ECONOMIC STATISTICS CENTRE OF EXCELLENCE

A COLLABORATION WITH Office for National Statistics

ESCoE Research Seminar

For A Fistful of Krones? How Improving the Measurement of Business Income Affects Income Inequality Estimates

Presented by Marco Francesconi
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For A Fistful of Krones? How Improving the Measurement of Business Income Affects Income Inequality Estimates

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What?

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2. assess how this new measure affects the *level* and the *evolution* of income inequality

How?

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(b) highly detailed **ownership data** and **firm level balance sheets** to allocate corporate profits to *personal* owners across the entire **Norwegian** economy between 2001 and 2016

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  - ⋆ **share** of market income accruing to the top 1% goes up by **more than 50%**, from about 10% using official measures to about 15–16% according to our measure
  - ⋆ **Gini** coefficient increases from an average of 0.25 with the official measure to an average of 0.33 using our new measure over the sample period, a whopping increase of more than 30%

Why?

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Recent literature points to importance of top incomes for understanding evolution of inequality

- Evidence is typically based on administrative tax records
- E.g. Piketty (2003); Piketty and Saez (2003); Atkinson and Piketty (2007, 2010); Atkinson et al. (2011)

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Key challenge: Current measures of business income are incomplete

- This is problematic if business income is a major source of income at the **top**

Business Income Dominates at the Very Top

Official measure of business income

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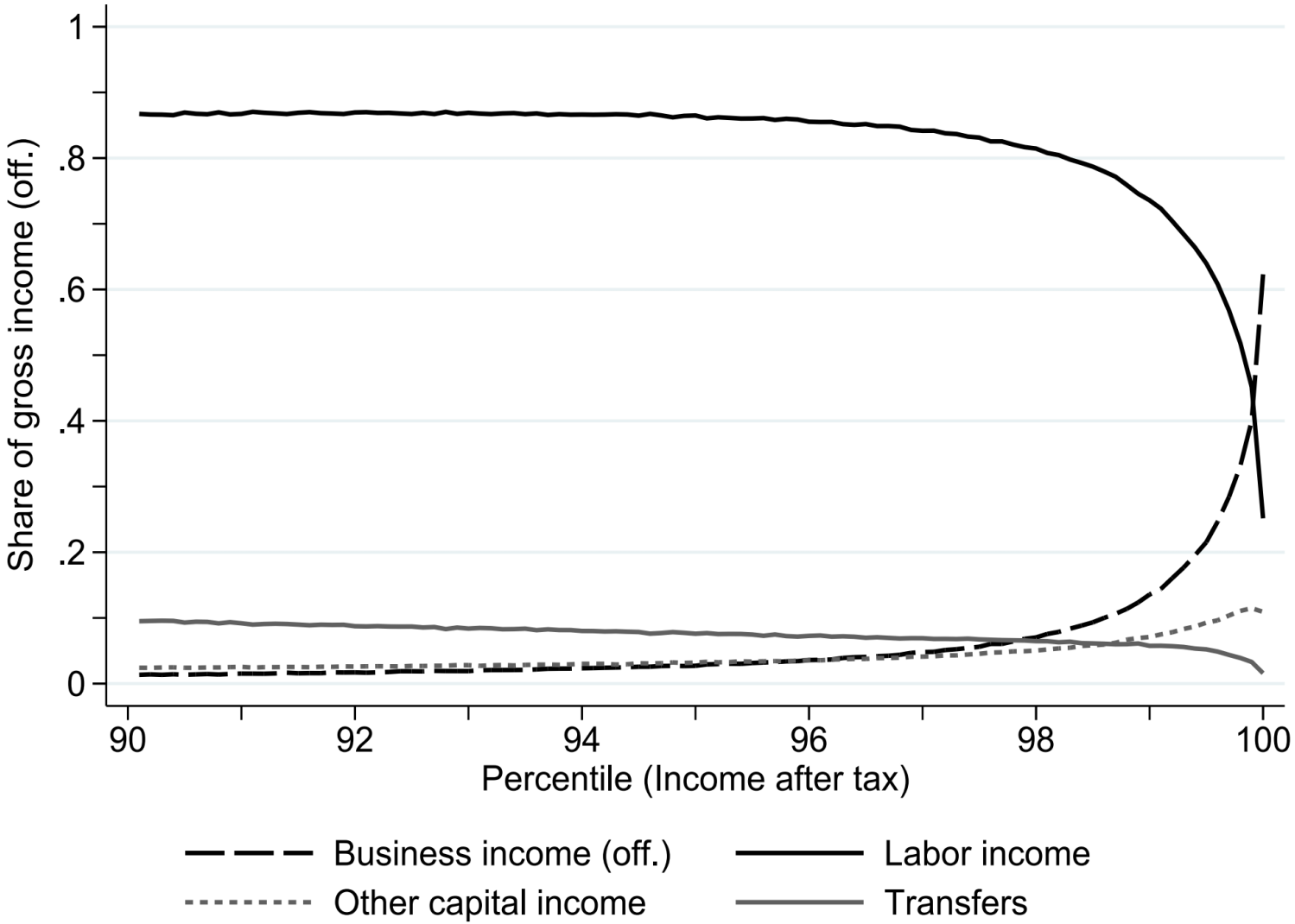

Composition of Gross Income

Previous figure shows composition of gross income for the **top 10%** of the distribution of income after tax (official measure of disposable income)

Gross income is divided into four broad sources of income: labor income, business income, other capital income, and government cash transfers.

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Gross income is divided into four broad sources of income: labor income, business income, other capital income, and government cash transfers.

- Labor income share is about **83%** between 90th and 95th percentiles (and this is the case from around the median), where business income accounts for **less than 2%** of gross income
- Slowly decreasing labor income share between 95th and 98th percentiles
- **Sharp drop** in the labor income share, from 80% to **23%**, between 98th percentile to the very top, where business income accounts for **60%** of gross income

Roadmap (from now on)

1. Measurement Problems with Official Measure of Business Income
2. A New Measure
3. Results
4. Conclusion

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Measurement (1)

Simple starting point is to think of total income, Y, as:

$$Y = L + B + K + T,$$

where L = labor income; B = **business income**; K = other capital income; T = government cash transfers

In official statistics, measure of B = dividends (and not well measured) + taxable realized capital gains

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- realization decisions are a **strategic** choice of firms and may be sensitive to tax incentives – see next figure; and
- it does not account for **indirect ownership**

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Sensitivity of Dividends to Tax Incentives

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1. 2006 dividend tax reform represents a **substantial** change in incentives:
   - It increased the tax on dividends to personal shareholders from 0% to 28%, while the tax on dividends to corporate shareholders remained untaxed
   - Reform was announced in the spring of 2004 (see picture below - big spike in dividends to personal shareholders in 2005 & top 1% receives lion's share of total dividends) [**DD analysis** in progress]

