



**Pension saving responses to anticipated tax changes
Evidence from monthly pension contribution records**

Kreiner, Claus Thustrup; Leth-Petersen, Søren; Skov, Peer

Published in:
Economics Letters

DOI:
[10.1016/j.econlet.2016.11.011](https://doi.org/10.1016/j.econlet.2016.11.011)

Publication date:
2017

Document version
Publisher's PDF, also known as Version of record

Document license:
[CC BY-NC-ND](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Citation for published version (APA):
Kreiner, C. T., Leth-Petersen, S., & Skov, P. (2017). Pension saving responses to anticipated tax changes: Evidence from monthly pension contribution records. *Economics Letters*, 150, 104-107.
<https://doi.org/10.1016/j.econlet.2016.11.011>



Pension saving responses to anticipated tax changes: Evidence from monthly pension contribution records



Claus Thustrup Kreiner^{a,b}, Søren Leth-Petersen^{a,b,*}, Peer Ebbesen Skov^c

^a University of Copenhagen, Øster Farimagsgade 5, DK-1353 Copenhagen, Denmark

^b CEPR, United Kingdom

^c Auckland University of Technology, 120 Mayoral Drive, Auckland 1010, New Zealand

HIGHLIGHTS

- Denmark passed a tax reform in May 2009 taking effect from the beginning of 2010.
- The reform lowered the tax rate on top bracket taxable income from 63% to 56%.
- This increased pensions savings before the change in taxation was enacted.
- Savings in tax deferred pension accounts as well as total pension savings increased.

ARTICLE INFO

Article history:

Received 22 August 2016

Received in revised form

9 November 2016

Accepted 10 November 2016

Available online 14 November 2016

JEL classification:

H3

Keywords:

Pension savings

Tax incentives

High frequency individual data

ABSTRACT

A Danish tax reform, passed in May 2009 and taking effect from the beginning of 2010, lowered the marginal tax rate on top bracket taxable income from 63% to 56%. Because contributions to pension accounts are tax deductible, the reform provided an incentive to increase pension contributions before the change in taxation. Using high frequency panel data, we document a temporary increase in pension contributions in the second half of 2009 in response to the anticipated change in taxation, and that this led to an increase in total savings in this period. The response is driven by less than 5% of those affected by the policy.

© 2016 The Authors. Published by Elsevier B.V.
This is an open access article under the CC BY-NC-ND license
(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

It is a long-standing topic of interest whether tax incentives effectively increase savings at the individual level, but due to a lack of high quality data on savings the economic literature has struggled to provide decisive answers (Bernheim, 2002). In a recent paper, Chetty et al. (2014) use high quality annual data on savings for the Danish population to show that a permanent change in the tax subsidy to pension contributions is ineffective at increasing savings in private pension accounts. A small minority of people shift their savings to other accounts when the tax incentives are changed, while the large majority do not respond at

all. A hitherto neglected temporary tax incentive for saving in tax deferred accounts arises in connection with the announcement of income tax reforms that change the value of future tax deductions by altering the marginal tax rate (MTR). We use a recent tax reform in Denmark as a natural experiment to identify the short run behavioral response to an anticipated change in taxes by exploiting a new data source with information of pensions contributions at the monthly frequency.

2. The 2010 Danish tax reform, data, and method

The Danish tax system consists of proportional taxes (a regional tax, a church tax, a labor market tax, and a bottom bracket income tax) and a progressive schedule on top of that. In 2009 the proportional taxes amounted to 43.5% and the progressive schedule consisted of a middle bracket tax rate of 6% and a top bracket tax rate of 15%. The middle and top tax brackets applied to income above DKK 377,000 (one USD corresponds to around

* Corresponding author at: University of Copenhagen, Øster Farimagsgade 5, DK-1353 Copenhagen, Denmark.

E-mail addresses: ctk@econ.ku.dk (C.T. Kreiner), soren.leth-petersen@econ.ku.dk (S. Leth-Petersen), pskov@aut.ac.nz (P.E. Skov).

<http://dx.doi.org/10.1016/j.econlet.2016.11.011>

0165-1765/© 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

DKK 6.5). A tax reform, passed by parliament on May 28, 2009 and taking effect from January 1, 2010, removed the middle bracket tax and increased the top-tax threshold to DKK 424,000. The tax reform lowered the MTR from almost 63% to 56% for people paying top taxes while leaving the marginal tax rate practically unchanged for others.¹ Because contributions to pension savings accounts are deductible the reform gave an incentive during the announcement period to advance pension contributions to 2009 while the tax rate was high.

