Tax Reforms and Intertemporal Shifting of Wage Income: Evidence from Danish Monthly Payroll Records

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Abstract

Differences in tax rates over time induce tax payers to shift income between periods. This intertemporal shifting behavior affects the excess burden of the tax system and creates a bias in empirical estimates using tax reforms to identify the long run, structural elasticity of taxable income. We provide strong empirical evidence of large, widespread intertemporal shifting responses in wage income. Our empirical analysis is based on new monthly payroll records for all Danish employees. The identifying variation is provided by a large tax reform that significantly reduced the marginal tax rates for the 1/3 of full-time employees with the highest incomes. The reform was announced in March 2009 and implemented in 2010 thereby giving employees sufficient time to arrange for shifting of income. Income shifting required employee-employer collaboration but did not conflict with the tax law, and is therefore a classic example of tax avoidance. In our analysis, income shifting accounts for 3/4 of the overall elasticity of taxable income. The elasticity of taxable income is increasing in income, as documented by many previous studies, but this increase is explained entirely by an increase in income shifting in proportion to income. Although survey evidence indicates that nine out of ten in the population are unaware of the tax avoidance opportunity, our results suggest that individuals with high income and opportunities to shift are significantly more aware of the possibility.

Incomplete draft. Work in progress.

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1 Introduction

Differences in tax rates over time induce taxpayers to shift income between periods. This intertemporal shifting behavior affects the excess burden and distributional impact of the tax system, and creates a bias in empirical estimates using tax reforms to identify the long run, structural elasticity of taxable income and thereby quantifying the efficiency loss from taxation (Slemrod, 1998; Slemrod and Kopczuk, 2002; Saez et al., 2012).

This paper provides strong empirical evidence of large, widespread intertemporal shifting responses in wage income. Our empirical analysis is based on new administrative records on monthly wages and salaries of all Danish employees. The records have been third-party reported by employers to the tax authorities since the creation of the register in January 2008. The identifying variation is provided by a large tax reform in Denmark, which reduced the highest marginal tax rate on earnings from 63 percent to 56 percent, thereby significantly changing the economic incentives for 1/3 of the full-time employees. The reform was announced in March 2009 and changed the tax scheme for income earned from 2010 and onwards, thereby creating strong incentives for high-wage earners to shift earnings from the end of 2009 to the beginning of 2010. This required, however, cooperation from the employer, who is reporting earnings to the tax authorities. It was possible to shift up to five months of earnings from 2009 to 2010 without coming into conflict with the tax law, and the shifting behavior is therefore a classic example of tax avoidance (for a discussion of the distinction between avoidance and evasion see Slemrod and Yitzhaki, 2002).

Our analysis provides clear graphical evidence of income shifting. By computing the differences between post-announcement and pre-announcement reported monthly earnings, we observe a clear negative spike in the last months of 2009, followed by a positive spike in the beginning of 2010, when comparing the treatment group of high-income individuals to a control group of middle-income individuals with only small changes in incentives. We detect no systematic effects in other months, including December 2010/January 2011, confirming that our results are driven by income shifting.

The large spikes around New Year 2010 are difficult to reconcile with models of real behavior, strongly suggesting that the observed movement in income is due to tax avoidance rather than real responses (Slemrod, 1995). When looking overall at the high-income employees, we find that the average level of reported wage income is five percent lower in December 2009 and five percent higher in January 2010, revealing large shifting effects even at the macro level. On the other hand, given that it
was not illegal to shift income, it would be natural from economic theory to expect even larger effects. This indicates that some types of optimizing frictions are crucial for our observed shifting behavior, in line with the conclusions in Chetty et al. (2011) and Chetty (2012) that optimizing frictions are important for understanding income and labor supply responses to taxation.

