Pay Now or Pay Later: Danish Evidence on Owed Taxes and the Impact of Small Penalties

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Auckland University of Technology

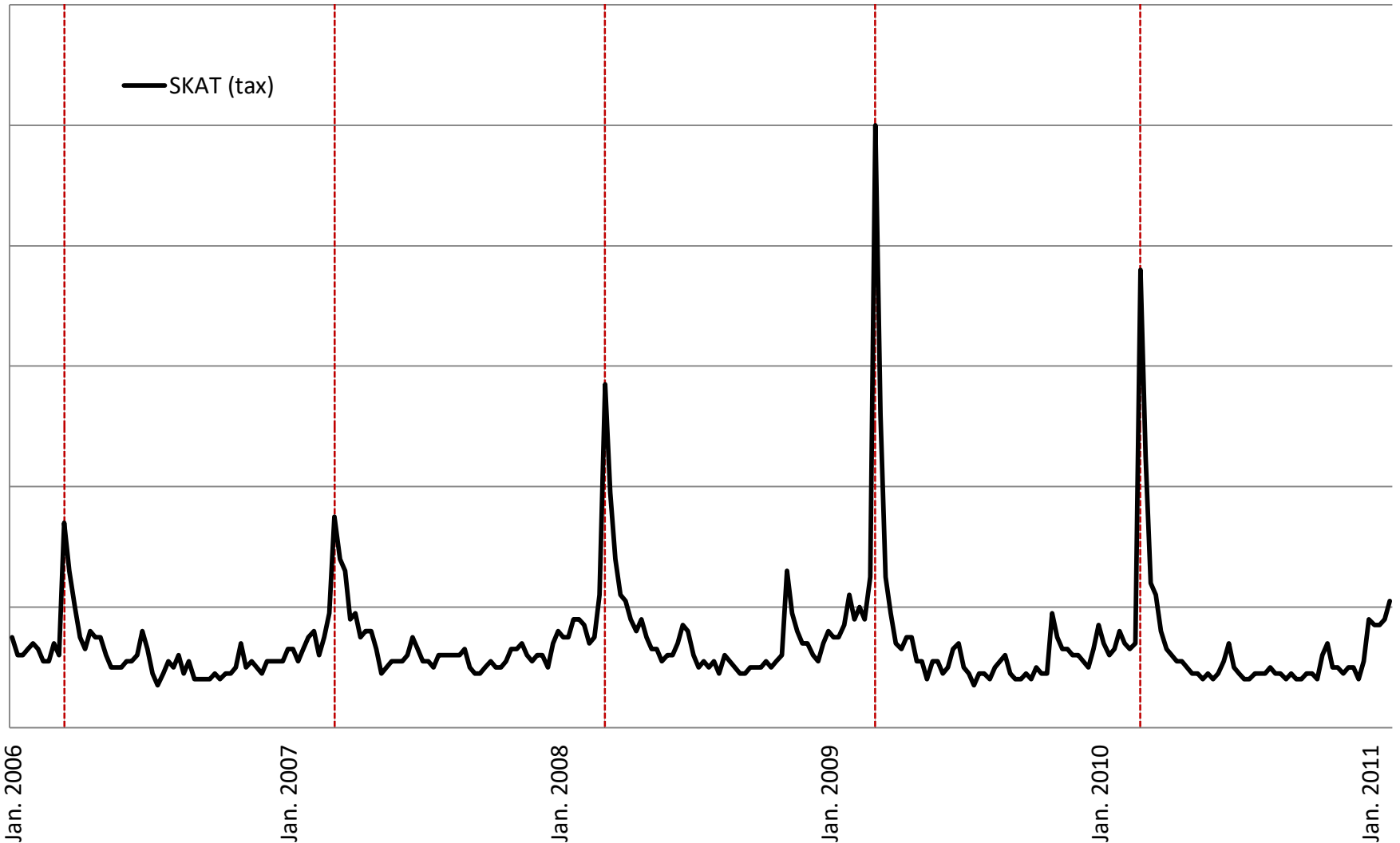PRELIMINARY RESULTS

Wednesday 11 October 2017

Public Finance Research Day

Wellington

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Motivation

Danish web searches from Google Trends

Organization of the talk

- Research agenda and motivation

- Institutional background

- Data

- Results

Related literature

Two approaches broad strands of research literature on **tax compliance** – deterrence vs. non-deterrence, Hallworth (2014).

Deterrence. Evading taxes is a gamble based on Sandmo (1972)

Non-deterrence.

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Introduction: The nature of owed taxes

The tax refund (R) is the discrepancy between tax prepayments (P), and tax liability (L).

$$R(A,I;Z) = P(A,I;Z) - L(A,I;Z)$$

where A is allowances, I is income and Z is the tax code.

$$R < 0 => \text{taxpayer owes taxes}$$

Denmark: The taxpayers are informed about R in the beginning of March every year.

Related literature

- **Slemrod et al. (1998).** Outline a simple theoretical framework to explain the filing times behind US tax returns in 1988 and show empirically that trigger happy taxpayers who remit owed taxes too soon pass up 46 USD million in foregone interest payments.

- **Jones, D. (2012).** Presents overwhelming evidence that taxpayers are dragging their feet in relation to adjusting to exogenous changes in their tax prepayments and tax liability. One such example is the 1992 Bush administration's reduction in the default level for tax prepayments, for wage earners below a specified income threshold, which in its first year was only offset by 25%.

- **Lalumia, S. (2008).** Use a 12 year panel dataset to investigate patterns of refund receipt over time. Lalumia reports that more than 30% of her sample receives a tax refund for the full observation period and that lower levels of income and wealth are characteristics of the tax payers receiving a refund.

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Research aim and method

Primary research question

Did the introduction of the owed tax interest penalty lead to an earlier repayment of owed taxes?

Secondary research question

Are taxpayers' marginal interest rates a significant predictor for the payment timing of owed taxes?

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Institutional Background

Year t-1		Tax year t		Year t+1	
Month	Event	*Month*	Event	*Month*	Event
		January	During the tax year the taxpayers pay preliminary taxes according to their PLIA.	*January*	Tax year t have ended but the taxpayers can still make additional tax payments anytime before July 1st.
				March	The taxpayers receive their pre-populated tax assessment notice including information on any outstanding taxes.
November	The taxpayers receive their preliminary income assessment (PLIA).			*May*	The taxpayers have to file corrections to their pre-populated tax assessment notice before May 1st
				July	The taxpayers can no longer file tax payments for tax year t. SKAT automatically collects any owed taxes.
		December	The tax year ends.		

Institutional Background

Payment timing	Tax year 2008 (Pre penalty introduction) - Penalty rate -	Tax year 2009 (Post penalty introduction) - Penalty rate -
December 31th (year t)	0%	0%
Between January 1st and March 17th (year t + 1)	0% on payments up to DKK40,000 2% on amounts in excess of DKK40,000.	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, 17.700 DKK, is deducted against the following tax year's (t+2) tax free allowance. Any owed amount in excess of the threshold is charged in 3 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, DKK18,300, is deducted against the following tax year's (t+2) tax free allowance. Any owed amount in excess of the threshold is charged in 3 installments of equal size in the following months of September, October and, November, tax year (t+1).

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Data

Register data from the Danish tax agency (SKAT)

Register 1: includes the results of the tax return calculations, i.e., the amount each taxpayer has either under or overpaid relative to his total tax liability, and the time and date the income assessment was available to the taxpayer via his personal *e*-account.

Register 2: provides information on the payments made by the taxpayers to SKAT.

Register 3: Includes annual information on all individual deposit and loan accounts and account specific interest payments made throughout the foregoing year.

All linked to Statistics Denmark registers.

Sample

All Danish taxpayers from 2005 – 2009

≈   Standard filing deadline taxpayers, 3.8 mil. Observations per tax year

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Amount and number of taxpayers with owed taxes by tax year
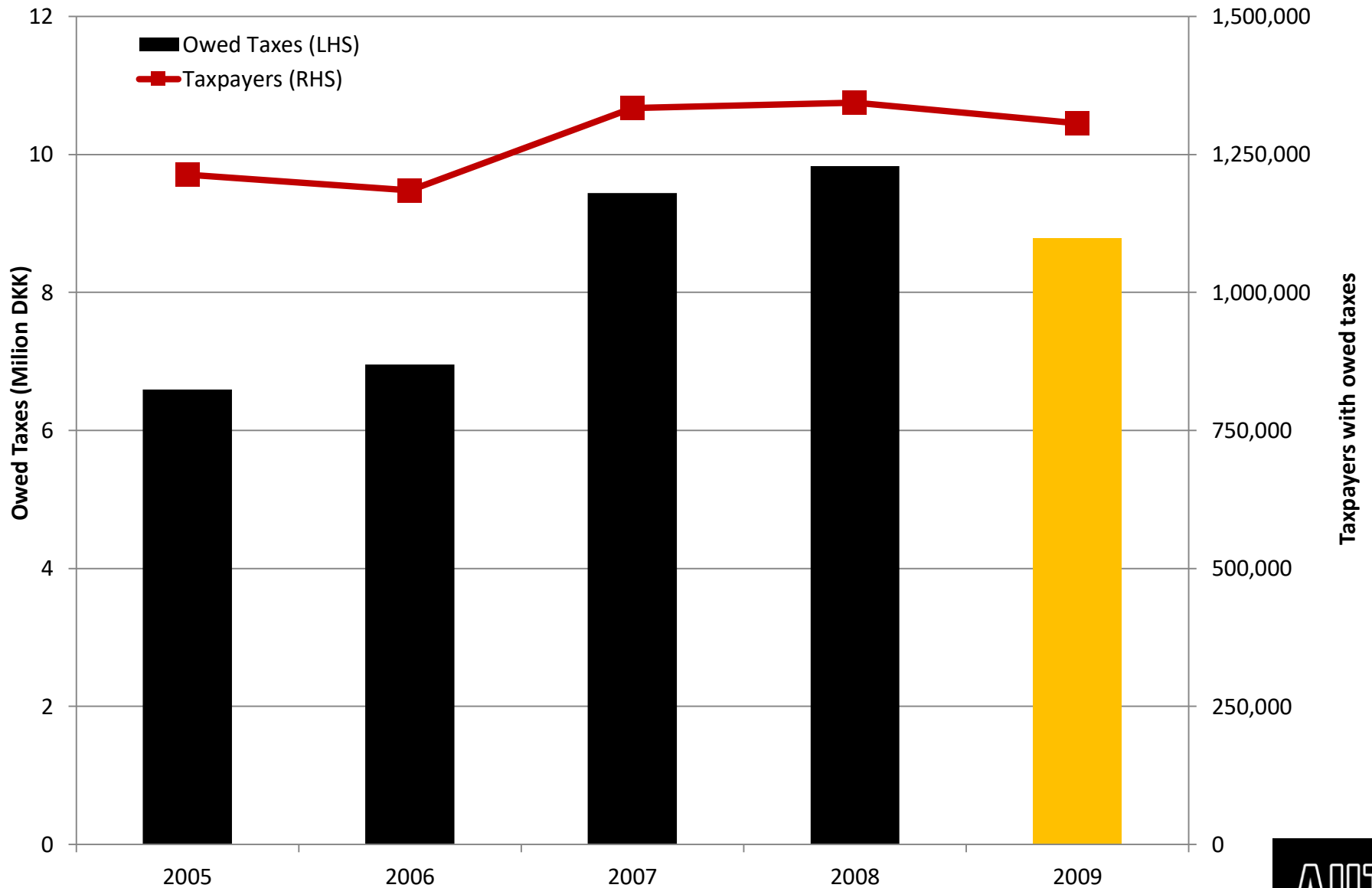
Distribution of owed taxes by tax year

