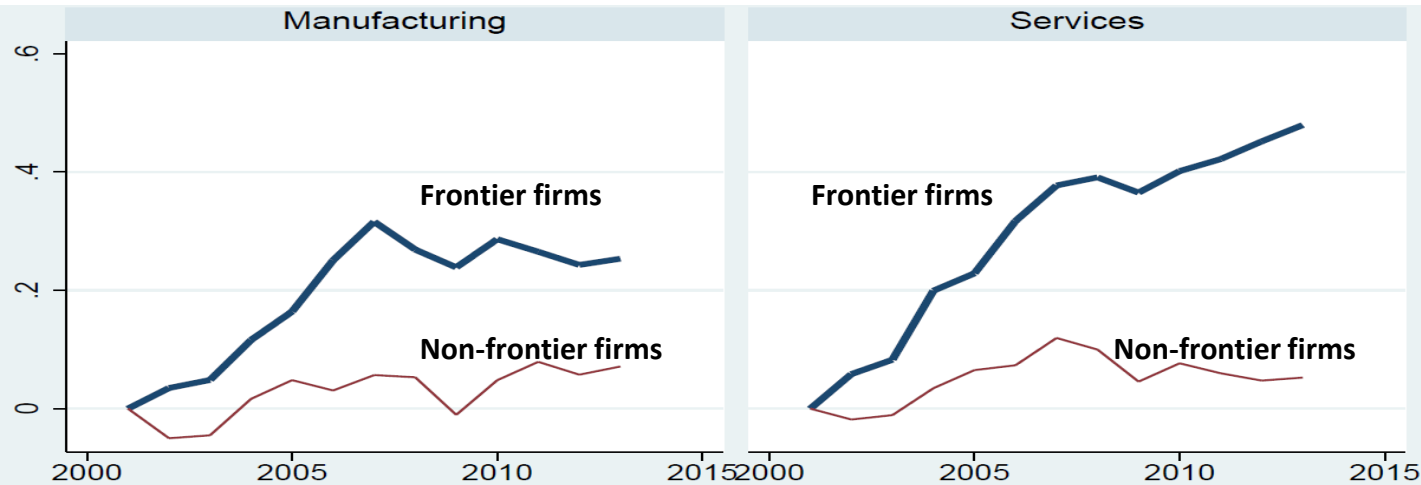
*Melitz, M. (2003), The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, *Econometrica*, 71, 1695–1725. https://scholar.harvard.edu/files/melitz/files/aggprod_ecma.pdf

The basic premises of the policy analysis here are very simple:

- Increased role of global firms in trade & economies
- Firms in general are more exposed to global markets
- Limit case: small open economy, i.e. perfect competition
- Price and factor demand elasticities are infinite
- Even very small distortions would have drastic effects
- In reality, imperfect competition and finite elasticities
- Policies considered against the following background:
- Assumption 1: Firms more exposed to competition implying higher demand elasticities & larger effects from distortions
- Assumption 2: AI use will further increase elasticities
- Assumption 3: Labour reallocation & skill renewal are slow processes relative to the optimizing decisions of firms.
- Assumptions 1 & 2 can be tested using, e.g., an approach by Mrázová & Neary (2017). Assumption 3 can be considered to be rather weak.



Source: OECD Economic Outlook, Statistical annex database



Average multifactor productivity levels for productivity frontier & non-frontier OECD country firms, log of productivity, 2001=0

Frontier firms = Top 5 % in terms of productivity

Source: Andrews, D. C. Criscuolo and P. Gal (2016), "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy", OECD Productivity Working Papers, No. 5.

Definintions & data in the OECD study*

- Frontier firms = top 5% of firms in terms of productivity levels, within each industry and year. Laggards = non-frontier firms. A good summary of six characteristics of productivity frontier firms is provided by the OECD study. It is reproduced in a slightly shortened version in Appendix B.
- While the *number* of frontier firms is fixed, the *set* of frontier firms is allowed to change over time. The 5% of firms per industry is determined using a fixed number of firms across time to avoid the expanding coverage problem but still allows for differences across industries in terms of their firm population, which is important given the heterogeneity of average firm size across industries. More specifically, frontier firms are identified using the top 5% of the median number of firms (across years), separately by each industry. This approach aims to capture as close as possible the top 5% of the typical population of firms. Using a MFPR-based productivity frontier definition, for example, results in a global frontier size of about 80 companies for the typical 2-digit industry.
- OECD-Orbis database = 24 OECD countries 1997-2014, non-farm, non-financial business sector. Productivity in the below table = labour productivity = real value added (in USD 2005 PPP)/number of employees. In the below table productivity & markups in logs. Frontier firms have 3-4 times higher productivity than the laggards (non-frontier firms).

Variables	Sector: manufacturing							Sector: services						
	Laggard firms			Frontier-firms			Difference	Laggard firms			Frontier-firms			Difference
	Mean	St.dev.	N	Mean	St.dev.	N		Mean	St.dev.	N	Mean	St.dev.	N	
Productivity	10.7	0.6	21,191	12.0	0.4	825	1.3 ***	10.4	0.7	22,053	11.9	0.7	627	1.5 ***
Employees	49.3	52.1	21,191	45.1	33.8	825	-4.2 ***	59.5	156.6	22,053	38.0	24.8	627	-21.6 ***
Capital-labour ratio ¹	86.1	115.3	21,191	274.5	425.5	825	188.4 ***	76.4	214.0	22,053	677.5	2,071.1	627	601.1 ***
Revenues ²	11.8	21.6	21,191	39.0	58.8	825	27.3 ***	14.8	54.0	22,053	57.9	133.0	627	43.1 ***
Markup (log)	0.1	0.4	21,191	0.1	0.4	825	0.05 ***	0.1	0.4	22,053	0.3	0.5	627	0.19 ***
Wages ¹	34.2	16.7	21,191	54.6	20.1	825	20.4 ***	34.5	16.7	22,053	56.6	23.4	627	22.1 ***

All statistics refer to 2013. Productivity & mark-up in logs, and productivity denotes labour productivity. The set of firms is restricted to a sample where all displayed variables in the table are jointly available. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.1: in thousands of 2005 USD; 2: in millions of 2005 USD; both using PPP conversions.

*D. Andrews, C. Criscuolo & P.N. Gal (2016), *The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy*. OECD Productivity Working Papers No. 05. <https://www.oecd.org/global-forum-productivity/library/OECD%20Productivity%20Working%20Paper%20N%C2%B05.pdf>

Markups, productivity frontier & non-frontier firms, OECD-countries

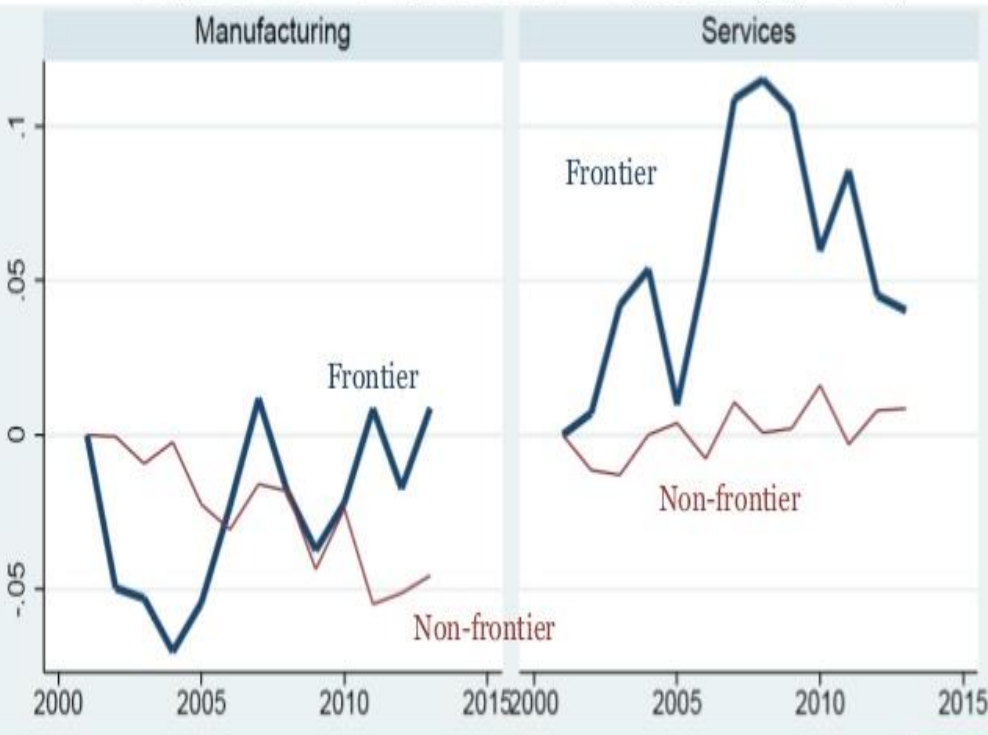
Manufacturing markups stagnant Frontier service firms' markups up

Sales, productivity frontier & non-frontier firms, OECD-countries

Manufacturing sales stagnant 2008- Service sector sales up

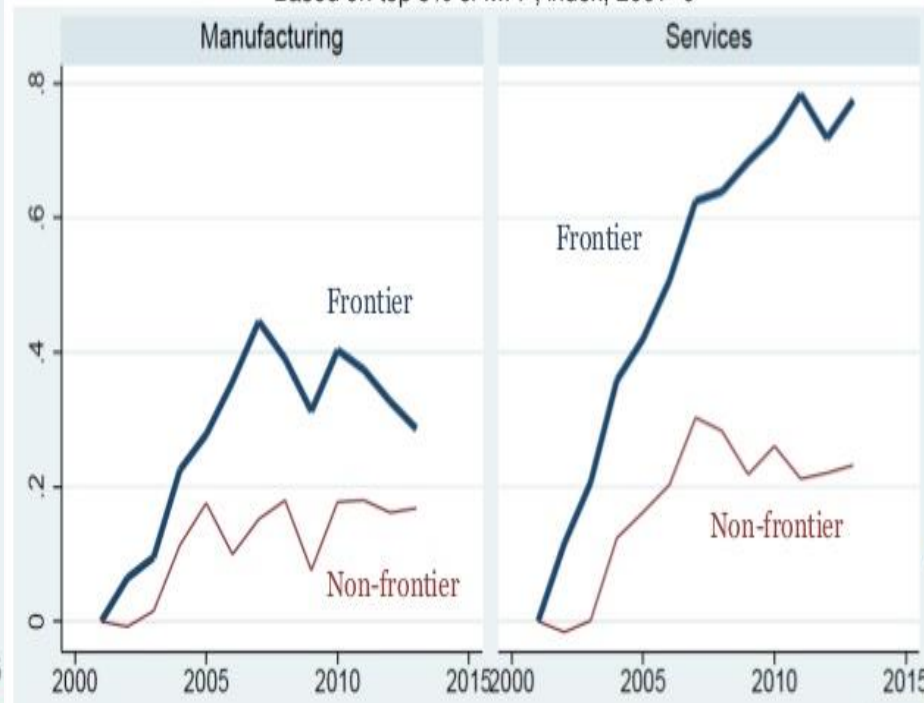
A possible reason for the manufacturing - service sector difference is that manufacturing sector has been more exposed to global competition

Average estimated mark-up across each 2-digit sector (log, 2001=0)



Average of log sales for global frontier firms and the rest

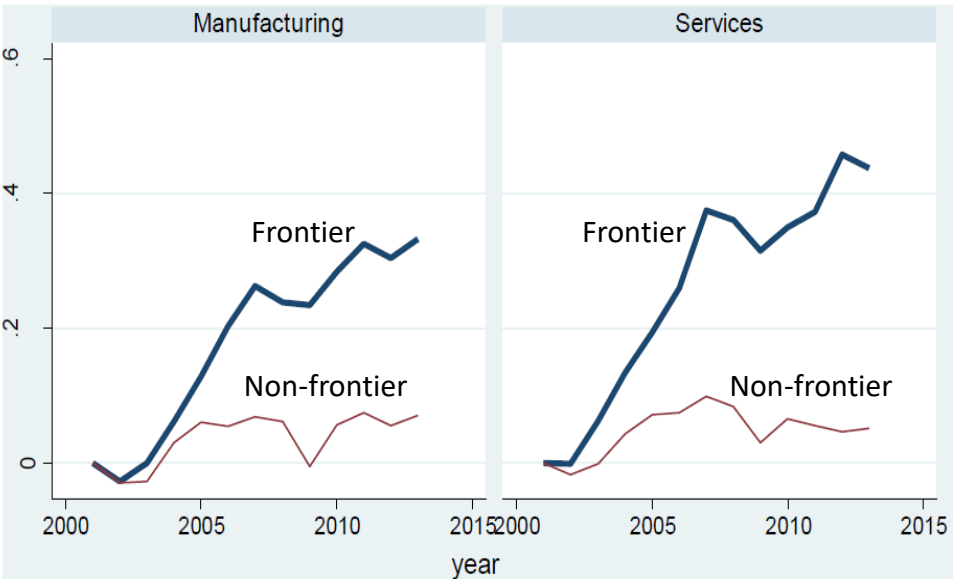
Based on top 5% of MFP; index, 2001=0



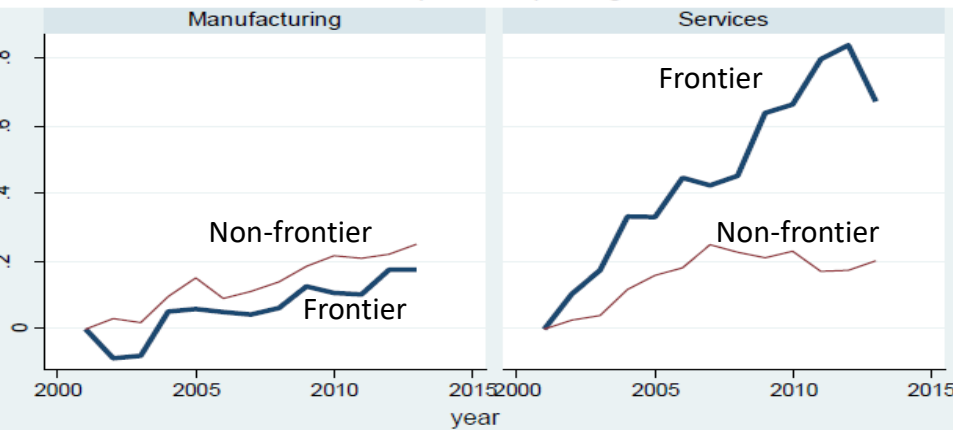
Source: Andrews, D. C. Criscuolo and P. Gal (2015), "The Global Productivity Slowdown, Technology Divergence and Public Policy: a Firm Level Perspective", OECD Productivity Papers forthcoming.

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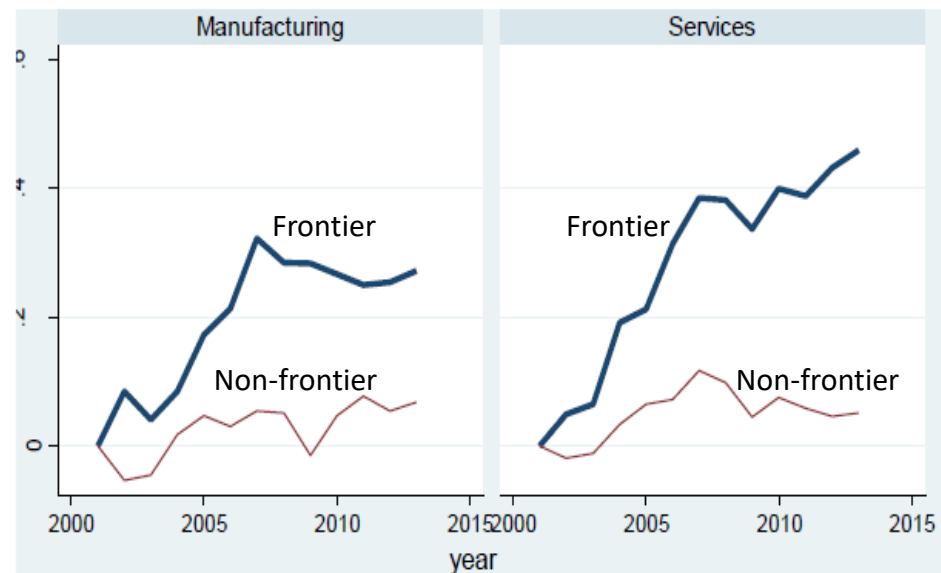
Labour productivity: value added per worker (2001-2013)



C: Capital deepening



B: Multi-Factor Productivity (MFPR)



Gains in labour productivity at the firm level can be achieved through either capital deepening (increased K/L) or multi-factor productivity (MFPR)

- The gaps show that the gains have come predominantly from MFPR
- Manufacturing frontier and non-frontier firms have had roughly same capital deepening

Source: Andrews, D. C. Criscuolo and P. Gal (2016), "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy", OECD Productivity Working Papers, No. 5.

Summary of the research review in Appendix A

- Global firms drive increasingly trade & economies
- They relatively efficient and sensitive to distortions
- Relatively slow labour reallocation (low job flows)
- Zombie firms add to resource misallocation
- Marked misallocation of resources
- AI use likely to further improve efficiency & amplify effects of distortions

Summary considerations based on Appendix A

- a) Manufacturing & blue collar workers have faced first globalisation and increased competition
→ Old distortions (taxes, markups, frictions) + higher elasticities = labor & investment (also human capital) more distorted
 - b) Services increasingly exposed to competition
→ Also in services labor & investment decisions more distorted
 - c) Internet & AI use likely to aggravate effects of distortions
 - d) Zombie firms have absorbed rising shares of labor & capital
- a)+b)+c)+d)
- ⇒ Larger misallocation of resources, productivity slowdown
 - ⇒ Falling wage share & increased inequality
 - ⇒ Subdued aggregate demand & inflation
 - ⇒ Low interest rates which keep zombies in business
 - ⇒ To reverse trends, act on distortions & zombies

Three policies

- i) **Cut distortions, aid reallocation by hiring & study subsidies**
- ii) UI reform to improve employment and labour reallocation
- iii) From wage tax towards VAT-based corporate cash flow tax

Consider first i) which is the simplest policy case

- Globalisation & AI improve product market efficiency
- This aggravates effects of existing distortions
- But just cutting distortions may fail to reallocate labour
- Creative destruction may be costly & slow (e.g. hysteresis)
- Labour does not move easily between, say, sectors
- It usually takes time for a person to learn new skills
- Her productivity may initially < her marginal product
- In that case, firms not willing to hire her at going wages
- Even the going wage may be lower than her old wage
- ⇒ Her reservation wage may be too high
- ⇒ She may need to learn much more to get her old wage

Two subsidies to facilitate labour reallocation

1) Hiring subsidies, pros & cons based on Brown (2015)*

Pros: Lower deadweight costs & other negative effects than with wage subsidies. Hiring subsidies enable employers to screen workers and help the unemployed to regain their human capital.