The aggregate shifting response masks substantial heterogeneity. With more than 2 million individuals observed monthly over three years and detailed socio-economic background variables, we are able to shed further light on the anatomy of shifting behavior and the underlying frictions. First, the share of income shifting out of income is steadily increasing in the income level with 15 percent of average monthly wage income being shifted around New Year 2010 for the top 10 percent of wage earners and around 30 percent for the top 1 percent of wage earners, indicating that shifting costs do not increase with the size of the incentive to shift income. Second, among the government employees in the treatment group we find no evidence of shifting, which emphasizes the role of employee-employer collaboration and firm willingness for the possibility of shifting income. Third, we conducted a telephone survey among randomly selected individuals in the working-age population in order to study the degree of information/inattention among workers. The survey evidence reveals that less than 10 percent of workers understand the shifting incentive and at the same time believe that shifting would be legal. However, although the awareness of the shifting possibilities is limited in the overall population, the survey and evidence of shifting suggest that individuals with high income and opportunities to shift (e.g. individuals working in the private sector) are much more aware of the shifting possibilities. [We are currently studying the importance of credit constraints, tax payer information proxied by tax payers who have given accountants access to their tax information, firm size, top executives, family ties etc.]

Danish tax return records have recently been used to provide some of the most compelling evidence of behavioral effects to taxation with respect to income responses, labor supply behavior and tax evasion (Chetty et al, 2011; Kleven et al., 2011; Kleven and Schultz, 2012). Our empirical results complements these findings by providing novel evidence of tax avoidance in the form of intertemporal shifting of wage income where existing knowledge is limited. Empirical analyses have detected strong intertemporal shifting effects in capital income due to retiming of capital gains (e.g. Auerbach, 1998) and in taxable income of executives due to timing in the realization of stock options (Goolsbee, 2000). The study by Goolsbee looked at the five highest-paid employees in US public companies, giving a
dataset with annual income of 6,133 top executives, and their responses to the marginal tax rate increase implemented in 1993 by President Clinton. In this data, Goolsbee found little responsiveness of salary and bonuses to the tax hike. This is in contrast to Sammartino and Weiner (1997) who found evidence in aggregate data of time-adjustments in bonuses due to OBRA 1993. A reason for this discrepancy may be that it is easier and more valuable for top executives to change the timing of the realization of stock options than bonuses, while other high-income individuals, who do not have stock options, instead focus their effort on the timing of bonuses. Our results provide some support to this conjecture.

Our results are relevant for the blooming literature, pioneered by Feldstein (1995) and recently surveyed by Saez et al. (2012), using tax reforms to estimate the elasticity of taxable income (ETI). If tax payers temporarily shift income from a period with a high tax rate to a period with a low tax rate then this effect enters into the empirical estimate of the ETI, thereby creating a biased estimate of the underlying structural elasticity. This problem is well-known in the literature (see Saez, Slemrod and Giertz, 2012) and Goolsbee (2000) found evidence of a large bias in his data on top executives. A simple Feldstein analysis on our data gives an overall ETI of around 0.1 for the treatment group, increasing as a function of income from 0.04 to 0.35 for the top one percent (broadly in line with the recent Danish evidence by Kleven and Schultz, 2012). Our result shows that these ETI estimates are almost entirely due to income shifting responses and that the ‘structural’ elasticity—after removing the shifting component—is close to zero throughout the treatment group. This could potentially explain why Chetty et al. (2011) find rather small elasticities of taxable income, when applying the bunching identification strategy of Saez (2010), compared to the larger elasticities found when using income variation generated by tax reforms for identification.

Our result showing large intertemporal shifting responsiveness may also carry implications for optimal tax policy and the design of tax reforms. In practise, most tax payers will experience lifetime variation in marginal tax rates (because of retirement, marriage, unemployment etc.) and from an optimal tax perspective there may be good arguments for age-dependency in tax rates (e.g. Blomquist, S. and L. Micheletto, 2008). On the other hand, shifting behavior will, ceteris paribus, call for less variation in tax rates over the lifetime. In the design of tax reforms, it may be important to take the possibility of shifting responses caused by a tax reform into account. Often a tax reform is replaced by a new reform a few years later, for example Denmark has had 6 tax reforms within the last 25 years,
implying that income shifting effects may be more important than the estimated ‘permanent effects’ often in focus when designing tax reforms.

Section 2 describes the Danish 2010 tax reform and the incentive for income shifting generated by the reform. Section 3 describes our data. Section 4 presents our very preliminary empirical results. Finally, Section 5 describes how we plan to proceed with the analysis.