	Distribution of owed taxes on pre-populated tax assesment for SFD taxpayers				
Percentile 5th	DKK 99	DKK 94	DKK 111	DKK 110	DKK 120
Percentile 10th	DKK 231	DKK 221	DKK 267	DKK 269	DKK 288
Percentile 25th	DKK 747	DKK 732	DKK 908	DKK 929	DKK 954
Percentile 50th	DKK 2.182	DKK 2.201	DKK 2.805	DKK 2.861	DKK 2.812
Percentile 75th	DKK 5.562	DKK 5.795	DKK 7.553	DKK 7.682	DKK 7.128
Percentile 90th	DKK 12.253	DKK 13.111	DKK 16.590	DKK 17.019	DKK 14.986
Percentile 95th	DKK 18.999	DKK 20.406	DKK 25.843	DKK 26.325	DKK 22.273
Average	DKK 5.434	DKK 5.873	DKK 7.077	DKK 7.317	DKK 6.718

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Distribution of owed taxes by tax year

Distribution of owed taxes on pre-populated tax assesment for SFD taxpayers

Percentile 5th	DKK 99	DKK 94	DKK 111	DKK 1	
Percentile 10th	DKK 231	DKK 221	DKK 267	DKK 2	
Percentile 25th	DKK 747	DKK 732	DKK 908	DKK 929	DKK 954
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Penalty by 1 July ≈21 DKK

Penalty by 1 July ≈177 DKK

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The Price of Owed Taxes by Payment Timing
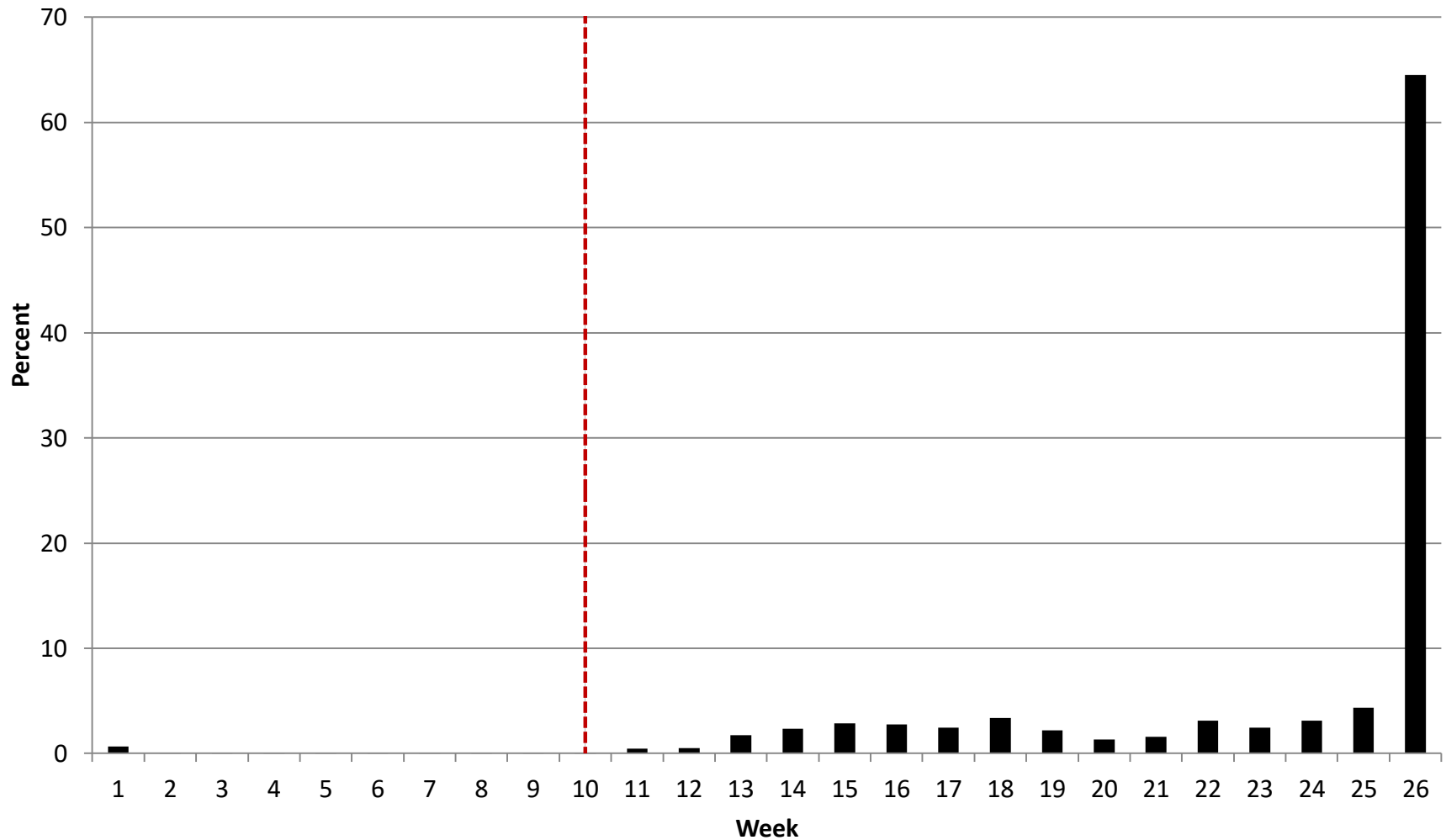## *Example: DKK 2,800 Owed Taxes*
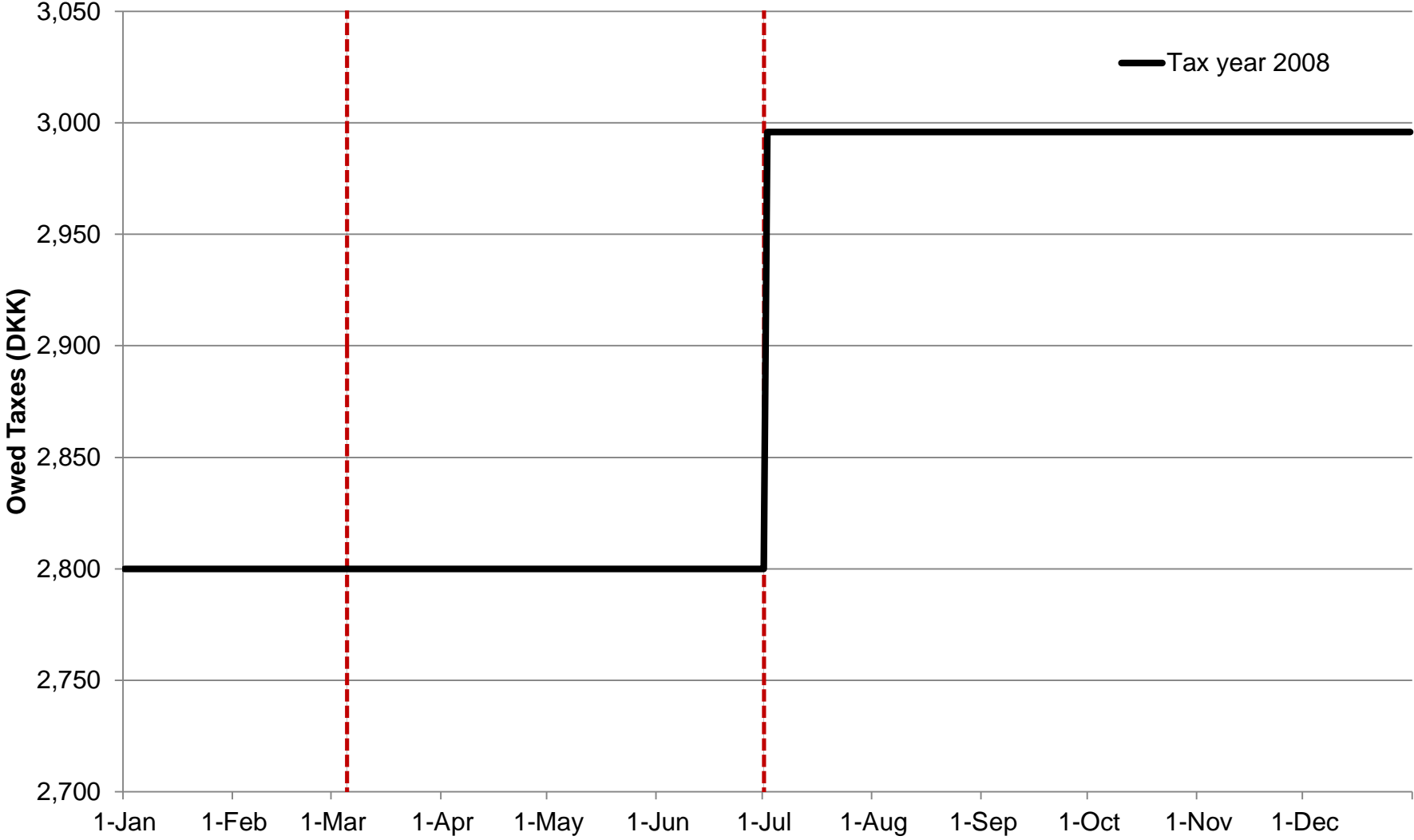
Payment timing 2005