Cons: Effects of hiring subsidy programs depend on targeting and design. Too loose targeting may create high potential deadweight costs.

*Brown, A. (2015), Can hiring subsidies benefit the unemployed?

IZA World of Labour, June 2015.

<https://wol.iza.org/uploads/articles/163/pdfs/can-hiring-subsidies-benefit-unemployed.pdf?v=1>

Recent research on the effectiveness of temporary hiring subsidies:

Cahuc, P., Carcillo, S., & Le Barbanchon, T. (2017), The effectiveness of Hiring Credits, IZA Discussion Paper 11248, forthcoming in *Review of Economic Studies*. <http://ftp.iza.org/dp11248.pdf>

2) Study subsidies

- Unemployed can study temporarily with unemployment benefit
- In Finland 1½ % of labour force in study subsidy scheme
- Supports skill formation, but may have unintended consequences given that unemployment benefits greater than student grants

ii) Unemployment insurance reform

- Reform important to improve labour reallocation
- But reform difficult given unavoidable trade-offs

Andersen, T. (2016), Incentives versus insurance in the design of tax-financed unemployment insurance. *International Journal of Economic Theory*, Vol. 12, No. 2, 2016, p. 127-150.

<https://voxeu.org/sites/default/files/file/DP8025.pdf>

Trade-off 1: Unemployment benefit level

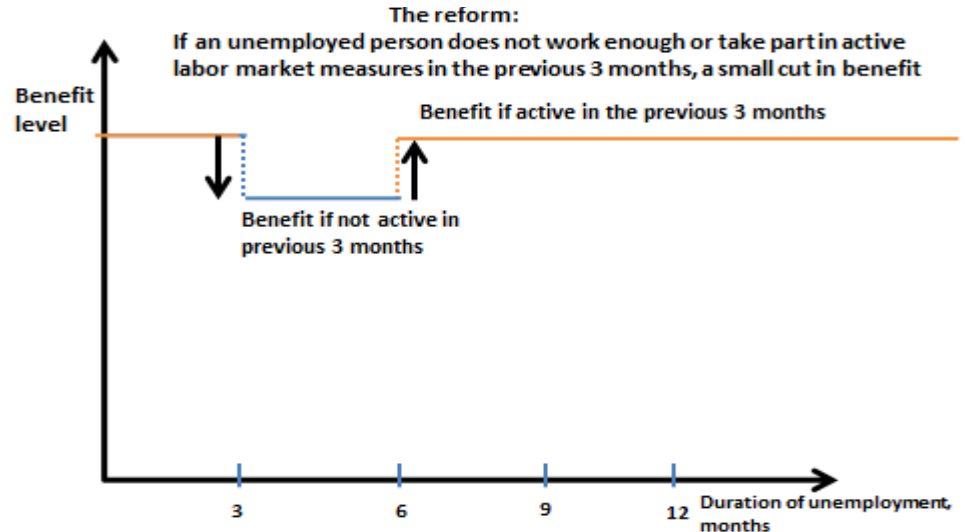
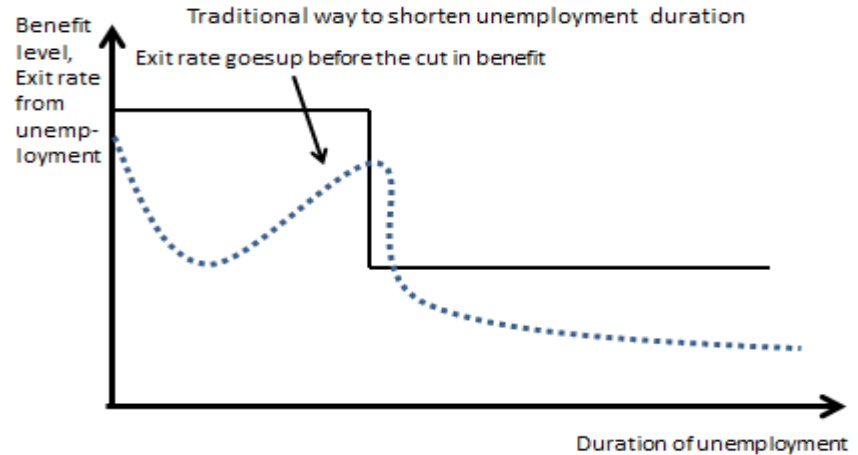
- High benefit = Good insurance, bad work incentives
- Low benefit = Bad insurance, good work incentives

Trade-off 2: Benefit duration

- Short benefit = Good work incentives, not enough time to search for a good job
- Long benefit = Bad work incentives, enough time to search for a good job

Acemoglu, D. & Shimer, R. (1999), Efficient Unemployment Insurance. *Journal of Political Economy*, 107, pp. 893-928.

<http://economics.mit.edu/files/3907>



The unemployment insurance reform (details in Appendix C):

- Average benefit for first 3 months of unemployment up by 3½ %.
- Non-cumulative conditional 4½ % cut on later 3 months periods.
- The cut is avoided by working at least 18 hours or participating for 5 days in active labour market measures in a 3 months period.
- Benefit always higher than the average benefit for first 3 months.
- Later benefit rises further if at least one activity condition met.

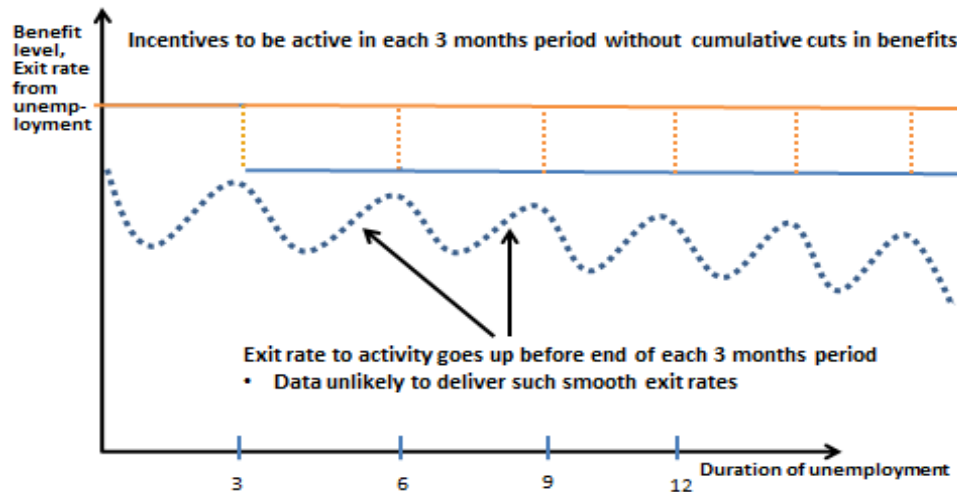
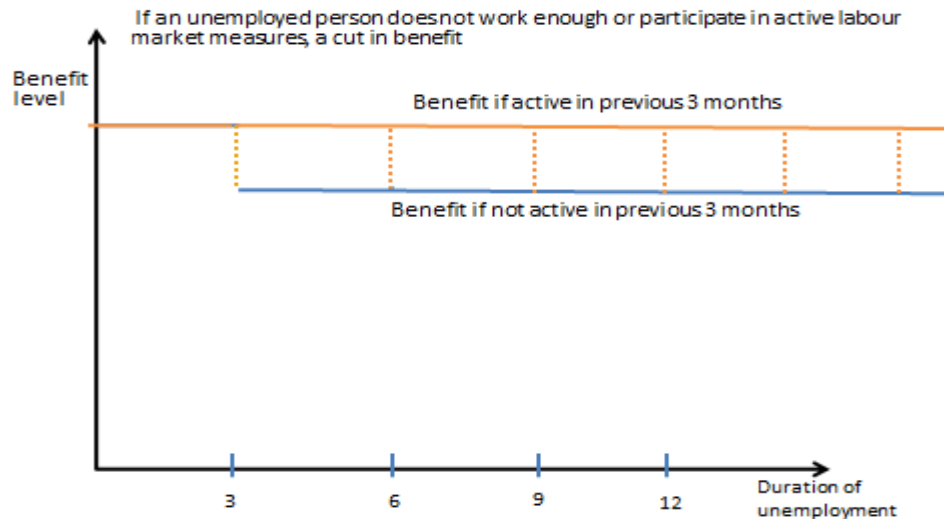
Using Swedish data and bunching at kink regression, Kolsrud et al (2017) conclude that: *“Putting this simple characterization to the data, our empirical implementation has shown that it is not at all obvious that declining [unemployment] benefit profiles are always optimal.”*

Kolsrud et al (2017) use duration-dependent kink (at 20 weeks) in the replacement rate to estimate duration elasticities. Kleven (2016) reviews strengths & weaknesses of bunching estimation. Blomquist & Newey (2017) show for taxable income elasticity that if the functional form of the distribution of preference heterogeneity is unknown, the kink is uninformative about elasticity.

Kolsrud, J., Landais, C., Nilsson, P. & Spinnewijn, J. (2017), The Optimal Timing of Unemployment Benefits: Theory and Evidence from Sweden, forthcoming American Economic Review. <http://personal.lse.ac.uk/spinnewj/dynamicUI.pdf>

Kleven, H. (2016), Bunching. Annu. Rev. Econ. 2016. 8:435–64. https://www.henrikkleven.com/uploads/3/7/3/1/37310663/kleven_annualreview_2016.pdf

Blomquist, S. & Newey, W. (2017), The Bunching Estimator Cannot Identify the Taxable Income Elasticity. IFS WP 40/2017 & NBER WP 24136. <https://www.ifs.org.uk/uploads/cemmap/wps/CWP401717.pdf>



iii) From wage tax towards VAT-based corporate cash flow tax

Policy consideration builds on

- Heatcote et al (2017), marginal income tax rates & inequality
- Auerbach & Deveraux (2017), corporate cash flow tax

Background 1

- Globalisation provides net gains, but loser may not be compensated
- In any case, part of gains lost due to distortionary taxes & transfers

Background 2

- Difficult to tax profits of global firms
- Tax co-ordination helps (e.g. OECD BEPS), but limits to what it can do

Background 3

- Higher markups, but hard to tax pure profits in current tax systems
- Debt bias in current corporate tax systems

Background 4

- General estimation gives high human capital elasticities

Keane, M. & Wasi, N. (2016), Labour Supply: the Roles of Human Capital and the Extensive Margin, *Economic Journal*, 578-617.

Background 5

- Corporate cash flow tax is a tax on pure profits
- Destination based cash flow tax (DBCFT)=EU VAT, but in EU VAT, wages not deductible & financial sector not in
- A shift towards a destination based cash flow tax = A reduction in wage tax financed by a VAT rate increase.
- A tax cut on wages can be viewed as deduction in a DBCFT. Implementing it with higher VAT is a tax on domestic consumption not financed with labour income.
- Mirrlees et al (2011): *"Taxing company profits in the jurisdiction of final sales to consumers would eliminate corporate tax distortions to location decisions of international companies and remove most opportunities to shift taxable profits between jurisdictions. Although we note that similar results could also be achieved by increasing broad-based VATs with offsetting reductions to payroll taxes."*

Background 6

- Social benefits CPI-indexed → benefit compensation for an increase in VAT

Mirrlees, J., S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles & J. Poterba (2011), Corporate Taxation in an International Context, Chapter 18, in *Tax by Design*. Oxford University Press. <https://www.ifs.org.uk/uploads/mirrleesreview/design/ch18.pdf>

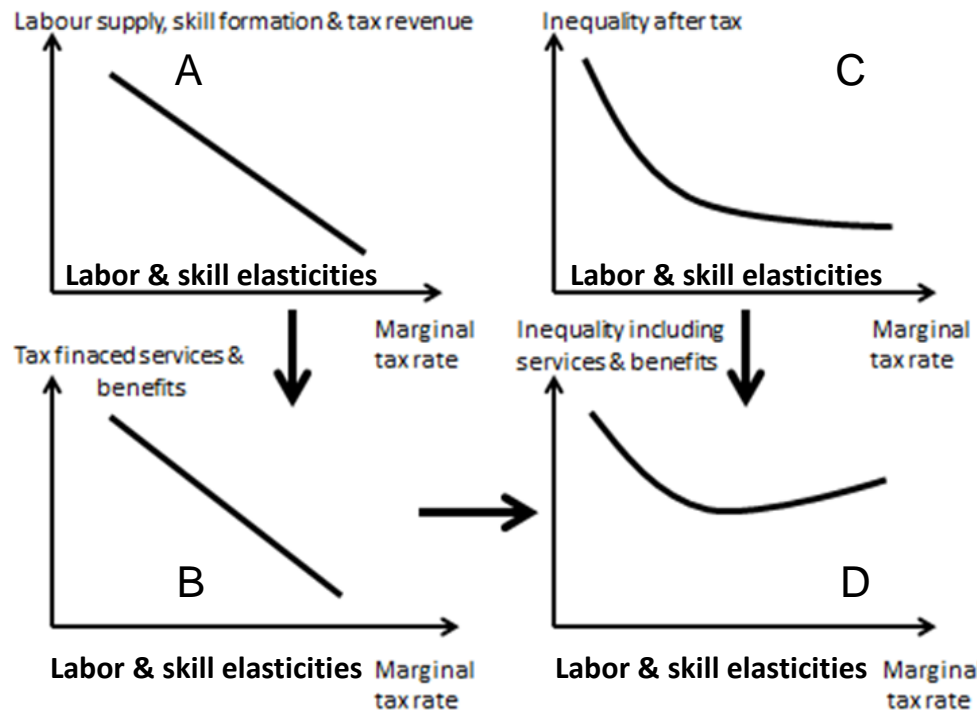
Higher marginal tax rates on wages can increase inequality when applying the tractable equilibrium analysis by Heatcote, J., K. Storesletten, G. L. Violante (2017), Optimal Tax Progressivity: An Analytical Framework. *The Quarterly Journal of Economics*, Volume 132, Issue 4, November 2017, 1693–1754. <https://doi.org/10.1093/qje/qjx018>

Explanation of the graph: Heatcote et al (2017) take into account the following effects of higher marginal tax rates:

- A: effect on labor & skills & tax revenue
- B: effect on tax financed services & benefits, excluding effect of increased tax revenue in panel C
- C: effect on inequality and tax revenue excl. effect on tax revenue in A, but including other behavioral effects, including increased scarcity of skilled labor
- D: with high enough labor and skill investment elasticities, higher marginal tax rates on labor income increase inequality (panel D = effects in B + effects in C).

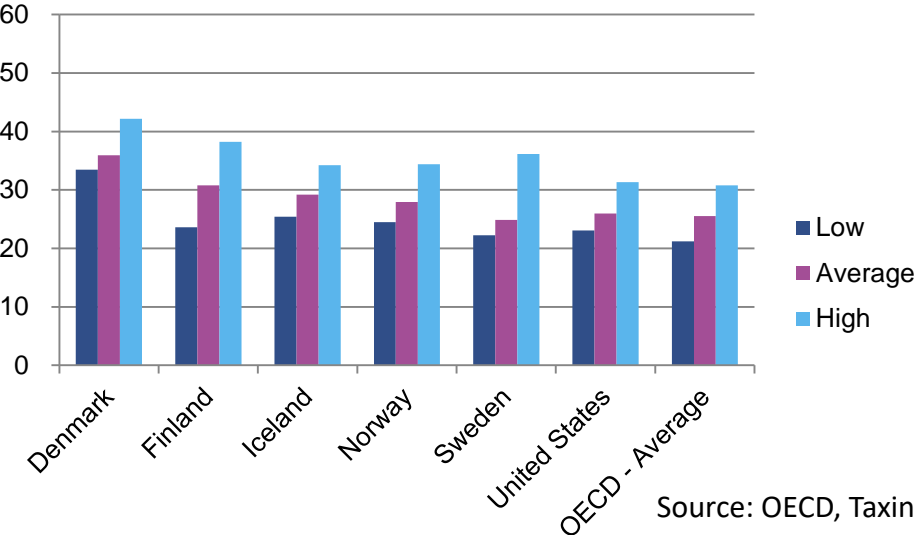
Marginal tax rates can be high at low wage levels (next slide) due to, e.g., earned income tax credits which are phased out as income increases. Hence marginal tax rate cuts do not necessarily reduce progressivity.

