Income Taxation, Firing Cost and Insurance within Firms

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Firms and optimal income taxation

People differ in initial ability and face productivity shocks along the life cycle.

We want to redistribute income and insure risk. Typically with income tax.

What is the role of firms?

Can firms insure their workers? How? Is it desirable?

Important clues:

- Firms have more information than the government.
- Firms can fire, workers can quit.
- Firms help their workers to avoid taxes.

This paper: a theory of optimal taxation with endogenous insurance on the labor market.

Why are firms important for personal income taxation?

Firms insure workers

- Lifetime employment: Flabbi and Ichino (2001),Watanabe (2000).
- Predictable income: Guiso, Pistaferri, and Schivardi (2005),Watanabe (2000), Lagakos and Ordonez (2011).

Firms help workers avoid taxes: income shifting

Kreiner, Leth-Petersen, and Skov (2015, 2014): in Jan 2010 Denmark reduced the top tax rate, which affected 1/4 of all employees.

- 10% of affected income was shifted from Nov/Dec 2009 to Jan 2010.
- Top managers shift both bonuses and salaries.

This paper

Key assumptions

- Every worker has an idiosyncratic productivity which evolves stochastically.
- Workers' productivities are observed by firms, but neither by the government nor financial markets.
- Firms can fire, workers can quit.

Main results

1. A high firing cost enables insurance within firms.
2. However, a high firing cost also enables tax avoidance within firms.
   - Firms shift incomes to histories with low marginal tax rates.

→ Trade-off between insurance and redistribution
   - Low productivity workers may end up uninsured, but with higher transfers.

3. Inclusion of private insurance simplifies tax implementation
   - Tax rates as in Mirrlees (1971), tax on consumption expenditures.

Related literature & contribution

Optimal taxation with firms / private insurance markets

Golosov and Tsyvinski (2007); Chetty and Saez (2010); Stantcheva (2014); Attanasio and Rıos-Rull (2000); Krueger and Perri (2011); Ábrahám, Koehne, and Pavoni (2016)

Here: private insurance constrained by commitment, not by information.

Simple fiscal implementations

Albanesi and Sleet (2006); Farhi and Werning (2013); Weinzierl (2011); Findeisen and Sachs (2015); Conesa, Kitao, and Krueger (2009)

Here: private insurance makes the optimal non-linear tax very simple.

Firing costs, dual labor markets

Blanchard and Tirole (2008); Cabrales, Dolado, and Mora (2014); García-Pérez, Marinescu, and Castello (2014); Bentolila, Cahuc, Dolado, and Le Barbanchon (2012); Kosior, Rubaszek, and Wierus (2015)

Here: firing costs affect how workers respond to taxes.

Plan of the presentation

Workers

A continuum of workers live for $\bar{t} \in \mathbb{N}$ periods and have a utility function

$$u(c) - v(n),$$

where $u'' \leq 0$ and $v'' > 0$. They discount future with β.

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In every period each worker draws a productivity from the finite set $\Theta \subset \mathbb{R}_+$.

A history is a sequence of productivity draws

$$\theta^t = (\theta_1, ..., \theta_t) \in \Theta^t.$$

History θ^t happens with probability $\mu(\theta^t)$.

History θ^t, conditional on sub-history θ^s, happens with probability $\mu(\theta^t \mid \theta^s)$.

Useful sets

$\mathcal{H}$	all possible histories	$\equiv \cup_{t=1}^{\bar{t}} \Theta^t$
$\mathcal{H}(\theta^s)$	all histories containing sub-history θ^s	$\equiv \{\theta^s\} \times \cup_{t=1}^{\bar{t}-s} \Theta^t$

Firms

A continuum of identical, risk neutral firms with a linear production technology.

They face exogenous interest rate $R = \beta^{-1}$.

Allocation and payoffs

The allocation (c, y, n) specifies

- consumption $c : \mathcal{H} \to \mathbb{R}_+$,
- labor income $y : \mathcal{H} \to \mathbb{R}$,
- labor supply $n : \mathcal{H} \to \mathbb{R}_+$.