2 The Danish 2010 tax reform and the scope for intertemporal income shifting

2.1 Incentive to shift wage income from 2009 to 2010

The 2010 tax reform is the sixth tax reform in Denmark within the last 25 years, and it broadly follows the direction of the previous reforms, which have reduced tax rates and broadened tax bases.1 The 2010 tax reform was introduced by the former Danish government and its political coalition partner on March 1st 2009, passed in the Danish parliament on May 28th and signed into law with effect from January 1st 2010. The distance between the announcement date and the actual implementation of the tax reform gave the tax payers at least half a year to plan and carry out the movement of income from 2009 to 2010.

The declared goal of the reform was to reduce taxation of labor income and thereby stimulate labor supply. The tax cut on labor income was financed primarily by decreasing the value of deductions (including interest payments), reducing business subsidies and increasing energy and environmental taxes, thereby keeping the government revenue constant (before behavioral responses).

The reform mainly reduced marginal tax rates on labor income for high-wage earners (our treatment group). In the income year 2009, high-wage earners with labor income (LI) above the top/middle tax income threshold of 377 thousand Danish kroner (DKK) faced a marginal tax rate of around 63 percent comprising of labor contributions (LC = 8% of LI), a regional tax (32.8% of LI-LC in the average municipality), a bottom tax (5.04% LI-LC), a middle tax (6% of LI-LC), a top tax (15% of LI-LC) and a church tax (0.7% of LI-LC on average).2 The tax reform removed the middle tax and reduced the bottom tax to 3.67 percent implying that the marginal tax rate of high-wage earners (\(\tau_H\)) was reduced to 56 percent, equivalent to a reduction in the after-tax rate, \(1 - \tau_H\), of close to 20 percent. Individuals

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1Kleven and Schultz (2012) provide more details about the Danish tax system and the reforms within the past 25 years.

2With an exchange rate of DKK 6 per dollar, the top/middle tax cutoff of DKK 377,000 corresponds to around $63,000.
with income just below the top/middle tax cutoff (our control group) did not pay the middle tax and the top tax, and faced therefore a marginal tax rate of 43.4 percent before the reform and 42.1 percent after the reform, corresponding to a reduction in the after-tax rate, $1 - \tau_L$, of only 2 percent.$^3$

The incentive to shift income was also influenced by a change in the top/middle tax income cutoff, which was increased from 377 thousand DKK to 424 thousand DKK. Figure 1 shows the economic incentive to shift one month's salary from 2009 to 2010 as a function of the (average) monthly level of earnings and salaries in 2009. The left panel shows the gain measured in DKK, while the right panel displays the economic gain measured in proportion to the monthly after-tax income from working. For individuals with monthly income below 32 thousand DKK, the gain from shifting is very small (less than DKK 1,000), unlikely to trigger employees (and employers) to use effort on moving income from 2009 to 2010. The economic incentive increases sharply at around 32 thousand DKK due to the change in the top/middle tax cutoff, and after passing the new tax cutoff the economic incentive is 7 percent of the amount shifted (the slope in Panel A), giving a sizable economic gain corresponding to nearly 20 percent of the monthly wage income after taxes (see Panel B) and more than DKK 4,000 for employees with monthly earnings equal to or above DKK 60 thousand.

< Figure 1 >

2.2 Limits to engage in shifting behavior

Shifting of labor income across years requires cooperation with the employer, who has to report the income earned to the tax authorities. The aim of the Danish legal rules concerning the payment of earnings and salaries is primarily to protect the employees from being exploited by firms, rather than to prevent workers and firms from engaging in tax avoidance by shifting income across years. The rules state that firms have to withhold taxes on the labor income of its employees, but no sooner than when the income is paid out to the employees. The company is obligated to withhold taxes no later than 6 months after the income is earned. Thus, labor income earned after July 1st can legally be shifted into the following income year. Obviously, this type of behavior is not intended by the tax reform and the tax laws, and it is therefore an example of tax avoidance. This implies that we should not expect to

$^3$These computations of the marginal tax rates would apply to the majority of taxpayers. The top/middle tax cutoff depends also on the size of net capital income (excluding stock income) provided it is positive. However, the big majority of taxpayers have negative capital income. Computations of marginal tax rates often involve complicated interactions between spouses (Immervoll et al., 2011). Denmark has an individual-based tax system with a few elements of jointness. For example, when computing the middle tax, it is possible to transfer unutilized allowances across spouses, implying that some married persons with income in a certain range pay the top tax but not the middle tax.
observe any shifting activity among (federal) government employees, and maybe also companies who are afraid to behave in conflict with social norms because they are in the public eye and depend on public reputation.

