Disclosure frequency induced earnings-cash flow conflict and the decision to be public

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Numerical example under quarterly reporting based on Bhojraj and Libby (2005)

Stock issuance

	Quarter 1	Quarter 2	Quarter 3	Up-to-date	Quarter 4	Total
Cash outflows from project 1	(100)	0	0	**(100)**	0	(100)
Cash inflows from project 1	0	0	120	**120**	0	120
Net cash flows from project 1	(100)	0	120	**20**	0	20
Cash outflows from project 2	(100)	0	0	**(100)**	0	(100)
Cash inflows from project 2	0	0	0	**0**	125	125
Net cash flows from project 2	(100)	0	0	**(100)**	125	25
Note	1) Managers see the entire stream of payoffs from both projects 2) Same timing and amount of cash outflows 3) Investors only see the most recent quarter and up-to-date information					

Evidence from the experiment

If stock issuance in quarter 4 (proxy for capital market pressure), investors can only see the information up to quarter 3 and make conjectures about the prospect of the company:

Project 1 yields HIGHER short-term earnings relative to project 2

a) Higher up-to-date earning

b) Higher quarter 3 earnings

However, project 2 yields HIGHER total cash flows than project 1

⇒ **Disclosure frequency-induced conflict between short-term reported earnings and total cash flows**

Evidence: nearly all managers in publicly traded companies choose project 1 ***(myopic choice)*** and no manager chooses project 2 under quarterly reporting

Interpretation: when faced with capital market pressure, managers are willing to sacrifice total cash flows to achieve short-term reporting objectives for earnings

Varying timeline of payoffs of project 2 under quarterly reporting

Stock issuance

	Quarter 1	Quarter 2	Quarter 3	Up-to-date	Quarter 4	Total
Cash outflows from project 1	(100)	0	0	**(100)**	0	(100)
Cash inflows from project 1	0	0	120	**120**	0	120
Net cash flows from project 1	(100)	0	120	**20**	0	20
Cash outflows from project 2	(100)	0	0	**(100)**	0	(100)
Cash inflows from project 2	0	0	**125**	**125**	0	125
Net cash flows from project 2	(100)	0	125	**25**	0	25
Experiment Evidence	All managers choose project 2; No managers choose project 1; No conflict between short-term reported earnings and total cash flows: project 2 have both higher reported earnings and total cash flows at the time of stock issuance					

Research question

Bhojraj and Libby (2005) show that disclosure frequency induced earnings-cash flow conflict pressures managers in publicly traded firms to choose projects that maximize short-term reported earnings at the expense of total cash flows.

Motivated by their experimental evidence, we ask:

Does disclosure frequency induced earnings-cash flow conflict influence the types of firms that choose to be public and the choices of listing exchanges conditional on being public?

Anecdotal evidence

Jonathan Klein, CEO of Getty Images:

"We moved swiftly and adjusted our cost base, invested in our employees and were able to acquire our then second largest competitor at a knock-down price . . . All of this was possible as a private company without the issues of quarterly reporting, providing guidance on earnings, a volatile stock price and external pressures"

Transition to archival setting

Experiment: a concrete project at one point of time

--- Manipulate the extent of disclosure induced earnings-cash flow conflict by varying **the timeline of payoffs** from the project

Archival: multiple projects on a continuous basis and payoffs are observable only on an aggregate rather than project-by-project basis

--- Capture the extent of disclosure induced earnings-cash flow conflict by varying **the average length of payoff from all projects**

Empirical proxy for the average length of payoffs from all projects

- Operationalize: **the length of the cash conversion cycle (CCC)** captures the average length of payoffs from all projects

- The length of CCC is defined as the average amount of time each net input dollar is tied up in the production and sales process before it is converted into cash flows

- CCC has both an industry-wide component and a firm-specific component

Hypothesis I (cross-sectional prediction)

- Given the same mandatory reporting frequency, the longer CCCs, the greater the disclosure frequency induced conflict between total cash flows and short-term reported earnings, the greater it **deters** firms from being public.
- However, longer CCCs also indicate **greater needs for external capital**.
- If the earnings-cash flow conflict is induced by mandatory disclosure frequency, it only matters for industries whose CCC exceeds the frequency of mandatory reporting:

H1: Ceteris paribus, the association between the length of cash conversion cycles and the likelihood of being public has a kink around the frequency of mandatory disclosure.