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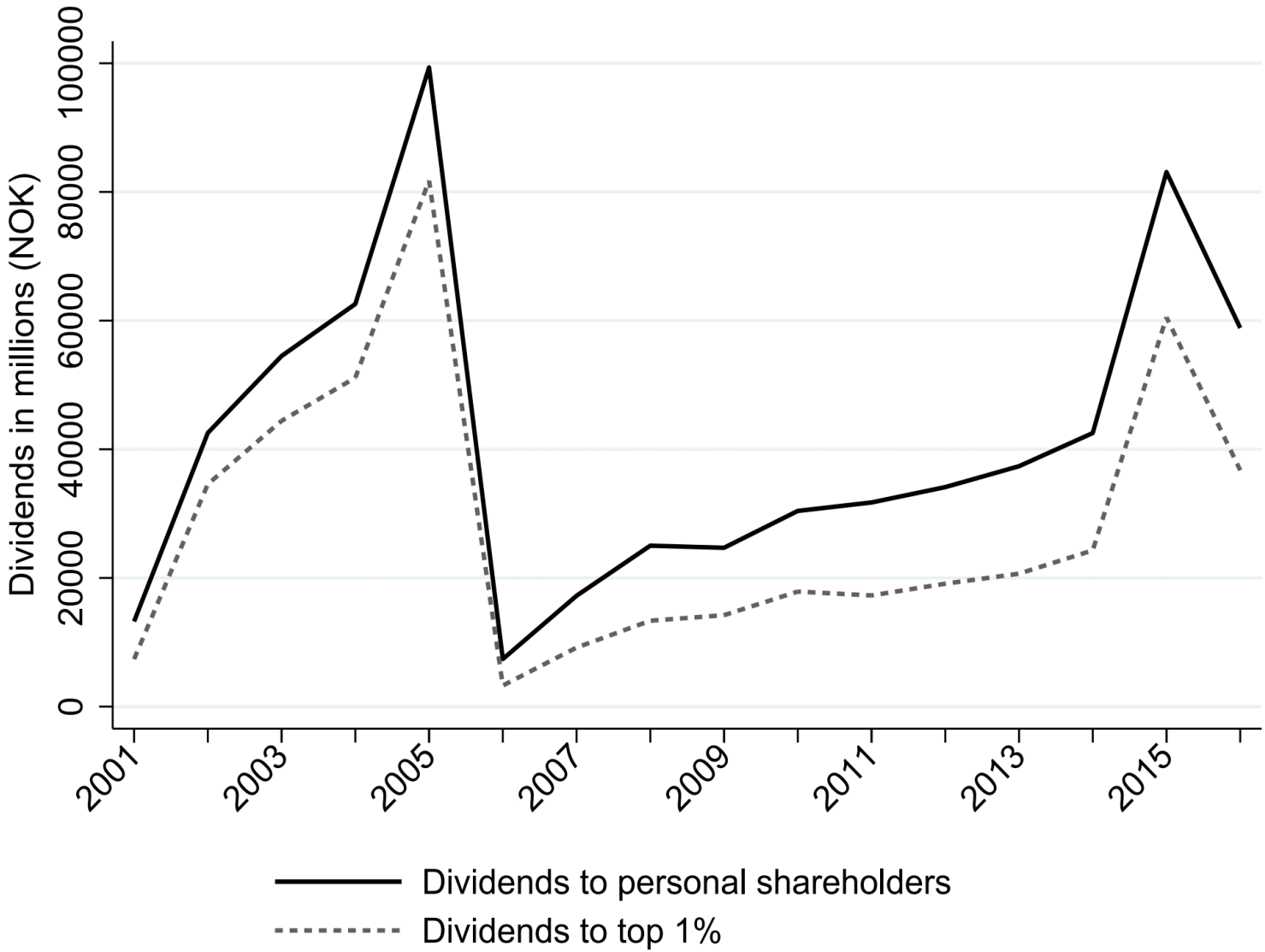
   - Reform was announced in the spring of 2004 (see picture below - big spike in dividends to personal shareholders in 2005 & top 1% receives lion's share of total dividends) [**DD analysis** in progress]
2. 2016 reform seems more **modest**:
   - tax on dividends increased from 28% to 31.68% percent over a 4-year period (starting at 28.75% in 2016)
   - yet this was apparently enough to make some personal shareholders react in 2015

Measurement (3)

Sensitivity of Dividends to Tax Incentives is High



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A measure of B that captures both realized and unrealized business income

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- Tax records + national accounts + strong assumptions
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Our approach

Build on Alstadsæter-Jacob-Kopczuk-Telle (2016), we:

- use **ownership data** and **firm level balance sheets** to allocate corporate profits to personal owners
- make use of the concept of **retained earnings** to avoid **double counting** of profits from indirectly held firms

A New Measure of B (2)

Combine several administrative data sources from Norway

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- Ownership data (all owners of limited liability firms)
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Construct a *more comprehensive* measure of personal income that includes both realized and unrealized B, and

- accounts for B as it **accrues** rather than when it is realized
- and is **less sensitive** to changes in tax incentives than the official measure of B

A New Measure of B (3)

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1. can be easily achieved for **pass-through** entities (partnerships and sole proprietorships),
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1. can be easily achieved for **pass-through** entities (partnerships and sole proprietorships),
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2. but it is more involved for **limited liability firms** (the main type of legal form in Norway; see next table); our goal is to
   - ⋆ use ownership shares and balance sheets to *mimic* pass-through regime

Legal Forms in Norway (2015)

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	Enterprises		Turnover		Employment	
	N	%	NOK (ml)	%	N	%
All	453,762	100	5,100,374	100	2,036,818	100
Partnership	12,797	2.82	47,342	0.92	32,532	0.59
Priv. ltd.	200,480	44.18	4,544,247	89.10	1,558,059	76.49
Publ. ltd.	160	0.04	100,657	1.97	36,629	1.80
Sole prop.	220,740	48.65	133,312	2.61	219,265	10.77
Other	19,585	4.32	274,816	5.39	190,333	9.34

Source: StatBank Table 08228. All active enterprises except public administration. Employment is the sum of employees and owners, and turnover is defined as the sum of sales plus gross income from other business activity (including e.g. income from rent and commission income, excluding government subsidies).

A New Measure of B (4)

Indirect ownership and the double-counting problem - Example

Suppose personal owner i owns share s_{ij} of firm j and share s_{ik} of firm k

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Suppose firm j also owns share s_{jk} of firm k, and earns

$$\Pi_j = \tilde{\Pi}_j + s_{jk}\tau_k\tilde{\Pi}_k,$$

where

- Π_j = after-tax profits (observed in the balance sheet data)
- $\tilde{\Pi}_j$ = profits from own economic activity
- $s_{jk}\tau_k\tilde{\Pi}_k$ = **dividends** received by firm j from firm k (τ is fraction of profits paid out as dividends)

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For simplicity, assume k does not own any other firm, hence $\Pi_k = \tilde{\Pi}_k$, i.e., k's after-tax profits = net income from own economic activity

A New Measure of B (5)

The double-counting problem

sum of after-tax profits $>$ sum of economic profits, i.e.

$$\Pi_j + \Pi_k = \tilde{\Pi}_j + \underbrace{s_{jk}\tau_k\tilde{\Pi}_k}_{\text{dividends paid from firm } k \text{ to firm } j} + \tilde{\Pi}_k > \tilde{\Pi}_j + \tilde{\Pi}_k$$

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Similarly, using after-tax profits, Π, to allocate business income to personal owner i, we obtain

$$\begin{aligned} B_i^P &= s_{ij}\Pi_j + s_{ik}\Pi_k + s_{ij}s_{jk}\Pi_k \\ &= s_{ij}(\tilde{\Pi}_j + s_{jk}\tau_k\tilde{\Pi}_k) + s_{ik}\tilde{\Pi}_k + s_{ij}s_{jk}\tilde{\Pi}_k \\ &= s_{ij}\tilde{\Pi}_j + s_{ik}\tilde{\Pi}_k + s_{ij}s_{jk}\tilde{\Pi}_k(1+\tau_k) \end{aligned}$$