2.3 Information and awareness

The opportunity to engage in tax shifting behavior was of course not advertised by the tax authorities. There was, however, a fairly intense debate on the possibility of shifting earnings in the popular press, including countrywide newspapers and on the webpage of the two large public news channels (DR and TV2). In order to get a better understanding of the overall level of information and awareness in the population about the economic incentives to shift income and about the possibilities according to the law, we have included two questions in a telephone survey conducted in February 2010 for a random sample of the adult population in Denmark.

First, we asked each respondent if it would be most beneficial for them, from a tax point of view, to obtain a little more extra wage income ‘just before the New Year 2010’, ‘just after the New Year 2010’ or ‘equally beneficial’. For almost all tax payers, it would be beneficial to receive the income after New Year, although the incentive is modest for individual with monthly income below DKK 32 thousand as described above. Second, we asked the respondent whether she perceived it to be ‘legal’ or ‘illegal’ for an employee to make an agreement together with the employer about postponing the payout of some of the earned income in 2009 to 2010. The average of the answers are shown in Table I. Clearly, many people are not aware of the economic incentive to shift income and the legal rules applying. Less than 1/4 of the respondents self-report that they have a tax incentive to shift income, only around 1/3 believe it is legal, and less than one out of ten indicate that they have an opportunity to avoid taxes through intertemporal shifting (the combination of answers ‘After New Year’ and ‘Legal’).

<table>
<thead>
<tr>
<th>Timing</th>
<th>Legal (%)</th>
<th>Illegal (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before New Year</td>
<td>3.4</td>
<td>6.2</td>
<td>9.6</td>
</tr>
<tr>
<td>After New Year</td>
<td>8.3</td>
<td>15.3</td>
<td>23.7</td>
</tr>
<tr>
<td>Equally beneficial</td>
<td>20.7</td>
<td>46.1</td>
<td>66.7</td>
</tr>
<tr>
<td>Total (%)</td>
<td>32.4</td>
<td>67.6</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: Average of 4,334 survey answers.

Figure 2 shows how the answers depend of the gross income of the respondents. The graph in Panel A shows the result from a polynomial smooth regression of a dummy variable, equal to one if
the respondent answered ‘After New Year’ and zero otherwise, against register information about gross income of the respondent. The graph reveals that the fraction of respondents thinking they benefit from shifting is increasing from below 20 percent for low-income respondents to around 40 percent for high-income respondents. The difference between low-income individuals and high-income individuals becomes even larger when also requiring that the respondents believe shifting is legal. When using this combination of answers as a measure of the presence and awareness of the tax avoidance opportunity, Panel B shows that the proportion of respondents aware of the opportunity to shift income and avoid taxes increases from 5 percent to around 20 percent.

< Figure 2 >

3 Data

Our empirical analysis is based on new administrative records on monthly wages and salaries for the universe of Danish tax payers, refereed to as the eIncome register. The law on this income register was passed on May 2006 with the actual reporting obligation being gradually phased in from January 2007 to be fully effective from January 1st 2008 and onwards. The eIncome register has two major innovations compared to the earlier year based system. First, this new monthly income reporting of the firms captures all information printed on a typical Danish payslip and replace yearly reports, implying that the Danish tax agency (SKAT) have even more detailed information about the income acquisition of tax payers. Second, all public bodies share this information, which is for example also used to generate employment statistics, thereby reducing the administrative burdens of firms.

The new income register offers a unique possibility to study shifting behavior of wage income. Intertemporal tax shifting is expected to take place around New Year. For example, employees and employers may determine to postpone payout of income earned by the end of the year or bonus payments to January. The monthly frequency of our data makes it possible to convincingly detect this shifting behavior, and with all tax payers in the data, we are able to shed more light on the overall importance and anatomy of this type of avoidance behavior. [The data is in the process of being transferred to Statistics Denmark where it may be combined with comprehensive social demographic background information of the employees as well as detailed information about firms.]

