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Peer Ebbesen Skov

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The Effect of Late Payment Penalties on the Payment Timing of Owed Taxes

PEER EBBESEN SKOV*

Auckland University of Technology

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Abstract:

This paper studies the effectiveness of a policy designed to influence the timing decision for payments of owed taxes. Owed taxes arise when the sum of the foregoing tax year's preliminary tax payments falls short of the total tax liability. In 2009 the Danish tax authority (SKAT) introduced an annualised penalty rate of 4.6%. Using administrative tax data, I show that the penalty rate introduction led to a 50-day advancement of payments.

*Skov: 120 Mayoral Drive, Auckland 1142, New Zealand. pskov@aut.ac.nz.Thanks to, Morten Ravn Appelsø, Norman Gemmell, Claus Thustrup Kreiner, Søren Leth-Petersen, and Søren Pedersen, and seminar participants at University of Copenhagen, The Danish tax authorities (SKAT) and the Rockwool Foundation Research Unit for helpful comments, conversations and suggestions, and the Danish tax authorities for generously sharing their data. This research was supported by the Rockwool Foundation Research Unit.

1 Introduction

The gross tax gap is defined as the amount of true tax liability faced by taxpayers that is not paid on time. The most recent report by the US Internal Revenue Service estimates the gross tax gap to be $496 billion per year from 2014-2016, equivalent to a non-compliance rate of about 15%.[1] The tax gap arises when taxpayers fail to meet one or more of their three main obligations: (1) filing tax returns on time; (2) making accurate reports on these returns; (3) paying any tax owed on time (US Treasury, 2009).

Risk-averse taxpayers in the A-S model (Allingham & Sandmo, 1972) balance the gain in expected utility from undeclared income against the loss in expected utility from detection and fines. The A-S model predicts that the tax gap can be reduced by increasing the audit risk and/or the penalty rate. This study is concerned with taxpayers' third obligation, the timely payment of owed taxes, and the effect of increasing the late payment penalty rate on payment timing.

Only a limited number of past empirical studies have examined the payment of owed taxes. In a large-scale natural field experiment combined with administrative data in the United Kingdom, Hallsworth et al. (2016) show that including social norm messages in reminder letters increases payment rates for overdue tax. In addition to behavioural nudges, most Western tax administrations charge interest penalties on owed taxes paid after some deadline.[2] In a small New Zealand field experiment on taxpayers with outstanding GST tax payments subject to a complex penalty scheme, Gemmell and Ratto (2018) study the effect of treating taxpayers with penalty information in combination with a repayment option including a small penalty discount. Their results indicate that the taxpayers were unresponsive to the treatment.

This paper adds to literature by showing the impact of interest penalties for the timing of late tax payments from a Danish policy reform that provides significant variation in the interest rate penalty. Using full population panel data, I compute the length, measured by days, of each late payment and compare the average distance for tax year 2008 (no interest penalty) to tax year 2009 (interest rate penalty 4.6% per year). The results show the average 'payment distance' was 50 days shorter in 2009. Of particular interest for tax administrations, the findings suggest that even small penalties on owed taxes can result in a substantial advancement of payments.

[1] Last visited 24/08/2022: https://www.irs.gov/newsroom/the-tax-gap

[2] E.g., US taxpayers are required to file a tax return and remit outstanding taxes to the IRS every year before April 15th. Taxpayers who don't meet the payment deadline face a failure-to-pay penalty of 0.5-1 % with monthly accrual on unpaid taxes.

2 Danish Institutional Setting and Data

The Danish tax year (t) follows the calendar year and in early March $(t+1)$ all standard filling deadline (SFD) taxpayers[3] receive their pre-populated tax return. The pre-populated tax return is based on available third-party reported information, e.g., reports from employers and banks etc. The return specifies the taxpayer's total tax liability and the amount collected via withholdings.

Taxpayers have until May 1st to amend their pre-populated return to include any income and deductions not third-party reported. Every correction to the pre-populated return generates a new return. Each return specifies the taxpayer's total tax liability and total taxes paid. About 60% of the SFD taxpayers file no amendments to their pre-populated return, making it also their final return.