Distribution of Owed Tax Payments by Week from January to July. Tax Year 2005.
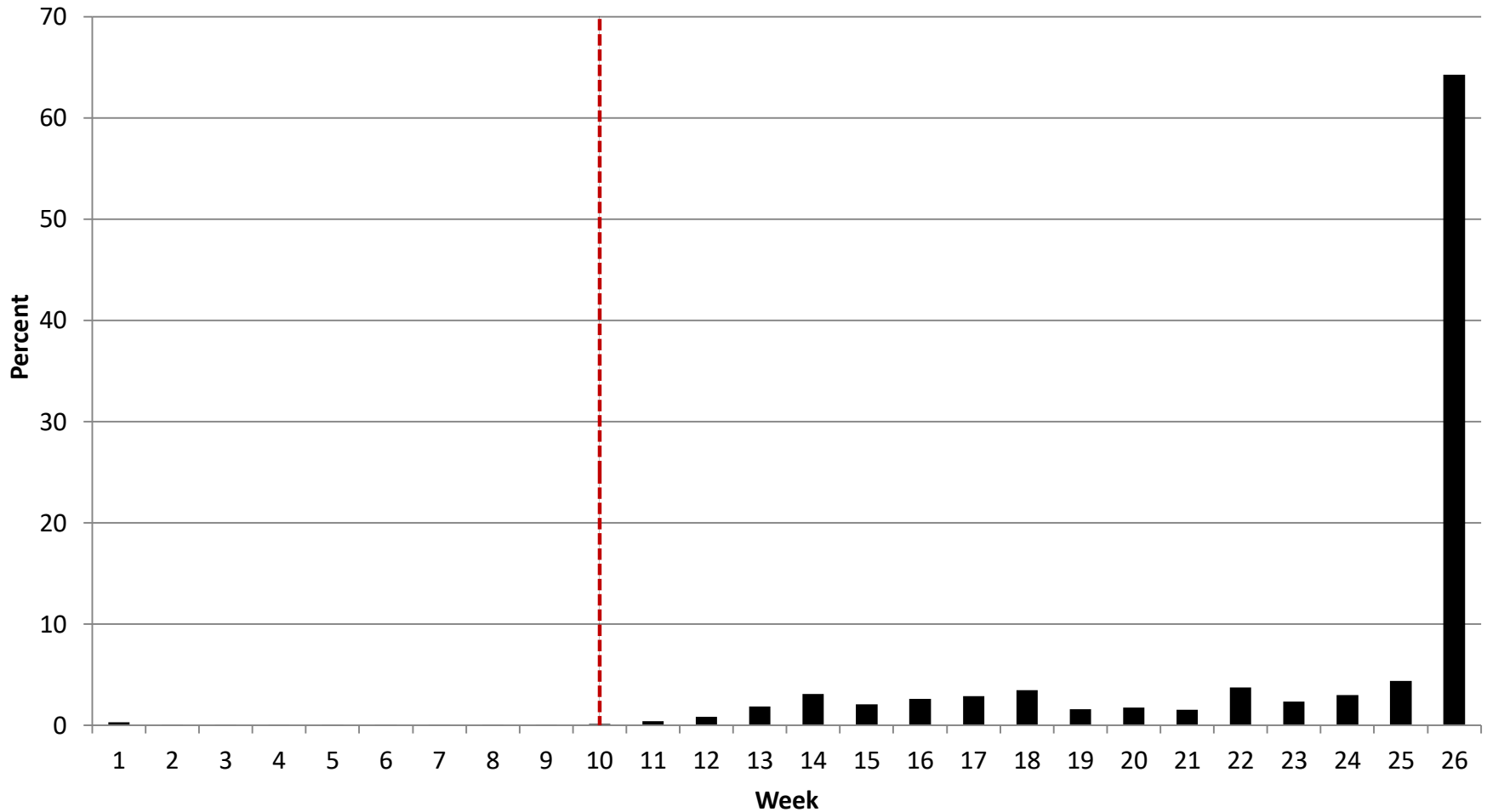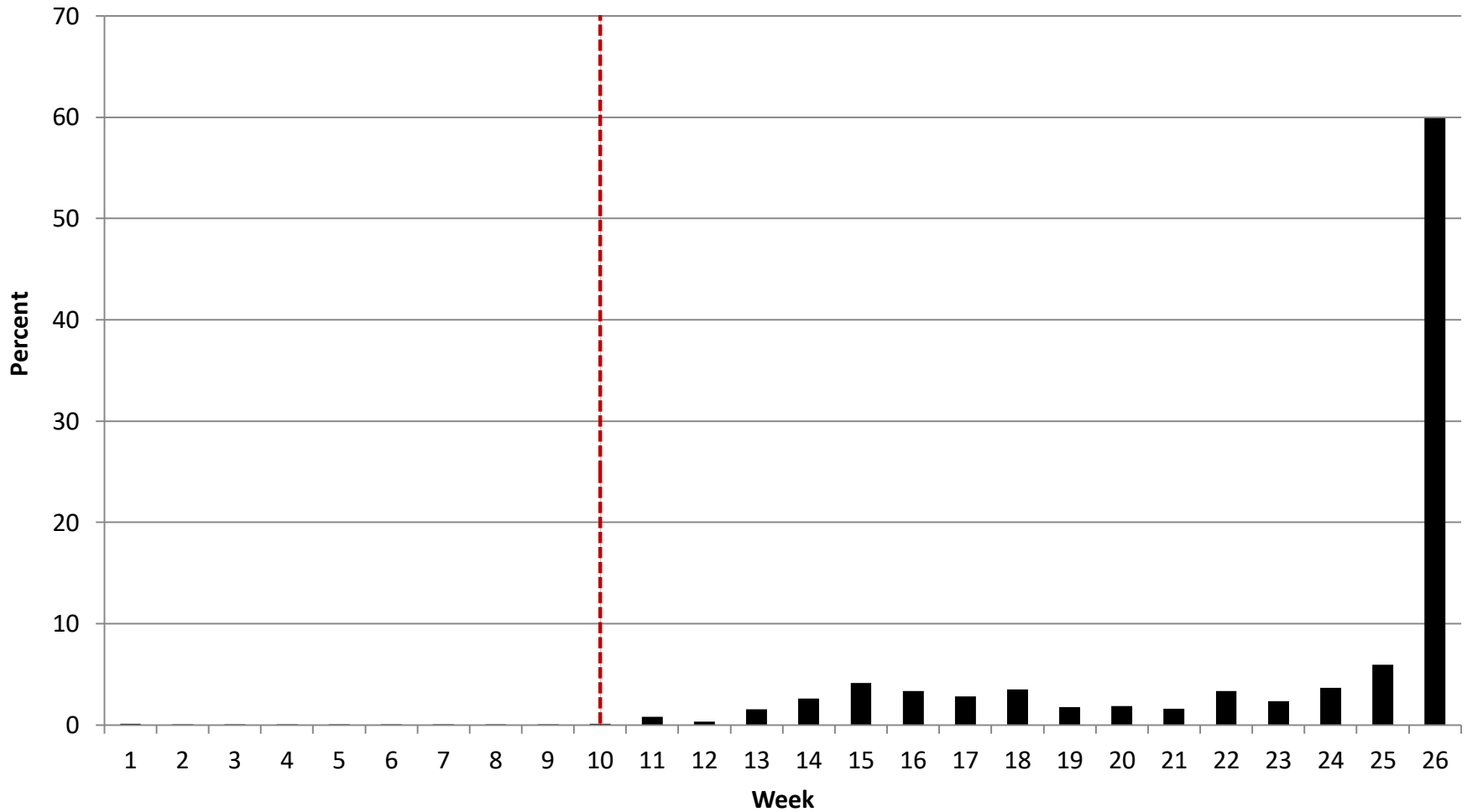
Payment timing 2006