(which is more than i's shares of total net incomes generated by j and k)

$\Rightarrow$ We are "double-counting" firm k's profits when $\tau_k > 0$

Importance of indirect ownership

One way of avoiding the double counting problem is to **ignore** indirect ownership altogether

- Ignoring indirect ownership however may lead to underestimation of incomes at the top
- Figure (in Appendix) shows shares of income accruing to the top 1% of the distribution, accounting for direct ownership only and for both direct and indirect ownership
- Differences are substantial from 2005 onwards
  - Indirect ownership has become **more prominent** over time and cannot be dismissed

A New Measure of B (6)

Using retained earnings to avoid double-counting

Following Alstadsæter et al. (2016), we use the accounting identity according to which:

$$\Pi_j = \Delta R_j + D_j,$$

where D_j = dividends; ΔR_j = change in retained earnings

and that *aggregating* the changes in accumulated retained earnings across firms corresponds to aggregating profits net of dividends to personal shareholders, that is, $\sum_j \Delta R_j = \sum_j \tilde{\Pi}_j - \sum_j \sum_i s_{ij} D_j$

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$\Rightarrow$ Use of personal owner's share of the change in accumulated retained earnings plus dividends received at the personal level as our measure of the personal owner's share of the firm's profits

A New Measure of B (7)

Using retained earnings to avoid double-counting

Next, we multiply direct ownership shares by the sum of changes in retained earnings and dividends, and indirect ownership shares by the change in retained earnings only (since dividends are only relevant at the direct ownership level), and obtain **our measure** personal owner's share of profits as:

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&= s_{ij}\tilde{\Pi}_j + s_{ij}s_{jk}D_k + s_{ik}\tilde{\Pi}_k + s_{ij}s_{jk}\tilde{\Pi}_k - s_{ij}s_{jk}D_k \\
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- Dividend terms cancel out (incl. dividends from indirectly held firms),

A New Measure of B (8)

We end up with our measure of **business income** = individual owner's shares of total net income generated by the two firms

This delivers a measure of income that is closer to the **Haig-Simons'** income definition (yearly consumption + change in net wealth in a given year), seen by many as the *gold standard* for measuring annual income, including capital gains at accrual (see Armour et al. 2014)

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Differences between our measure and Alstadsæter et al.'s (2016)

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Proposed dividends by general assembly of firm j in $t-1$, D_{jt-1}, are payable in t

- Information on D: available in *accounting register*

In general, $d_{jt} = D_{jt-1}$, but this is *not* always the case.

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- Alstadsæter et al. (2016) use d (distributed), while we use D (proposed)
- **Extraordinary** dividends are in their measure, *not* ours
- In general the differences are small
- But in 2005, in anticipation of the 2006 reform, the differences were **large** (see figure in Appendix)

Income Composition in the Top 10% - Revisited

Comparing the official measure of B to ours

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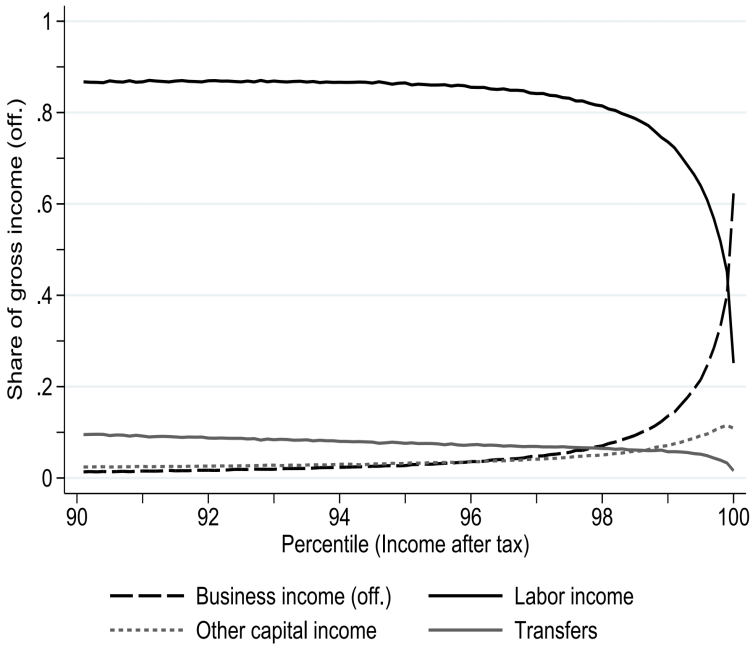
(a) With Official Measure of B



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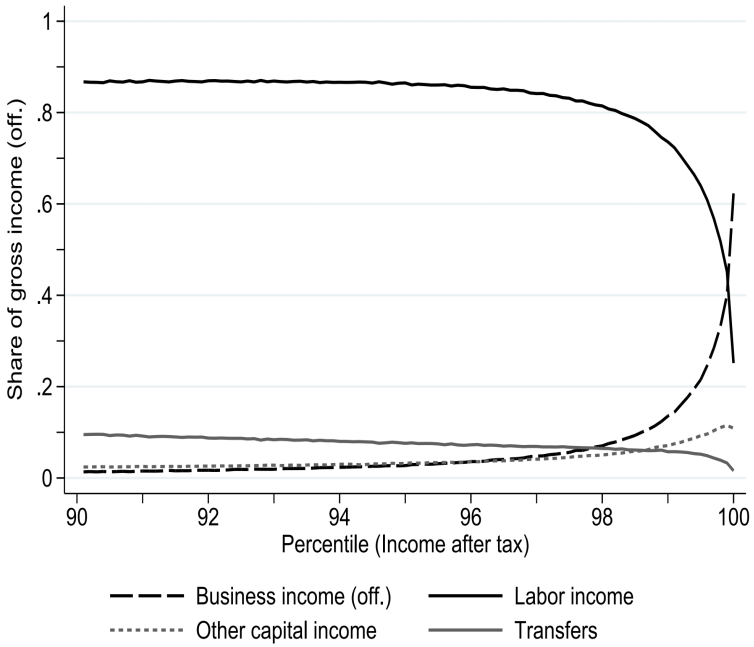
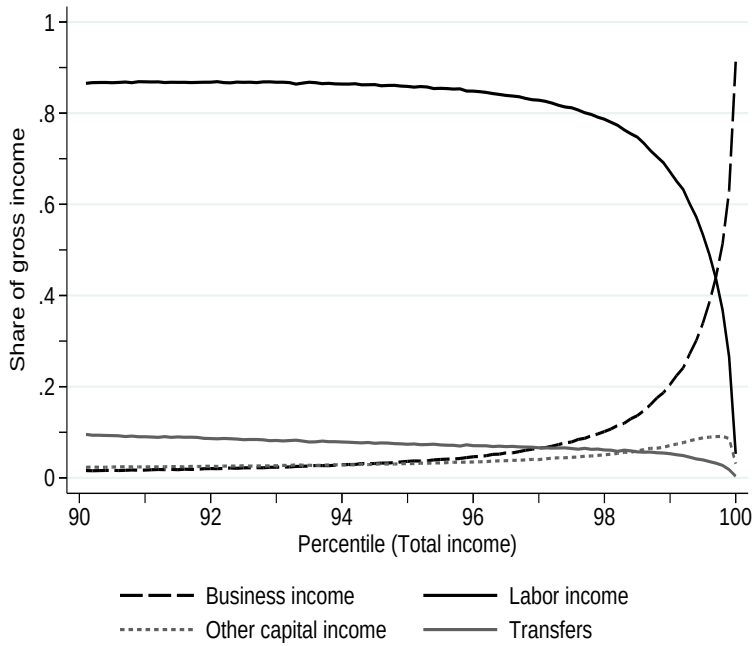


(b) With Our Measure of B



$\therefore$ Business income is **even more important** at the very top.