Sample for testing H1

- Industries defined by 6-digit NAICS
- Number of all firms (NUM_FIRMS_CENSUS), collected from Census of Manufacturers (COM) and assigned to the five years centered on the census year (e.g., 2007 COM applied to 2005 to 2009)
- Number of public firms (NUM_PUBLIC) from Compustat
- LOG_ODDS = Ln[PROPORTION/(1-PROPORTION)], where PROPORTION = NUM_PUBLIC/NUM_FIRMS_CENSUS
- INDUSTRY_CCC: Median length of CCC within an industry
- CCC_LONG1Q: Indicator for INDUSTRY_CCC longer than one quarter
- Final sample: 4,832 industry-year observations from 401 manufacturing industries from 1995 to 2009

Model specification for testing H1

Regression (1):

$$LOG\_ODDS_{it} = \propto + \beta_1 INDUSTRY\_CCC_{it} + \beta_2 NUM\_FIRMS\_CENSUS_{it} + \beta_3 CCC\_LONG1Q_{it} + \boldsymbol{\beta_4 CCC\_LONG1Q_{it} * INDUSTRY\_CCC_{it}} + \beta_5 INDUSTRY\_MARKUP_{it} + \beta_6 Ln(INDUSTRY\_SALES)_{it} + \beta_7 POST\_SFAS131_t + \beta_8 POST\_SOX_t + \boldsymbol{\varepsilon_{it}}$$

Regression (2):

$$LOG\_ODDS_{it} = \propto + \beta_1 CCC\_LONG1Q_{it} + \beta_2 INDUSTRY\_DSI_{it} + \boldsymbol{\beta_3 CCC\_LONG1Q_{it} * INDUSTRY\_DSI_{it}} + \beta_4 INDUSTRY\_DSO_{it} + \boldsymbol{\beta_5 CCC\_LONG1Q_{it} * INDUSTRY\_DSO_{it}} + \beta_6 INDUSTRY\_DPO_{it} + \boldsymbol{\beta_7 CCC\_LONG1Q_{it} * INDUSTRY\_DPO_{it}} + \beta_8 NUM\_FIRMS\_CENSUS_{it} + \beta_9 INDUSTRY\_MARKUP_{it} + \beta_{10} Ln\,(INDUSTRY\_SALES)_{it} + \beta_{11} POST\_SFAS131_t + \beta_{12} POST\_SOX_t + \boldsymbol{\varepsilon_{it}}$$

Table 1 Descriptive statistics for variables testing H1

	NUM_FIRMS_CENSUS	PROPORTION	INDUSTRY_CCC	INDUSTRY_MARKUP	INDUSTRY_SALES
N	4,832	4,832	4,832	4,832	4,832
Mean	694	2.863	102.08	-0.04	1,740.54
Median	312	1.136	90.45	0.02	475.48
Std	1,385	4.810	87.12	0.38	5,818.92
Min	4	0.005	0.50	-18.24	0.01
Max	22,180	50.000	4,070.63	2.60	106,661.87

Table 2 Pearson (Above) and Spearman (Below) Correlations

	LOG_ODDS	INDUSTRY _CCC	NUM_FIRMS _CENSUS	INDUSTRY _MARKUP	INDUSTRY _SALES	POST_SFAS131	POST_SOX
LOG_ODDS		0.038***	-0.513***	-0.039***	0.183***	-0.036**	-0.061***
INDUSTRY_CCC	0.058***		-0.054***	-0.018	-0.089***	-0.032**	-0.079***
NUM_FIRMS_CENSUS	-0.611***	0.039***		0.013	-0.074***	0.002	-0.003
INDUSTRY_MARKUP	-0.137***	-0.067***	-0.091***		0.016	-0.026*	-0.032**
INDUSTRY_SALES	0.324***	-0.243***	-0.144***	0.119***		0.057***	0.103***
POST_SFAS131	-0.032**	-0.064***	0.005	-0.088***	0.135***		0.412***
POST_SOX	-0.054***	-0.122***	0.005	-0.045***	0.187***	0.412***	