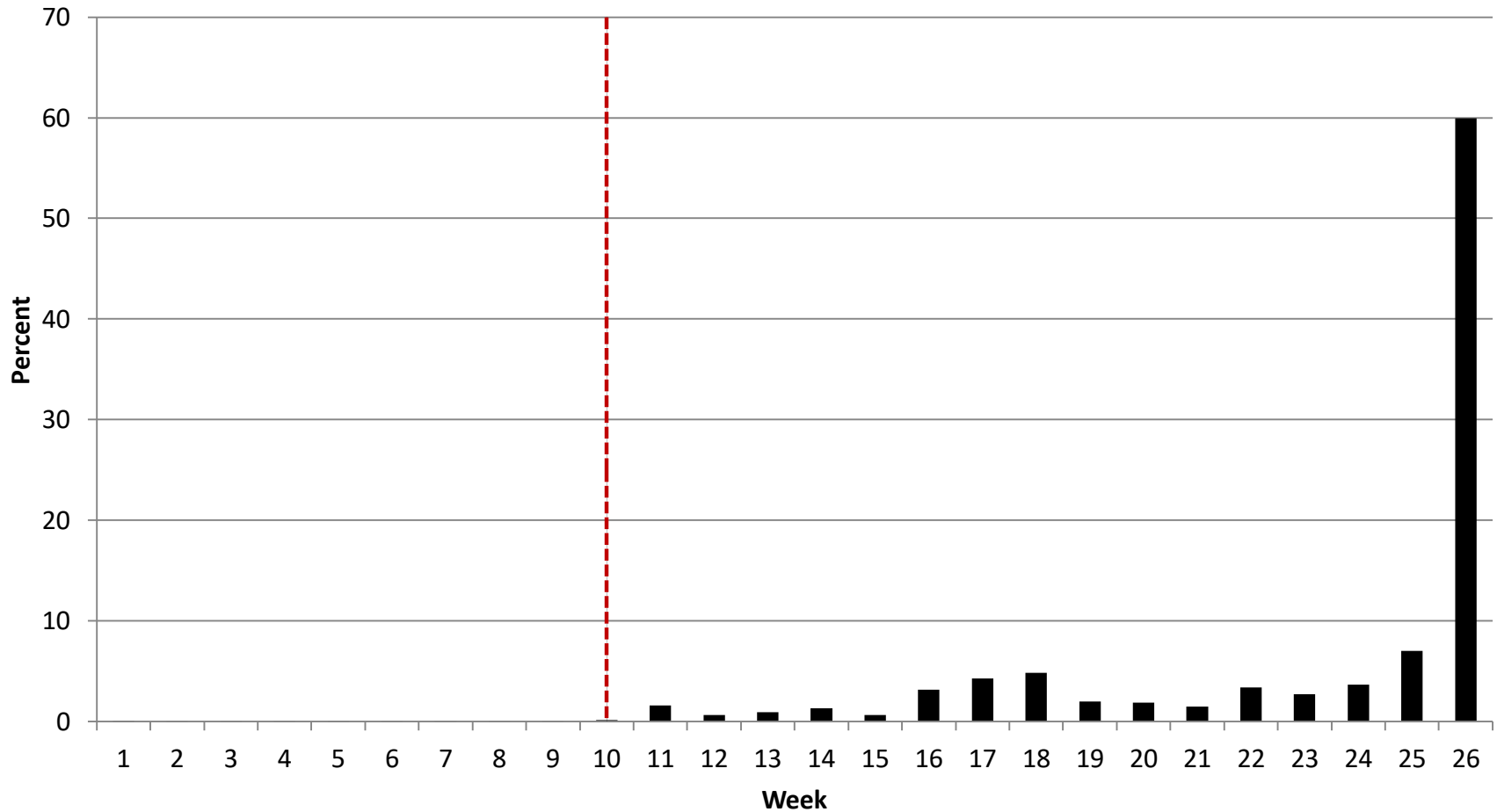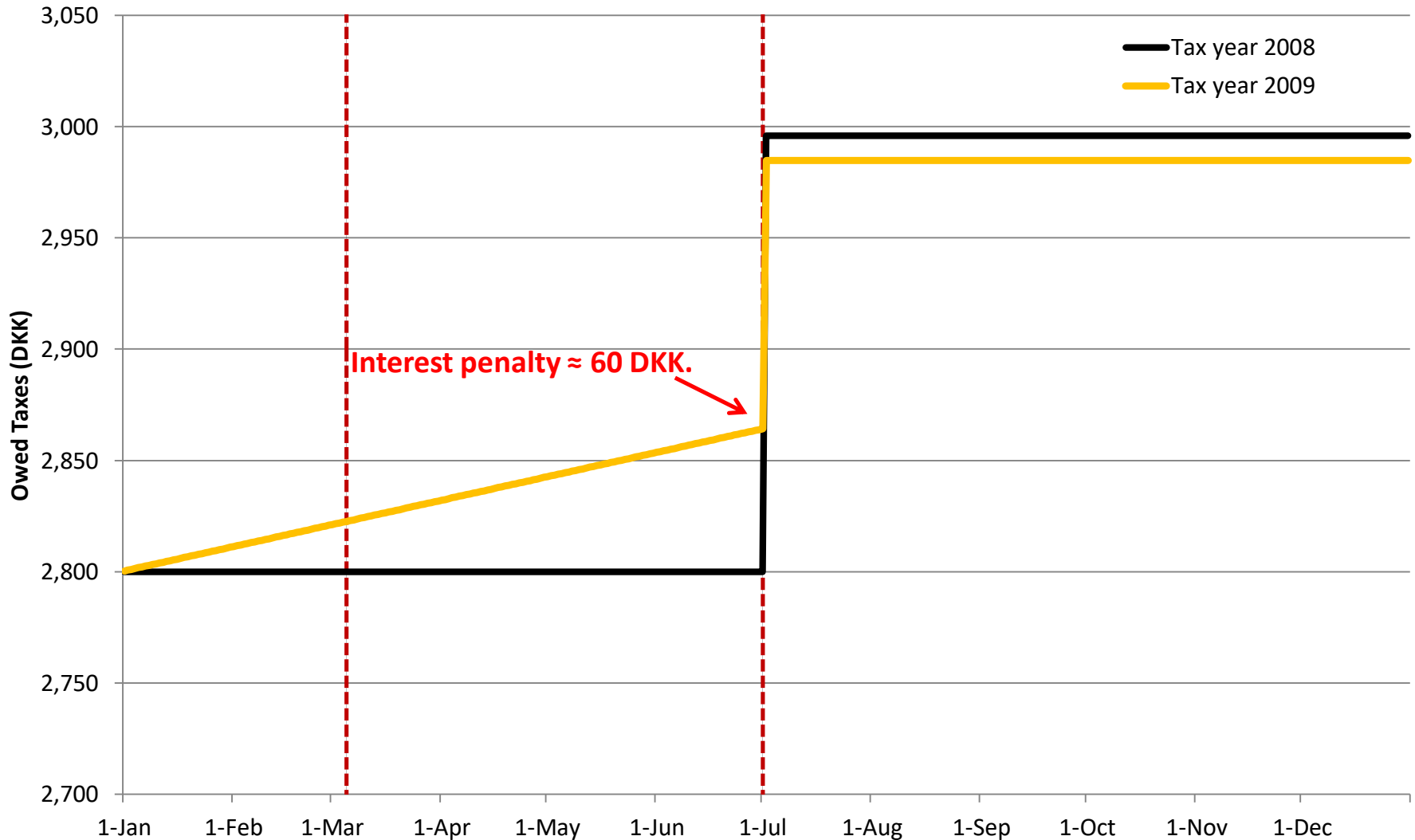**Distribution of Owed Tax Payments by Week from January to July. Tax Year 2006.**

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Payment timing 2007

Distribution of Owed Tax Payments by Week from January to July. Tax Year 2007.

Payment timing 2008

Distribution of Owed Tax Payments by Week from January to July. Tax Year 2008.

The Price of Owed Taxes by Payment Timing
Example: DKK 2,800 Owed Taxes

Payment timing 2009

Distribution of Owed Tax Payments by Week from January to July. Tax Year 2009.
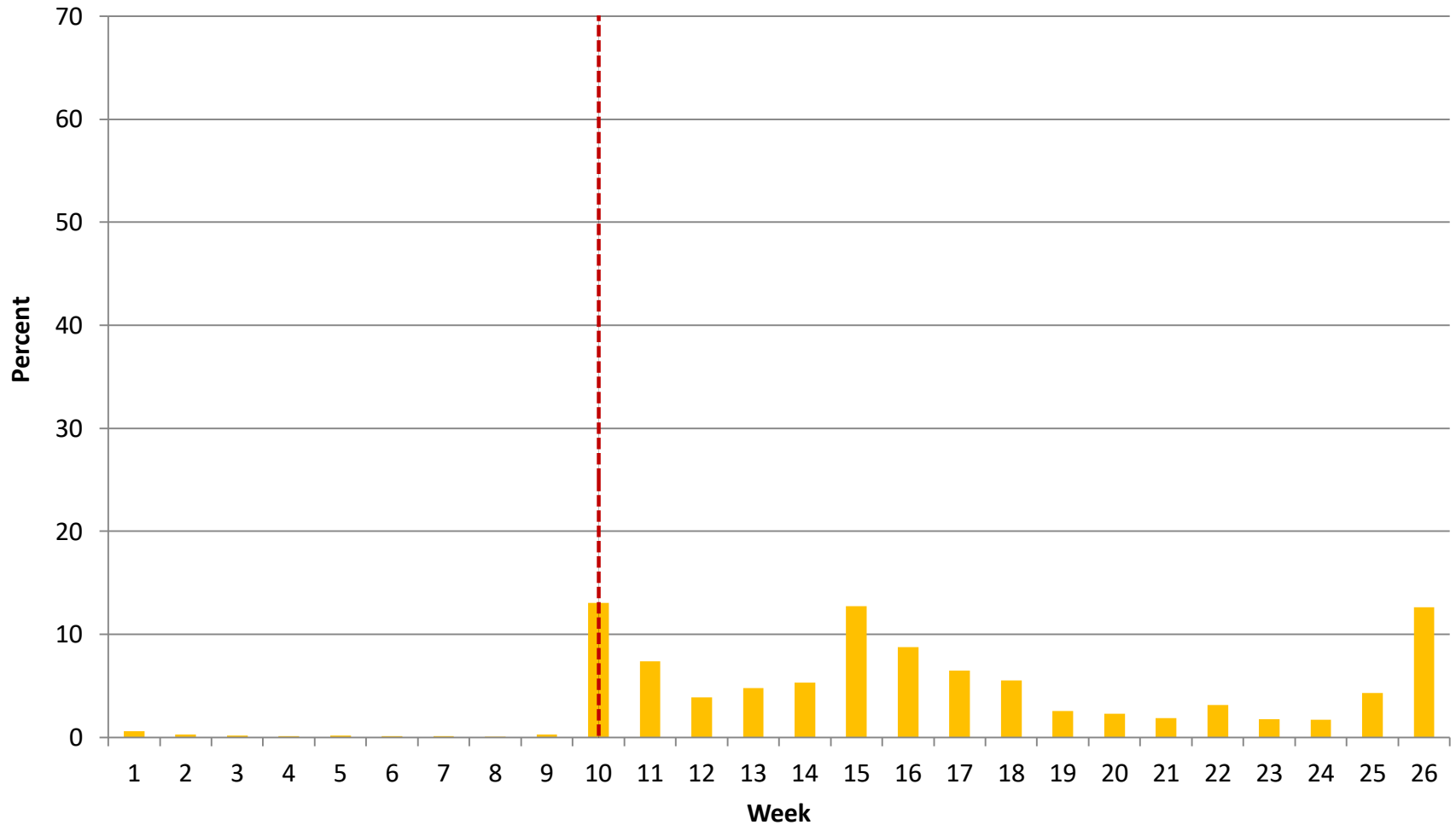
Empirical specification

Outcome 'dist_jan': The dependent variable is calculated as [payment date – 1 January] for the relevant tax year

Outcome 'dist_logon': The dependent variable is calculated as [payment date - tax account log-on date] for the relevant tax year.

$$dist\_jan_i = \beta_0 + \sum_{d=2006}^{2009} \alpha_d \cdot 1\{year = d\}$$

Payment timing
LPM regression

Table 1: LPM estimation of payment timing on tax year

	Model 1 dist_jan b/se	Model 2 dist_logon b/se
Tax year 2006	-1***	0
	(0.1)	(0.1)
Tax year 2007	-3***	5***
	(0.1)	(0.1)
Tax year 2008	-1***	8***
	(0.1)	(0.1)
Tax year 2009	-53***	-38***
	(0.1)	(0.1)
Baseline (Tax year 2005)	159***	61***
	(0.1)	(0.1)
Observations	2.325.967	2.325.963

The dependent variable 'dist_jan' from model 1 is calculated as [payment date - 1 January] for the relevant tax year.

The dependent variable 'dist_logon' from model 2 is calculated as [payment date - tax account log-on date] for every tax year.

Regression 1 and 2 includes alle payments from December 15 to July 5th. Robust standard errors are shown in the parathesis. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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For tax year 2005 the average payment fell on June 4.

The dependent variable 'dist_jan' from model 1 is calculated as [payment date – 1 January] for the relevant tax year.