When paid taxes exceed the total tax liability, the difference is refunded directly into the taxpayer's bank account. When paid taxes fall short of the taxpayer's total tax due, the taxpayer is required to pay the difference. Prior to tax year 2009, the tax return(s) informed taxpayers that owed taxes paid before July 1st $(t+1)$ were not subject to late payment penalties,[4] thus January 1st to July 1st $(t+1)$ was an interest-free credit period. After the July 1st payment deadline, outstanding taxes below a threshold (DKK 18,500 in 2008) were automatically off set against the personal allowance (in $t+2$). Owed taxes above the threshold were subject to a late payment penalty and collected in three installments in September, October, and November in tax year $(t+1)$.

Owed taxes arise as a misalignment between the Danish tax authority's (SKAT) forecast and the taxpayer's actual personal allowance and average tax rates. SKAT's forecasts are based on historical return information. Forecast errors occur, according to SKAT's website[5], from job-transitions, changes to retirement savings, and house purchase/sales.

2.1 The 2009 Change to Late Payment Penalties

As part of a 2010 tax reform, the Danish Government introduced a late payment penalty on owed taxes. The reform took effect from January 1st 2010, so the interest penalty applied to owed taxes for tax year 2009. The rest of the reform concerned tax year 2010 onwards.

[3] About 80% of all taxpayers

[4] Owed taxes in excess of DKK40, 000 (98th percentile, 2008) faced a separate penalty schedule prior to 2009. Appendix Table A.1 and Figure A.1 outlines and illustrates payment rules and timing. Appendix Table B.1 re-runs the analysis including taxpayers with owed taxes less than DKK40,000.

[5] Last visited on 18/08/2022: https://www.sktst.dk/aktuelt/pressemeddelelser/undgaa-restskat-faa-styr-paa-forskudsopgoerelsen/

The penalty introduction meant that from January 1st 2010 (i.e., affecting late payments for tax year 2009) the interest-free credit from January 1st to July 1st was abolished. Instead, late tax payments were penalised by an interest penalty according to the formula:

$$Penalty = \delta * \left(0.046 * \frac{\#days(payment\ date - December\ 31st)}{365}\right) \quad (1)$$

where δ is the balance due, and the fraction captures how late, as a share of the year, the payment is. For a taxpayer with DKK2,800 in owed taxes (median in 2009), the costs of postponing a late payment from January 1st to July 1st was DKK64. Figure A.1 in Appendix A illustrates the difference in the late payment penalty from 2008 to 2009.

2.2 Data and Sample Selection

The analysis is based on an administrative register holding information on late tax payments, including the amount paid, date of payment, and an individual identification number (CPR). To compute the taxpayer's price of liquidity, I link this register to another administrative register within SKAT containing information on loans, deposits, and interest payments. Following Kreiner et al. (2019), I impute marginal interest rates based on deposit and loan registers by first calculating account-specific interest rates as:

$$r_i = \frac{R_i^t}{1/2[D_i^{t-1} + D_i^t]} \quad (2)$$

where R_i^t is interest payments from account *i* during year *t*. D_i^{t-1} is the value of the account by the end of tax year *t-1* and D_i^t is the value of the account by the end of tax year *t*. For individuals with loan accounts, I choose the highest account-specific interest rate as the individual's marginal interest rate, and for individuals holding only deposit accounts, I choose the lowest account-specific interest rate. Finally, I link taxpayer background information from other Statistics Denmark administrative registers.

I base my analysis on SFD taxpayers and restrict my attention to late payments filled between January 1st and July 5th from 2005 to 2009.[6] [7] These sample selection criteria yield an unbalanced panel of 1,240,964 taxpayers and 2,150,199 payment observations. I compute my outcome variable as the distance in days between the end of the tax year (December 31st) and the payment date.