Table 3 Test of H1

The kink when INDUSTRY_CCC > 90 days

Explanatory Variables	Dependent Variable		
	= Ln [(PROPORTION$_{it}$ / (1- PROPORTION$_{it}$)]		
INTERCEPT	-4.079***	-5.541***	-5.919***
	(-46.252)	(-31.293)	(-24.635)
INDUSTRY_CCC	0.000	0.001**	0.006**
	(0.464)	(2.548)	(2.283)
NUM_FIRMS_CENSUS	-0.537***	-0.507***	-0.506***
	(-6.430)	(-6.590)	(-6.494)
CCC_LONG1Q			0.483**
			(2.415)
CCC_LONG1Q*INDUSTRY_CCC			**-0.005****
			(-2.139)
INDUSTRY_MARKUP		-0.299***	-0.302***
		(-3.008)	(-2.880)
Ln (INDUSTRY_SALES)		0.265***	0.270***
		(9.124)	(9.268)
POST_SFAS131		-0.131***	-0.127***
		(-9.232)	(-37.648)
POST_SOX		-0.294***	-0.282***
		(-3.055)	(-3.119)
Adjusted R-squared	26.28%	35.54%	35.98%
N	4,832	4,832	4,832

Table 4 Test of H1

The effects of the three components of CCC

Explanatory Variables	Dependent Variable = Ln [(PROPORTION$_{it}$ / (1- PROPORTION$_{it}$)]			
INTERCEPT	-6.063***	-5.608***	-5.821***	-6.054***
	(-27.247)	(-21.848)	(-24.429)	(-20.872)
CCC_LONG1Q	0.602***	0.022	0.242**	0.383*
	(4.205)	(0.118)	(2.079)	(1.720)
INDUSTRY_DSI	0.008***			0.008***
	(4.070)			(3.221)
CCC_LONG1Q*INDUSTRY_DSI	**-0.008*** **			**-0.008*** **
	(-3.897)			**(-3.003)**
INDUSTRY_DSO		0.000		-0.001
		(0.007)		(-0.365)
CCC_LONG1Q*INDUSTRY_DSO		**0.003**		**0.003**
		(0.821)		**(0.629)**
INDUSTRY_DPO			0.005**	0.000
			(2.160)	(0.116)
CCC_LONG1Q*INDUSTRY_DPO			**-0.002**	**0.003**
			(-0.530)	**(0.503)**
NUM_FIRMS_CENSUS	-0.502***	-0.505***	-0.503***	-0.502***
	(-6.412)	(-6.581)	(-6.562)	(-6.417)
INDUSTRY_MARKUP	-0.282***	-0.292***	-0.257***	-0.262***
	(-2.978)	(-3.197)	(-3.462)	(-3.318)
Ln (INDUSTRY_SALES)	0.274***	0.273***	0.275***	0.279***
	(9.467)	(9.455)	(9.268)	(9.250)
POST_SFAS131	-0.135***	-0.128***	-0.132***	-0.129***
	(-7.719)	(-18.226)	(-13.670)	(-22.424)
POST_SOX	-0.284***	-0.292***	-0.293***	-0.294***
	(-3.135)	(-3.039)	(-3.083)	(-3.187)
Adjusted R-squared	36.51%	35.82%	36.17%	36.74%
N	4,832	4,832	4,832	4,832

Hypothesis II (time-series prediction)

- Increased mandatory disclosure frequency exacerbates the conflict between short-term reported earnings and total cash flows especially for firms whose cash conversion cycles are shorter than the length of the old reporting period but are longer than the length of the new reporting period.

H2. The increased mandatory disclosure frequency from semi-annual to quarterly decreases the proportion of public firms in industries whose cash conversion cycles are between one quarter and two quarters to a greater extent than other industries.