Around 3.1 million Danes have some wage income during a year and around 2.5 million have some wage income in a given month. Panel A of Figure 3 shows the average monthly nominal wage income of
all employed persons in Denmark in each month from January 2008 to January 2011. The development over time reflects both a yearly time trend and systematic seasonal variation with high average wage income in April and December and low average wage income in the Winter and in the Fall. This seasonal variation is due to fluctuations in both wage per employed and in the number of employed persons over the year. Note as a first indication of income shifting that income drops around New Year in all years but that the fall is considerably smaller around New Year 2010.

Panel B shows the distribution of the average monthly wage income of individuals who are registered as employed in all twelve months of 2008 ("full time employed"). The median income level is approximately DKK 30,000, and more than 1/3 of the full time employed have monthly earnings above DKK 32,000 and are therefore subject to non-negligible incentives to shift income.

4 Empirical results

4.1 Overall evidence of shifting behavior

In order to identify intertemporal shifting behavior, we employ a standard difference-in-difference identification strategy. We focus on employees in the private sector with positive wage income in all years. We define the treatment group (T-group) as individuals with average monthly wage income above DKK 32,000 in 2008, and define the control group (C-group) as individuals with average monthly wage income in the range DKK 30,000–32,000. This gives 270 thousand individuals in the treatment group and a little more than 50 thousand individuals in the control group.

Panel A of Figure 4 shows the development in monthly wage income of the T-group and C-group, respectively, both exhibiting the same seasonal variation as in the full sample of employees shown in Figure 3. An important exception though from this common pattern is the increase in the average reported wage income of the treatment group around New Year 2010. This is opposite the direction observed around New Year 2009 and New Year 2011 for the treatment group, and it is also in contrast to the control group where wage income went down from December to January in all three years.

To further identify the income shifting effect, we compute the percentage change in the monthly pay of each individual relative to year 2008 and compare treatment group and control group according
to

\[ x_{y,m} = \frac{1}{n_T} \sum_{i \in T} \frac{z_{y,m,i} - \bar{z}_{2008,i}}{\bar{z}_{2008,i}} - \frac{1}{n_C} \sum_{i \in C} \frac{z_{y,m,i} - \bar{z}_{2008,i}}{\bar{z}_{2008,i}}, \]  

where \( i \) denotes the individual, \( T \) denotes the treatment group, \( C \) denotes the control group, \( n \) denotes the number of individuals in each of the groups, \( y \) denotes the year, \( m \) denotes the month, and \( \bar{z}_{2008,i} \) denotes the average monthly pay of individual \( i \) in 2008. Panel B of Figure 4 shows the development in the estimates of \( x_{y,m} \) over the time period. By definition, it is zero in each month of 2008. In 2009 it fluctuates a little around zero but then drops down in November and January 2009 before the implementation of the tax reform, increases sharply just after implementation of the reform, and then drops down at a lower level in the remaining months. The wage income of the treatment group is 2-3 percent below the non-reform counterfactual level in each of the two months before the reform, and 7 percent above the counterfactual level in January 2010. Note also that no effects are observed around New Year 2011, strongly suggesting that the responses around New Year 2010 are indeed due to tax-motivated shifting behavior. The shifting effects are very significant with a 95 percent confidence interval of \([-4.1\%, -2.8\%]\) for December 2009 and \([6.2\%, 7.5\%]\) for January 2010.

### 4.2 Shifting behavior and the elasticity of taxable income

Intertemporal income shifting behavior is relevant for the literature, pioneered by Feldstein (1995) and recently surveyed by Saez et al. (2012), using tax reforms to estimate the elasticity of taxable income. If tax payers temporarily shift income from a period with a high tax rate to a period with a low tax rate then this effect enters into the empirical estimate of the elasticity of taxable income thereby creating an upward bias when trying to measure the underlying structural elasticity. This problem is well-known in the literature (see Saez, Slemrod and Giertz, 2012) but only a single study by Goolsbee (2000) has been able to gauge the potential size of the upward bias. Goolsbee considered the changes in yearly income of 6,133 top executives due to the 1993 US tax reform, which raised marginal tax rates of high-income individuals. He concluded that most of the income variation of these top executives was generated by retiming in the realization of stock options, implying that most of the elasticity of taxable income was due to intertemporal income shifting rather than a high underlying structural elasticity. With our data, it is possible to analyze whether this is a general phenomenon or just applies to few individuals who are in the very top of the earnings distribution and own stock options.
We start by carrying out a simple Feldstein type estimation of the elasticity of taxable income:

\[
\text{ETI} = \frac{1}{n_T} \sum_{i \in T} \frac{\bar{y}_{2010,i} - \bar{y}_{2009,i}}{\bar{y}_{2009,i}} - \frac{1}{n_C} \sum_{i \in C} \frac{\bar{y}_{2010,i} - \bar{y}_{2009,i}}{\bar{y}_{2009,i}},
\]