2.3 Descriptive Analysis

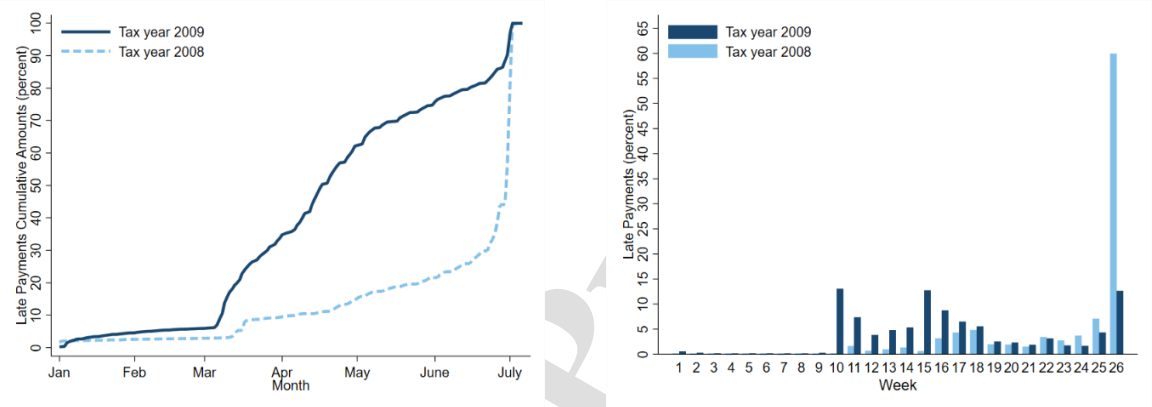
[6] I exclude non-SFD taxpayers as they are subject to different filing deadlines.

[7] Officially SKAT does not accept late payments after July 1st though in practice they allow a grace period of a few days, so I use July 5th as the cut-off.

As a first test of the taxpayers' response to the introduction of the late payment penalty, Figure 1(a) shows the accumulated payments for tax years 2008 and 2009. The panel provides clear descriptive evidence that the timing of late tax payments changed: in 2008, about 50% of total tax owed was collected in the final week before the payment deadline compared to 15% in 2009. Figure 1(b) shows the percentage of payments across weeks. For both years, the first payments occur around week 10 (early March), corresponding to the release of the pre-populated tax return. In tax year 2009, 50% of all payments were filed by week 15; in tax year 2008, 60% of all payment were filed in the final week.

Figure 1: Timing of late tax payments by tax year

(a) Accumulated payments by month (b) Payment timing by week



Notes: The figure illustrates in the left panel the accumulated value of all late tax payments by month. The right panel illustrates the number of late tax payments by week. Both panels include tax year 2008 (prior to the penalty introduction) and 2009 (after the penalty introduction).

3 Results and Discussion

Because the 2010 policy change to the late payment penalties for tax year 2009 affected all taxpayers at the same time, I do not have a comparison group that was unaffected by the policy change and observed in the same year. Instead, I rely on the penalty variation over time and use the register information to include a rich set of controls. In my preferred specification, I exploit the data's panel structure to account for taxpayer fixed effects. Letting $Dist_{it}$ denote the distance in days between December 31st and the late payment for taxpayer *i* in tax year t, I estimate the Equation 3:

$$Dist_{it} = \beta_0 + \sum_{j=2006}^{2009} \gamma_j \cdot 1(year_{it} = j) + x'_{it}\beta + \mu_i + \varepsilon_{it} \quad (3)$$

where $1(year_{it} = j)$ is an indicator equal to 1 when the late payment refers to tax year *j*, so γ_j shows the average length of the late payments for each tax year. x_{it} is a range of observed

individual characteristics including age, gender, five country region dummies, six dummies for education length, three work force status dummies, and a full set of dummies for liquidity percentiles. Finally, μ_i is a time-invariant individual effect and ε_{it} the error term.

Column 3 in Table 1 shows the results from Equation 3. In 2005, the average payment distance was 163 days, corresponding to a mid-June payment. The coefficients on the year dummies show very limited year-to-year variation in the payment distance in the four years prior to the policy change (2005-2008). The coefficient on 2009 shows a significant 50-day reduction in the average payment distance, corresponding to a mid-April payment or a reduction in the late payment distance of approximately 30%.