Take some allocation (c, y, n).

The expected utility of the worker with history θ^s is

$$U\left(c, n; \theta^s\right) \equiv \sum_{\theta^t \in \mathcal{H}(\theta^s)} \mu\left(\theta^t \mid \theta^s\right) \beta^{t-s} \Big(u\left(c(\theta^t)\right) - v(n(\theta^t)) \Big). \tag{1}$$

The firm's expected profit from hiring the worker with history θ^s is

$$\Pi\left(y, n; \theta^s\right) \equiv \sum_{\theta^t \in \mathcal{H}(\theta^s)} \mu\left(\theta^t \mid \theta^s\right) R^{t-s} \Big(\theta_t n(\theta^t) - y(\theta^t) \Big). \tag{2}$$

Labor market

1. Workers enter the labor market after the initial productivity draw.
2. Firms make offers dependent on the initial productivity.
3. Workers observe all offers: a Bertrand competition among firms.

Contracts can differ in the firing cost f

no firing cost

$f = 0$

high firing cost

$f = \bar{f}$

Assumption: $\bar{f}$ is so high enough s.t. a firm never fires a worker.

Denote by f the assignment of type of contract to the worker's history

$$f : \mathcal{H} \to \left\{0, \bar{f}\right\}.$$

Social planner

Observables: consumption c, firing cost f, labor income y.

Unobservables: individual productivity θ, hours worked n, output θn.

Revelation principle: we can restrict attention to *direct mechanisms*

1. The planner commits to the mechanism $\{\mathcal{H}, (c, y, f)\}$.
2. In every period each worker makes a type report $r \in \mathcal{H}$.
3. The planner assigns him $(c(r), y(r), f(r))$.

The *truthful reporting strategy* r^* : $\forall_{h \in \mathcal{H}} r^*(h) = h$.

W.l.o.g. we can restrict attention to pure reporting strategies.

Labor market equilibrium

Equilibrium consists of reporting strategy r and labor policy n.

Lemma

The set of equilibria of mechanism (c, y, f) is

$$\mathcal{E}(c, y, f) \equiv \arg\max_{r,n} \sum_{\theta^1 \in \Theta} \mu(\theta^1) U\left(c \circ r, n; \theta^1\right)$$

$$\begin{array}{lll} \textit{s.t.} & & \\ \textit{zero profit:} & \forall_{\theta^1 \in \Theta} & \Pi\left(y \circ r, n; \theta^1\right) = 0 \\ \textit{limited commitment:} & \forall_{\theta^t \in \mathcal{H}} & -f\left(r\left(\theta^t\right)\right) \leq \Pi\left(y \circ r, n; \theta^t\right) \leq 0 \end{array}$$

Equilibrium policies (r, n) maximize workers' ex ante utility subject to

1. zero profit condition
   $\rightarrow$ firms cannot redistribute among the initial types.
2. limited commitment constraints
   $\rightarrow$ at no history a worker or a firm have incentives to terminate the contract.

Social planner's problem

The planner maximizes the social welfare function (with Pareto weights λ)

$$\max_{c,y,f} \sum_{\theta^1 \in \Theta} \lambda(\theta^1)\ \mu(\theta^1)\ U(c, n; \theta^1)$$

subject to the resource constraint

$$\sum_{\theta^t \in \mathcal{H}} \mu(\theta^t) R^{-t} \left(y(\theta^t) - c(\theta^t) \right) \geq 0$$

and the implementability constraint

$$(r^*, n) \in \mathcal{E}(c, y, f).$$

The implementability constraint means that:

- there exists an equilibrium with truthful reporting,
- labor supply is determined by the truthful equilibrium.

Plan of the presentation

No firing costs

Lemma (Equivalence to NDPF)

Suppose that the planner sets all firing costs to zero.

Firms provide no insurance. The planner's problem is equivalent to New Dynamic Public Finance problem.