The Danish pension system consists of three components that are typical of retirement savings systems in developed countries: a state-provided defined benefit (DB) plan (analogous to Social Security in the United States), employer organized defined contribution (DC) accounts (analogous to 401(k)s in the United States), and privately organized DC accounts (analogous to IRAs in the United States). 90% of all DC contributions are made to employer organized accounts. For further details, see [Chetty et al. \(2014\)](#). In Denmark, as in the US, there is increased reliance on DC schemes and this raises the interest in understanding the factors determining these contributions.

Our analysis is based on a new administrative register (called the *elIncome* register) with monthly information from employers about wages, salaries and contributions to employer organized pension accounts for all employees in Denmark. We have access to data covering the 48 months from January 2008 to December 2011. The *elIncome* register contains the identification number of the employee, which we use to link the data to annual records with additional information about financial wealth.

To identify the effect of the reform on pension contributions during 2009, we split the sample into taxpayers who experienced a reduction in their MTR and taxpayers who did not, where people are allocated to a tax bracket based on income in 2008. The treatment group (T-group) includes employees with monthly gross earnings above DKK 35,000 in 2008, roughly the 75th percentile of the income distribution. The control group (C-group) includes individuals with a monthly income in the range DKK 30,000–35,000.

Our sample consists of all individuals who are employed in the private sector, and where we have 48 consecutive observations from January 2008 to December 2011 with positive wage income. We further limit the sample to individuals with contributions to annuity pension schemes of less than DKK 100,000 in 2008.² The final sample consists of 116,724 individuals in the T-group and 64,287 individuals in the C-group.

3. Results

Fig. 1, panel A displays the average monthly contribution rate – measured in proportion to total monthly gross payments to the individual – to employer organized pension accounts. The contribution rate for the C-group is more or less constant at a level of 4.5% throughout the observation period. For the T-group the level is slightly higher. More importantly, there is a spike in the contribution rate towards the end of 2009. This is consistent with

the tax incentive to increase payments while the deduction rate is still at a high level.

The graph does not reveal whether the effect is driven by many individuals who change their contributions a little, or whether it is driven by a few individuals who change their contributions a lot. In order to identify individuals who made extraordinarily large pension contributions, we construct a dummy indicator that equals one for an individual if the pension contribution rate in December 2009 is 25 percentage points higher than its level in December 2008.³ Panel B of **Fig. 1** is similar to panel A with the exception that the treatment group is divided into a group consisting of individuals who made extraordinarily large contributions according to the dummy indicator (T-group2) and another group consisting of individuals who did not (T-group1). 4818 persons made extraordinary contributions according to this definition, and panel B shows that the entire increase in the average monthly rate of pension contribution from panel A is driven by the group who made extraordinary contributions.

Fig. 1 documents higher contributions to employer organized pension accounts, but it does not reveal whether this increase is offset by reduced savings in other accounts. We address this issue in **Table 1**, which is based on annual data from the income-tax register on savings in privately organized retirement savings accounts and in financial assets in each of the years 2006–2011. To quantify the effect of the increased contributions to employer organized accounts on savings in privately organized pension savings accounts, we estimate the following equation

$$P_{it}^{Priv} = \beta_0 + \beta_1 D_t + \beta_2 P_{it}^{Empl} + \mu_i + u_{it} \quad (1)$$

where P_{it}^{Priv} are contributions to privately organized pension savings accounts in year t measured as a fraction of total annual gross payments, D_t is a vector of year dummies, P_{it}^{Empl} are contributions to employer organized accounts measured as a fraction of total annual gross payments, μ_i is an individual specific effect, which is potentially correlated with the explanatory variables, and u_{it} is an error term. The parameter of interest β_2 measures the effect of increasing contributions to employer organized accounts on contributions to privately organized accounts. We instrument P_{it}^{Empl} using the interaction $D_{2009} \times D_i^{Treat}$ where the indicator D_i^{Treat} is one for individuals belonging to the treatment group. This isolates the changes in contributions to employer organized accounts that are related to the anticipated tax change.

Columns (1) and (2) in **Table 1** present the results from the estimation. Column (1) is based on the full sample. The results show that when contributions to employer organized accounts increase by one unit then contributions to privately organized accounts increase by 0.156 units. The positive coefficient means that contributions to employer accounts crowd in contributions to private accounts. Crowding in is expected since the tax incentive also applies to private accounts. In column (2) we limit the treatment group to include only the 4818 individuals who made extraordinary contributions to their employer organized accounts. The parameter estimate from this regression based on the T-group2 and the C-group is smaller, showing that the group contributing extraordinarily to employer organized accounts is only partially overlapping with the group that contributes extra to privately organized accounts.