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1. Measurement Problems with Official Measure of Business Income
2. A New Measure
3. **Results**
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Results

We focus on **income inequality** and present evidence on:

1. **Shares** of market income accruing at the top of the distribution
2. **Gini** coefficients (household disposable income)
   - Perform decompositions to estimate the inequality shares of different income components

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   - Perform decompositions to estimate the inequality shares of different income components

In each case we present estimates by year using:

- ⋆ our measure of B as well the official statistics measure,
- ⋆ and labour income alone

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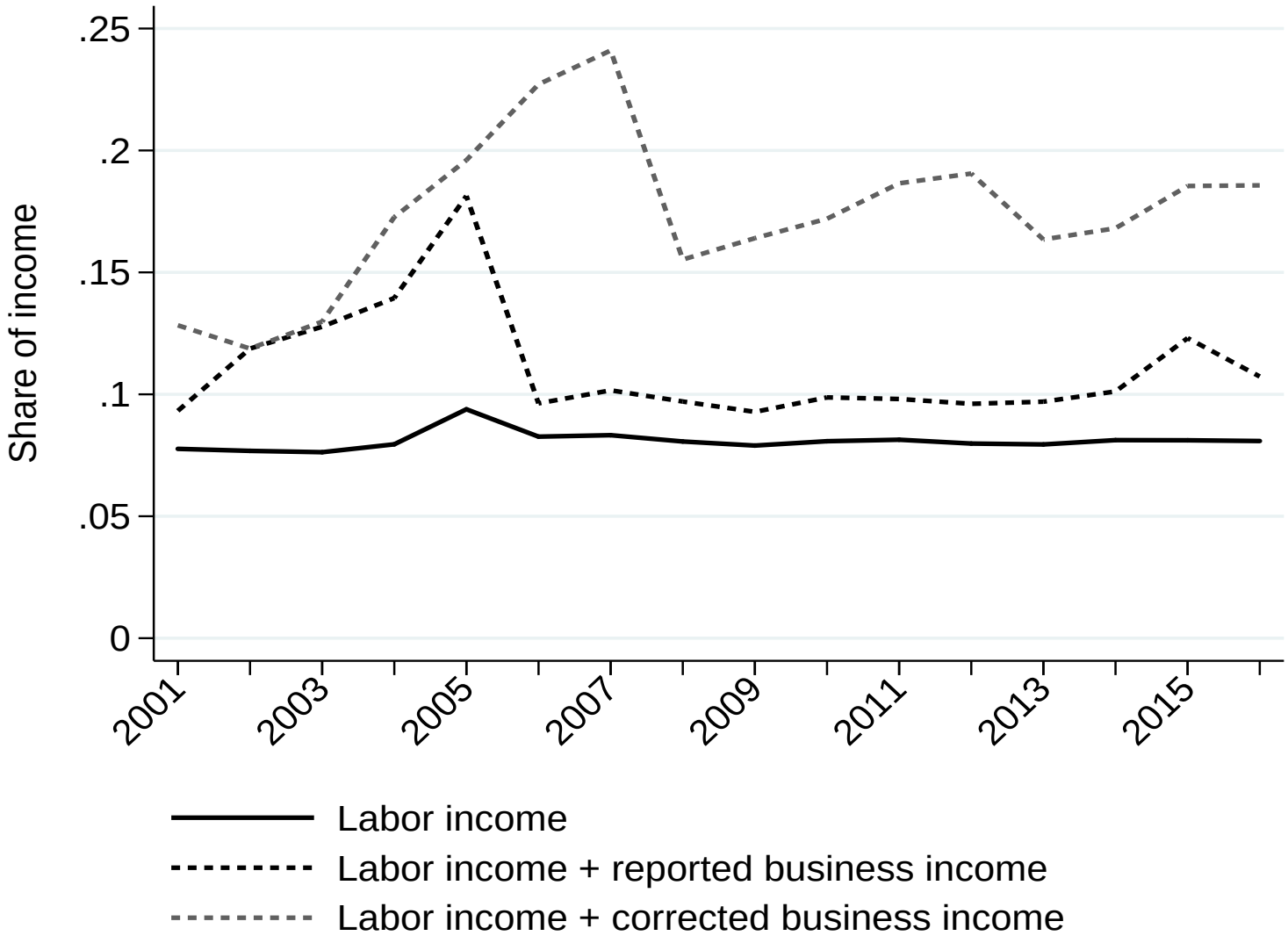
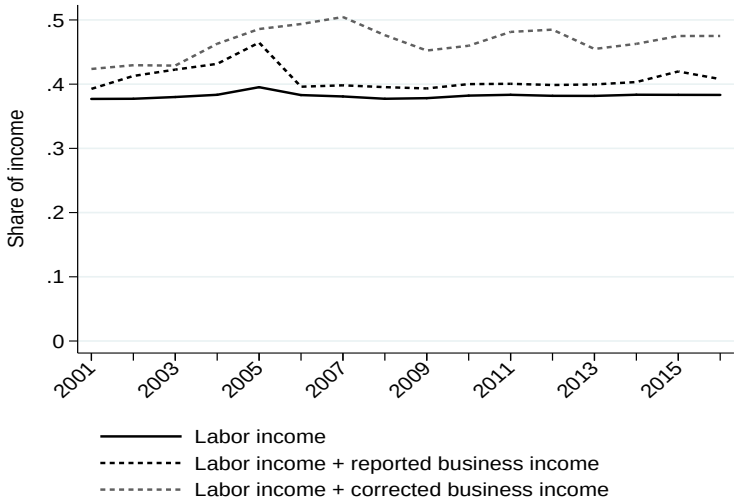
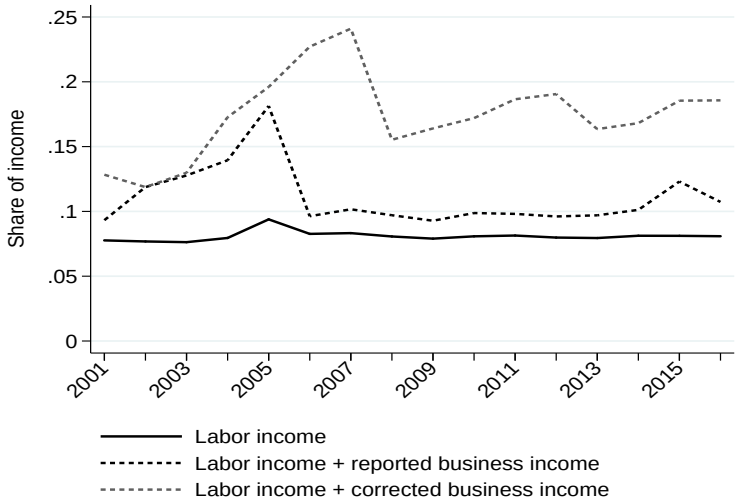