Two samples for testing H2

- **US Sample**
  - Change from semi-annual to quarterly around 1970
  - Industries defined by SIC: SIC1967 and SIC1972 are mapped to SIC1987
  - Two COMs (1967, 1972) around 1970 are hand collected
  - CCC_1Q2Q: equals to one if INDUSTRY_CCC **measured between 1965 and 1969** is longer than 90 days and shorter than 180 days, and zero otherwise.
  - USQTR: equals to one if the year is between 1970 and 1974, and zero if the year is between 1965 and 1969
  - Final sample: 880 industry-year observations from 97 manufacturing industries from 1965 to 1974

Regression (3):

$$LOG\_ODDS_{it} = \propto + \beta_1 INDUSTRY\_CCC_{it} + \beta_2 NUM\_FIRMS\_CENSUS_{it} + \beta_3 USQTR_t + \beta_4 CCC\_1Q2Q_i + \boldsymbol{\beta_5 CCC\_1Q2Q_i * USQTR_t} + \beta_6 INDUSTRY\_MARKUP_{it} + \beta_7 Ln(INDUSTRY\_SALES)_{it} + \boldsymbol{\varepsilon_{it}}$$

Table 5 Test of H2 – The US sample

Change from semi-annual to quarterly reporting in US decreases the proportion of public firms in industries with 90 days<CCC<180 days

Explanatory Variables	Dependent Variable		
	= Ln [(PROPORTION$_{it}$ / (1- PROPORTION$_{it}$)]		
INTERCEPT	-3.940***	-5.725***	-6.115***
	(-15.881)	(-12.245)	(-12.275)
INDUSTRY_CCC	0.002	0.001	0.001
	(1.149)	(0.319)	(0.579)
NUM_FIRMS_CENSUS	-0.512***	-0.502***	-0.485***
	(-5.409)	(-5.644)	(-5.757)
USQTR			0.216***
			(3.385)
CCC_1Q2Q			0.429*
			(2.204)
CCC_1Q2Q*USQTR			-0.300***
			(-7.904)
INDUSTRY_MARKUP		1.886**	2.070**
		(2.343)	(2.631)
Ln(INDUSTRY_SALES)		0.293***	0.291***
		(4.065)	(3.966)
Adjusted R-squared	36.49%	46.18%	47.41%
N	880	880	880

Two samples for testing H2

- **UK Sample**
  - Change from semi-annual to quarterly around 2007
  - Diff-in-Diff research design: US firms as benchmark
  - Industries defined by Worldscope industry group; Financials are excluded
  - CCC_1Q, CCC_1Q2Q, and CCC_2Q: equal to one if a firm belongs to industries whose median CCC **measured from 2002 to 2006 using UK firms** is less than 90 days, between 90 days and 180 days, or more than 180 days, respectively, and zero otherwise
  - UKQTR: equals to one if between 2007 and 2011, and zero if between 2002 and 2006
  - Final sample: 17,217 firm-year observations in the UK and 80,922 firm-year observations in the US between 2002 and 2011

Regression (4):

$$CCC\_1Q_l = \alpha + \beta_1 UK_l + \beta_2 UKQTR_t + \boldsymbol{\beta_3 UK_l * UKQTR_t} + \beta_4 INDUSTRY\_GPM_{l,t} + \beta_5 INDUSTRY\_SALES_{l,t} + \varepsilon_{l,t}$$

$$CCC\_1Q2Q_l = \alpha + \beta_1 UK_l + \beta_2 UKQTR_t + \boldsymbol{\beta_3 UK_l * UKQTR_t} + \beta_4 INDUSTRY\_GPM_{l,t} + \beta_5 INDUSTRY\_SALES_{l,t} + \varepsilon_{l,t}$$

$$CCC\_2Q_l = \alpha + \beta_1 UK_l + \beta_2 UKQTR_t + \boldsymbol{\beta_3 UK_l * UKQTR_t} + \beta_4 INDUSTRY\_GPM_{l,t} + \beta_5 INDUSTRY\_SALES_{l,t} + \varepsilon_{l,t}$$

Table 6 Test of H2–The UK sample

Percentage of firms in groups partitioned by INDUSTRY_CCC

	UK			US			Diff-in-Diff
	2002-2006	2007-2011	Diff.	2002-2006	2007-2011	Diff.	
INDUSTRY_CCC<90 (CCC_1Q=1)	0.835	0.846	0.011**	0.798	0.797	-0.001	0.012*
			(2.021)			(-0.208)	(1.782)
90<= INDUSTRY_CCC<=180 (CCC_1Q2Q=1)	0.163	0.152	-0.011*	0.201	0.201	0.000	-0.011*
			(-1.957)			(0.227)	(-1.735)
180< INDUSTRY_CCC (CCC_2Q=1)	0.002	0.002	0.000	0.001	0.002	0.001	-0.001
			(0.687)			(0.178)	(-0.547)
N	9,148	8,069		42,859	38,063		