(2)

where the numerator is the percentage change in yearly income of the T-group from the year before the implementation of the reform to the year after implementation, and measured relative to the C-group. As may be seen from Figure 4, Panel B this is equal to \(1.05 + 0.64 = 1.69\) percentage points. The denominator is the percentage change in the after-tax rate \((1 - \tau)\) of the T-group relative to the C-group, which from the information in Subsection 2.1 is approximately \(18.3 - 2.2 = 16.1\) percentage points. This gives a simple measure of the elasticity of taxable income equal to \(1.69/16.1 = 0.1\). A regression analysis shows that the elasticity is very precisely estimated with a 95 percent confidence interval of \([0.09, 0.12]\). The size of the elasticity is also in line with recent empirical evidence for Denmark by Kleven and Schultz (2012) using yearly income data, spanning a period of 25 years with identifying variation provided by a series of tax reforms, and more advanced empirical methods.

Note from Figure 4, Panel B that the average earnings level in 2009, before implementation of the reform, of the T-group is \(0.64\) percent below the counterfactual level, and that this is mainly due to a fall in the last months of 2009 of the same size as the spike in January 2010. It is therefore reasonable to ascribe this income variation to shifting behavior. This implies that shifting accounts for \(2 \times 0.64 = 1.28\) percentage points (we multiply by 2 because shifting both reduce the 2009 level and increase the 2010 level) of the measured income increase from 2009 to 2010 in the numerator of eq. (2). The ETI due to shifting then becomes \(1.28/16.1 = 0.08\) and the 95 percent confidence interval equals \([0.05, 0.11]\). Hence, the mean estimate indicates that more than \(3/4\) of the ETI is due to shifting behavior, and that the underlying ‘structural’ elasticity—after removing the shifting component—becomes less than 0.03. According to the confidence intervals of the estimates, shifting behavior explains 50–100 percent of the ETI.

### 4.3 Shifting behavior across the income distribution

A robust conclusion from the elasticity of taxable income literature is that estimates of ETI is increasing in the income level. From an optimal tax policy point of view, it is important to know whether this is due to temporary shifting effects or permanent income responses. The excess burden of the tax system and the limits to redistribution (the Laffer rate) are governed by the permanent income responses rather than the temporary shifting effects around reform implementation.
In Figure 5, we consider the shifting response of high income groups compared to the same control group as before. Panel A shows the development of individuals with earnings in the percentiles 75 to 90 (P75-P90) of the overall income distribution described in Figure 3. Panel B considers individuals with earnings in the percentiles 90 to 95, and so on. Clearly, the share of income shifting out of income is steadily increasing in the income level with 5 percent of average monthly wage income being shifted around New Year 2010 for the P75-P90 group, increasing up to 30 percent for the top 1 percent of wage earners.

The ETI estimates for these four groups are increasing and equal to 0.11, 0.17, 0.21, 0.35, respectively, thereby consistent with previous findings. However, the analysis strongly indicates that this increase in the elasticity is explained entirely by shifting. For example, for the two highest income groups, the estimate of the shifting elasticity is larger than the estimate of the ETI, suggesting that the underlying structural elasticity is close to zero.

4.4 Employee-employer corporation and robustness

In order to ensure that our identification of income shifting is not governed by job changes, job losses, income from temporary jobs or extra income from non-ordinary employee-employer relationships, we redo the basic analysis for individuals with 37 consecutive income observations (Jan09-Jan11) at the same employer, and include only these 37 observations in the analysis. The left panel of Figure 6 (private sector employees) is comparable to Panel B in Figure 4 and the graphs are very similar. If anything, the shifting effect is somewhat larger now. This confirms that shifting occurs in main occupations with long employee-employer relationships.