Results (2) - Shares of Income Accruing to the Top X%

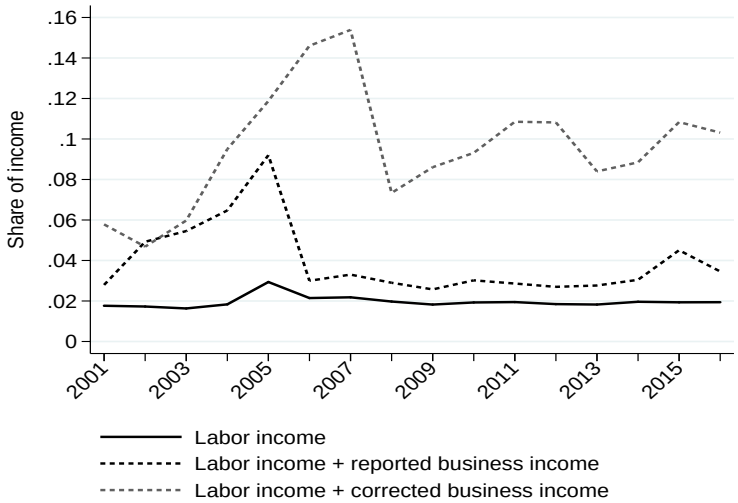
(a) Top 10%



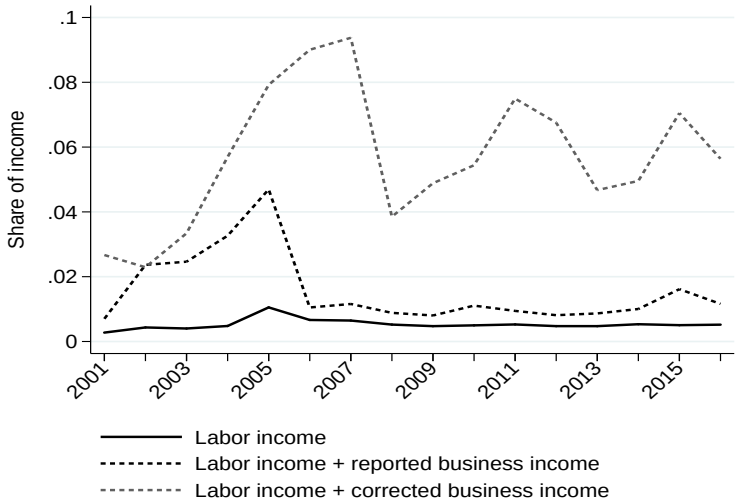
(b) Top 1%



(c) Top 0.1%



(d) Top 0.01%



Results (3) - Gini Coefficients

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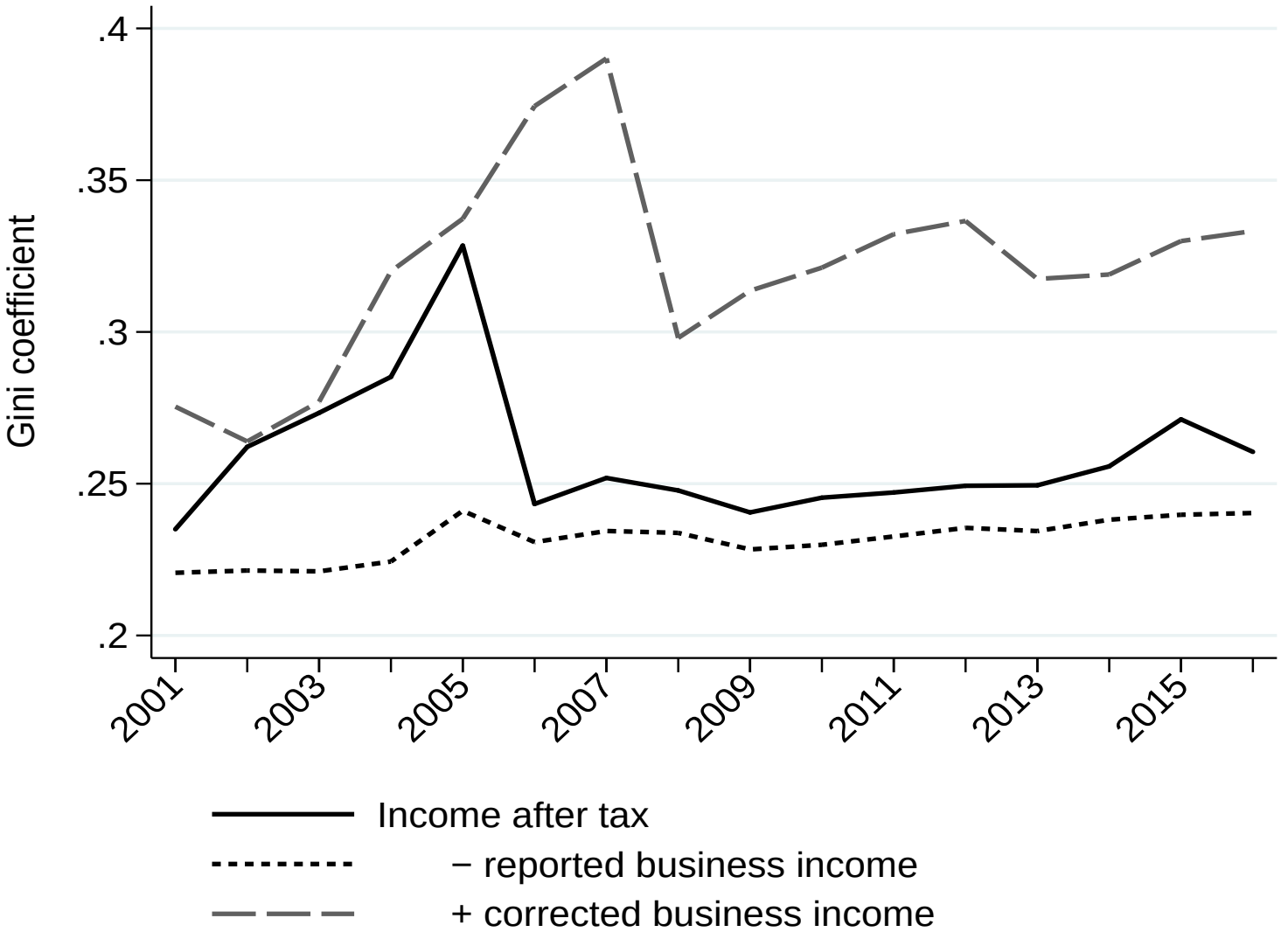

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In particular, we find:

- **Shares** of market income accruing to the top 1% go up by 50–60% (from about 10% to more than 15–16%)
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- **Gini coefficient** increases from an average of 0.25 with the official measure to an average of 0.33 using our new measure over the sample period, a 30% increase

Results - Decompositions of the Gini Coefficient

The Gini coefficient admits the following decomposition (Rao 1969):

$$G = \sum_{c=1}^{5} v_c\left(G\right) = \sum_{c=1}^{5} \frac{\mu_c}{\mu}\gamma_c \tag{1}$$

where: μ is overall mean income; μ_c is the mean of income component c; $\frac{\mu_c}{\mu}$ is the income share of component c

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The concentration coefficient γ_c is the conditional Gini coefficient of component c, given the rank order in total income

The inequality share λ_c of an income component is defined as

$$\lambda_c = \frac{\mu_c}{\mu} \frac{\gamma_c}{G},$$

with $\sum_{c=1}^{5} \lambda_c = 1$

Results - Decompositions of the Gini Coefficient (cont.)

Notice if the mean of component c is positive, then:

- $\gamma_c < 0$: indicates an **equalizing** contribution from component c,
- $\gamma_c > 0$: contribution is **disequalizing**
- $\gamma_c = 0$: an equal amount of component c is received by every household

Results - Decompositions of the Gini Coefficient (cont.)