Columns 1 and 2 in Table 1 include the results from two minor variations of Equation 3. First, column 1 shows the results from the basic specification leaving out the control variables (x_{it}) and the individual fixed effects (μ_i). The results in column 2 include the control variables but not the individual fixed effects. The results are robust across these specifications.

The analysis compares the timing of late tax payments conditional on owing taxes. If taxpayers manipulate tax payments to avoid owing taxes because of the penalty introduction, a different sample composition across the tax years could thus drive part of the result. Column 4 explores the subset of taxpayers with late payments in every year from 2005-2009. Reassuringly, the estimates are of similar magnitude.[8]

Table 1: Acceleration of payment timing from interest rate penalty

	POLS	POLS	FE	FE
	(1)	(2)	(3)	(4)
		Base year = 2005		
2006	-0.7***	-0.6***	-0.1	1.2***
	(0.1)	(0.1)	(0.1)	(0.3)
2007	-2.1***	-1.7***	0.4**	2.0***
	(0.1)	(0.1)	(0.1)	(0.3)
2008	-0.8***	-0.5***	2.1***	3.2***
	(0.1)	(0.1)	(0.1)	(0.3)
2009	-50.1***	-49.6***	-53.3***	-59.7***
	(0.1)	(0.1)	(0.2)	(0.5)
Covariates		X	X	X
Individual fixed effects			X	X
Observations (payments)	2,150,199	2,150,199	2,150,199	79,608

[8] Appendix Table B.2 shows the results from re-running the analysis including only the first late payment each year.

Taxpayers	1,240,964	1,240,964	1,240,964	15,767
Mean of dep. Var. in 2005	162.5	162.5	162.5	164.6

*Notes: The table reports estimation results of Equation (3) in column 3, while columns 1 and 2 provide estimates for robustness excluding individual fixed effects (2) and covariates (1). Estimates in column 4 are based on the sample of taxpayers who owed taxes every year from 2005-2009. The dependent variable is computed as the difference between the end of the tax year (December 31st) and the payment date. The sample includes all late payments from January 1st to July 5th. Robust standard errors reported in brackets. * p<0.05; ** p<0.01; *** p<0.001*

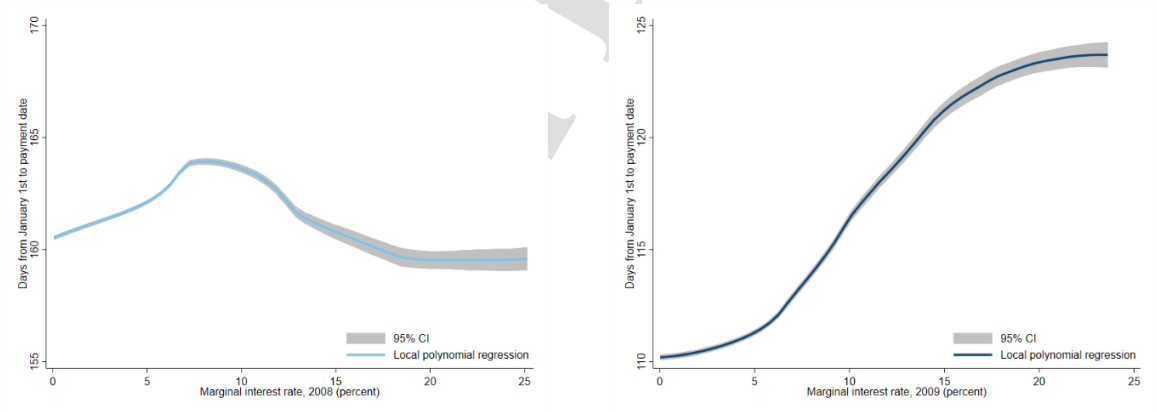
3.1 Heterogeneity

The results above showed that abolishment of the interest-free credit period with the introduction of the late payment penalty significantly reduced the duration of late payments. Figure 2 shows the payment distance by taxpayers' marginal interest rates for 2008 versus 2009.