Effects of higher marginal wage tax rates on income inequality

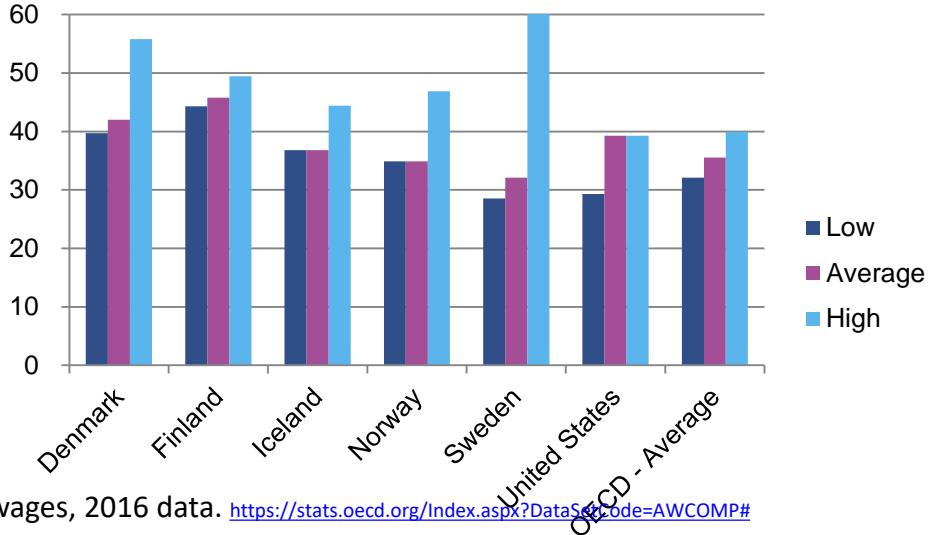


- A Marginal tax rate \uparrow \rightarrow labor & skills \downarrow (income effect $<$ subst.) \rightarrow tax revenue \downarrow
- B Reduced tax revenue \rightarrow services & benefits \downarrow \rightarrow income inequality \uparrow
- C Higher marginal tax rates \rightarrow inequality \downarrow & tax revenue \uparrow (excl. effects in A), but also scarcity of skilled workers \uparrow \rightarrow their wages \uparrow \rightarrow income inequality \uparrow
- D = B + C With high enough elasticities, higher marginal tax rates on wages (= tax on labor & skills) increase inequality

Average personal net income tax rate for a single at earning levels low (67 % of), average (100 % of), high (167 % of) average earnings



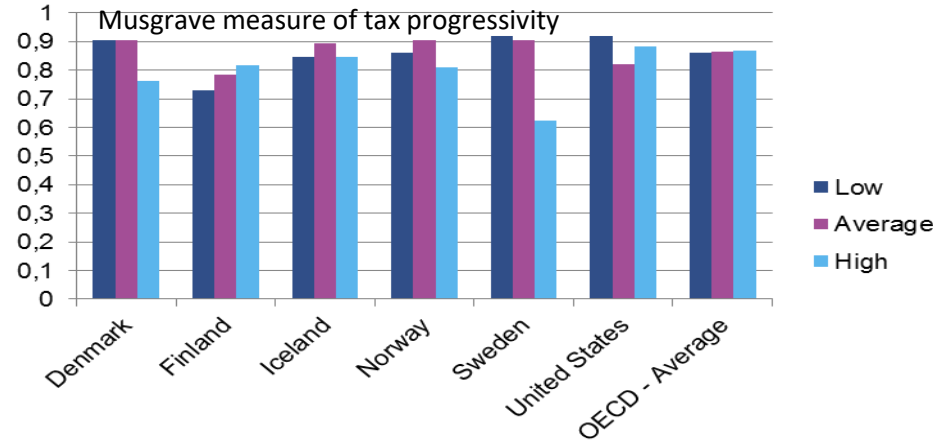
Marginal personal net income tax rate for a single at earning levels low (67 % of), average (100 % of), high (167 % of) average earnings



Source: OECD, Taxing wages, 2016 data. <https://stats.oecd.org/Index.aspx?DataSetCode=AWCOMP#>

The Musgrave measure of tax progression is defined as*
 $a(Y) = (1-m(Y))/(1-t(Y))$,
 where m=marginal tax rate, Y=income before tax, t=average tax rate.
 - The lower a is, the higher is the progressivity.

*Jakobsson, U. (1976), On the Measurement of the Degree of Progression. Journal of Public Economics 5 (1976) 161-168.
[http://darp.lse.ac.uk/papersdb/Jakobsson_\(JPubE76\).pdf](http://darp.lse.ac.uk/papersdb/Jakobsson_(JPubE76).pdf)



Destination-based corporate cash flow tax

Auerbach, A. & Devereaux, M. (2017), Cash-Flow Taxes in an International Setting. Forthcoming American Economic Review.

<https://eml.berkeley.edu/~auerbach/Auerbach%20Devereaux%20Nov%2012%202017.pdf>

Abstract: *“ This paper models the effects of cash-flow taxes on company profit which differ according to the location of the tax. The model incorporates a multinational producing and selling in two countries with three sources of economic rent, each in a different location: a fixed basic production factor (located with initial production), mobile managerial skill, and a fixed final production factor (located with consumption). In the general case, national governments face trade-offs in choosing between alternative taxes. In particular, a cash-flow tax on a source basis creates welfare-impairing distortions to production and consumption, but is partially incident on the owners of domestic production who may be non-resident. By contrast, a destination-based cash-flow tax does not distort behavior, but is incident only on domestic residents.”*

“We do not dwell here on the choice between direct implementation of a destination-based cash-flow tax and implementation via VAT cum payroll subsidy, a choice that could be influenced by a number of factors, including whether a country already has in place a VAT and a payroll tax that can be adjusted, whether these existing taxes are sufficiently broad-based to be suitable vehicles for the tax reform, and political and legal distinctions unrelated to economic considerations.”

Auerbach (2017) in explaining the origins and merits of a destination-based corporate tax flow tax (DBCFT):

“One such approach builds on the concept of business cash-flow taxation, first proposed in the late 1970s by the Meade Committee (Institute for Fiscal Studies 1978). Originally conceived as a tax on the cash flows of domestic producers (an ‘origin-based’ tax), the cash-flow tax had many potential benefits, including eliminating the tax on normal returns to new investment, removing tax-based incentives for corporate borrowing, and eliminating the need to measure income of companies with complex business arrangements. But this standard cash-flow tax leaves in place the pressure for international tax competition via incentives for companies to shift the location of profitable activities and reported profits to low-tax countries. This shortcoming led to consideration of a destination-based cash-flow tax (DBCFT), which adds ‘border adjustment’ to cash-flow taxation and has the effect of basing the tax on the location of consumers rather than on the location of profits, production, or corporate residence.

As described in a series of papers, including Auerbach (2017), converting an origin-based cash-flow tax into a destination-based cash-flow involves relieving tax on export revenues and imposing tax on imports, in precisely the same manner as is done under existing value-added taxes (VATs). The key difference from a VAT is that the DBCFT maintains the income tax deduction for wages and salaries, and thus amounts to a tax on domestic consumption not financed by labour income, in principal a much more progressive tax than the VAT.”

Auerbach, A. (2017), Understanding the destination-based approach to business taxation, CEPR Vox column, October 2017.

<http://voxeu.org/article/understanding-destination-based-approach-business-taxation>

Destination-based cash flow tax (continued)

Auerbach, A. & Devereaux, M., Keen, M., Vella, J. (2017), Destination-Based Cash-Flow Taxation. Oxford University Centre for Business Taxation. WP 17 /01.

<https://eml.berkeley.edu/~auerbach/CBTWP1701.pdf>

Executive summary: *“This paper presents, analyses, and further develops the idea of a destination-based cash-flow tax (DBCFT). Its purpose is expositional: to describe the DBCFT, how it might work, what its effects would be and some of the challenges that its implementation would face.*

The DBCFT has two basic components. The “cash flow” element gives immediate relief to all expenditure, including capital expenditure, and taxes revenues as they accrue. The “destination-based” element introduces border adjustments of the same form as under the value added tax (VAT): exports are untaxed, while imports are taxed. This is equivalent in its economic impact to introducing a broad-based, uniform rate Value Added Tax (VAT) - or achieving the same effect through an existing VAT – and making a corresponding reduction in taxes on wages and salaries.

The paper evaluates the DBCFT against five criteria: economic efficiency, robustness to avoidance and evasion, ease of administration, fairness and stability. And it does so both for the case of universal adoption by all countries and the more plausible case of unilateral adoption. In contrast with existing systems of taxing corporate profit, especially in an international environment, the DBCFT and VAT-based equivalent have significant attractions: A central motivation for the DBCFT is to improve economic efficiency by taxing business income in a relatively immobile location – that is, the location of final purchasers of goods and services (the “destination”). The DBCFT should not distort either the scale or the location of business investment and eliminates the tax bias towards debt finance by assuring neutral treatment of debt and equity as sources of finance.”

“As noted above, either the DBCFT or the VAT plus payroll subsidy approach could be introduced gradually. But perhaps most easily, it could be introduced by a gradual increase in the rate of VAT (although this would be subject to concerns about multiple rates), a gradual reduction in the payroll tax and a gradual reduction in the rate of existing corporation tax.”

Devereaux & Vella (2014):

“A long-standing criticism of the system for taxing multinationals’ profit is that it distorts economic activity, affecting investment, financial and location decisions, and economic growth. However, it has been the recent growing realisation that multinationals are able to arrange their affairs to reduce their aggregate tax liabilities by taking advantage of deficiencies in the tax system that has generated a real momentum for reform.”

“Whilst the [OECD] BEPS project is still in progress, its general direction of travel is fairly clear. This paper argues that although the BEPS project will probably close some existing loopholes, it will not provide the radical reform that is required to produce a stable system for years to come.”

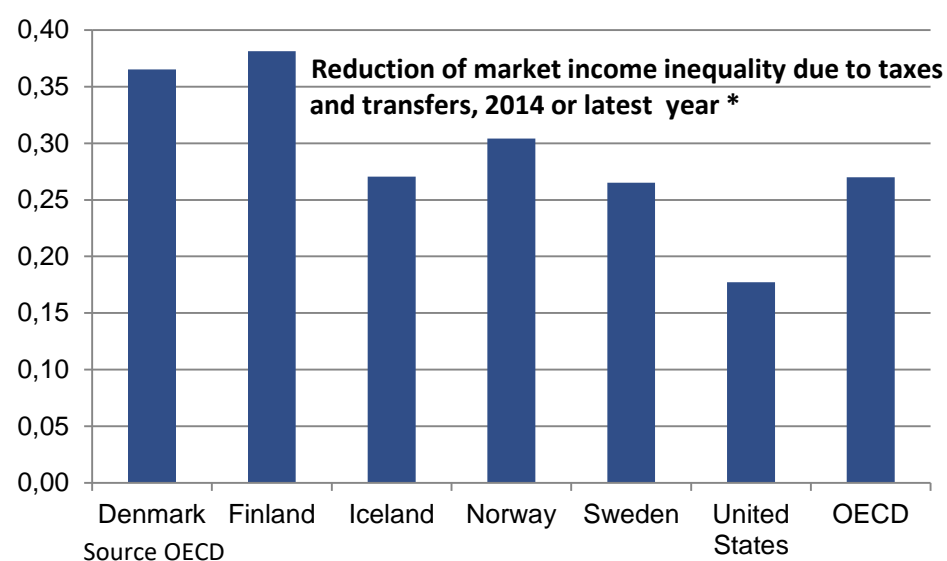
“This tension is particularly evident in the UK, where the goal of having the most competitive corporation tax regime in the G20 is held concomitantly with an active role in pushing forward the OECD’s BEPS Action Plan. There may be competition not only with respect to rates, but also with regard to many other aspects of the tax base. For example, several countries have introduced rules – such as the US check-the-box rules and the UK Finance Company Partial Exemption – designed to gain a competitive advantage for domestic companies, but which facilitate the erosion of the tax base of both domestic and foreign jurisdictions.”

“The OECD is not setting out to change the framework itself. It is not even questioning the desirability or logic of a regime centered on the residence/source and active/passive income dichotomies in the 21st century.”

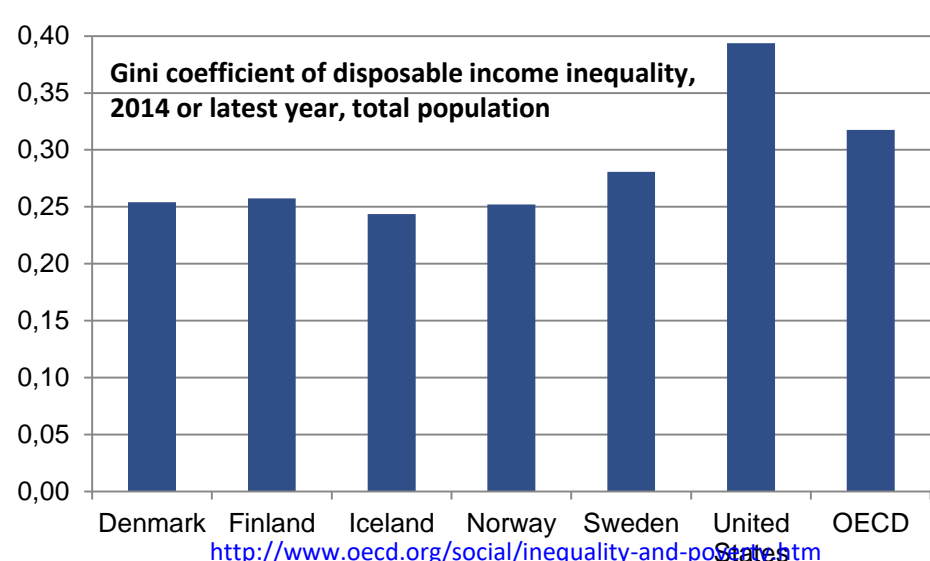
“Even if the actions proposed by the OECD are successfully implemented, the international tax regime will still not be fit for purpose. The regime will consist of a confused, complex mass of arcane, arbitrary and sometimes illogical rules, competition will still drive rates down and reliefs up, location of real economic activity will remain distorted, and cross-country arbitrage opportunities are likely to persist.”

Devereux, M. & J. Vella, (2014), Are We Heading towards a Corporate Tax System Fit for the 21st Century? *CESifo DICE Report 12 (4)*, 2014, 03–07

<https://www.cesifo-group.de/DocDL/dicereport414-forum1.pdf>



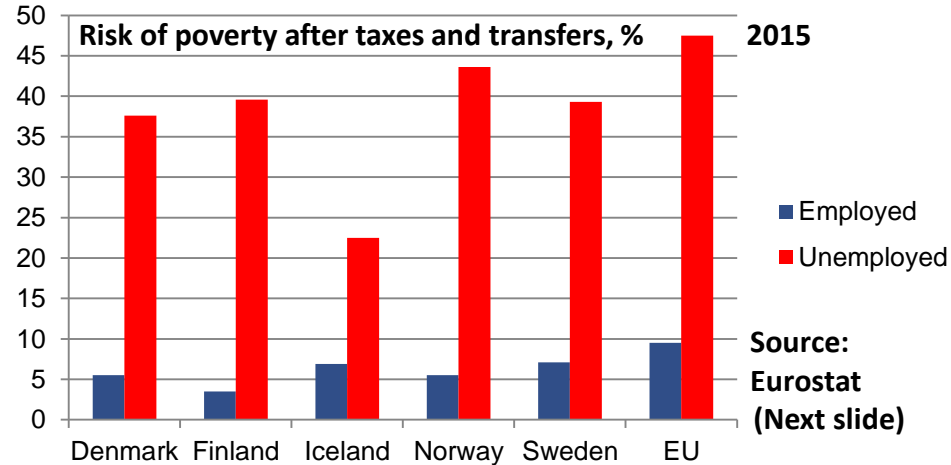
*Defined as the difference between market income and disposable income inequality, expressed as a percentage of market income inequality.



**Policies i) and ii) improve labour reallocation and employment.
Policy iii) shifts taxation away from labour and human capital.**

Unemployment key source of poverty

- E.g. in Nordic countries fairly equal income distribution (Gini)
- Risk of poverty (income <60 % of median) about 8 times higher if unemployed vs. if employed, 10 times higher in Finland where poverty among employed lowest in Europe (3.5 %)
- In EU risk of poverty 5 times higher if unemployed vs. if employed
- Detailed data in Appendix D



Real economy problems and policies

Problems

Productivity

- More efficient markets, more harm from distortions
- ⇒ Labor & investment (also human capital) get more distorted
- ⇒ Resource misallocation
- ⇒ Productivity growth reduced

Inequality

- Productivity growth ↓ → Labor share ↓ → Inequality ↑

Demand

- Inequality ↑ → household demand ↓
- Labor & investment distortions ↑ → factor demand ↓
- ⇒ Secular stagnation due to lack of demand
- ⇒ Inflation low → low interest rates → zombies can stay

Policies

Address distortions

- Tax distortions
- Competition distortions
- Frictions & rigidities limiting factor reallocation
- AI likely to enhance market efficiency, but it may also give rise to new distortions

Address zombies

- Regulatory forbearance
- Insolvency regimes

Financial stability risks and the policies considered

Financial stability risks

Secular stagnation

- ⇒ Low rates justified in spite of high debt & asset values
- Low rates → less insolvencies → less questions asked
- ⇒ Information sensitivity of debt reduced
- ⇒ Spreads on debt narrow
- ⇒ Search for yield by investing in riskier debt
- ⇒ Current calm may reflect partly lack of insolvencies
- It may also reflect investors' beliefs about policy in crises
- ⇒ Liquidity ensured in possible future crises
- ⇒ Lender of last resort (LOLR) rules relaxed if need be
- ⇒ Liquidity also against bad collateral & to non banks
- ⇒ Systemic assets backed by LOLR in a crisis
- ⇒ Systemic assets insured against crises

Demand & productivity boosting policies

Demand & productivity boosting policies would

- Reduce need for monetary policy support
 - Improve debt sustainability
 - Ease pressure on asset values from interest rates
 - Limit zombies
 - Widen spreads on debt
 - Increase pricing of risks
- ⇒ Alleviate financial stability risks

Concluding remarks

1 Large uncertainty about causes of productivity & income inequality trends and how artificial intelligence (AI) affects the trends

2 Basic premises for policy consideration

- Trade and the global economy is increasingly driven by the decisions of global firms
- Small changes in trade costs can have magnified effects on trade flows
- Labor and capital (including human capital) decisions are affected by a range of distortions
- Labor reallocation and human capital adjustments are relatively

3 Firms & households likely to improve their decisions using AI

- This enhances market efficiency which aggravates effects of distortions

4 Three policies are considered to improve resource allocation, productivity, income equality and demand:

- i) General reduction in economic distortions to improve resource allocation facilitated with hiring and study subsidies
- ii) An unemployment insurance reform, based on a small potential benefit cut, to improve employment & labour reallocation
- iii) A cut in marginal income tax rates financed by higher VAT (a shift towards a destination-based corporate cash flow tax)

These policies enhance, i.a., employment, productivity and fiscal sustainability.

Appendix A: How economies and firms have evolved with globalisation and how they are likely to evolve with increasing use of artificial intelligence: Review of recent research

- The global economy is very much driven by the decisions by large global firms
- These firms are typically the frontier top 5 % of firms in terms of productivity (Appendix B)
- The productivity level of these firms is some 3-4 higher than in the non-frontier firms (Appendix B)
- Manufacturing industry has so far been more exposed to global competition than services
- This is likely to explain why markups have risen in services, not in manufacturing
- This may also explain why markups have risen more among the smaller than among the larger firms
- The large global firms are typically apply first new technologies to improve efficiency
- This is also likely to be the case with the speed of making use of artificial intelligence

Basic premise of policies

- Global firms drive global trade and increasing also economies more generally
- Small changes in trade costs can have magnified effects on trade flows
- Labor and capital (including human capital) decisions are distorted by a range of distortions
- Effects of distortions have been aggravated with the advance globalisation
- Labor reallocation and human capital adjustments are relatively slow

Globalisation

Bernard, A., Jensen, B., Redding, S. & Schott, P. (2018), *Global Firms*. *Journal of Economic Literature* (forthcoming).