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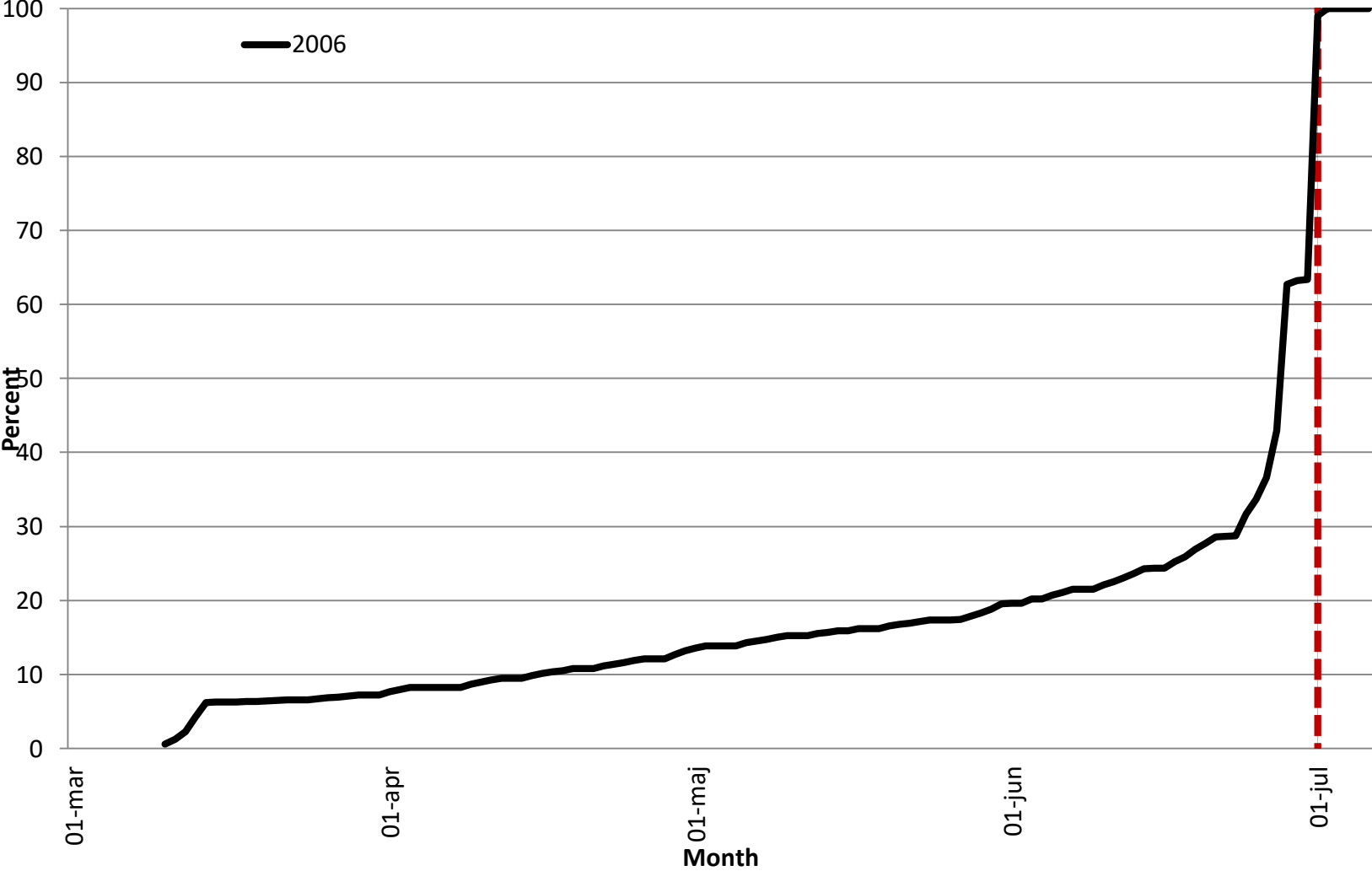|	Model 1 dist_jan b/se	Model 2 dist_logon b/se
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For tax years 2005 – 2008 the average payment fell on June 4.

The dependent variable 'dist_jan' from model 1 is calculated as [payment date - 1 Jjanuary] for the relevant tax year.
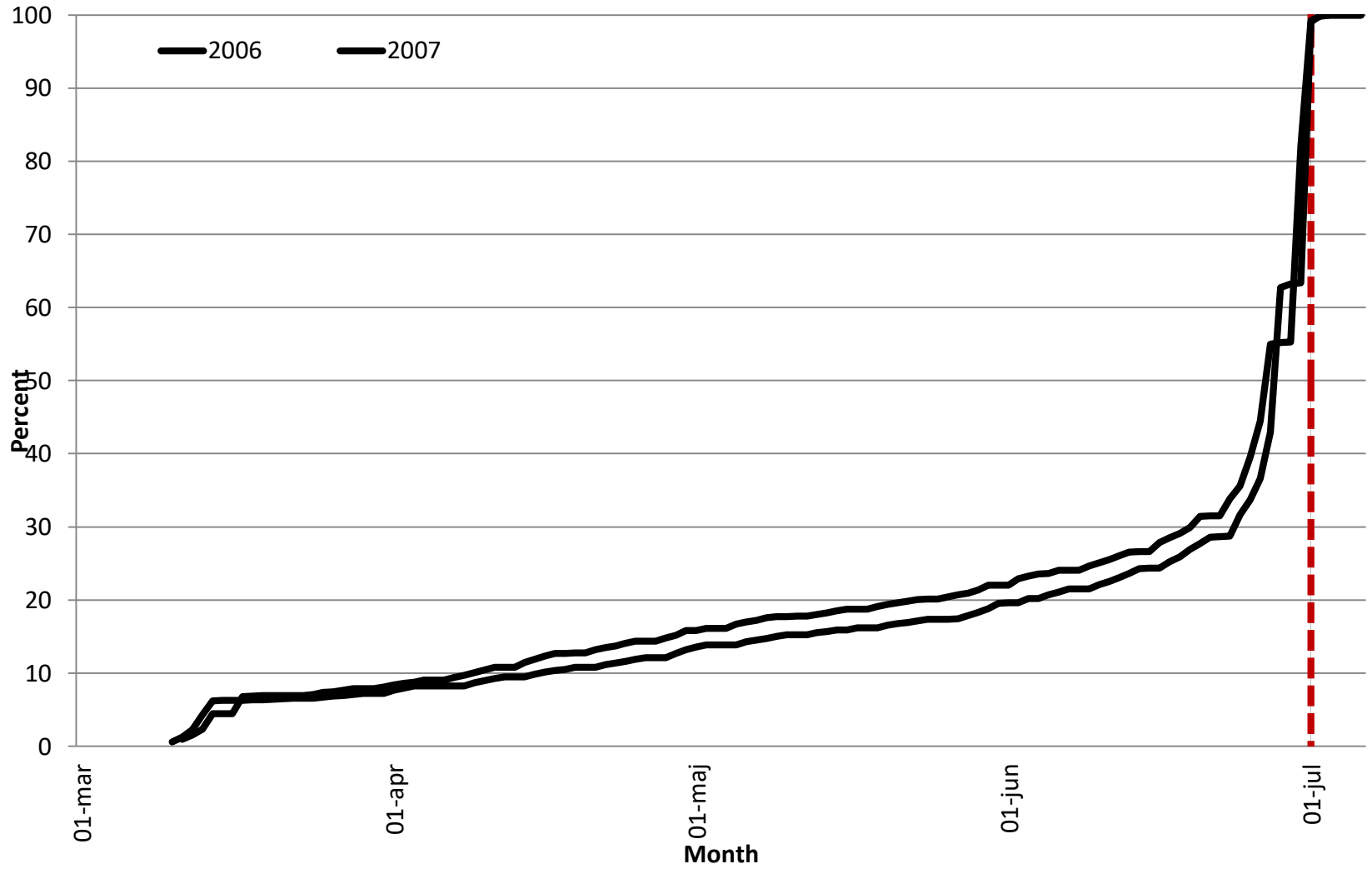
The dependent variable 'dist_logon' from model 2 is calculated as [payment date - tax account log-on date] for every tax year.

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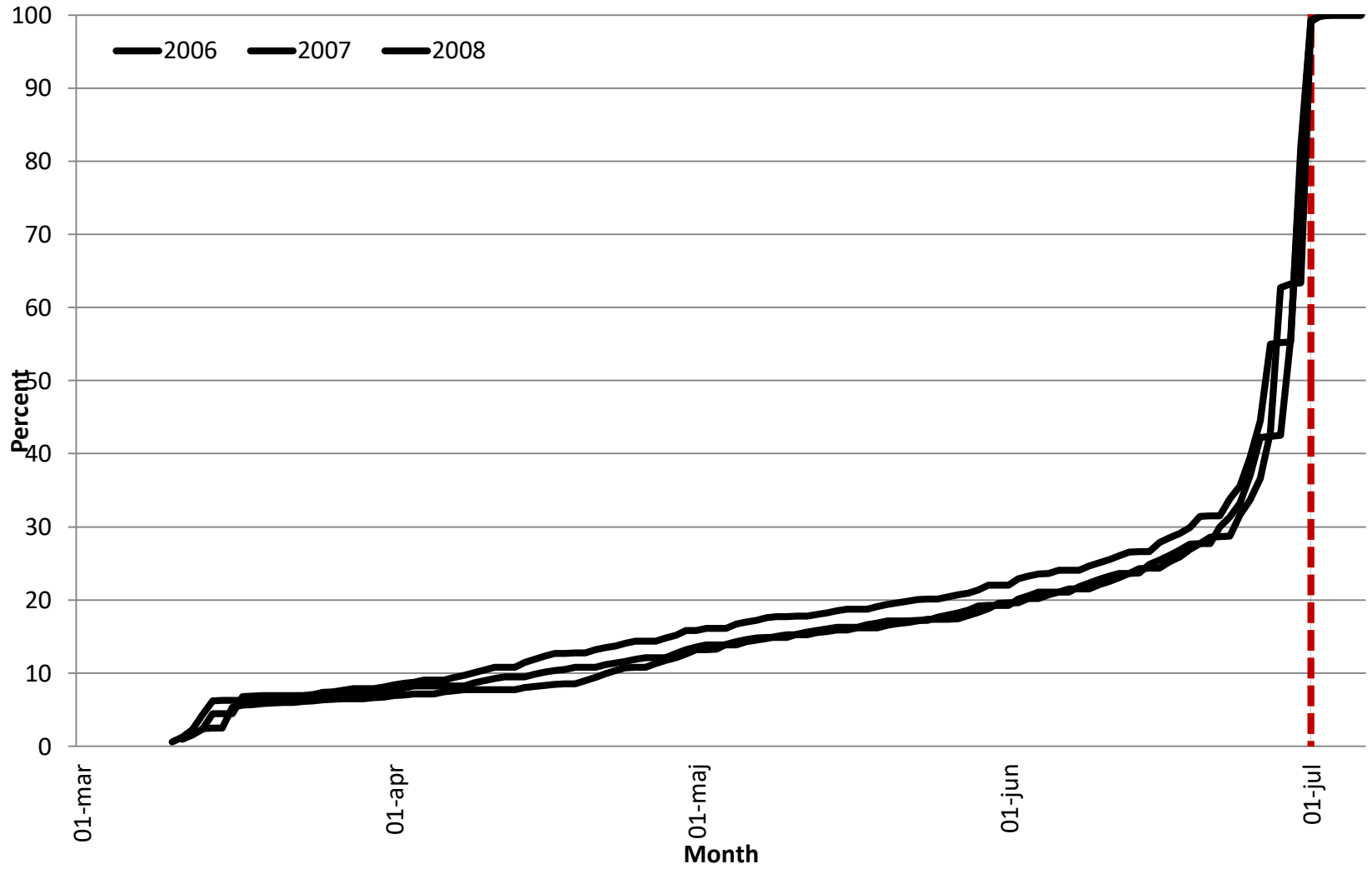# Payment timing
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For tax year 2009 the average payment fell on April 12.