Table 1 showed that, on average, late payments in 2008 were filed 163 days after the end of the tax year. Figure 2(a) shows very limited variation in payment distance by taxpayer liquidity for tax year 2008. This is likely because all taxpayers, no matter their liquidity status, were incentivised to delay late payments to July 1st.

Figure 2: Late tax payments and marginal interest rates by tax year

(a) 2008 (b) 2009



Notes: The figure illustrates the relationship between the taxpayers' marginal interest rates and their late tax payment. Panel (a) includes tax year 2008 (prior to the penalty introduction), while Panel (b) shows tax year 2009 (after the penalty introduction).

Table 1 shows the 2009 penalty scheme shortened the average payment duration by approximately 50 days. The interest rate penalty incentive is stronger for taxpayers with lower marginal interest rates. Figure 2(b) provides compelling evidence of a strong correlation between payment responses and the marginal interest rates, indicating that the interest rate penalty serves as a significant motivating factor for the observed responses in Table 1.

4. Conclusion

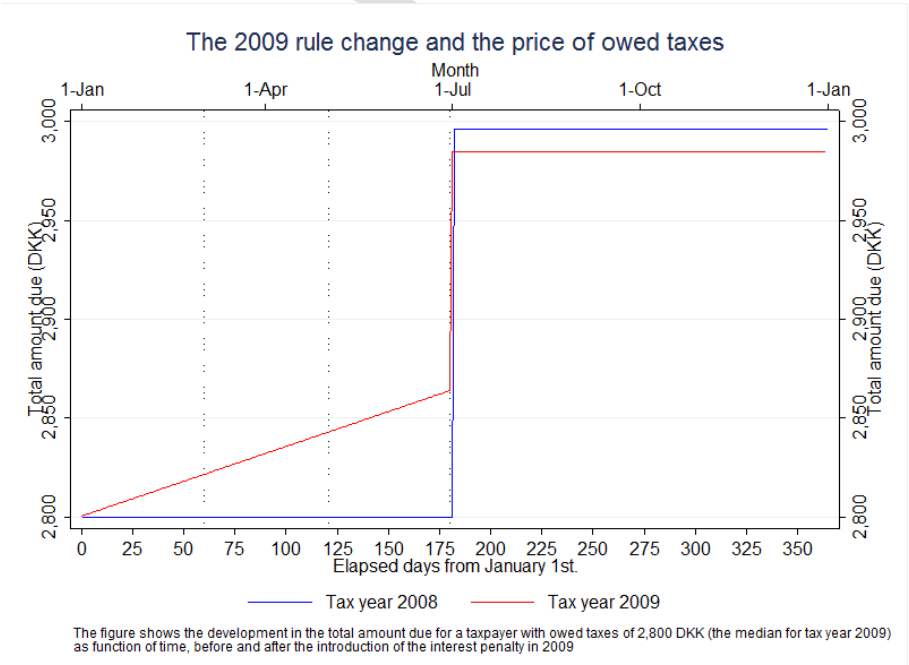
Most Western tax administrations penalise late tax payments. This paper provides evidence on the effectiveness of late payment penalties by studying the 2009 Danish introduction of an annualised penalty rate of 4.6%. Results show the penalty rate introduction led to a 50-day advancement of payments. Probing the heterogeneity in the timing of late payments shows that taxpayers with higher marginal interest rates pay later. These findings highlight the efficacy of late payment penalties for tax administrations.