Without firing costs, the limited commitment constraints become

$$\forall_{\theta^t \in \mathcal{H}} \quad \Pi(y, n; \theta^t) = 0 \implies y(\theta^t) = \theta_t n(\theta^t).$$

Income is always equal to output $\rightarrow$ no insurance within firms.

Conditional on no firing costs, the optimal allocation involves:

- history dependent tax on labor income: Farhi and Werning (2013); Golosov, Troshkin, and Tsyvinski (2016),
- tax on capital income: Golosov, Kocherlakota, and Tsyvinski (2003); Kocherlakota (2005),
- only partial consumption insurance.

High firing costs

Theorem (High firing costs solve commitment problem)

With high firing costs, the limited commitment constraints do not restrict the set of implementable allocations of consumption and labor supply.

Specifically, workers can get full consumption insurance within firms. How?

With high firing costs, limited commitment constraints become

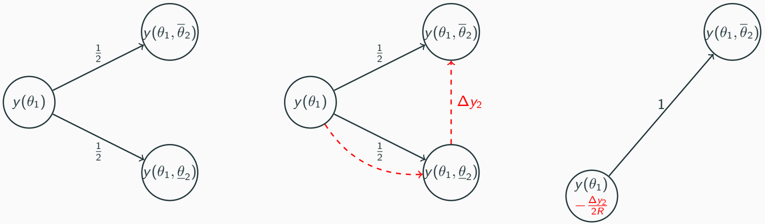
$$\forall_{\theta^t \in \mathcal{H}} \quad \Pi\left(y \circ r, n; \theta^t\right) \leq 0.$$

→ As long as profits are non-positive, $y(\theta^t)$ can be $\neq$ than $\theta_t n(\theta^t)$.
→ Income payments can be shifted to later periods (backloading).

How to insure workers by backloading income?
→ Pay less today, pay more tomorrow when productivity is low.

High firing costs: insurance via backloading

1. Income process without insurance. 2. A firm shifts income forward. 3. A deterministic income path.



All this happens without changing the labor supply allocation.

Now income is deterministic, but not constant across time.

How to smooth consumption?

- borrow against future wages: Harris and Holmstrom (1982).
- age/tenure dependent taxation.

Optimal firing costs

Theorem (High firing costs for top taxpayers)

An initial type θ^1 is a top taxpayer if

$$\theta^1 \in \arg\max_{\theta} \sum_{\theta^t \in \mathcal{H}(\theta)} R^{-t} \mu(\theta^t \mid \theta) \left(y(\theta^t) - c(\theta^t) \right).$$

Assigning high firing cost and full consumption insurance to top taxpayers is Pareto improving.

Assign high firing cost to initial types that pay the highest lifetime taxes.

- Top taxpayers benefit as they are better insured.
- If other types decide to mimic a top taxpayer, they won't be worse off and they will pay higher taxes.

With Markov productivities, result applies to top taxpayers after every history.

Conclusion: It is *never* optimal to set all firing costs to zero.

Optimal firing costs

Proposition (Redistribution channel)

Suppose that (i) productivities are iid, (ii) $u(c) = c^{1-\sigma}/(1-\sigma)$, (iii) the planner is Rawlsian: $\lambda(\theta) = 0 \; \forall_{\theta \neq \underline{\theta}}$.

There exists a threshold $\bar{\sigma} > 0$ such that when $\bar{\sigma} > \sigma$, assigning zero firing cost to the initially least productive type $\underline{\theta}$ is welfare improving.

Assigning zero firing cost to $\underline{\theta}$ has two effects:

1. reduces consumption insurance of $\underline{\theta}$ $\rightarrow$ welfare loss bounded by $\sigma < \bar{\sigma}$.
2. relaxes the incentive constraints $\rightarrow$ strictly positive gain in redistribution.

Optimal firing costs

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Why are incentive constraints relaxed?

When $f(\underline{\theta}) = \bar{f}$, income can be backloaded $\rightarrow$ mimicker can produce more initially and be paid more than his output in the future.