The dependent variable 'dist_jan' from model 1 is calculated as [payment date - 1 January] for the relevant tax year.

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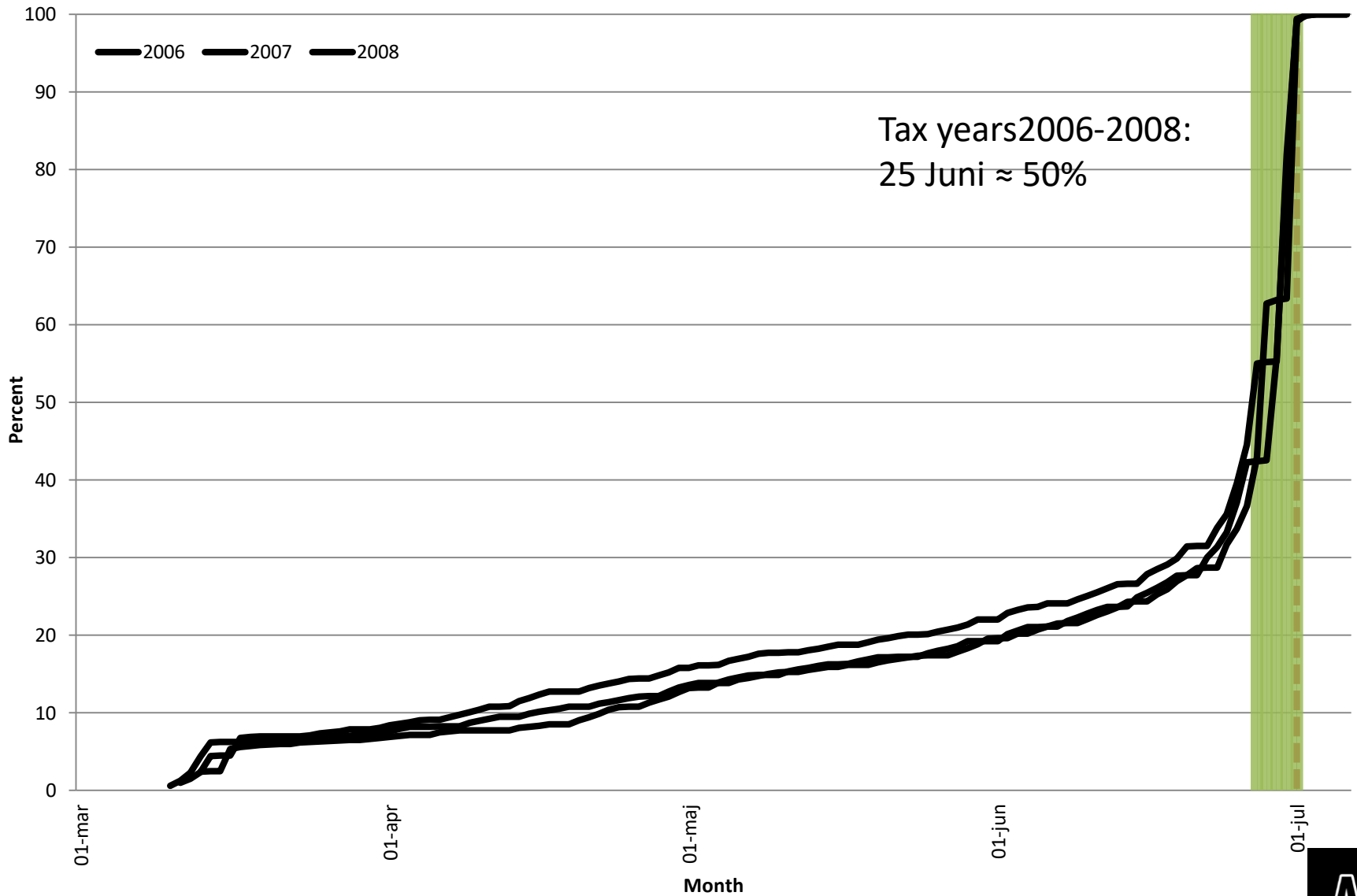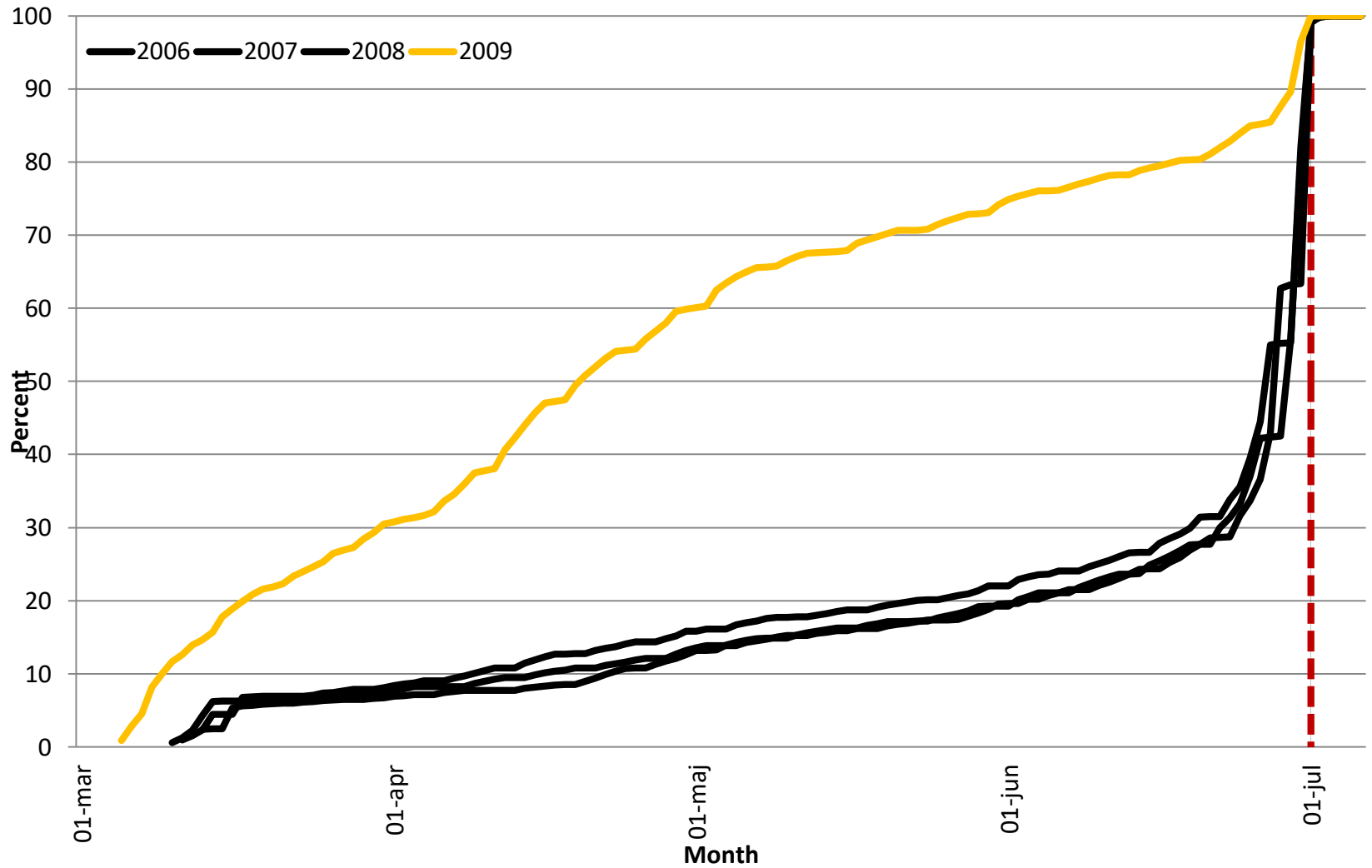
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Accumulated Payments by Tax Year

Accumulated Payments by Tax Year

Accumulated Payments by Tax Year

Accumulated Payments by Tax Year

Tax years 2006-2008:
25 Juni ≈ 50%
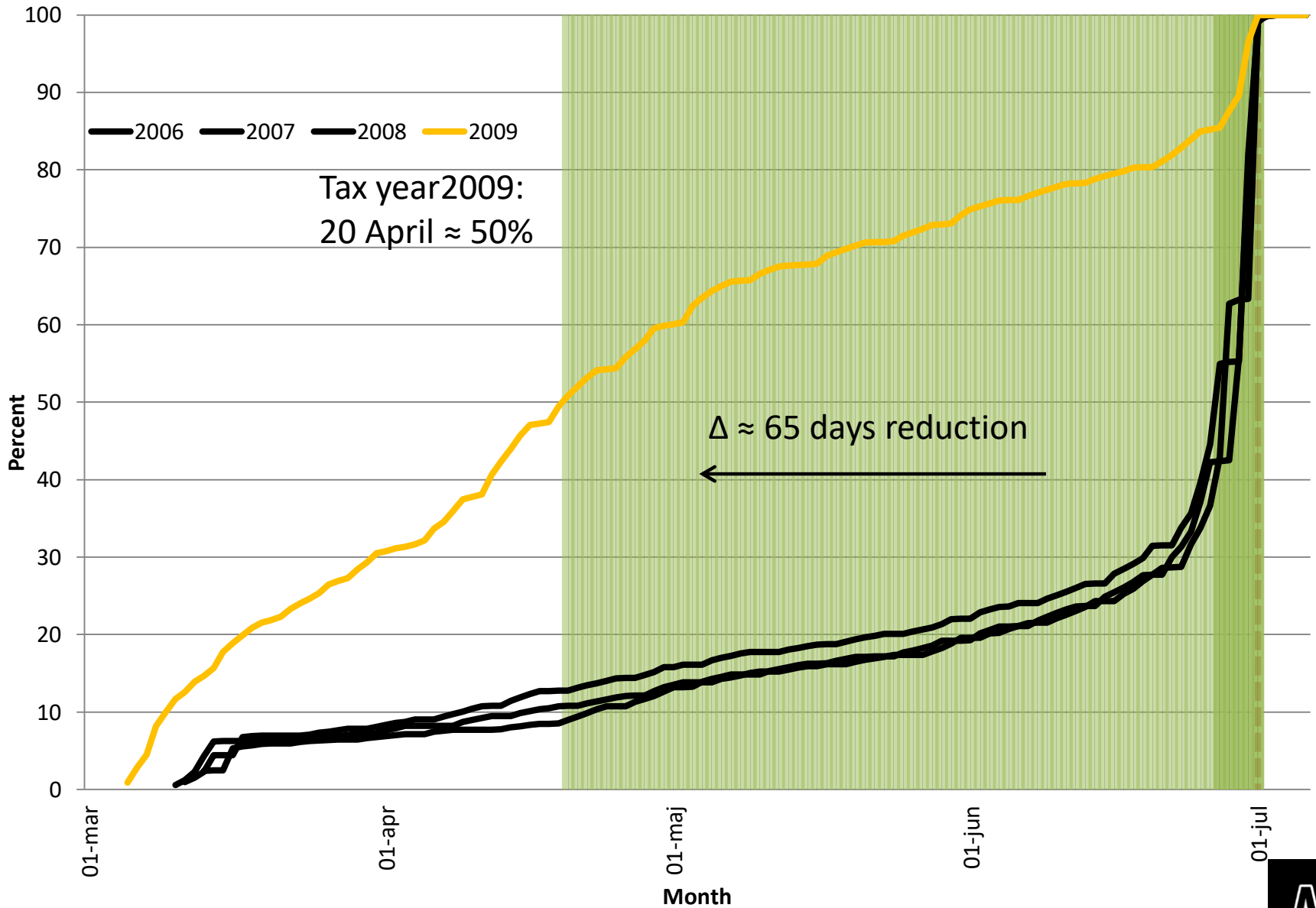
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Accumulated Payments by Tax Year