<http://www.princeton.edu/~reddings/papers/NBER-WP-22727.pdf>

Abstract: *“Research in international trade has changed dramatically over the last twenty years, as attention has shifted from countries and industries towards the firms actually engaged in international trade. The now-standard heterogeneous firm model posits measure zero firms that compete under monopolistic competition and decide whether to export to foreign markets. However, much of international trade is dominated by a few “global firms,” which participate in the international economy along multiple margins and account for substantial shares of aggregate trade. We develop a new theoretical framework that allows firms to have large market shares and to decide simultaneously on the set of production locations, export markets, input sources, products to export, and inputs to import. Using U.S. firm and trade transactions data, we provide strong evidence in support of this framework’s main predictions of interdependencies and complementarities between these margins of firm international participation. Global firms participate more intensively along each margin, magnifying the impact of underlying differences in firm characteristics, and increasing their shares of aggregate trade.”*

Bernard et al (2017)*: *“In a world of interdependent firm decisions, small reductions in tariffs or trade costs can have magnified effects on trade flows, as they induce firms to serve more markets with more products at greater volumes, and also to source greater volumes of intermediate inputs from more countries.”*

“We organise our empirical work around four sets of theoretical predictions. First, firm decisions for each margin of participation in the international economy are interdependent. Importing decisions are interdependent across countries because the decision to incur the fixed costs of sourcing inputs from one country gives access to lower-cost suppliers, which in turn reduces firm production costs and prices. These lower prices imply a larger scale of operation, making it profitable to incur the fixed costs of sourcing inputs from other countries (as in Antràs et al. 2014). Exporting and importing decisions are also interdependent. Incurring the fixed exporting cost for an additional market increases firm revenue, making it profitable to incur the fixed cost of sourcing inputs from any given country. This interaction between exporting and importing in turn implies that exporting decisions are interdependent across markets. Second, firm decisions along multiple margins of international participation magnify the effects of differences in firm productivity on endogenous outcomes, such as sales and employment. More productive firms participate more intensively in the world economy along each margin. Small differences in firm productivity can have magnified consequences for firm sales and employment.

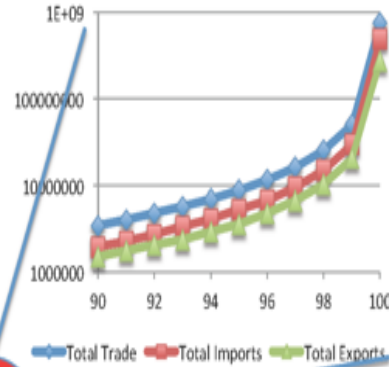
Third, these global firms are large and their choices can affect market aggregates, giving rise to strategic market power (Atkinson and Burstein 2008, Hottman et al. 2016). Firms with larger market shares face lower perceived elasticities of demand leading them to charge higher markups of price over marginal cost. This provides an explanation for empirical findings of ‘pricing to market’, where firms charge different prices in different markets. Variable markups also are compatible with ‘incomplete pass-through’, whereby cost shocks are not passed through fully into consumer prices (e.g. De Loecker and Goldberg 2014).

Fourth, the magnification of exogenous differences across firms implies that aggregate trade is concentrated in the hands of a relatively small number of firms...”

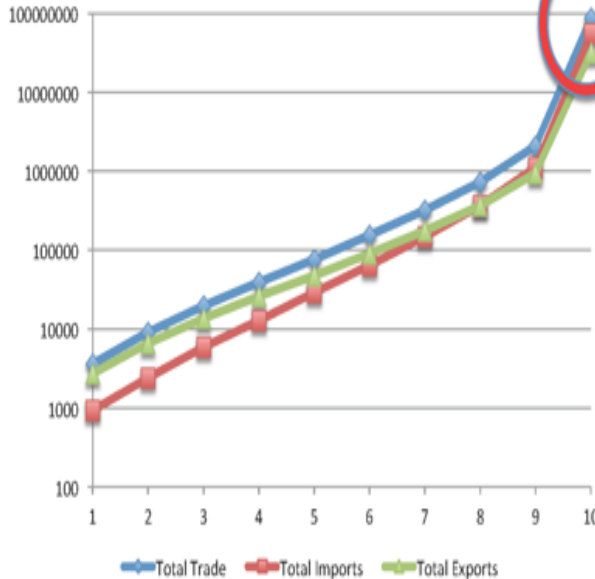
Bernard, A., Jensen, B., Redding, S. & Schott, P. (2017), *Global firms: Insights for trade and trade policy*. CEPR Vox. <http://voxeu.org/article/global-firms-insights-trade-and-trade-policy>

Figure 1 Value of firm exports, imports and total trade by decile/percentile of firm total trade

Average Trade By Percentile



Average Trade By Decile



Bernard et al (2017)*: “The main panel of Figure 1 shows that the logs of the average values of firm exports and imports increase monotonically across the first nine deciles of the firm total trade distribution. Total trade for the average firm increases roughly 225% from one decile to the next. The picture changes drastically for the top decile. Average total trade for the largest ten percent of firms is 42 times greater than that of the previous decile. The biggest traders are far larger than the rest of the trading firms and this pattern holds for both their imports as well as their exports. The distribution of trade across firms has a fractal property where the same pattern holds across percentiles of the top decile as across the deciles of the distribution as a whole. Average total trade, exports, and imports increased relatively steadily until the very top percentile when it jumps again. The top 1% of traders are 15 times larger than the second largest percentile of firms.”

“The most global firms not only import and export more overall, but also import and export more with related parties.”

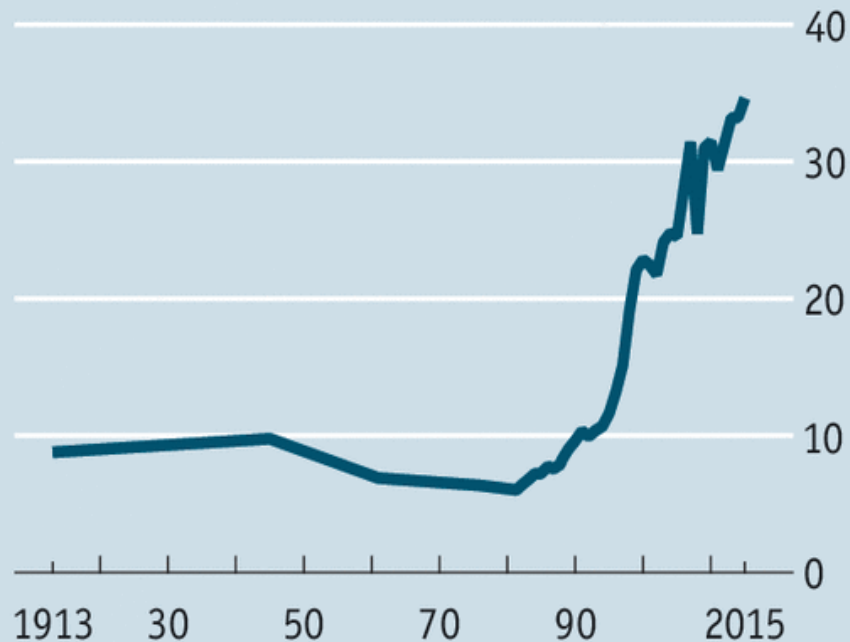
“The average firm in the top percentile of trading firms conducts 29 times as much related-party trade as the average firm in the next percentile.”

“In a world of interdependent firm decisions, small reductions in tariffs or trade costs can have magnified effects on trade flows, as they induce firms to serve more markets with more products at greater volumes and at the same time source greater volumes of intermediate inputs from more countries.”

*Bernard, A., Jensen, B, Redding, S. & Schott, P. (2017), Global firms: Insights for trade and trade policy. CEPR Vox. <http://voxeu.org/article/global-firms-insights-trade-and-trade-policy>

In the long run

Stock of foreign direct investment
As % of global GDP

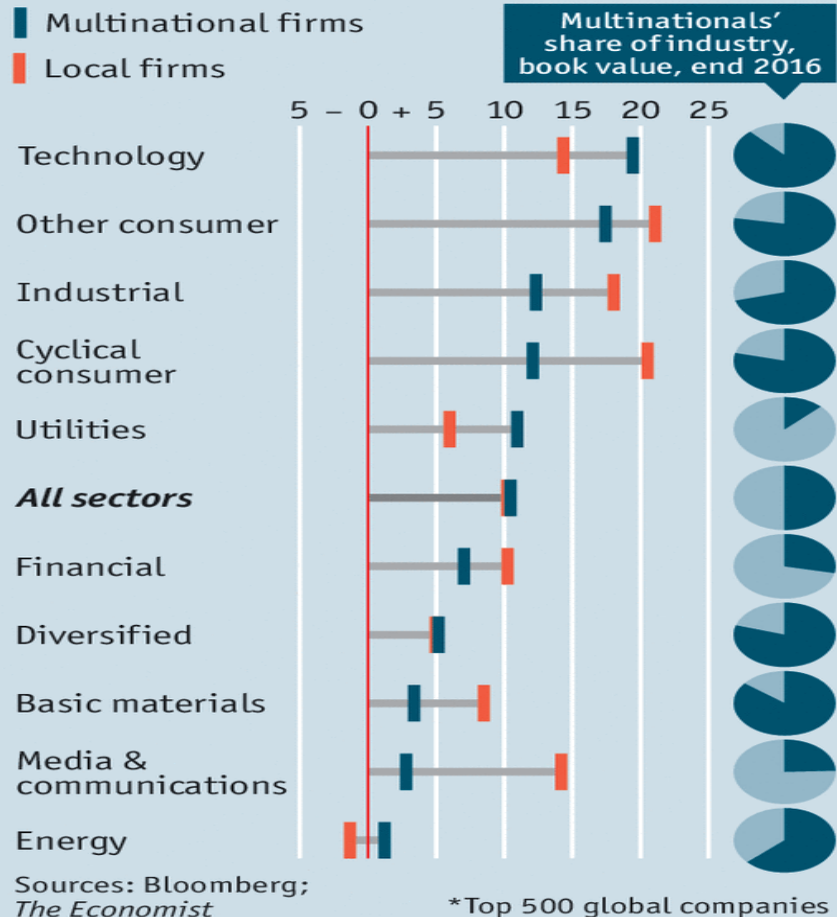


Sources: Arvind Subramanian and Martin Kessler

1

The price of being global

Return on equity*, latest 12 months, %



Sources: Bloomberg;
The Economist

*Top 500 global companies

4

Globalisation (continued)

Mrázová, M. & Neary, P. (2017), Not So Demanding: Demand Structure and Firm Behavior. *American Economic Review*, 107:12, December 2017, 3835-3874.

<http://users.ox.ac.uk/~econ0211/papers/pdf/SuperC.pdf>

Abstract of Mrázová & Neary (2017): *“We show that any well-behaved demand function can be represented by its “demand manifold,” a smooth curve that relates the elasticity and convexity of demand. This manifold is a sufficient statistic for many comparative statics questions; leads naturally to characterizations of new families of demand functions that nest most of those used in applied economics; and connects assumptions about demand structure with firm behavior and economic performance. In particular, the demand manifold leads to new insights about industry adjustment with heterogeneous firms, and can be empirically estimated to provide a quantitative framework for measuring the effects of globalization.”*

Lichter, A., A. Peichl & S. Sieglösch (2017), Exporting and labour demand: Micro-level evidence from Germany. *Canadian Journal of Economics*. 0 (4), 1161–1189.

<http://onlinelibrary.wiley.com/doi/10.1111/caje.12290/abstract>

Abstract of Lichter et al (2017): *“It is widely believed that globalization increases the extent of employment and wage responses to economic shocks. In this paper, we investigate the effect of firms’ exporting activities on the wage elasticity of labour demand. Using rich, administrative linked employer–employee panel data from Germany and destination-specific industry-level information on trade flows, we explicitly control for self-selection into exporting and endogeneity concerns. Overall, we find that exporting has a significant positive effect on the (absolute value of the) unconditional wage elasticity of labour demand. In line with our hypothesis, we further show that the effect is particularly strong for those plants that export a significant share of their output to low- and medium-income countries, hence face relatively more price-elastic product demand.”*

Mrázová & Neary (2017):

The demand function is a sufficient statistic

- Key policy effects depend only on it because:
- *“In perfectly competitive models, shifts in supply curves lead to movements along the demand curve, and so their effects hinge on the slope or elasticity of demand. When firms are monopolists or monopolistic competitors, as in this paper, they do not have a supply function as such; instead, exogenous supply-side shocks or differences between firms lead to more subtle differences in behavior, whose implications depend on the curvature as well as the slope of the demand function.”*

Lichter et al (2017) find an own-wage elasticity for the median exporting plant of -0.93, compared to -0.53 for non-exporting plants. They show that the results are not driven by selection into exporting. They find also that the results are not due to differences in the conditional elasticity of labor demand.

Globalisation (continued)

Feenstra, R. & Weinstein, D. (2017), *Globalization, Competition, and U.S. Welfare*," *Journal of Political Economy*, August 2017, 125(4), 1041-1074.

<http://www.journals.uchicago.edu/doi/full/10.1086/652695>

Abstract: *"This paper estimates the impact of globalization on markups, and the effect of changing markups on US welfare, in a monopolistic competition model. We work with symmetric translog preferences, which allow for endogenous markups and firm entry and exit, thereby changing product variety. We find that between 1992 and 2005, US import shares rose and US firms exited, leading to an implied fall in markups, while variety went up because of imports. US welfare rose by nearly 1 percent as a result of these changes, with product variety contributing one-half of that total and declining markups the other half."*

Feenstra & Weinstein (2017): "Specifically, Arkolakis et al. [2017] focus on the second reason mentioned in the opening paragraph for gains from trade: the efficiency gains due to improved productivity, as the most efficient firms self-select into exporting. Under their assumptions that the distribution of firm productivity is Pareto with a support that is unbounded above and the only parameter changing between equilibria is trade costs, they find that the efficiency gains are identical in the translog and CES cases. By construction in their model, the first and third reasons for gains from trade mentioned above do not operate when preferences are homothetic: trade brings about changes neither in product variety nor in the distribution of markups, both of which remain fixed as the costs of trade change. As shown in Feenstra [2017], if the distribution of firm productivity is instead Pareto with a bounded support, then the product variety and pro-competitive effects reappear. In this paper we focus on product variety and firm markups and ignore the gain in productivity through the self-selection of firms into exporting. Efficiency gains due to improved productivity will certainly apply in our model, but we do not attempt to measure these."

Arkolakis, C., Costinot, A., Donaldson, D. & Rodríguez-Clare, A. (2017), *The Elusive Pro-Competitive Effects of Trade*. Accepted, *Review of Economic Studies*.

<http://www.econ.yale.edu/~ka265/research/ACDR/ACDRdraft.pdf>

Abstract: *"We study the gains from trade liberalization in models with monopolistic competition, firm-level heterogeneity, and variable markups. For a large class of demand functions used in the international macro and trade literature, we derive a parsimonious generalization of the welfare formula in Arkolakis et al. (2012). We then use both estimates from micro-level trade data and evidence regarding firm-level pass-through to quantify the implications of this new formula. Within the class of models that we consider, our main finding is that gains from trade liberalization predicted by models with variable markups are equal to, at best, and slightly lower than, at worst, those predicted by models with constant markups. In this sense, pro-competitive effects of trade are elusive."*

Arkolakis et al (2017): "Our main finding here is that (rightly) taking into account variable markups leads to gains from trade liberalization that are up to 14% lower than those that one would have predicted by (wrongly) assuming constant markups. In this sense, pro-competitive effects remain elusive."

"...it is perfectly possible for domestic and foreign markups to move in opposite directions, as Helpman and Krugman (1989) stress and as our analysis illustrates. If one is interested in the aggregate implications of variable markups, this suggests caution when extrapolating from evidence on the behavior of domestic producers alone.

Second, information about the cross-sectional or time variation in markups alone is unlikely to be sufficient for evaluating the pro-competitive effects of trade. In the present paper, the average elasticity of markups matters, but so do non-homotheticities in demand. Intuitively, whether trade liberalization is likely to alleviate or worsen underlying misallocations does not only depend on the distribution of markups in the economy. It also depends on whether in response to a "good" income shock, such as the one created by trade liberalization, consumers spend more or less on goods with higher markups. The often imposed assumption of homothetic preferences may not be innocuous in this context."

Globalisation (continued)

P. Antràs, A. de Gortaria, O. Itskhoki (2017), Globalization, inequality and welfare. *Journal of International Economics* 108 (2017) 387–412

https://scholar.harvard.edu/files/antras/files/agl_published.pdf

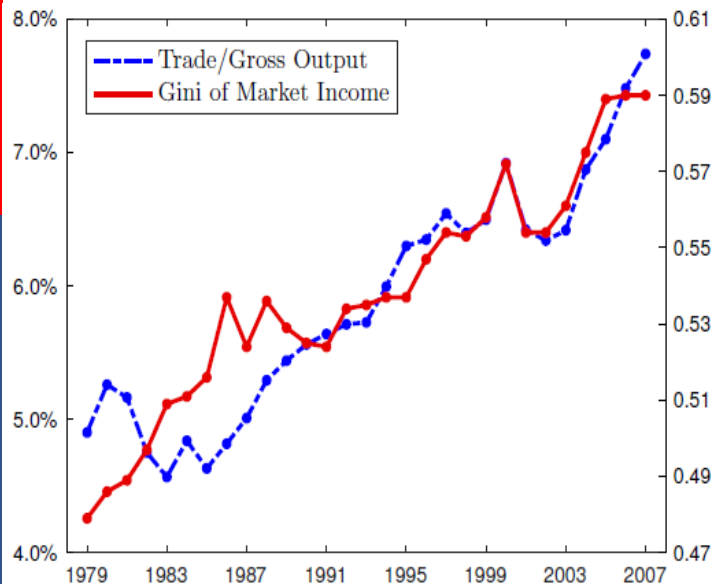
Helpman, E., Itskhoki, O., Muendler, M-A, Redding, S. (2017), Trade and Inequality: From Theory to Estimation. *Review of Economic Studies* 84 (1): 357-405.

https://scholar.harvard.edu/files/helpman/files/post_print_trade_and_inequality.pdf

Antras et al (2017) Abstract: "This paper studies the welfare implications of trade opening in a world in which trade raises aggregate income but also increases income inequality, and in which redistribution needs to occur via a distortionary income tax-transfer system. We provide tools to characterize and quantify the effects of trade opening on the distribution of disposable income (after redistribution). We propose two adjustments to standard measures of the welfare gains from trade: a 'welfarist' correction inspired by the Atkinson (1970) index of inequality, and a 'costly-redistribution' correction capturing the efficiency costs associated with the behavioral responses of agents to trade-induced shifts across marginal tax rates. We calibrate our model to the United States over the period 1979–2007 using data on the distribution of adjusted gross income in public samples of IRS tax returns, as well as CBO information on the tax liabilities and transfers received by agents at different percentiles of the U.S. income distribution. Our quantitative results suggest that both corrections are non-negligible: trade-induced increases in inequality of disposable income erode about 20% of the gains from trade, would be about 15% larger if redistribution was carried out via non-distortionary means."