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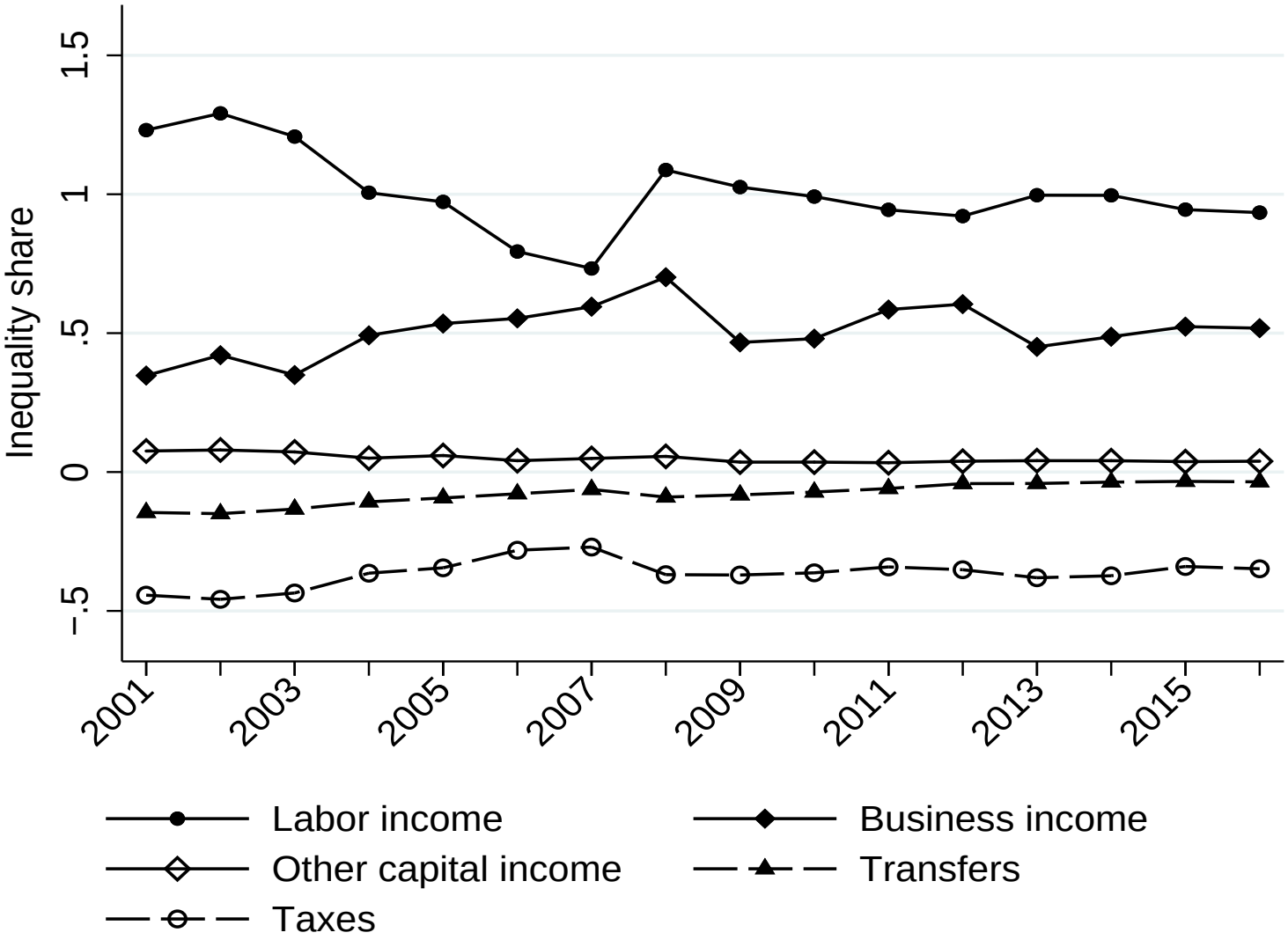
Therefore:

- whether a component is equalizing or disequalizing depends on the sign of the associated concentration coefficient, γ;
- **strength** of the equalizing or disequalizing effect depends on the magnitudes of both the concentration coefficient and the income share

Results (4) - Decomposition of G: Inequality Shares

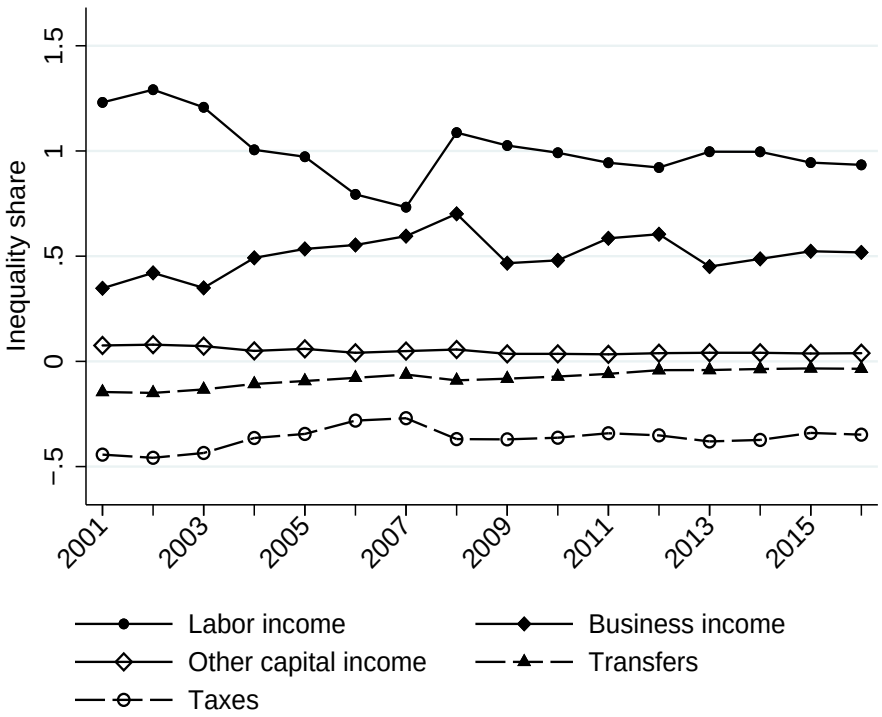
Using our measure of B



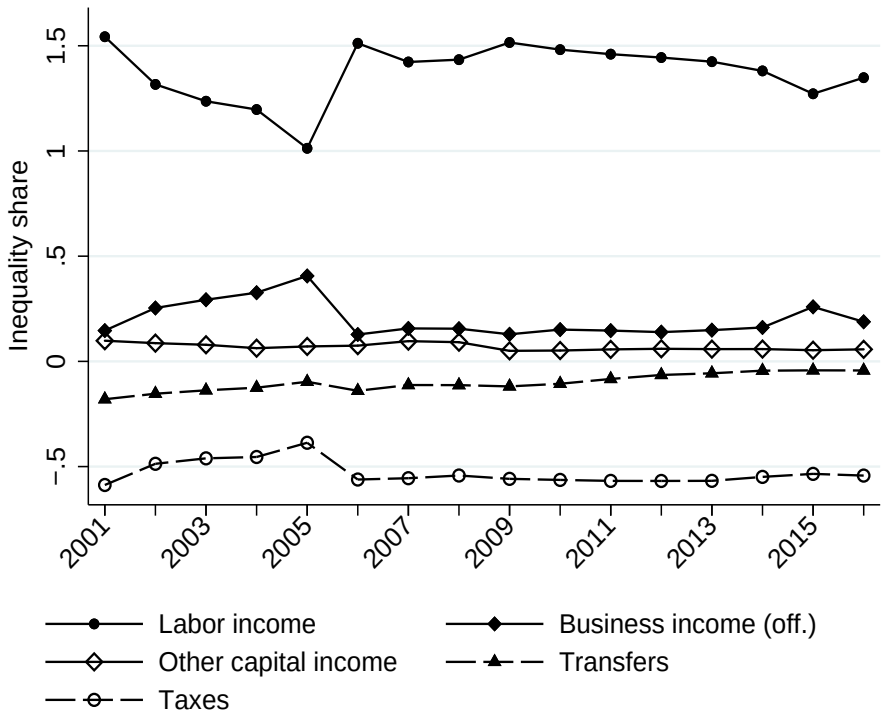
Results (5) - Decomposition of G: Inequality Shares