Accumulated Payments by Tax Year

Liquidity measure

Liquid assets relative to disposable income

$$\text{Liquidity}_i = \left[\frac{\text{Bank deposits + Market value of shares and investment certificates}}{\text{Total taxable income} - \text{Total personal tax payments}} \right] \text{x } 100$$
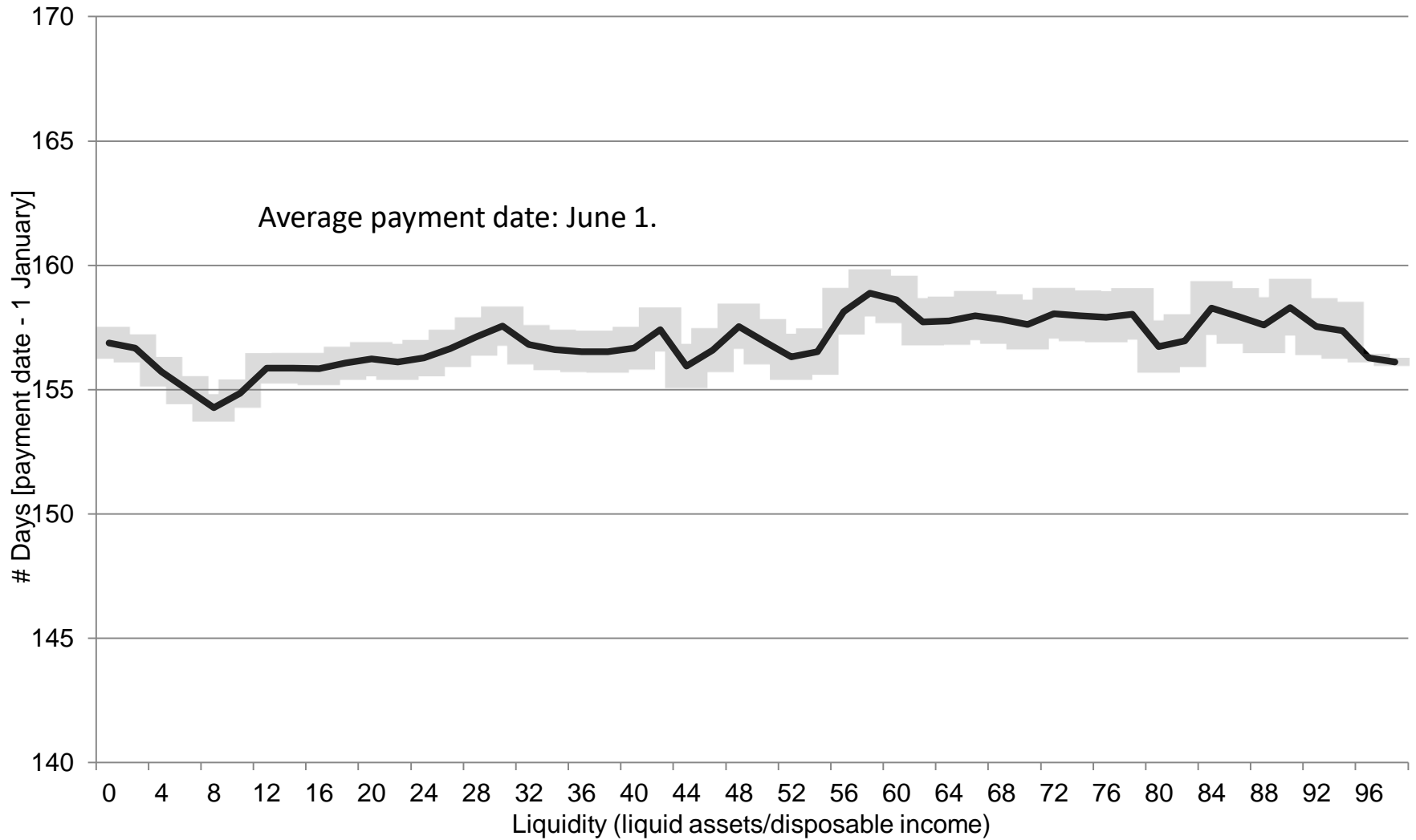
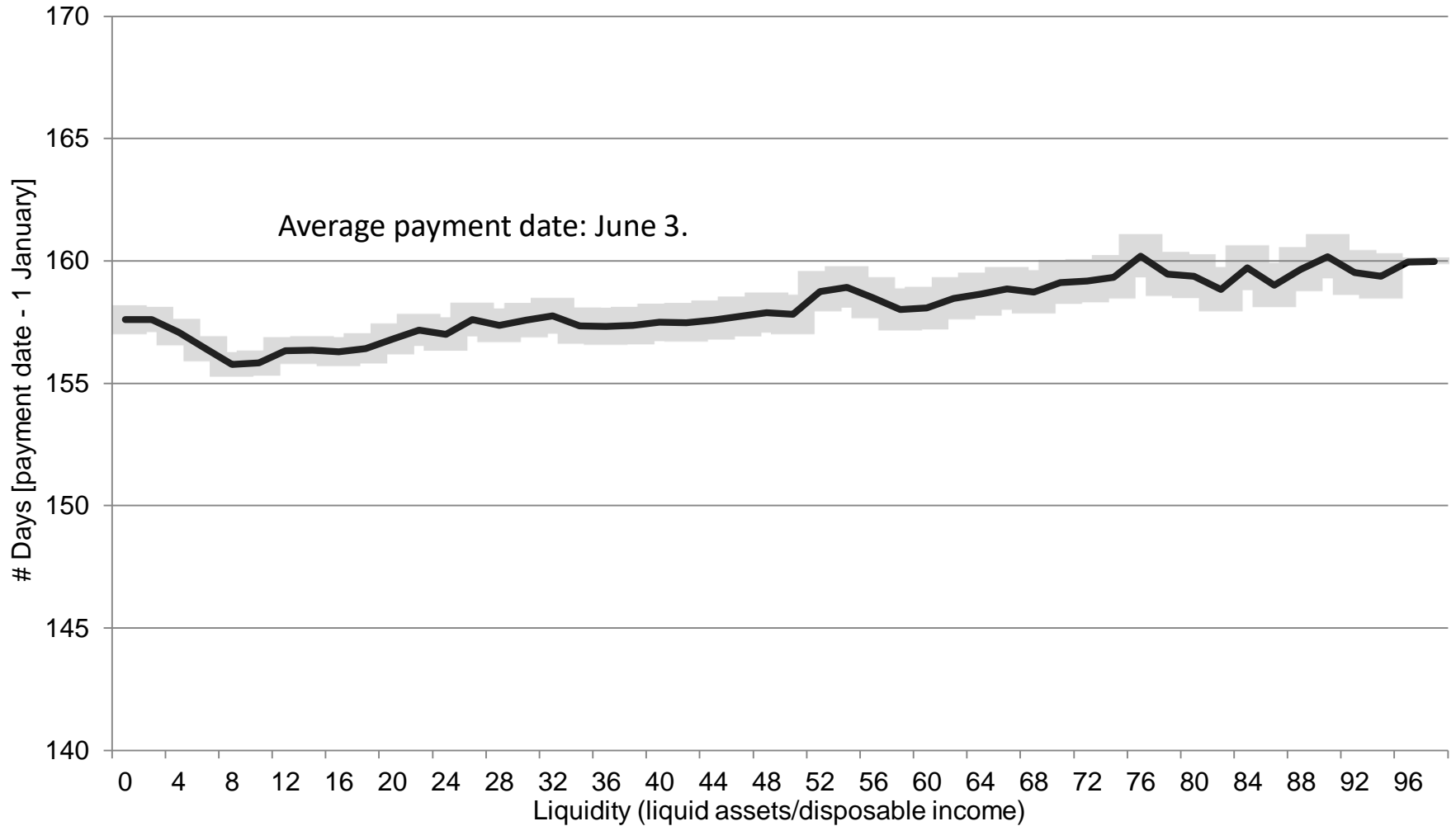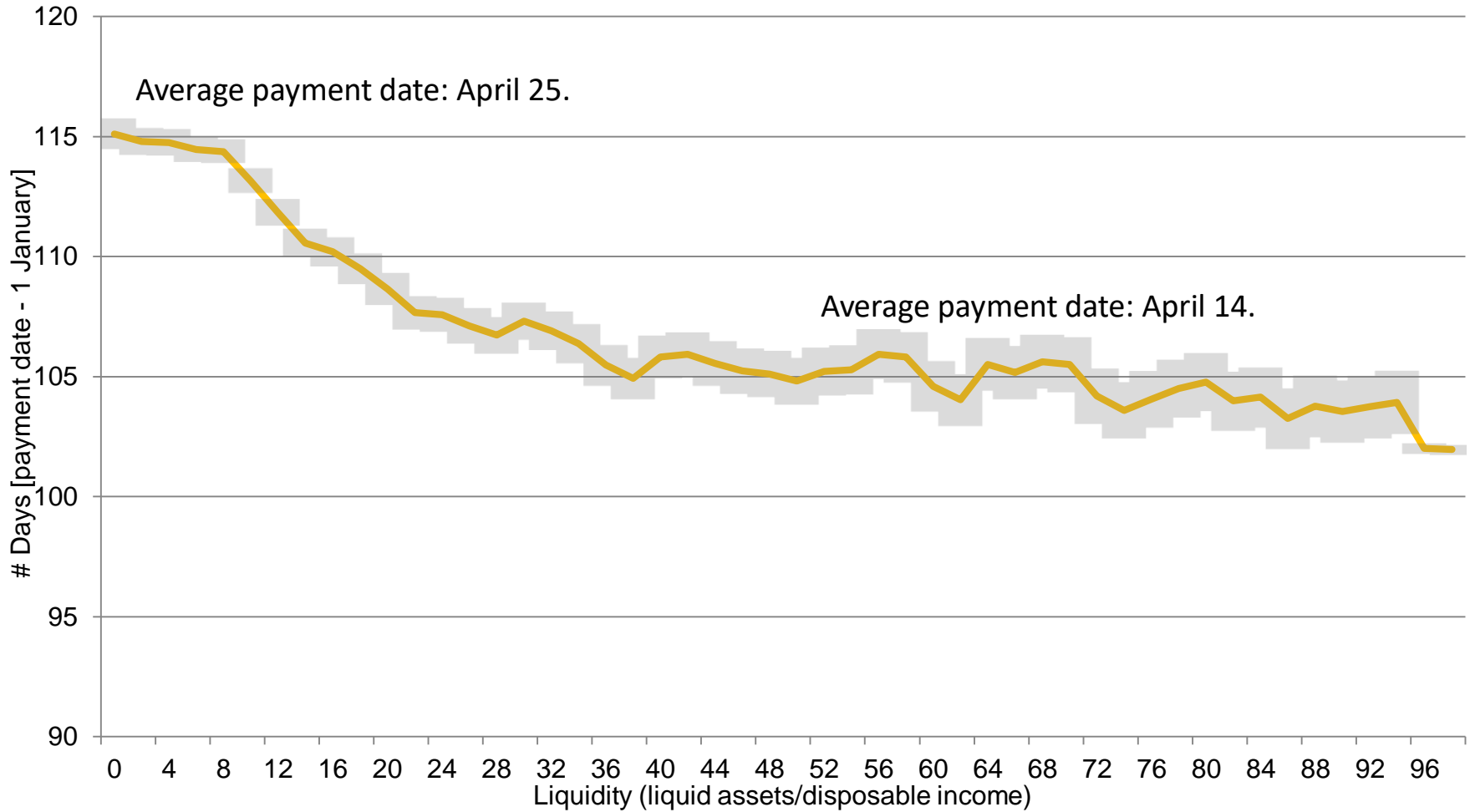| Liquidity	Liquidity corresponding to
0	None
8	One months income
50	Half-year income
100	Full year income