Helpman et al (2017): Abstract: "While neoclassical theory emphasizes the impact of trade on wage inequality between occupations and sectors, more recent theories of firm heterogeneity point to the impact of trade on wage dispersion within occupations and sectors. Using linked employer-employee data for Brazil, we show that much of overall wage inequality arises within sector-occupations and for workers with similar observable characteristics; this within component is driven by wage dispersion between firms; and wage dispersion between firms is related to firm employment size and trade participation. We then extend the heterogeneous-firm model of trade and inequality from Helpman, Itskhoki, and Redding (2010) and estimate it with Brazilian data. We show that the estimated model provides a close approximation to the observed distribution of wages and employment. We use the estimated model to undertake counterfactuals, in which we find sizable effects of trade on wage inequality."

Trade integration and income inequality in the U.S.



Source: Antras et al (2017)

However, Helpman (2017) presents a critical review on effect of globalization on inequality questioning it.

Helpman, E. (2017), Globalization and Wage Inequality. *Journal of the British Academy* 5: 125-162.
<http://www.nber.org/papers/w22944.pdf>

Globalisation (continued)

Eaton, J. Kortum, S. & Neiman, B. (2016), Obstfeld and Rogoff's International Macro Puzzles: a Quantitative Assessment.

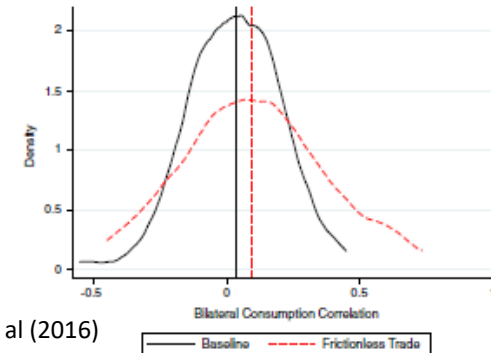
Journal of Economic Dynamics and Control (2016) Vol. 72, pp. 5-23

<https://doi.org/10.1016/j.jedc.2015.08.002>
www.elsevier.com/locate/econbase
The copyright in this preprint (which was not certified by peer review) is held by the author(s). All rights reserved. No reuse allowed without permission.

Abstract: "Obstfeld and Rogoff (2001) propose that trade frictions lie behind key puzzles in international macroeconomics. We take a dynamic multi country model of international trade, production, and investment to data from 19 countries to assess this proposition quantitatively. Using the framework developed in Eaton et al. (2016), we revisit the puzzles in a counterfactual world without trade frictions in manufactures. Removing these trade frictions goes a long way toward resolving a number of puzzles. The dependence of domestic investment on domestic saving falls by half or disappears entirely, mitigating the Feldstein and Horioka (1980) puzzle. Changes in nominal GDPs in U.S. dollars become less variable across countries and line up with changes in real GDPs as much as with real exchange rates, mitigating the exchange rate disconnect puzzle. Less dramatically, changes in consumption become more correlated across countries, mitigating the consumption correlations puzzle and changes in real exchange rates become less variable across countries, mitigating the relative purchasing power parity puzzle."



Fig. 3. Trade deficit/GDP in the baseline and with frictionless trade for selected countries.



Source: Eaton et al (2016)

Fig. 4. Distribution of quarterly consumption correlations in the baseline and with frictionless trade.

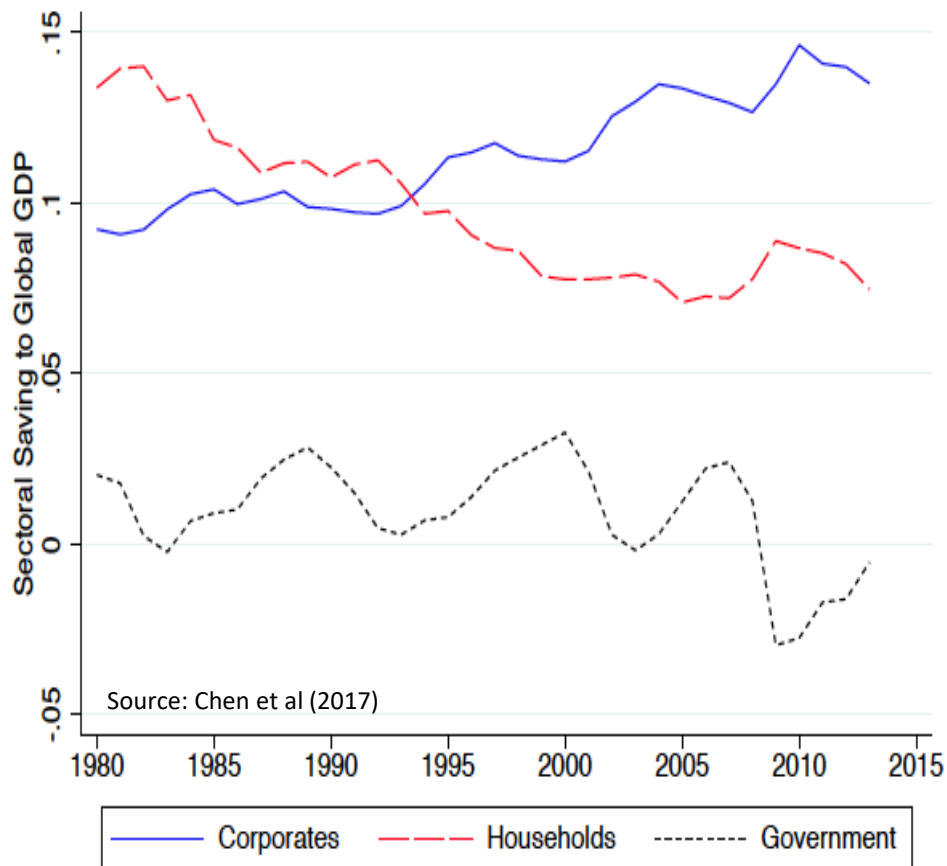
Corporate saving

Chen, P., Karabarbounis, L. & Neiman, B. (2017), *The Global Rise of Corporate Saving*. *Journal of Monetary Economics*, forthcoming.

<http://faculty.chicagobooth.edu/brent.neiman/research/CKN.pdf>

Abstract: *"The sectoral composition of global saving changed dramatically during the last three decades. Whereas in the early 1980s most of global investment was funded by household saving, nowadays nearly two-thirds of global investment is funded by corporate saving. This shift in the sectoral composition of saving was not accompanied by changes in the sectoral composition of investment, implying an improvement in the corporate net lending position. We characterize the behavior of corporate saving using both national income accounts and firm-level data and clarify its relationship with the global decline in labor share, the accumulation of corporate cash stocks, and the greater propensity for equity buybacks. We develop a general equilibrium model with product and capital market imperfections to explore quantitatively the determination of the flow of funds across sectors. Changes including declines in the real interest rate, the price of investment, and corporate income taxes generate increases in corporate profits and shifts in the supply of sectoral saving that are of similar magnitude to those observed in the data."*

Global sectoral saving and investment trends



Markups

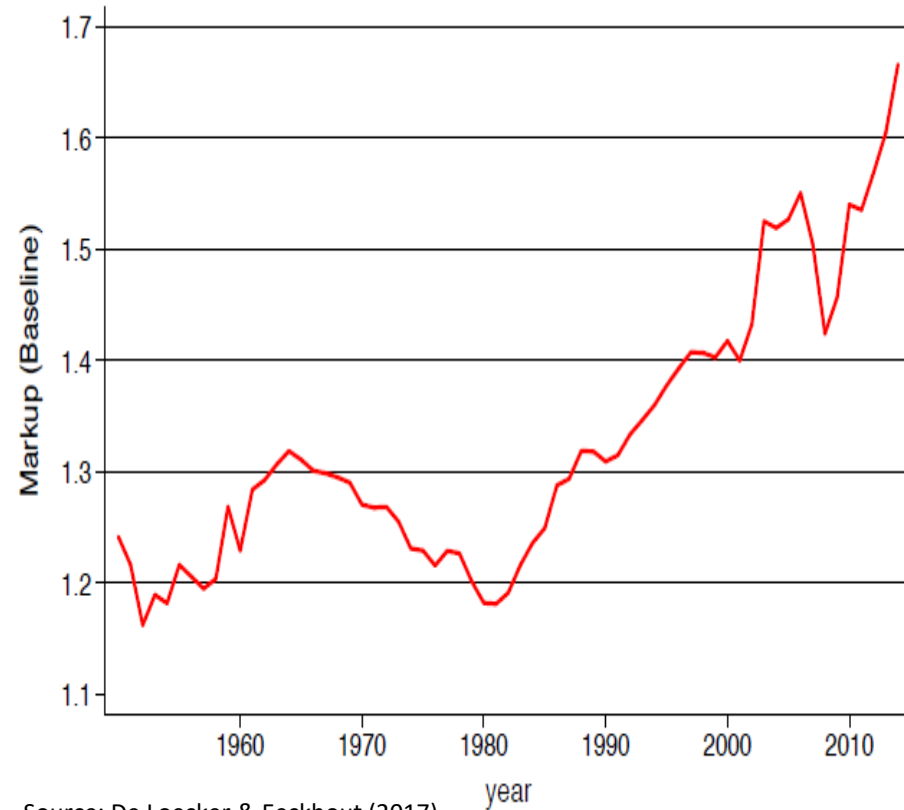
De Loecker, J. & Eeckhout, J. (2017), *The Rise of Market Power and the Macroeconomic Implications*.

<http://www.janeeckhout.com/wp-content/uploads/BMP.pdf>

Abstract: "We document the evolution of markups based on firm-level data for the US economy since 1950. Initially, markups are stable, even slightly decreasing. In 1980, average markups start to rise from 18% above marginal cost to 67% now. There is no strong pattern across industries, though markups tend to be higher, across all sectors of the economy, in smaller firms and most of the increase is due to an increase within industry. We do see a notable change in the distribution of markups with the increase exclusively due to a sharp increase in high markup firms."

We then evaluate the macroeconomic implications of an increase in average market power, which can account for a number of secular trends in the last 3 decades: 1. decrease in labor share; 2. decrease in capital share; 3. decrease in low skill wages; 4. decrease in labor force participation; 5. decrease in labor flows; 6. decrease in migration rates; 7. slowdown in aggregate output."

Average Markups, 1960 – 2014, US Economy, average markup is weighted by marketshare of sales in the sample



Source: De Loecker & Eeckhout (2017)

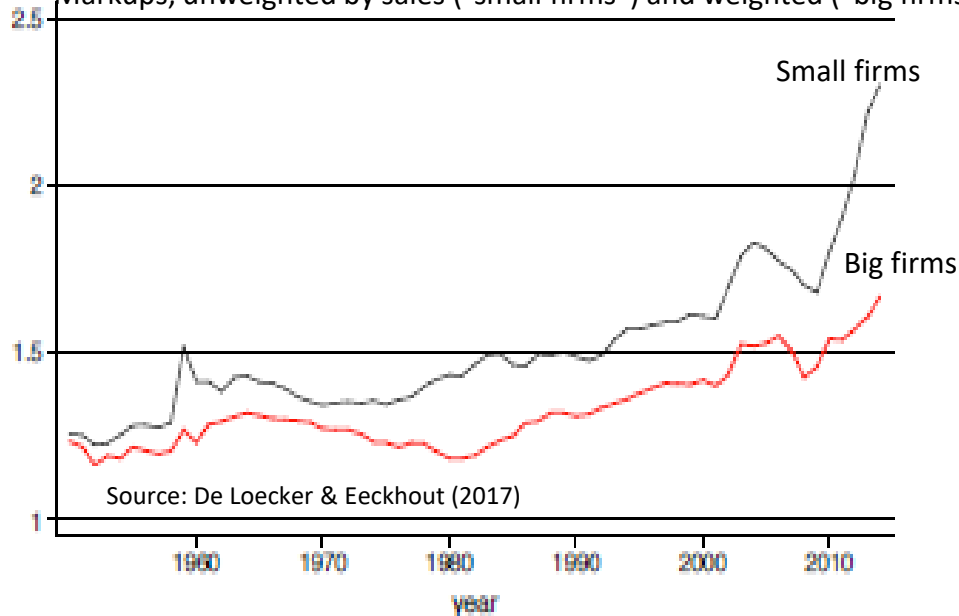
The increase in markups mainly due to smaller firms

- At odds with monopoly or industry concentration case
- E.g. global tech firms may exploit technology or data advantage rather than limit output (monopoly case)

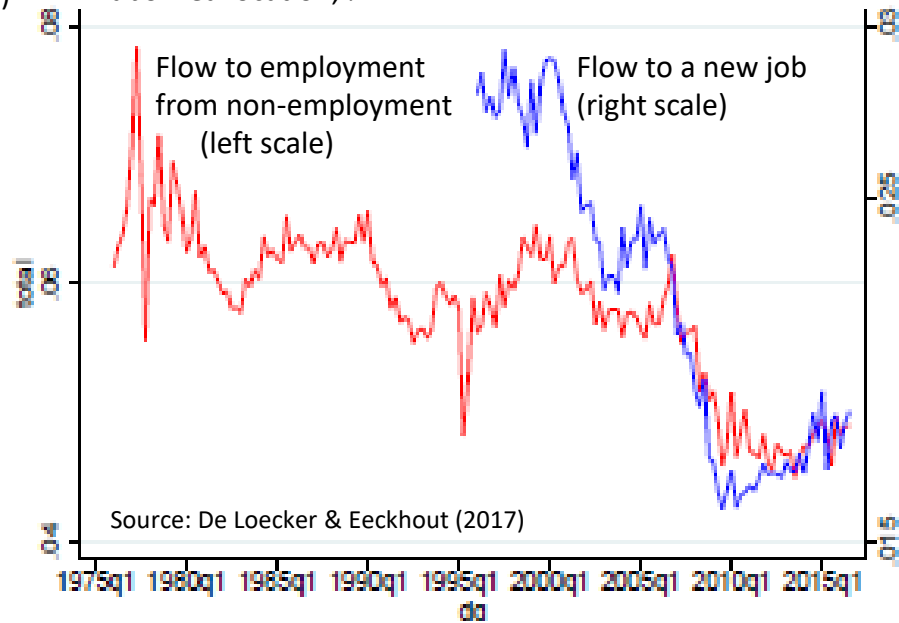
Labor reallocation has fallen especially in the 2000s

- Flow rate to work from non-employment (unemployed or not in labor force) to work fallen from 6.5% in 1980 to 4.7%
- Job to job flow has fallen from about 2.9 % to about 1.8 %

Markups, unweighted by sales ("small firms") and weighted ("big firms")



Labor reallocation, %



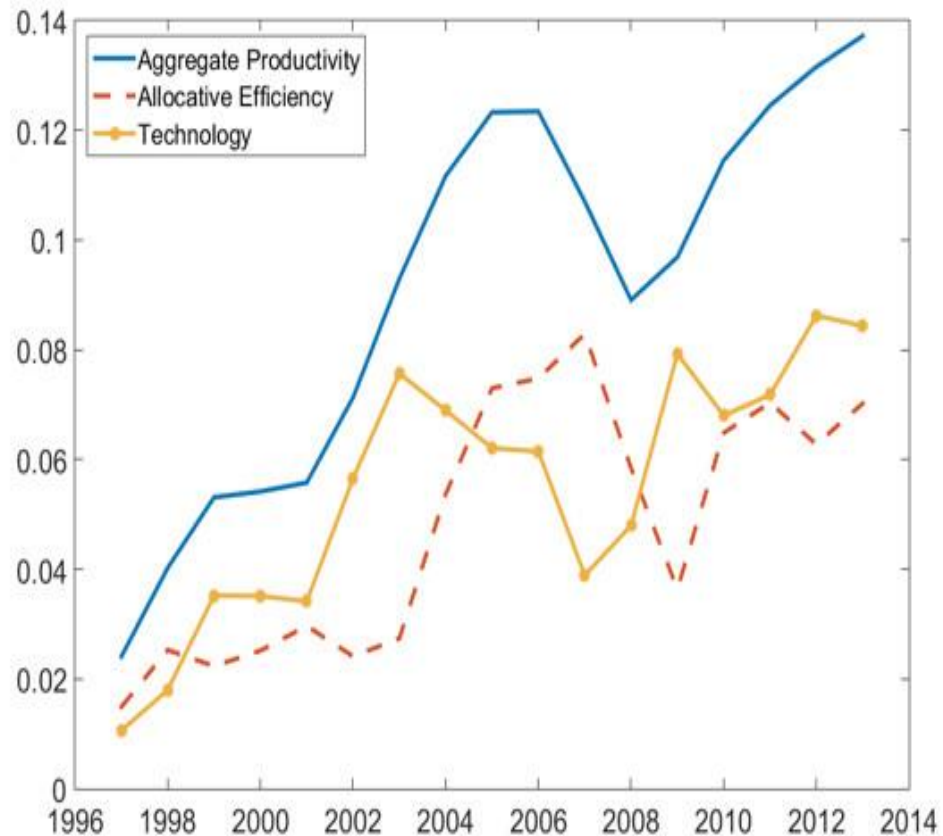
Resource misallocation

Baqae D. & E. Farhi (2017), Productivity and Misallocation in General.

https://scholar.harvard.edu/files/farhi/files/micro_distortions_draft_body.pdf

Abstract: "We provide a general non-parametric formula for aggregating microeconomic shocks in general equilibrium economies with distortions such as taxes, markups, frictions to resource reallocation, and nominal rigidities. We show that the macroeconomic impact of a shock can be boiled down into two components: its "pure" technology effect; and its effect on allocative efficiency arising from the associated reallocation of resources, which can be measured via changes in factor income shares. We also derive a formula showing how these two components are determined by structural microeconomic parameters such as elasticities of substitution, returns to scale, factor mobility, and network linkages. Overall, our results generalize those of Solow (1957) and Hulten (1978) to economies with distortions. To demonstrate their empirical relevance, we pursue different applications, focusing on markup distortions. For example, we operationalize our non-parametric results and show that improvements in allocative efficiency account for about 50% of measured TFP growth over the period 1997-2015. We also implement our structural results and conclude that eliminating markups would raise TFP by about 40%, increasing the economy wide cost of monopoly distortions by two orders of magnitude compared to the famous 0.1% estimates of Harberger (1954)."