Comparing decomposition with official measure of B to ours

(a) Our Measure of B



(b) Official Measure



Results - Summary (2)

- **Labor** and **business** income are the two components that contributed the most to inequality over the period
  - both with **disequalizing effects** (becoming more equal over time)
- Both *taxes* and *government cash transfers* are **equalizing**, as expected, but slightly less so towards the end of the period
- *Other capital income* has only a very **limited** impact on overall inequality

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- *Other capital income* has only a very **limited** impact on overall inequality

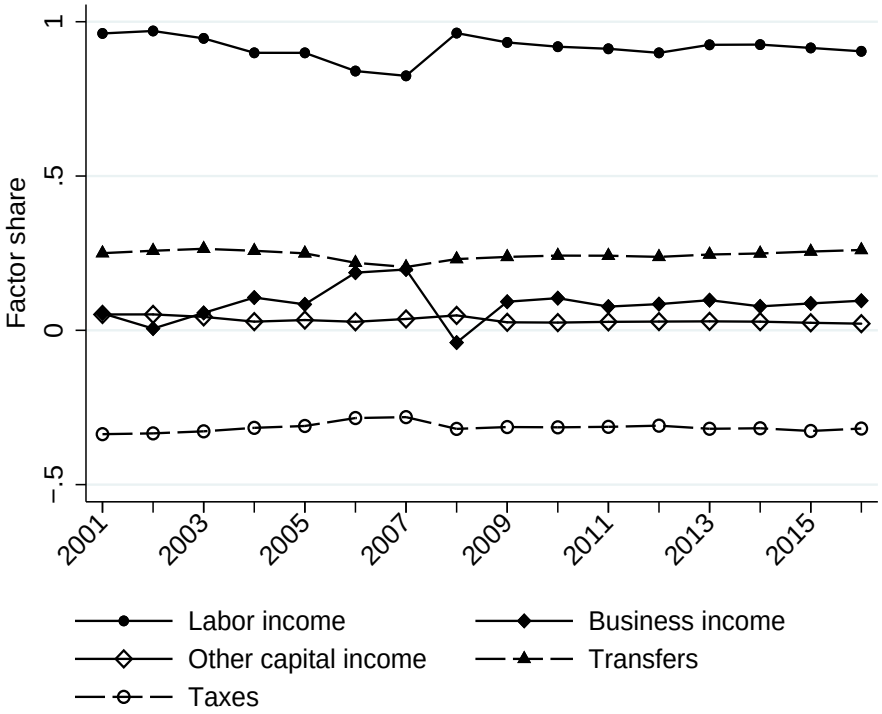
– **Official statistics**: labor income gets a much higher inequality share, especially after the 2006 reform, while the inequality share of business income is lower

– L has larger **disequalizing** contribution, while B has much **smaller** disequalizing contribution as compared to our preferred measure

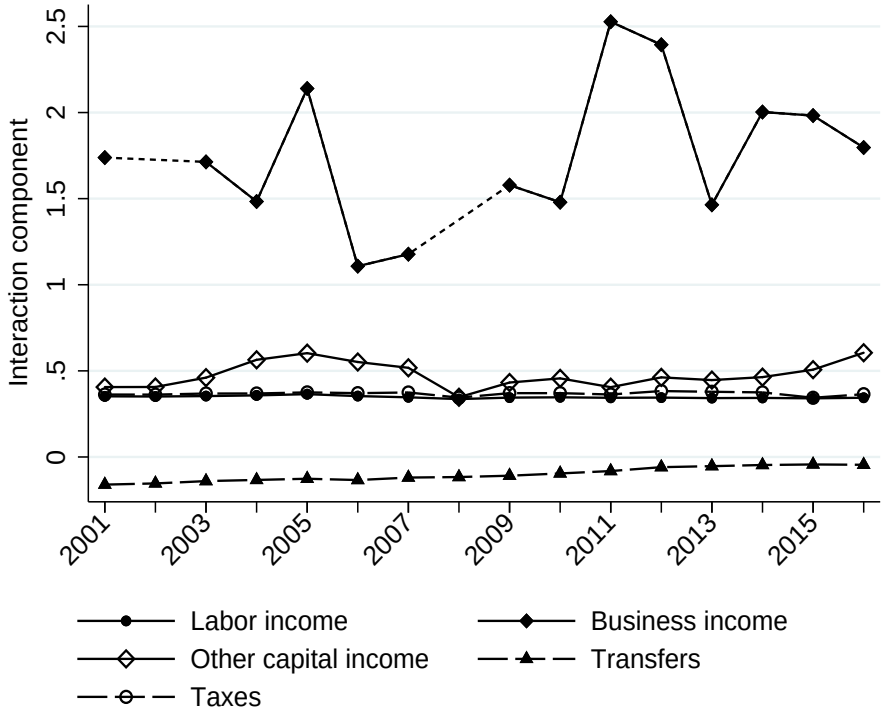
Results (6) - Decomposition of G: Inequality Shares

Factor shares and interaction components

(a) Factor shares ($\frac{\mu_c}{\mu}$)



(b) Concentration coefficients (γ_c)



Results - Summary (3)

From the decomposition exercise, we see that:

- **factor shares** of all components have remained fairly **stable** over time, with some fluctuations only for business income
- **concentration coefficient** for labor income has decreased slightly over the period
- while the business income share has fluctuated in line with the business cycle, but only slightly higher at the end than at the beginning

Roadmap (from now on)

1. Measurement Problems with Official Measure of Business Income
2. A New Measure
3. Results
4. **Conclusion**

Conclusion (1)

We have proposed a new measure of business income based on the notion of **retained earnings** (to avoid double counting of profits) and **proposed dividends**, as opposed to the official measure based on distributed dividends and the taxable part of realized capital gains on financial assets

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We end up with a measure of B as it **accrues** rather than when it is realized

We combine several administrative data sources from **Norway** (tax records; ownership data (all owners of limited liability firms); firm level income statements and balance sheet data)

Conclusion (2)

With our new measure, we find that standard inequality estimates **increase** dramatically:

1. **Shares** of market income accruing to the top 1% goes up by 50–60%, going from about 10% using official measures to about 15–16% according to our measure
2. **Gini** coefficient increases from an average of 0.25 with the official measure to an average of 0.33 using our new measure over the sample period, a 30% increase

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2. **Gini** coefficient increases from an average of 0.25 with the official measure to an average of 0.33 using our new measure over the sample period, a 30% increase
3. Contribution to inequality of business income is greater with our measure (and becoming more similar to that of labour income)
4. Gini coefficient estimates are less sensitive to changes in tax incentives and **more** sensitive to **business cycle**

Conclusion (3)

Where next?