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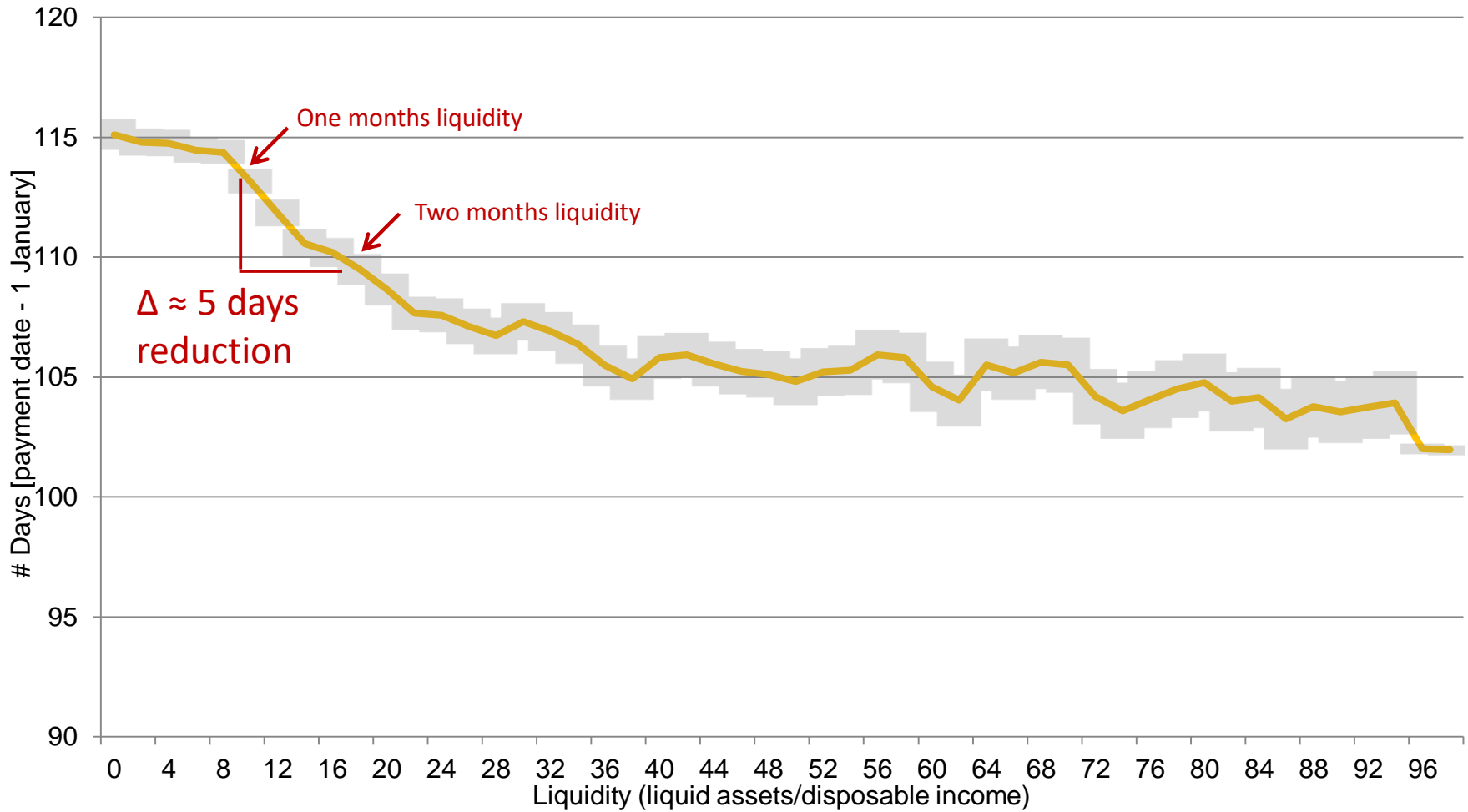
Payment timing by liquidity. Tax year 2006.
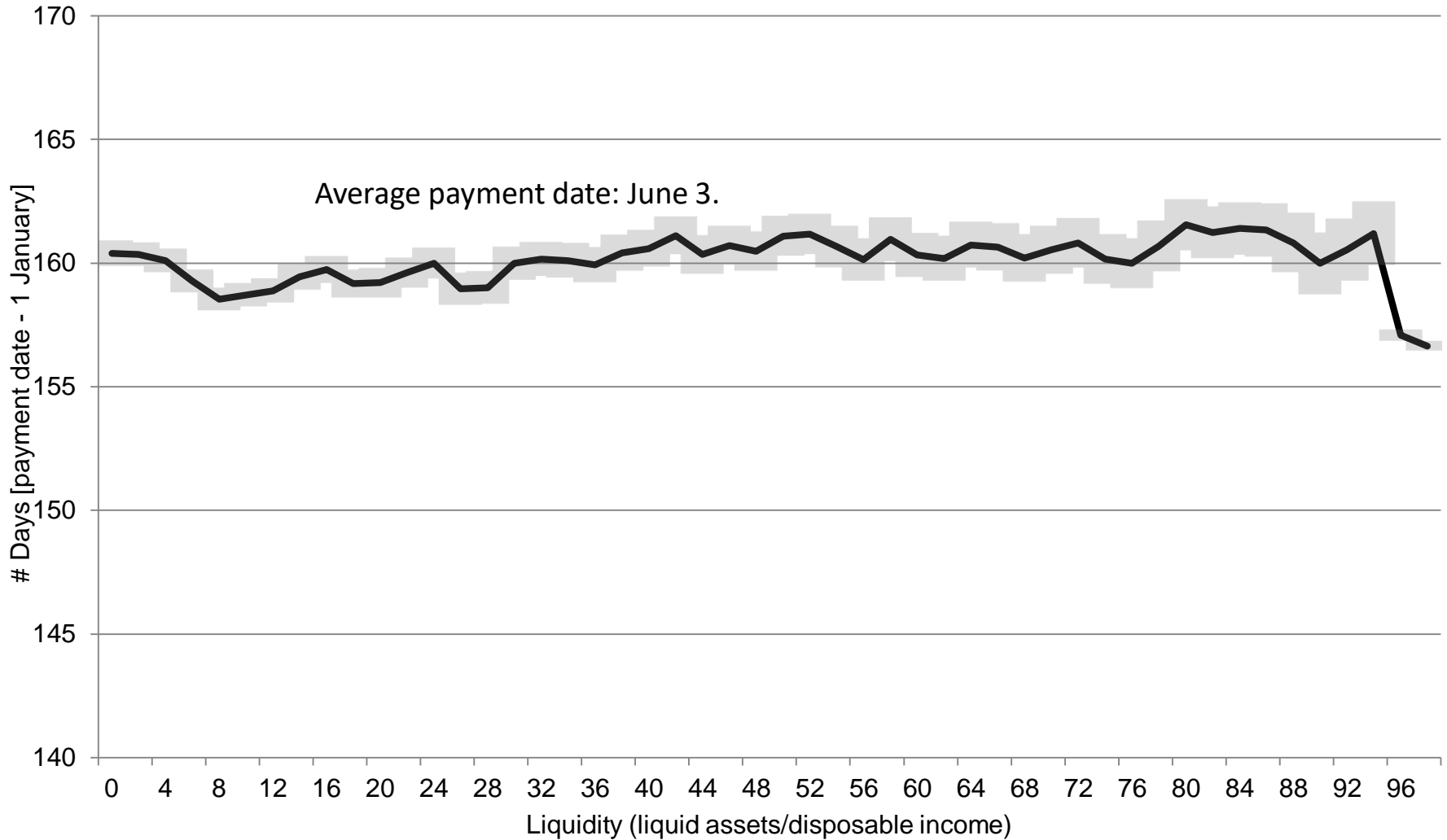
Payment timing by liquidity. Tax year 2007.

Payment timing by liquidity. Tax year 2008.

Average payment date: June 3.

Payment timing by liquidity. Tax year 2009.

Payment timing by liquidity. Tax year 2009.

Conclusion

Taxpayers respond to incentives;

➢ The introduction of the so-called day-to-day interest penalty on owed taxes reduced the payment time by 50 days (corresponding to a reduction in payment time by 35%)

➢ Liquidity constrained taxpayers showed a smaller response to introduction of the interest penalty .

Even small incentives can be very effective;

➢ The payment timing was reduced by taxpayers changing their payment date from late June to mid-March (publication of the pre-printed return)

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