Finally, we estimate the effect of the total increase in contributions to tax favored pension savings accounts, i.e. both employer organized and privately organized accounts, on savings

¹ Formally, there is a gross labor market contribution (*LMC*), a regional tax (*RT*), a bottom tax (*BT*), a middle tax (*MT*), a top tax (*TT*), and a church tax (*CT*). Before January 1, 2010 the marginal tax rate for a top taxpayer was $MTR = LMC + (1 - LMC) \times (RT + BT + MT + TT + CT) = 8 + (100 - 8) \times (32.8 + 5.04 + 6 + 15 + 0.7) \simeq 63\%$. After January 1, 2010 the marginal tax rate for a top taxpayer was $MTR = 8 + (100 - 8) \times (32.8 + 3.67 + 0 + 15 + 0.7) \simeq 56\%$. See [Kreiner et al. \(2016\)](#) for more details about the tax system and the 2010 reform.

² The latter selection is imposed because the tax deductibility for contributions to annuity schemes was capped at DKK 100,000 from 2010, and we want to avoid interference from this rule change when measuring the effect of the change in the marginal tax rate on contributions in 2009.

³ Results are very similar if we use other thresholds than 25 percentage points or use a dummy indicator that equals one if an individual has extraordinarily high contribution rates in any of the months after the reform was decided.

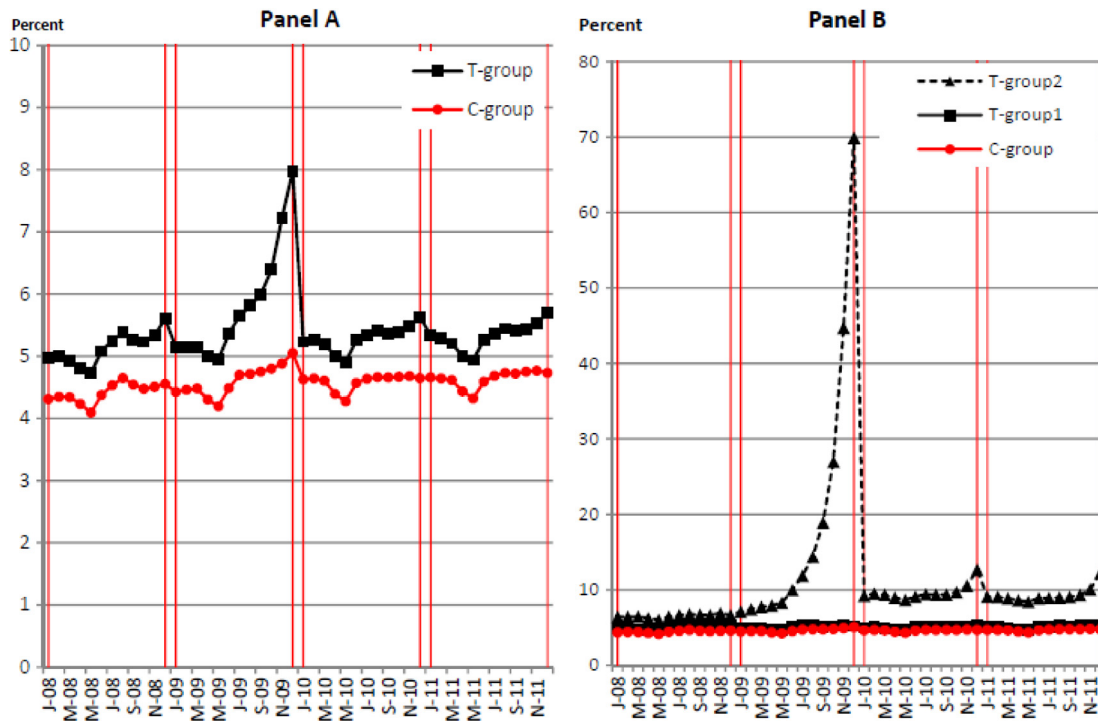


Fig. 1. Contributions to employer organized retirement savings accounts.