(a) Check the **sensitivity** of our measure to the 2006 reform (DD analysis)

(b) Dig deeper into the **role of corporate taxes** (include personal owners' shares of corporate taxes in gross income measures, and investigate the impacts of both corporate and personal taxes on measures of inequality when working with household disposable income)

(c) Explore whether our measure gives us different perspectives on **top income transitions**

The End

THANK YOU

Appendix: Proposed vs Distributed Dividends (1)

Year $t-1$ proposed dividends are distributed in year t:

$$d_{jt} = D_{jt-1}$$

Therefore necessary to subtract $s_{ijt}s_{jkt}(D_{kt-1} - D_{kt})$:

$$\begin{aligned}
Y_{it}^{RE} &= s_{ijt}(\Delta R_{jt} + D_{jt}) + s_{ikt}(\Delta R_{kt} + D_{kt}) + s_{ijt}s_{jkt}\Delta R_{kt} \\
&= s_{ijt}(\Pi_{jt} - D_{jt} + D_{jt}) + s_{ikt}(\Pi_{kt} - D_{kt} + D_{kt}) + s_{ijt}s_{jkt}(\Pi_{kt} - D_{kt}) \\
&= s_{ijt}(\tilde{\Pi}_{jt} + s_{jkt}D_{kt-1}) + s_{ikt}\tilde{\Pi}_{kt} + s_{ijt}s_{jkt}(\tilde{\Pi}_{kt} - D_{kt}) \\
&= s_{ijt}\tilde{\Pi}_{jt} + s_{ikt}\tilde{\Pi}_{kt} + s_{ijt}s_{jkt}\tilde{\Pi}_{kt} + s_{ijt}s_{jkt}(D_{kt-1} - D_{kt}).
\end{aligned}$$

Appendix: Proposed vs Distributed Dividends (2)

If we use $d_{ijt} = s_{ijt} D_{jt-1}$ rather than $s_{ijt} D_{jt}$, we get

$$
\begin{aligned}
Y_{it}^{d} &= s_{ijt}\Delta R_{jt} + d_{ijt} + s_{ikt}\Delta R_{kt} + d_{ikt} + s_{ijt}s_{jkt}\Delta R_{kt} \\
&= s_{ijt}(\Pi_{jt} - D_{jt} + D_{jt-1}) + s_{ikt}(\Pi_{kt} - D_{kt} + D_{kt-1}) + s_{ijt}s_{jkt}(\Pi_{kt} - D_{kt}) \\
&= s_{ijt}(\tilde{\Pi}_{jt} + s_{jkt}D_{kt-1} - D_{jt} + D_{jt-1}) + s_{ikt}(\tilde{\Pi}_{kt} - D_{kt} + D_{kt-1}) \\
&\quad + s_{ijt}s_{jkt}(\tilde{\Pi}_{kt} - D_{kt}) \\
&= s_{ijt}\tilde{\Pi}_{jt} + s_{ikt}\tilde{\Pi}_{kt} + s_{ijt}s_{jkt}\tilde{\Pi}_{kt} \\
&\quad + s_{ijt}(D_{jt-1} - D_{jt}) + s_{ikt}(D_{kt-1} - D_{kt}) + s_{ijt}s_{jkt}(D_{kt-1} - D_{kt}),
\end{aligned}
$$

Appendix: Shares of Income Accruing to the Top 1%

Alstadsæter-Jacob-Kopczuk-Telle (2016) vs Our Measure

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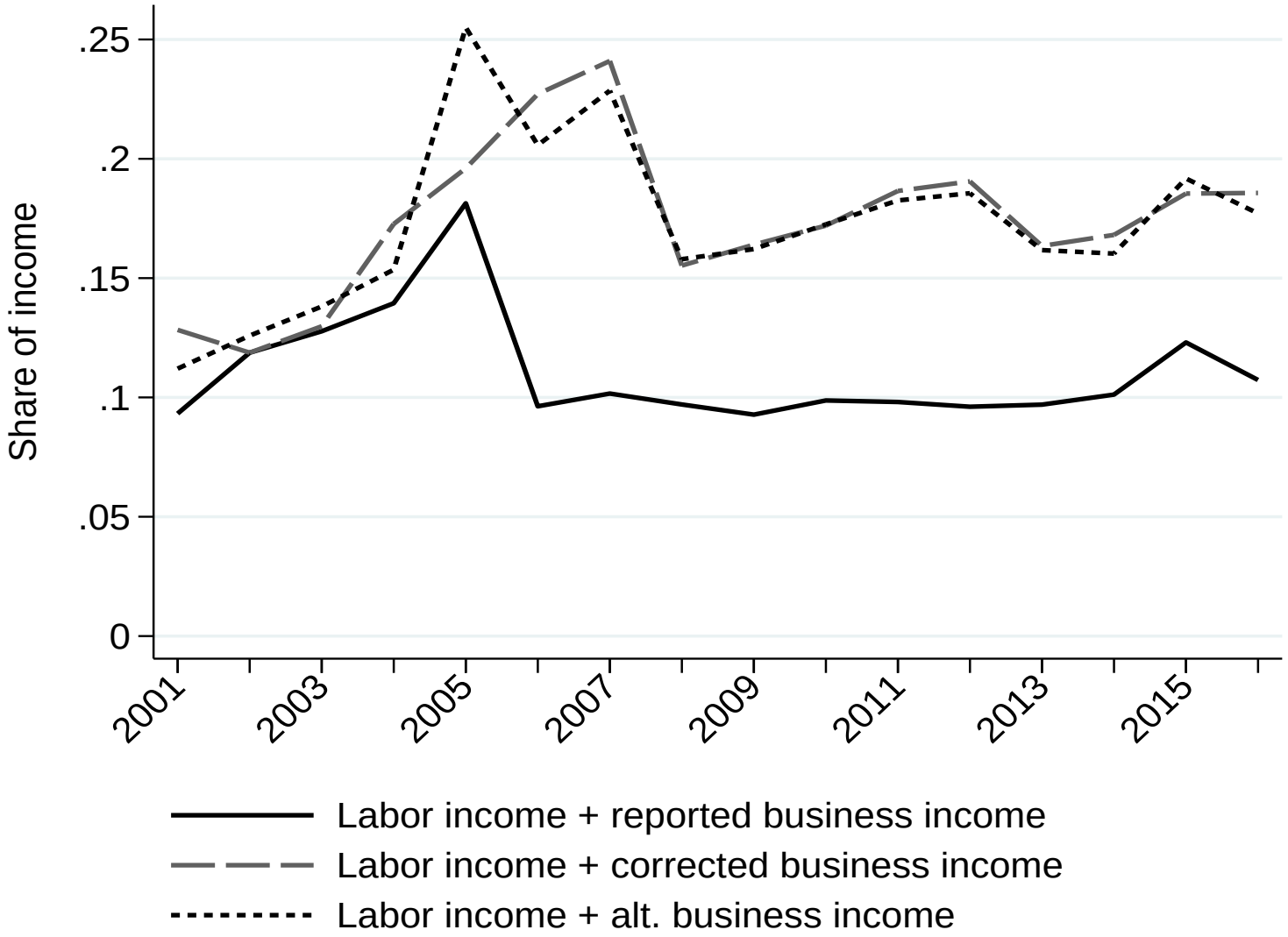

Appendix: Importance of Indirect Ownership - Top 1% shares