Decomposition of aggregate productivity growth into technology and allocative efficiency



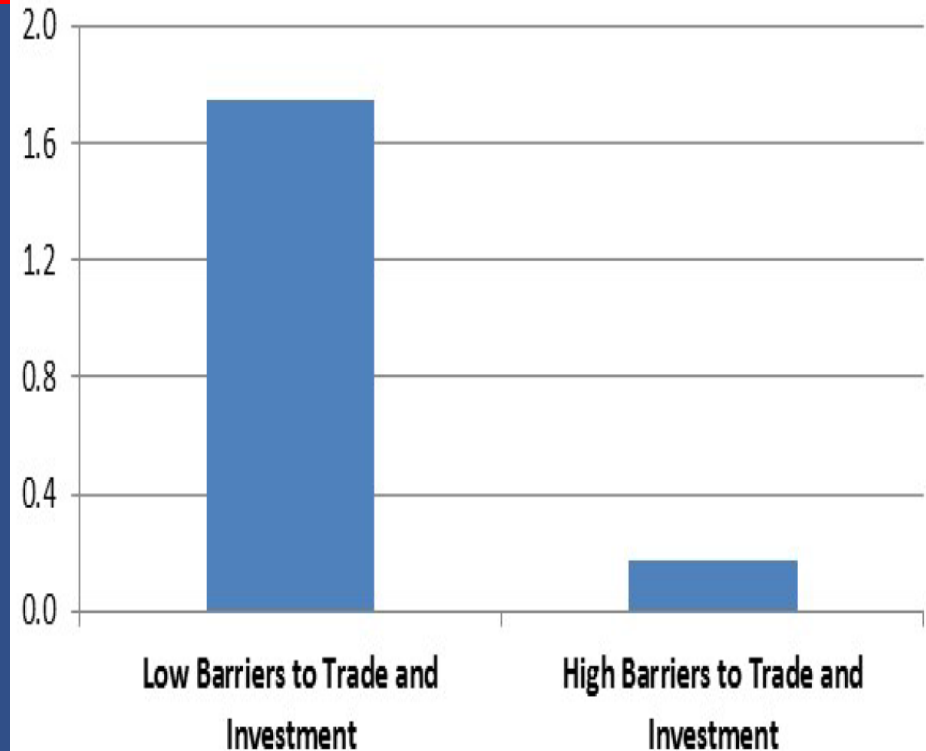
Source: Baqae and Farhi (2017)

Productivity, monetary policy & distortions

Aghion, P., E. Farhi, E. Kharroubi (2017), On the interaction between monetary policy, corporate balance sheets and structural reforms. https://scholar.harvard.edu/files/aghion/files/on_the_interaction.pdf

Abstract: "In this paper, we use cross-industry, cross-country panel data to test if, and how monetary policy can affect growth. To do so, we use two alternative approaches. We first focus on term interest rates to the business cycle and show that its interaction with industry-level measures of financial constraints correlates positively and significantly with industry-growth. Yet, this effect holds only in countries with a relatively low index for product market regulation. When product markets are severely regulated, the cyclical pattern of real short term interest rates has no impact on industry growth. Second, we compute the unexpected drop in long-term government bond yields of Euro Area countries that followed the ECB's announcement of Outright Monetary transactions (OMT) and show that it raised growth disproportionately more in highly indebted sectors. Moreover, this effect holds only in countries where the product market regulation index is rather low. Otherwise, the drop in government bond yields had either no effect or benefited to less indebted sectors."

The growth benefit to counter-cyclical MP *difference-in-difference effect*



Source: Aghion et al (2017)

Great Recession 2008-2009

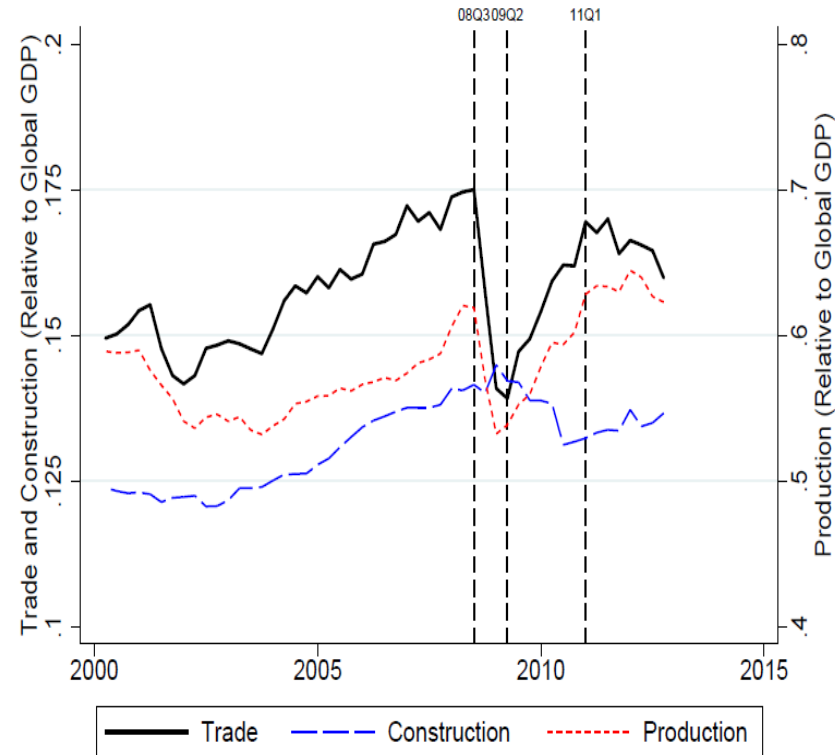
Eaton, J., Kortum, S., Neiman, B. & Romalis, J. (2016), Trade and the Global Recession. *American Economic Review*, Vol. 106, 11, 3401-3438. <http://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.20101557>

Abstract: “We develop a dynamic multicountry general equilibrium model to investigate forces acting on the global economy during the Great Recession and ensuing recovery. Our multisector framework accounts completely for countries’ trade, investment, production, and GDPs in terms of different sets of shocks. Applying the model to 21 countries, we investigate the 29 percent drop in world trade in manufactures during the period 2008–2009. A shift in final spending away from tradable sectors, largely caused by declines in durables investment efficiency, accounts for most of the collapse in trade relative to GDP. Shocks to trade frictions, productivity, and demand play minor roles.”

“Declines in the efficiency of investment in durable manufactures, an intensively traded sector, were the major driver of the overall collapse in trade, as well as the decline in manufacturing production, during the global recession. The efficiency of investment in durables for the world as a whole plummeted at an annual rate of 23 percent during the recession, having been quite flat in the eight years before.”

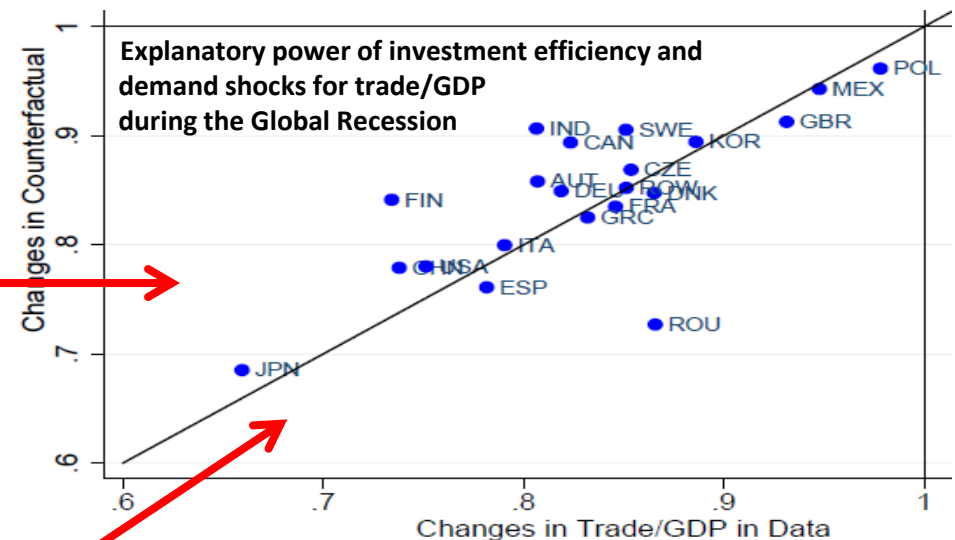
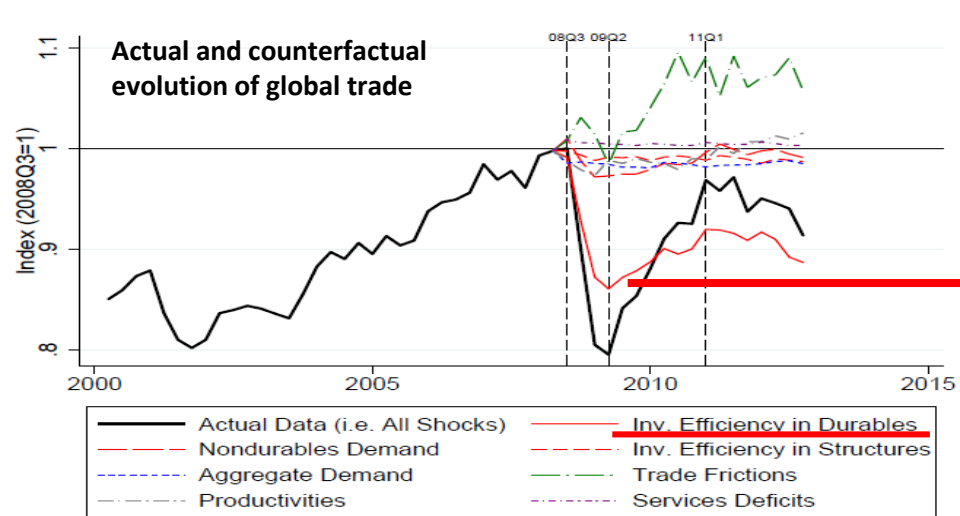
“For example, China was the only country that experienced growth in durables investment efficiency during the recession and was also the country with the mildest decline in durables trade and the largest increase in durables production.”

Global trade, construction and production relative to GDP



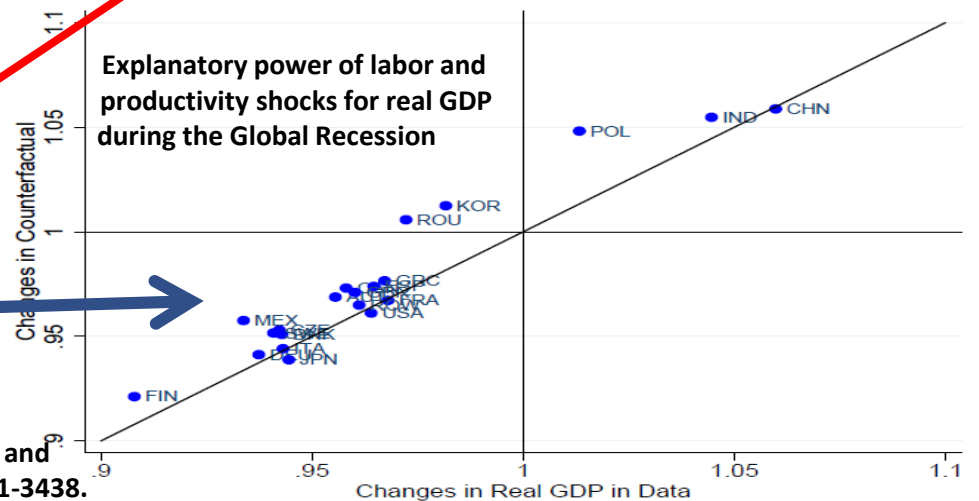
Source: Eaton et al (2016)

Graphs on next slide describe key results by Eaton et al (2016)



Eaton et al (2016) develop a dynamic general equilibrium model to analyse forces acting on the global economy during the Great Recession in 2008-2009 and during the recovery after the crisis.

- The decline in durable investment efficiency explains to a large degree the changes in trade/GDP ratios in 2008-2009.
- Nontradeable sector productivity and labor shocks explain largely real GDP changes in 2008-2009. They generate over 70 % of the decline in global real GDP.
-



Source: Eaton, J., Kortum, S., Neiman, B. & Romalis, J. (2016), Trade and the Global Recession. *American Economic Review*, Vol. 106, 11, 3401-3438.

Zombie firms

R. Caballero, T. Hoshi, and A. Kashyap (2008), *Zombie Lending and Depressed Restructuring in Japan*, *American Economic Review* 2008, 98:5, 1943–1977.

<http://economics.mit.edu/files/3279>

Abstract: “Large Japanese banks often engaged in sham loan restructurings that kept credit flowing to otherwise insolvent borrowers (which we call zombies). We examine the implications of suppressing the normal competitive process whereby the zombies would shed workers and lose market share. The congestion created by the zombies reduces the profits for healthy firms, which discourages their entry and investment. We confirm that zombie-dominated industries exhibit more depressed job creation and destruction, and lower productivity. We present firm-level regressions showing that the increase in zombies depressed the investment and employment growth of non-zombies and widened the productivity gap between zombies and non-zombies.”

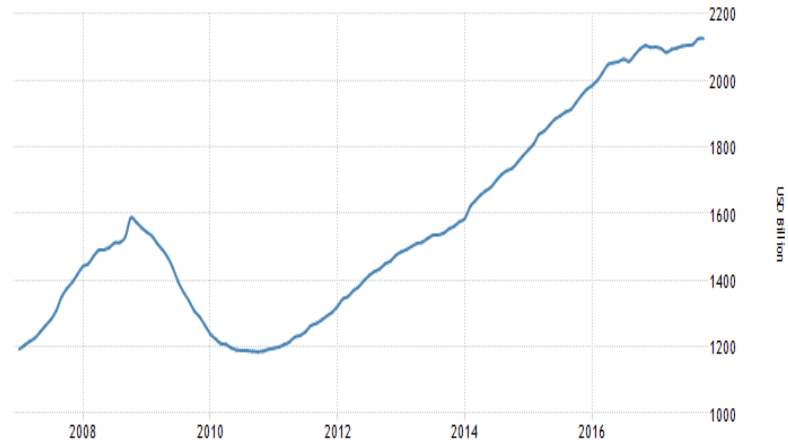
Acharya, V., Eisert, T., Eufinger, C. and Hirsch, C. (2016), *Whatever It Takes: The Real Effects of Unconventional Monetary Policy*. <http://dx.doi.org/10.2139/ssrn.2749338>

Abstract: “On July 26, 2012 Mario Draghi announced to do “whatever it takes” to preserve the Euro and shortly after launched the Outright Monetary Transactions (OMT) Program, which led to a significant reduction in the sovereign yields of periphery countries. Due to their significant holdings of GIIPS sovereign debt, the OMT announcement indirectly recapitalized periphery country banks by increasing the value of their sovereign bond holdings. This paper shows that this backdoor recapitalization of European banks led to an increased supply of loans to private borrowers in Europe. This loan increase is mostly targeted towards low-quality firms and can at least partly be explained by evergreening of banks that benefited from the OMT announcement, but remained weakly capitalized even after the OMT announcement. We show that firms that receive new loans from these banks use the newly available funding to build up cash reserves, but there is no impact on real economic activity like employment or investment. Moreover, the presence of zombie firms depresses employment growth and investment of high quality firms that operate in the same industry.”

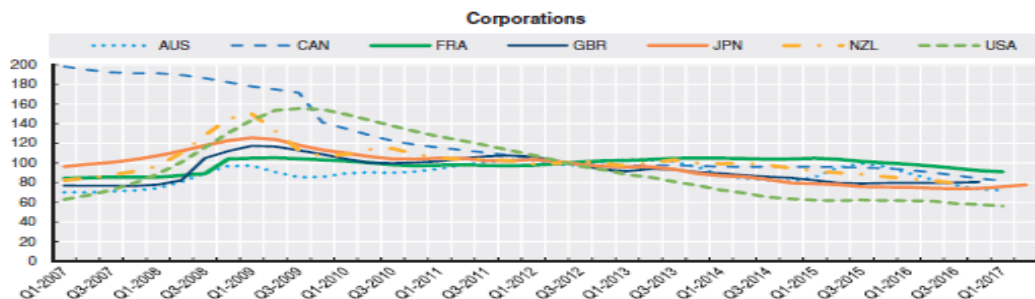
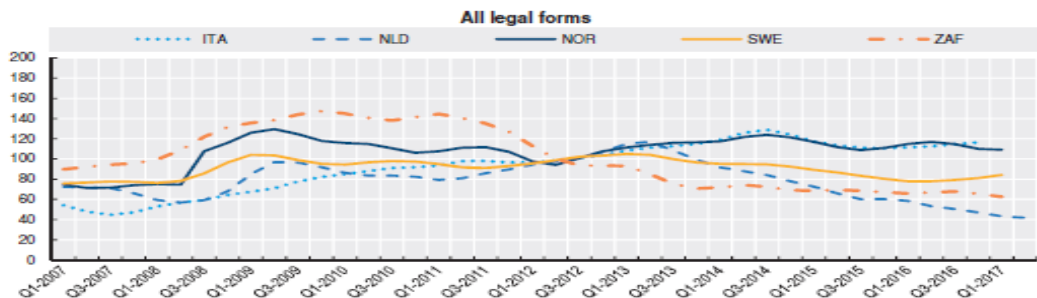
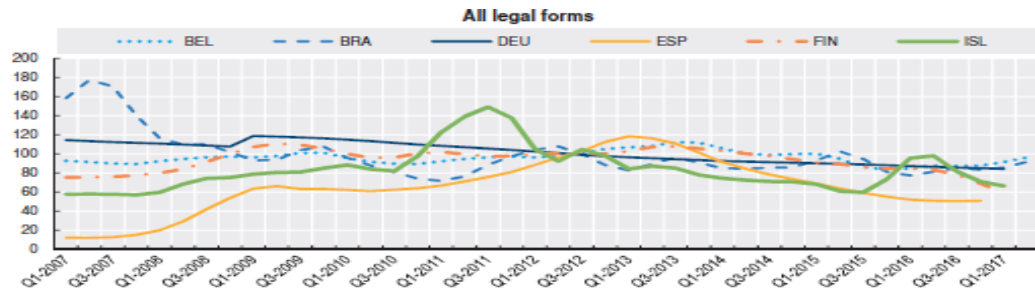
US BANKRUPTCIES



US COMMERCIAL AND INDUSTRIAL LOANS



Bankruptcies, 2012=100



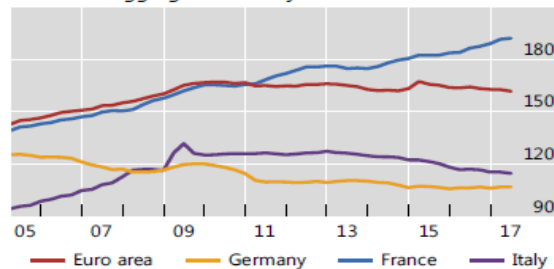
Source: OECD Timely Indicators of Entrepreneurship (database), July 2017.