Appendix A

Table A.1: Late payment penalties and deadlines by tax year

Payment timing	Tax year 2008 (Pre penalty introduction) - Penalty rate -	Tax year 2009 (Post penalty introduction) - Penalty rate -
December 31th (Year t)	0% (Last day possible for timely payment)	0% (Last day possible for timely payment)
Between January 1st and March 17th (Year t + 1)	0% on payments up to DKK 40,000 2% on amounts over DKK 40,000.	Penalty = 4,6 % * ((Payment date - January 1st) / 365 days). ex payment on March 11th 2010 4,6 % * (70 days / 365 days) = 0,88%.
Between March 17th and July 1st (Year t + 1)	0% but payments capped at DKK40,000.	As above.
After July 1st (Year t+ 1)	7 % - Owed taxes (including the penalty) below a threshold, DKK 17,700, is deducted against the following tax year's (t+2) tax free allowance. Any owed amount in excess of the threshold is charged in three installments of equal size in the following months of September, October, and November, tax year (t+1).	6 % - Owed taxes (including the penalty) below a threshold, DKK 18,300, is deducted against the following tax year's (t+2) tax free allowance. Any owed amount in excess of the threshold is charged in three installments of equal size in the following months of September, October, and November, tax year (t+1).

Figure A.1: The 2009 rule change and the price of owed taxes



Appendix B

Table B.1: Interest rate penalty effect on payment timing: taxpayer with owed taxes below DKK40.000 threshold

	POLS (1)	POLS (2)	FE (3)	FE (4)
		Base year = 2005		
2006	-0.7***	-0.6***	-0.0	1.5***
	(0.1)	(0.1)	(0.1)	(0.3)
2007	-2.1***	-1.7***	0.4***	1.9***
	(0.1)	(0.1)	(0.1)	(0.3)
2008	-0.7***	-0.3***	2.3***	3.6***
	(0.1)	(0.1)	(0.1)	(0.3)
2009	-50.1***	-49.6***	-53.2***	-59.8***
	(0.1)	(0.1)	(0.2)	(0.5)
Covariates		X	X	X
Individual fixed effects			X	X
Observations (payments)	2,102,158	2,102,158	2,102,158	72,274
Taxpayers	1,226,130	1,226,130	1,226,130	14,393
Mean of dep. Var. in 2005	162.5	162.5	162.5	164.6

*Notes: The table reports estimation results of Equation (3) in column 3 while columns 1 and 2 provide estimates for robustness excluding individual fixed effects (2) and covariates (1). Estimates in column 4 is based on the sample taxpayers with owed taxes every year from 2005-2009. The dependent variable is computed as the difference between the payment date and (end of tax year) December 31st for each tax year. The sample includes all taxpayers with less than DKK40.000 in owed taxes. Robust standard errors reported in brackets. * p<0.05; ** p<0.01; *** p<0.001*

Table B.2: Acceleration of first late payment from interest rate penalty

	POLS	POLS	FE	FE
	(1)	(2)	(3)	(4)
		Base year = 2005		
2006	-0.7***	-0.6***	-0.1	1.2***
	(0.1)	(0.1)	(0.1)	(0.3)
2007	-2.0***	-1.7***	0.4**	1.9***
	(0.1)	(0.1)	(0.1)	(0.3)
2008	-0.8***	-0.4***	2.1***	3.1***
	(0.1)	(0.1)	(0.1)	(0.3)
2009	-50.4***	-49.9***	-53.5***	-60.0***
	(0.1)	(0.1)	(0.2)	(0.5)
Covariates		X	X	X
Individual fixed effects			X	X
Observations (payments)	2,112,871	2,112,871	2,112,871	77,916
Taxpayers	1,240,964	1,240,964	1,240,964	15,767
Mean of dep. Var. in 2005	162.5	162.5	162.5	164.6

*Notes: The table reports estimation results of Equation (3) in column 3 while columns 1 and 2 provide estimates for robustness excluding individual fixed effects (2) and covariates (1). Estimates in column 4 is based on the sample taxpayers with owed taxes every year from 2005-2009. The dependent variable is computed as the difference between the payment date and (end of tax year) December 31st for each tax year. The sample includes all taxpayer's first late payments from January 1st to July 5th by year. Robust standard errors reported in brackets. * p<0.05; ** p<0.01; *** p<0.001*

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1. This study provides causal evidence on the effectiveness of interest penalties for the timing of late tax payments.
2. The analysis uses the 2009 Danish introduction of an annualised penalty rate of 4.6% and shows that it caused a 50-day advancement of payments.
3. Results show that taxpayers with higher marginal interest rates pay later.