Notes: Panel A and B show average monthly contributions to employer organized pension accounts as a share of total gross payments for the T-group and C-group (Panel A) and T-Group1, T-Group2 and the C-group (Panel B). The C-group (64,287) includes all private sector employees with average monthly wage income in the range DKK 30,000–35,000 in 2008, contributions to annuity pension schemes of less than DKK 100,000 in 2008, and (48) registered monthly wage payments from January 2008 to December 2011. The T-group (116,724) includes all private sector employees with average monthly wage income above DKK 35,000 in 2008, contributions to annuity pension schemes of less than DKK 100,000 in 2008, and (48) registered monthly wage payments from January 2008 to December 2011. T-group2 (4818) includes all individuals from the T-group whose contribution rate in December 2009 was at least 25 percentage points higher than their contribution rate in December 2008. The T-group1 includes members of the T-group who are not included in T-group2.

Table 1

Effect of the tax reform on savings in privately organized retirement accounts and on savings in financial assets.

Dependent variable	(1) p^{Priv}	(2) p^{Priv}	(3) S	(4) S
p^{Empl}	0.156*** [0.126,0.186]	0.050*** [0.042,0.057]		
p^{TotPen}			−0.650 [−1.362,0.063]	−0.086 [−0.222,0.050]
Observations	1,069,320	408,702	1,069,320	408,702

Notes: 95% confidence intervals reported in square brackets. These are based on standard errors which are clustered at the individual level. Columns (1) and (2) present estimates of β_2 from Eq. (1) and columns (3) and (4) present estimates of α_2 from Eq. (2). p^{Empl} and p^{TotPen} are instrumented with $D_{i,2009} \times D_i^{Treat}$. Estimates in column (1) and (2) are based on the full sample. Estimates in columns (2) and (4) include only those individuals in the treatment group who made extraordinary contributions to employer organized retirement accounts before the reform, here defined as having a pension contribution rate measured in proportion to total gross payments in December 2009 that is 25 percentage points higher than its level in December 2008. All regressions include year dummies and control for individual fixed effects.

*** Indicates that the coefficient is significant at a 0.1% level.

in financial assets by running the following regression

$$S_{it} = \alpha_0 + \alpha_1 D_t + \alpha_2 p_{it}^{TotPen} + \theta_i + v_{it} \quad (2)$$

where S_{it} is savings in financial assets relative to total gross payments. The income tax register records financial wealth at the end of the year and savings in financial wealth is then approximated by the difference between financial wealth in year t and year $t - 1$. D_t is a vector of year dummies and p_{it}^{TotPen} are total contributions to tax subsidized retirement savings accounts measured as a fraction of total annual gross payments, which is instrumented using the interaction $D_{2009} \times D_i^{Treat}$. Column (3) shows estimates for the full sample and column (4) shows estimates for the sample where the treatment group only consists of the 4818 individuals who made extraordinary contributions to their employer organized retirement savings account. In both cases the parameter is insignificant. The estimate in column (3) has

a wide confidence interval, but the estimate in column (4) is more precisely estimated and the confidence interval rules out crowd-out in excess of 22% of the increase in contributions to pension savings accounts. This indicates that a large part of the contributions shown in Fig. 1 passes through to total savings during the announcement period.

4. Conclusion

The announcement of a tax reform that reduces the marginal tax rate creates a temporary incentive to increase savings in tax deferred pension savings accounts during the announcement period, i.e. the period where the policy change is made public but not yet enacted. This is the first paper to document that an announcement of a reduction in the marginal tax rate generates higher savings in such pension accounts during the

announcement period. In addition, we find that the increase in pension contributions passes through to total savings during the announcement period, and that the effect is driven by less than 5% of the people who were affected by the policy change. Our analysis cannot identify the long run effect on pension wealth, but we do not observe any counteracting decrease in pension contributions relative to the pre-announcement level up to 12 months after the tax change took effect.

Acknowledgments

Søren Leth-Petersen is grateful for financial support from The Danish Council for Independent Research grant number 0602-

01719B. The authors would also like to thank the Economic Policy Research Network (EPRN) for financial support.

References

- Bernheim, B. Douglas, 2002. Taxation and saving. In: Auerbach, A.J., Feldstein, M. (Eds.), *Handbook of Public Economics*, Vol. 3. Elsevier, Amsterdam, pp. 1173–1249.
- Chetty, Raj, Friedman, John, Leth-Petersen, Søren, Nielsen, Torben H., Olsen, Tore, 2014. Active vs. passive decisions and crowd-out in retirement savings: Evidence from Denmark. *Quart. J. Econ.* 129 (3), 1141–1219.
- Kreiner, Claus Thustrup, Leth-Petersen, Søren, Skov, Peer Ebbesen, 2016. Tax reforms and intertemporal shifting of wage income: Evidence from danish monthly payroll records. *Am. Econ. J.: Econ. Policy* 8 (3), 233–257.