Total credit to the private non-financial sector (core debt)

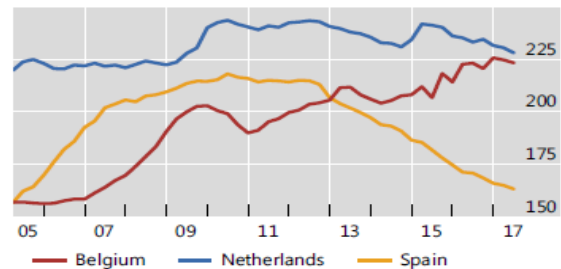
As a percentage of GDP

Graph F.2

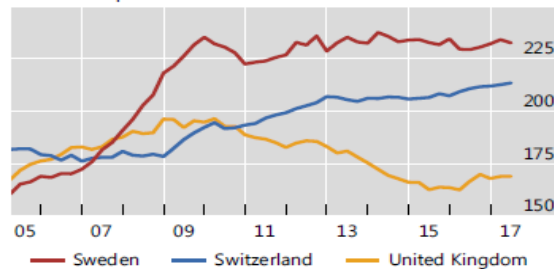
Euro area: aggregate and major countries



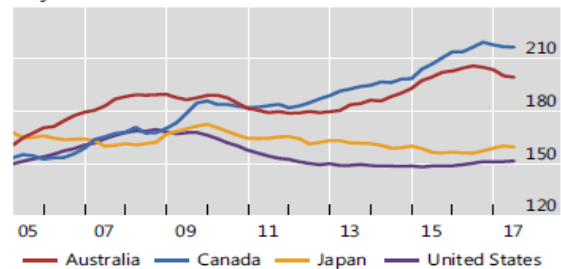
Euro area: other countries



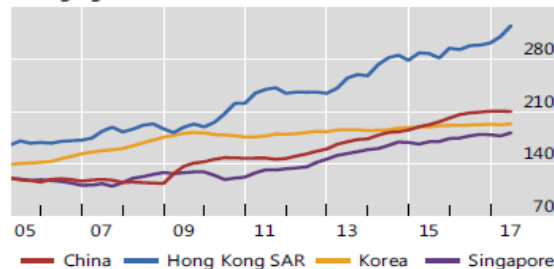
Other European countries



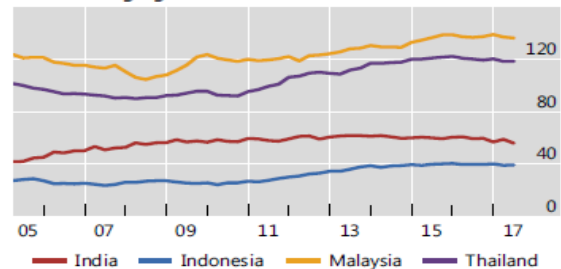
Major advanced economies



Emerging Asia



Other emerging Asia



Source: BIS

Zombie firms (continued)

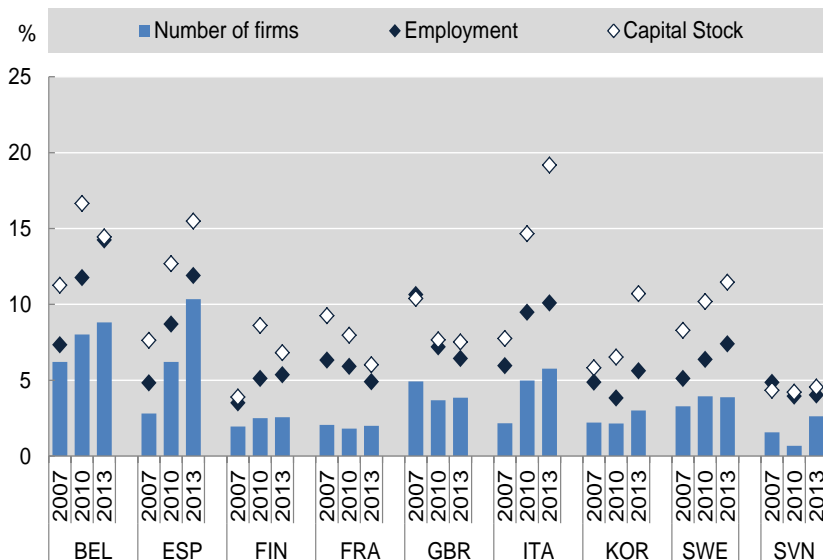
Andrews, D. and F. Petroulakis (2017), "Breaking the Shackles: Zombie Firms, Weak Banks and Depressed Restructuring in Europe, *OECD Economics Department Working Papers*, No. 1433. http://www.oecd-ilibrary.org/economics/breaking-the-shackles_0815c00c-en

Abstract: "This paper explores the connection between "zombie" firms (firms that would typically exit in a competitive market) and bank health and the consequences for aggregate productivity in 11 European countries. Controlling for cyclical effects, the results show that zombie firms are more likely to be connected to weak banks, suggesting that the zombie firm problem in Europe may at least partly stem from bank forbearance. The increasing survival of zombie firms congests markets and constrains the growth of more productive firms, to the detriment of aggregate productivity growth. Our results suggest that around one-third of the impact of zombie congestion on capital misallocation could be directly attributed to bank health and additional analysis suggests that this may partly be due to reduced availability of credit to healthy firms. Finally, improvements in bank health are more likely to be associated with a reduction in the prevalence of zombie firms in countries where insolvency regimes do not unduly inhibit corporate restructuring."

McGowan, A., D. Andrews and V. Millot (2017), **Confronting the zombies: Policies for productivity revival. OECD Economic Policy Papers.** http://www.oecd.org/economicpolicy/confronting-the-zombies_13188222

Abstract: "Policies that spur more efficient corporate restructuring can revive productivity growth by targeting three inter-related sources of labour productivity weakness: the survival of "zombie" firms (low productivity firms that would typically exit in a competitive market), capital misallocation and stalling technological diffusion. New OECD policy indicators show that there is much scope to improve the design of insolvency regimes in order to reduce the barriers to restructuring of weak firms and the personal costs associated with entrepreneurial failure. Insolvency regime reform can not only address the aforementioned sources of productivity weakness but also enhance the productivity impacts of reducing entry barriers in product markets. As the zombie firm problem may partly stem from bank forbearance, complementary reforms to insolvency regimes are essential to ensure that a more aggressive policy to resolve non-performing loans is effective. Distortions in the banking sector highlight the importance of market-based financing instruments for productivity growth with the inherent debt bias in corporate tax systems emerging as a key barrier to technological diffusion. Finally, well-designed job search and retraining policies are effective at returning workers displaced by firm exit to work, particularly in environments where barriers to firm entry are low."

Share of zombie firms, their employment & capital shares



Source: OECD: McGowan, A., D. Andrews and V. Millot (2017)

Zombies = firms aged ≥ 10 years and with an interest coverage ratio < 1 over three consecutive years.

- Zombies absorb an increasing share of labour & capital
- Share of zombies smaller than their labour & capital shares
 \Rightarrow Zombies larger than average firms
- Zombies may be too big to fail for the weak banks

Productivity slowdown & decline in labor share

G. Grossman, E. Helpman, E. Obereld, T. Sampson (2017),
The Productivity Slowdown and the Declining Labor Share:
A Neoclassical Exploration.

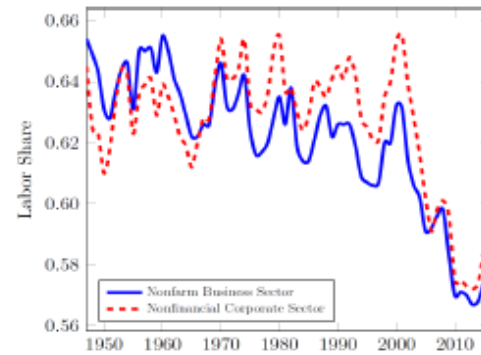
<https://scholar.harvard.edu/files/helpman/files/lshare091417.pdf>

Abstract: “We explore the possibility that a global productivity slowdown is responsible for the widespread decline in the labor share of national income. In a neoclassical growth model with endogenous human capital accumulation a la Ben Porath (1967) and capital-skill complementarity a la Grossman et al. (2017), the steady-state labor share is positively correlated with the rates of capital-augmenting and labor-augmenting technological progress. We calibrate the key parameters describing the balanced growth path to U.S. data for the early postwar period and find that a one percentage point slowdown in the growth rate of per capita income can account for between one half and all of the observed decline in the U.S. labor share.”

“We will argue that a productivity slowdown generates a deceleration of human capital accumulation and a long-run decline in the labor share in income in a setting of neoclassical growth with a certain form of capital-skill complementarity.”

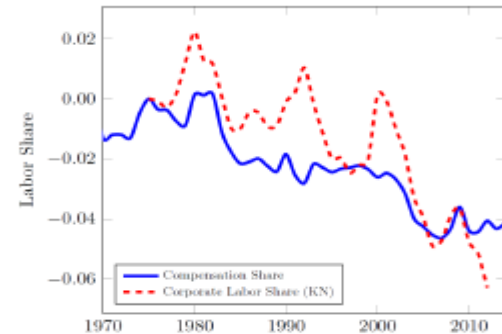
“Our story has additional attractive features. First, unlike several of the other explanations for the decline in the labor share, ours does not rely on considerations that are specific to the United States. The shift in aggregate factor shares has been seen in the data for many countries, especially among the advanced countries. The productivity slowdown also has been a common phenomenon, at least in the OECD countries. Real interest rates have fallen globally. And educational gains have slowed in many advanced countries.”

Figure 1: US Labor Share



Source: BLS (<https://www.bls.gov/lpc>). Labor compensation includes wages and salaries of employees plus employers contributions for social insurance and private benefit plans, and all other fringe benefits in current dollars. For the nonfarm business sector, an estimate of the wages, salaries, and supplemental payments of the self-employed is included.

Figure 2: Global Labor Share



Sources: Compensation Share from Penn World Tables 9.0 and Corporate Labor Share from Karabarbounis and Neiman (2014). Compensation includes only wages and salaries of employees. Each series plots time fixed effects from a regression of labor shares on time fixed effects and country fixed effects, weighted by real GDP. The compensation is calculated using 125 countries, and the corporate labor share series is calculated using 66 countries. OPEC countries are excluded from both.

Effects of internet & AI use

Varian, H. (1995), *Economic Mechanism Design for Computerized Agents*.

WOEC'95 Proceedings on the 1st conference on USENIX.

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.56.1930&rep=rep1&type=pdf>

Varian, H. (2016), *Intelligent Technology. Finance & Development*,

September 2016, Vol. 53, No. 3, IMF. <http://www.imf.org/external/pubs/ft/finand/2016/09/varian.htm>

Varian (1995): *“Game theory has been justly criticized for its “hyper-rational” view of human behavior. However, such hyper-rationality may actually be an appropriate model for software agents: presumably software agents have much better computational powers than human beings. The whole framework of game theory and mechanism design may well find its most exciting and practical application with computerized agents rather than human agents, a point recognized by Rosenschein and Zlotkin (1994).”*

Varian (2016):

“Computer mediation allows services that were previously one-size-fits-all to become personalized to satisfy individual needs. Today we routinely expect that online merchants we have dealt with previously possess relevant information about our purchase history, billing preferences, shipping addresses, and other details. This allows transactions to be optimized for individual needs.”

Varian (2016): *“Contracts are critical to economic transactions, but without computers it was often difficult or costly to monitor contractual performance. Verifying performance can help alleviate problems with asymmetric information, such as moral hazard and adverse selection, which can interfere with efficient transactions.”*

Algorithms conduct an increasing share of trades in many markets

- Trend likely to continue with low cost of software & more data

Low cost of machine learning software: Example Google

Feature	First 1000 units/month	Units 1001 - 5,000,000 / month	Units 5,000,001 - 20,000,000 / month
Label Detection	Free	\$1.50	\$1.00
Text Detection	Free	\$1.50	\$0.60
Safe Search (explicit content) Detection	Free	Now free with Label Detection	Now free with Label Detection
Facial Detection	Free	\$1.50	\$0.60
Landmark Detection	Free	\$1.50	\$0.60
Logo Detection	Free	\$1.50	\$0.60
Image Properties	Free	\$1.50	\$0.60

Source: Shapiro, C. & H. Varian (2017), *Machine Learning, Market Structure & Competition*. NBER Conference on Artificial Intelligence.

<https://static1.squarespace.com/static/59c2a584be42d60a2772ba71/t/59c2c44618b27dd6e4244e83/1505936455425/Shapiro-Varian.pdf>

Effects of internet & AI use (continued)

Agrawal, A., Gans, J. & Goldfarb, A. (2017a), Prediction, Judgment and Uncertainty.

http://conferences.nber.org/confer//2017/AIP17/Agrawal_Gans_Goldfarb.pdf

Abstract: “We interpret recent developments in the field of artificial intelligence (AI) as improvements in prediction technology. In this paper, we explore the consequences of improved prediction in decision-making. To do so, we adapt existing models of decision-making under uncertainty to account for the process of determining payoffs. We label this process of determining the payoffs ‘judgment.’ There is a risky action, whose payoff depends on the state, and a safe action with the same payoff in every state. Judgment is costly; for each potential state, it requires thought on what the payoff might be. Prediction and judgment are complements as long as judgment is not too difficult. We next consider a tradeoff between prediction frequency and accuracy. We show that as judgment improves, accuracy becomes more important relative to frequency. We show that in complex environments with a large number of potential states, the effect of improvements in prediction on the importance of judgment depend a great deal on whether the improvements in prediction enable automated decision making. We discuss the implications of improved prediction in the face of complexity for automation, contracts, and firm boundaries.”

Agrawal et al (2017b)*:

“Recent advances in AI are best thought of as a drop in the cost of prediction. By prediction, we don’t just mean the future—prediction is about using data that you have to generate data that you don’t have, often by translating large amounts of data into small, manageable amounts. For example, using images divided into parts to detect whether or not the image contains a human face is a classic prediction problem. Economic theory tells us that as the cost of machine prediction falls, machines will do more and more prediction. Prediction is useful because it helps improve decisions. But it isn’t the only input into decision-making; the other key input is judgment.

Consider the example of a credit card network deciding whether or not to approve each attempted transaction. They want to allow legitimate transactions and decline fraud. They use AI to predict whether each attempted transaction is fraudulent. If such predictions were perfect, the network’s decision process is easy. Decline if and only if fraud exists.”

“In many cases, especially in the near term, humans will be required to exercise this sort of judgment. They’ll specialize in weighing the costs and benefits of different decisions, and then that judgment will be combined with machine-generated predictions to make decisions.

But couldn’t AI calculate costs and benefits itself? In the credit card example, couldn’t AI use customer data to consider the trade-off and optimize for profit?”

*Agrawal, A., Gans, J. & Goldfarb, A. (2017b), How AI Will Change the Way We Make Decisions. Harvard Business Review, July 26.

<https://hbr.org/2017/07/how-ai-will-change-the-way-we-make-decisions>

Effects of internet & AI use (continued)

Sandholm, T. (2017), Super-Human AI for Strategic Reasoning: Beating Top Pros in Heads-Up No-Limit Texas Hold'em. Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence (IJCAI-17).

<https://www.ijcai.org/proceedings/2017/0004.pdf>

Sandholm (2017):

“Poker has been a challenge problem in AI and game theory for decades. As a game of imperfect information it involves obstacles not present in games like chess and Go, and requires totally different techniques.”

“In January 2017, our AI, Libratus, beat a team of four top specialist professionals in heads up no-limit Texas hold'em, which has 10^{161} decision points. This game is the main benchmark challenge for imperfect-information game solving.”

“Libratus has a self-improving module that augments the precomputed blueprint over time to play even closer to Nash equilibrium based on what holes (out-of-abstraction actions, i.e., bet sizes in poker) the opponents have been able to identify and exploit. This is in stark contrast to prior approaches to learning in games, where the goal has typically been opponent modeling and exploitation—an approach that tends to open the agent up to counter-exploitation and causes the strategy to be opponent specific. In contrast, Libratus's self-improvements are universal.”

“The algorithms are domain independent.”

AI use will increase rapidly given that it is easy to improve human decision making with AI and given the pace of AI development.

Daniel Kahneman's remarks in NBER conference on artificial intelligence in 2017:

https://www.youtube.com/watch?v=gbj_NsgNe7A

- *“So, as an outsider here, actually I have been surprised not to hear more about that about superiority of AI to what people can do.”*
- *“...most of the errors that people make are better viewed as this random noise. And there's an awful lot of it. Admitting the essence of noise has implications for practice. And one implication is obvious: you should replace humans by algorithms whenever possible. This is really happening even when the algorithm don't do very well. Humans do so poorly and are so noisy that just by removing the noise you can do better than people.”*
- *“The one thing that I find extraordinarily surprising and interesting in what is happening in AI these days is that everything is happening faster than was expected.”*

Firms and households likely to increase AI use given that

- Using algorithms saves time and effort
- Already today people use routinely an algorithmic search engine (Google) to find something from the internet
- The cost of not using algorithms increases with better algorithms and more data available.