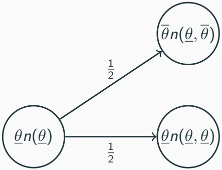
Mimicker has higher initial productivity, so he likes it!

High firing costs and tax avoidance within firm

$\Theta = \{\underline{\theta}, \overline{\theta}\}, \overline{\theta} > \underline{\theta}$, two periods.

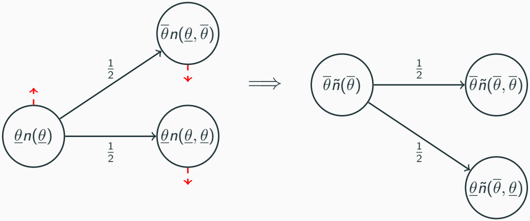
Allocation of output of $\underline{\theta}$

and of mimicker if $f(\underline{\theta}) = 0$.



Allocation of output of mimicker when $f(\underline{\theta}) = \bar{f}$

Mimicker has incentives to produce more today and less tomorrow



$f(\underline{\theta}) = 0$: Mimicker has output equal to income at each history.

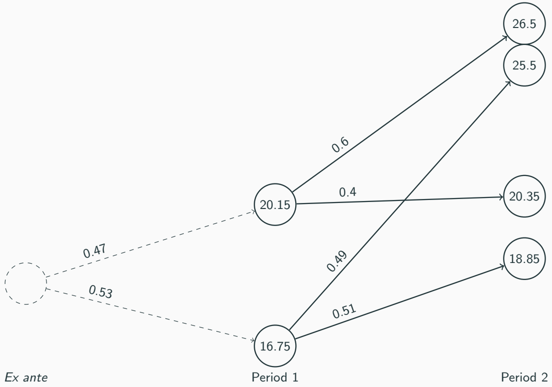
$f(\underline{\theta}) = \bar{f}$: Mimicker produces more using higher initial productivity and less in the future. Firm shifts income forward, s.t. income allocation is unchanged.

$\rightarrow$ mimicker strictly gains in comparison to $f(\underline{\theta}) = 0$

Plan of the presentation

Calibration to Italy

I estimate a simple income process from Work Histories Italian Panel.



Following Saez (2001), I derive productivities using the actual Italian income tax and the utility function $u(c) - v(n) = \log(c) - \frac{n^2}{2}$.

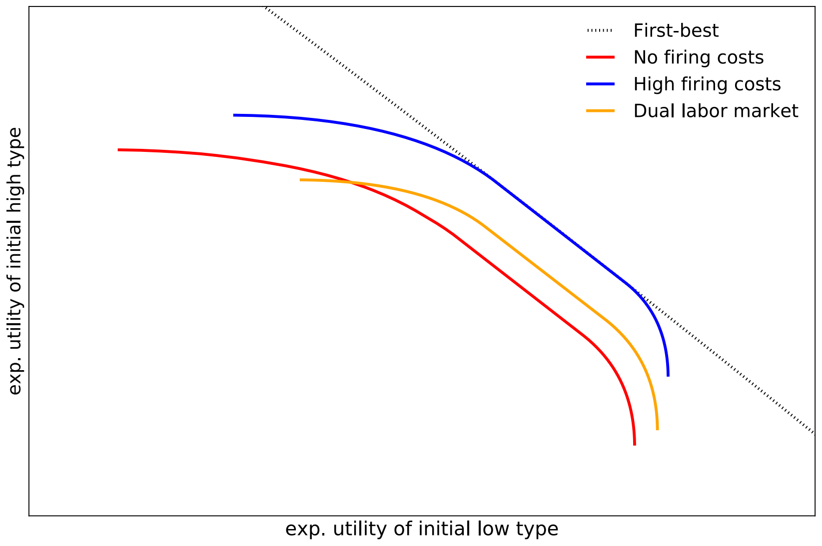
3 scenarios

No firing cost: both initial types have zero firing cost.