In Panel B, we carry out the same analysis with government employees instead of private sector employees. As described in Subsection 2.2, we should not expect to see income shifting among (federal) government employees because of the need to collaborate with the employer, who reports wages and salaries to the tax agency, in order to carry out the tax avoidance strategy. This is confirmed by the graph where income is basically constant around New Year in all three years, thus revealing no evidence of shifting behavior.
We have tried to change the income threshold dividing the treatment group and the control group from DKK 32,000 to DKK 35,000, and have tried to include individuals with income in the range 25,000–30,000 in the control group. These changes had negligible quantitative impact on any of the results.

5 Work in progress

The data is in the process of being transferred to Statistics Denmark where it will be combined with comprehensive social demographic background information of the employees as well as detailed information about firms. This will enable us to shed further light on the anatomy of shifting behavior and the underlying frictions. We plan to study:

• The role of information of the employee: (i) We will combine the wage data with the survey data used in Subsection 2.3 in order to see if the survey indicators of information and awareness are able to predict shifting behavior. (ii) Some tax payers have given accountants permission to make correction in their tax return. We are working to get this information.

• The role of credit constraints: We will use information on households marginal interest rates and size of liquid assets in proportion to income (often used in studies of consumption behavior).

• Importance of firm type/organization: Firm size, firm control (top executives), self-employed...

• Importance of network effects: clustering, family ties, colleagues ...

References


Figure 1: Incentive to shift one months salary from 2009 to 2010

A. Economic gain (DKK)

B. Gain in proportion to after-tax earnings (%)

Note: It is assumed that the monthly earnings level is the same for all months. The computations are based on a two percent growth rate in nominal wages from 2009 to 2010.
Figure 2: Awareness of incentive and legality

Note: Results from a survey questionnaire conducted in February 2010 for a random sample of the adult population in Denmark. The left panel reports the share of respondents answering that it was most beneficial to receive extra earnings just after New Year 2010 than just before. The right panel reports the share answering that it was most beneficial to receive extra earnings just after New Year 2010 and answering that it was legal to postpone wage payment from December 2009 to January 2010. The information of gross income of the respondents are obtained from register data at Statistics Denmark.
Figure 3: Monthly wage over time and across employees

A. Development in the average monthly wage

B. Distribution of average monthly wage in 2008

Note: The left panel shows average monthly nominal wage income of all employed persons in Denmark in each month from January 2008 to January 2011. The rights panel shows the distribution of average monthly wage income of individuals who are registered as employed in all twelve months of 2008 (“full time employed”).
Figure 4: Treatment group relative to control group

A. Average monthly wage

B. Change in monthly wage of T-group relative to C-group

Note: The left panel shows the development in monthly wage income of the T-group and the C-group, respectively. The T-group consists of private sector employees with average monthly wage income above DKK 32,000 in 2008 and positive wage income in 2009 and 2010. The C-group consists of private sector employees with average monthly wage income in the range DKK 30,000-32,000 in 2008 and positive wage income in 2009 and 2010. The right panel shows the difference between wage in a given month compared to the same month in 2008 (in percent of the average wage in 2008) for the T-group and measured relative to the C-group (in percentage points).
Figure 5: Shifting across the income distribution

A. Change in monthly wage of P75-P90 relative to C-group

B. Change in monthly wage of P90-P95 relative to C-group

C. Change in monthly wage of P95-P99 relative to C-group

D. Change in monthly wage of P99+ relative to C-group

Note: Each panel shows a subgroup of the employees in the T-group measured relative to the C-group, and is constructed in the same way as Figure 4. Panel A shows the development of individuals with earnings in the percentiles 75 to 90 of the overall income distribution described in Figure 3. Panel B considers individuals with earnings in the percentiles 90 to 95, and so on.
Figure 6: Robustness and employee-employer corporation

Note: The graphs are based on individuals with 37 consecutive observations (Jan09-Jan11)) at the same employer, and include only these 37 observations in the analysis. The left panel focuses on private sector employees as in the remaining analysis, and is comparable to Panel B in Figure 4, while the right panel is a similar analysis with only public sector employees in the treatment group and in the control group, using the same income thresholds as before to define the two groups.