Effects of internet & AI use (continued)

Hetemäki, M. (2017), *Artificial Intelligence and Markets*.

[Link to be attached to this presentation](#)

Abstract (2017): *“The main point of the paper is that AI is likely to affect labor market and rest of the economy via changes in market efficiency. Such an approach enables a testable analysis of AI’s economic effects. Moreover, it provides a basis to identify potential policies and the time line with which AI impacts the economy.*

The paper examines two effects of AI. The first effect is based on a hypothesis that AI will, in general, improve efficiency of markets. This holds if, in general, AI is required to reach rational decisions based on all available data. The increased market efficiency will aggravate effects of existing economic distortions.

The second effect is based on a hypothesis that AI may induce new distortions. Research on algorithmic high-frequency trading indicates that AI can give rise to new distortions which are neither easy to detect nor self-correcting. This effect may be amplified by AI’s efficiency improving general effect.

The paper puts forward two propositions on how AI affects employment via the market effects.

The paper argues that AI impacts the economy, via the markets, earlier than it automates jobs on a larger scale. AI’s potential economic effects and their likely speed stress the need for proactive policies.

The paper argues that required policies would amount to addressing existing economic distortions and to boosting skills. These policies would be warranted even in the absence of AI. Moreover, they are likely to be policies that would facilitate sustained job creation in the face of AI’s technological effects via automation.”

With better AI, and growing use of AI in decisions, assumptions of the the Arrow-Debreu model become more realistic.

Geanakoplos (1987)* assesses the meaning of the rationality assumption as a requirement of the efficiency result of the Arrow-Debreu model. In that assessment Geanakoplos (1987, p. 117) describes rather well that computers should be capable to today’s AI, for the rationality assumption of the Arrow-Debreu model to hold, when he notes the following:

“As an instance of this last case, note that it follows from the rationality hypothesis that the surge in the microcomputer industry influenced consumer choice between typewriters and word processors only through availability (via the price), and not through any learning effect. (Consumers can ‘learn’ in the Arrow-Debreu model, e.g. their marginal rates of substitution can depend on the state of nature, but the rate at which they learn is independent of production or consumption – it depends on the exogenous realization of the state. We shall come back to this when we consider information.) If for no other reason, the burden of calculation and attention which rational choice over consumption plans imposes on the individual is so large that one expects rationality to give way to some kind of bounded rationality in some future general equilibrium models.”

*Geanakoplos, J. (1987), “The Arrow-Debreu Model of General Equilibrium,” J. Eatwell, M. Milgate, and P. Newman, eds., *The New Palgrave Dictionary of Economics*, Macmillan Press, London, 1987, Vol. 1, pp. 116-124.

<http://dido.econ.yale.edu/~gean/art/1987-newpalgrave1.pdf>

Appendix B: Six characteristics of productivity frontier firms: A slightly shortened quote from the OECD 2016 study*:

***“First,** firms at the global productivity frontier are on average 3 to 4 times more productive than non-frontier firms. These differences appear large but are to be expected given the widespread heterogeneity in firm productivity that is typically observed within narrowly defined sectors (Syverson, 2004).*

A host of literature has focused on how such large differences in productivity can be sustained in equilibrium, given the expectation that market selection and the reallocation of resources would necessarily equalise them over the longer run. Supply-side explanations have typically emphasised factors related to technology shocks, management skill, R&D, or investment patterns (Bartelsman and Doms, 2000).

The demand side also appear relevant, given evidence that imperfect product substitutability – due to geographical segmentation (i.e. transport costs), product differentiation (i.e. consumer preferences, branding/advertising) and intangible factors (customer-producer relationships) – can prevent industry customers from easily shifting purchases between industry producers (Syverson, 2004).

The combination of demand and supply side imperfections can indeed lead to large and persistent differences in productivity levels across firms (Syverson, 2011). Note that most studies focus on within-country productivity dispersion, while our analysis pools together different countries, potentially further widening the productivity distribution.

***Second,** on average, global frontier firms have greater sales and are more capital intensive – as expected, more so for labour productivity.*

***Third,** global frontier firms pay higher average wages, which ranges between \$20,000 and \$26,000 (in 2005 USD terms) depending on the measure. These differences might reflect the sorting of better workers into frontier firms (Card, Heining and Kline, 2013; Song, Price, Guvenen, Bloom and von Wachter, 2016) and the potential sharing of higher rents by frontier companies with their workers.*

***Fourth,** in manufacturing, firms at the frontier in terms of MFP (MFPR and its mark-up corrected variant) have significantly higher employment size than laggards, in line with existing evidence that productivity is positively correlated with size of manufacturing firms.*

The empirical literature on productivity-enhancing reallocations indeed finds an important role for the entry-exit margin of firms (e.g. Foster et al., 2001), and the theoretical literature also emphasizes its potential role (Caballero and Hammour, 1994; Campbell, 1998).

***Fifth,** frontier firms are also shown to charge higher mark-ups in the case of labour productivity and MFPR, particularly in services. This could reflect weaker competition in the less tradable and more regulated services sector, which allows for larger market power differences across firms. However, when the frontier is defined based on mark-up corrected MFPR, frontier firms are found to charge lower mark-ups. This is consistent with the idea that the most productive firms can afford to charge lower prices and thus attract more demand. In particular, this is in line with the findings of Foster, Haltiwanger and Syverson (2008) using US firm level data on prices and quantities, who show that there is a strong negative relationship between measures of MFP based on physical output rather than revenues (and thus purged from markups) and firm level prices.*

***Sixth,** global frontier firms are also more likely to belong to a multinational group/conglomerate and patent more intensively than other firms (Andrews, Criscuolo and Gal, 2015).”*

***D. Andrews, C. Criscuolo & P.N. Gal (2016), The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy. OECD Productivity Working Papers No. 05. <https://www.oecd.org/global-forum-productivity/library/OECD%20Productivity%20Working%20Paper%20N%C2%B05.pdf>**

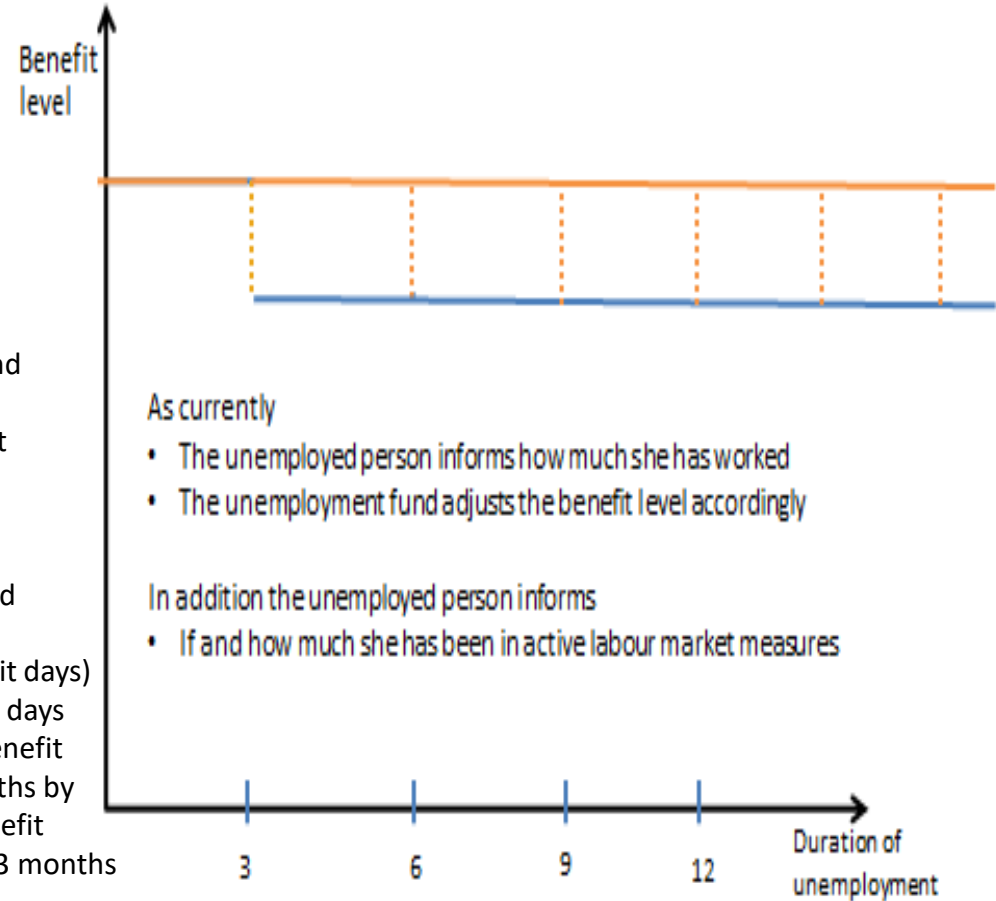
Appendix C: The Finnish unemployment insurance reform

Idea for the Finnish UI reform came from a UI reform in Denmark

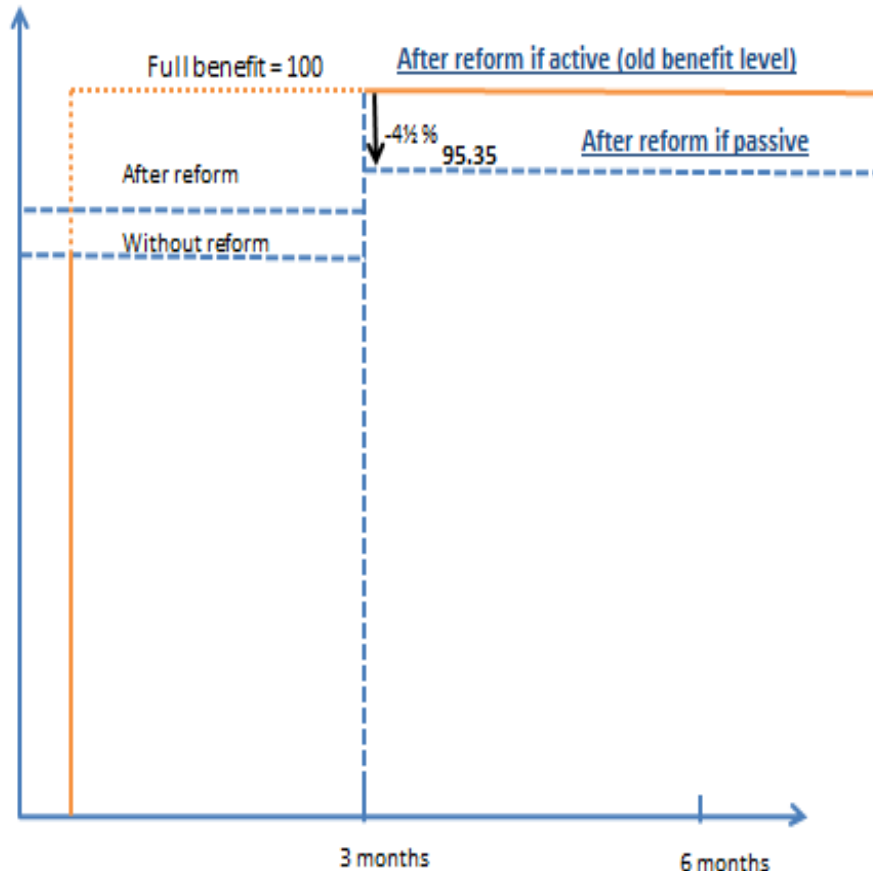
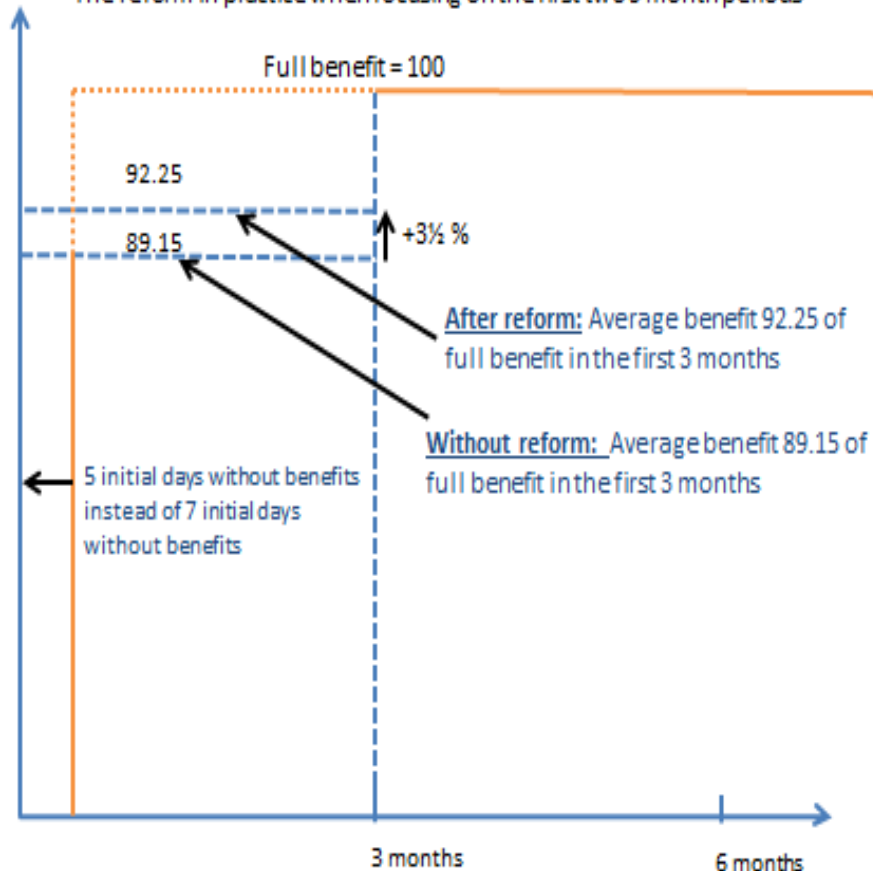
- In Denmark, an unemployed is one day without benefit in a 4 month period if she has not worked enough, corresponding to a ~1 % benefit cut, compared to a ~4½ % cut in Finland
- But in Denmark the work requirement to avoid the cut is 150 hours in 4 months while it is only 18 hours in 3 months in Finland
- In Finland enough time to search for a suitable job, in addition one can earn max 300 €/month with full unemployment benefit
- In Denmark benefit cut avoided only by work, in Finland also by participating in active labour market measures for at least 5 days over the 3 months period
- In Denmark working while unemployed lengthens benefit period

The Finnish new UI system operates in 3 months periods (=65 benefit days)

- At the start of unemployment 5 days without benefit instead of 7 days
→ The average benefit for the first 3 months is $60/65 \approx 0.92$ of full benefit
- If not active in the first 3 months, benefit cut for following 3 months by an amount=3 days without benefit → benefit $62/65 \approx 0.95$ of full benefit
- If active in any subsequent 3 months period, full benefit for next 3 months



The reform in practice when focusing on the first two 3 month periods



**Appendix D:
At-risk-of-poverty rate after
social transfers by most
frequent activity status,
2015, %**

Source: Eurostat

The at-risk-of-poverty
threshold is set at 60 % of
national median equivalised
disposable income.

Risk of poverty in EU-28 if

- Employed ~10 %
- Unemployed ~50 %

	Total population	Persons employed	Not employed	Unemployed	Retired	Other inactive persons
EU-28	16.3	9.5	23.8	47.5	13.2	29.0
Euro area (EA-19)	16.3	9.4	23.4	47.4	12.2	27.4
Belgium	13.9	4.6	23.2	40.7	12.4	31.5
Bulgaria	21.5	7.7	35.0	53.3	30.0	29.1
Czech Republic	8.6	4.0	14.3	48.7	7.4	14.0
Denmark	12.5	5.5	21.9	37.6	8.8	34.1
Germany	17.1	9.7	26.3	69.1	17.0	30.3
Estonia	22.0	10.0	39.1	54.8	40.1	33.6
Ireland	15.6	4.8	27.1	40.4	15.9	28.3
Greece	19.9	13.4	24.1	44.8	10.8	26.2
Spain	20.5	13.1	26.7	46.5	10.2	23.9
France	11.9	7.5	16.9	37.1	7.1	28.8
Croatia	19.8	5.9	29.6	42.8	22.1	32.4
Italy	18.4	11.5	24.0	47.3	11.0	26.4
Cyprus	16.0	9.1	23.4	42.0	16.5	18.7
Latvia	22.2	9.2	37.9	55.0	36.7	31.9
Lithuania	20.7	9.9	33.6	62.3	27.6	30.1
Luxembourg	13.6	11.6	16.5	42.7	5.8	22.7
Hungary	13.1	9.3	17.0	54.4	5.0	24.5
Malta	14.8	5.4	24.4	55.7	18.1	25.2
Netherlands	10.8	5.0	17.9	35.5	6.2	27.9
Austria	13.1	7.9	19.4	41.4	12.9	26.4
Poland	16.4	11.2	22.2	45.7	11.1	28.1
Portugal	18.3	10.9	25.2	42.0	14.4	31.9
Romania	22.4	18.8	26.4	55.5	15.8	42.1
Slovenia	14.3	6.7	21.9	44.8	15.9	19.9
Slovakia	10.6	6.0	16.2	45.5	6.2	15.7
Finland	13.1	3.5	22.6	39.6	13.5	30.2
Sweden	14.8	7.1	26.9	39.3	19.2	43.0
United Kingdom	15.8	8.2	26.7	48.3	18.2	35.0
Iceland	9.1	6.9	14.7	22.5	9.8	15.6
Norway	11.9	5.5	22.9	43.6	10.1	35.2
Switzerland (*)	12.3	6.3	23.1	24.6	25.7	18.8
FYR of Macedonia	19.7	8.9	27.4	39.7	7.3	26.7
Serbia	24.5	13.5	30.5	46.2	15.2	36.6
Turkey (*)	18.2	14.9	21.2	38.1	3.1	23.6

Note: for persons aged 18 or over.

(*) 2014.

(*) 2013.

Source: Eurostat (online data code: ilc_li04)

[http://ec.europa.eu/eurostat/statistics-explained/index.php/File:At-risk-of-poverty_rate_after_social_transfers_by_most_frequent_activity_status,_2015_\(%25\)_YB17.png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:At-risk-of-poverty_rate_after_social_transfers_by_most_frequent_activity_status,_2015_(%25)_YB17.png)