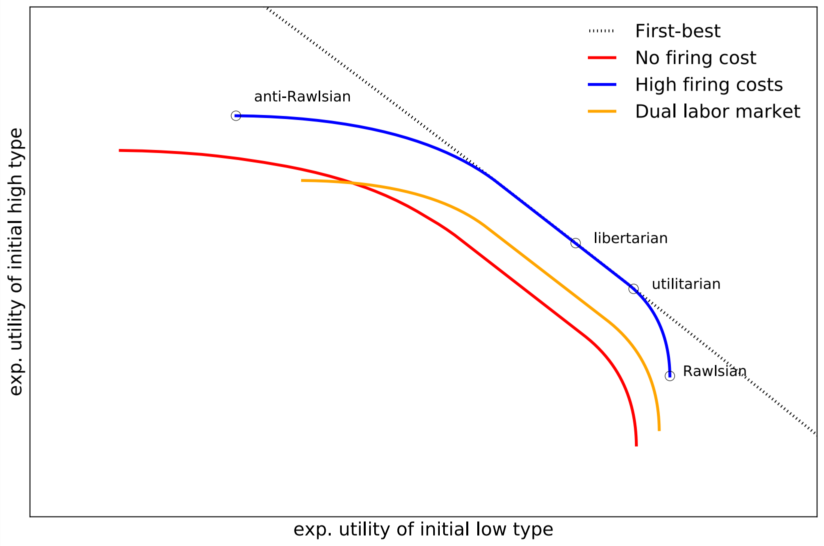
High firing cost: both initial types have high firing cost.

Dual labor market: Initial high type has high firing cost, initial low type has zero firing cost.

Pareto frontiers



Pareto frontiers



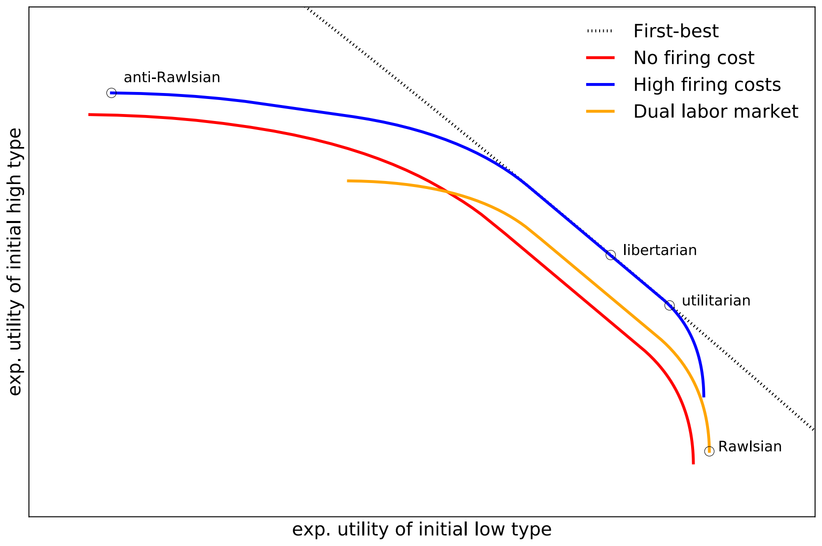
Large welfare gains from using permanent contracts

Welfare [consumption equivalent]

	utilitarian	libertarian	Rawlsian	anti-Rawlsian
laissez-faire	100%	100%	100%	100%
no firing costs	102.8%	102.6%	107.2%	105.9%
high firing costs	104.3%	104.1%	108.3%	107.2%
relative gain from high firing costs	53.3%	59.7%	12.9%	20.3%

High firing costs imply large welfare gains especially when the planner is not 'too redistributive'.

Pareto frontiers with increased initial differences ($\underline{\theta} \searrow$ by 5%)



Conclusions

1. Firing costs enable insurance within firms.

2. Firing costs enable tax avoidance within firms as well.

3. Policy implications:
   - → high firing costs at high incomes,
   - → possibly zero firing costs at low incomes.

   Such arrangement maximizes redistribution from high to low incomes.

4. Private insurance simplifies tax implementation: tax rates as in Mirrlees (1971), consumption expenditure tax. [not shown today]