Figure 1 Panel A: Changes in the percentage of firms in each industry in UK and US after UK firms are required to disclose quarterly reports

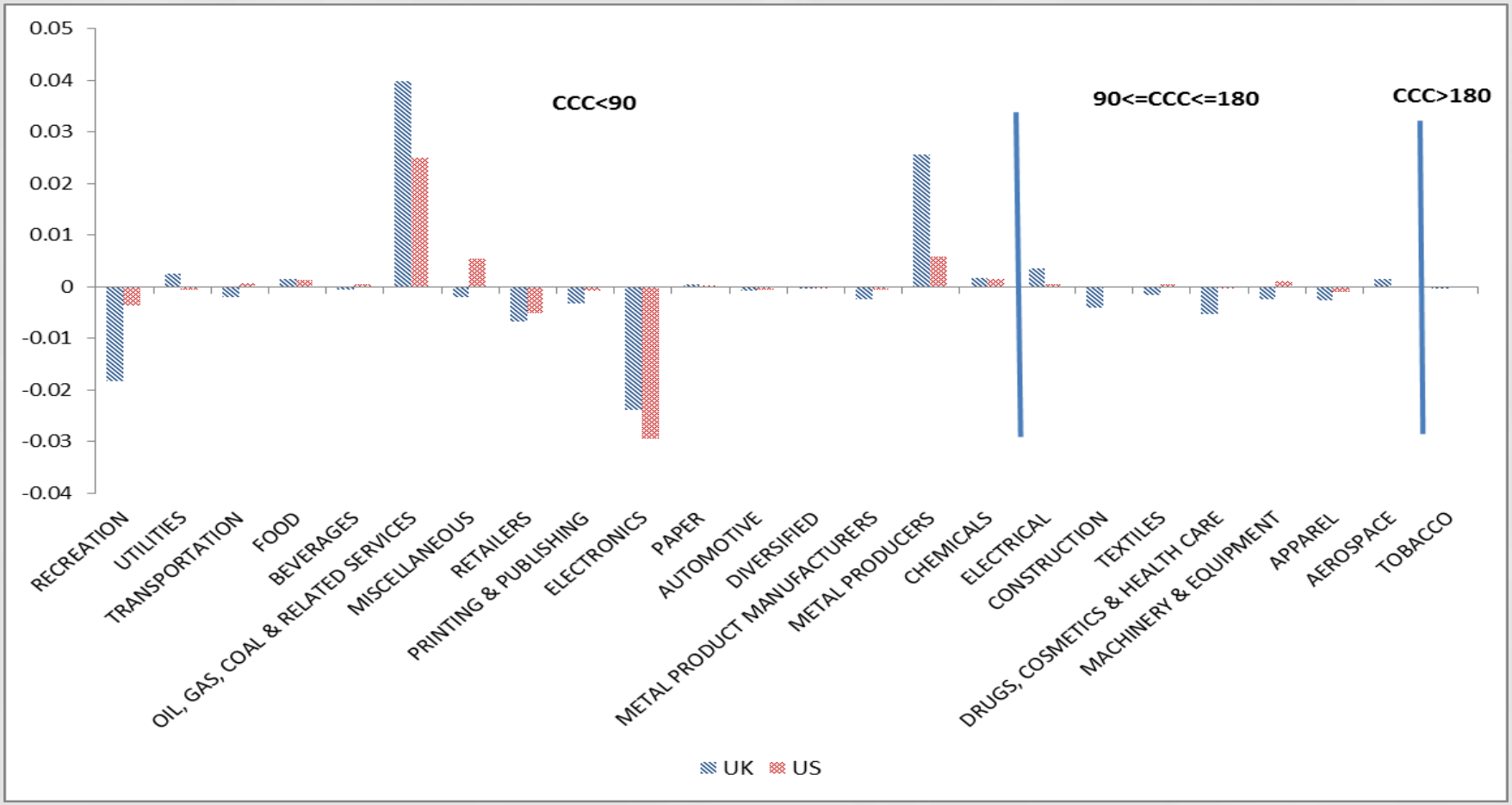

Figure 1 Panel B: UK Change - US Change after UK firms are required to disclose quarterly reports

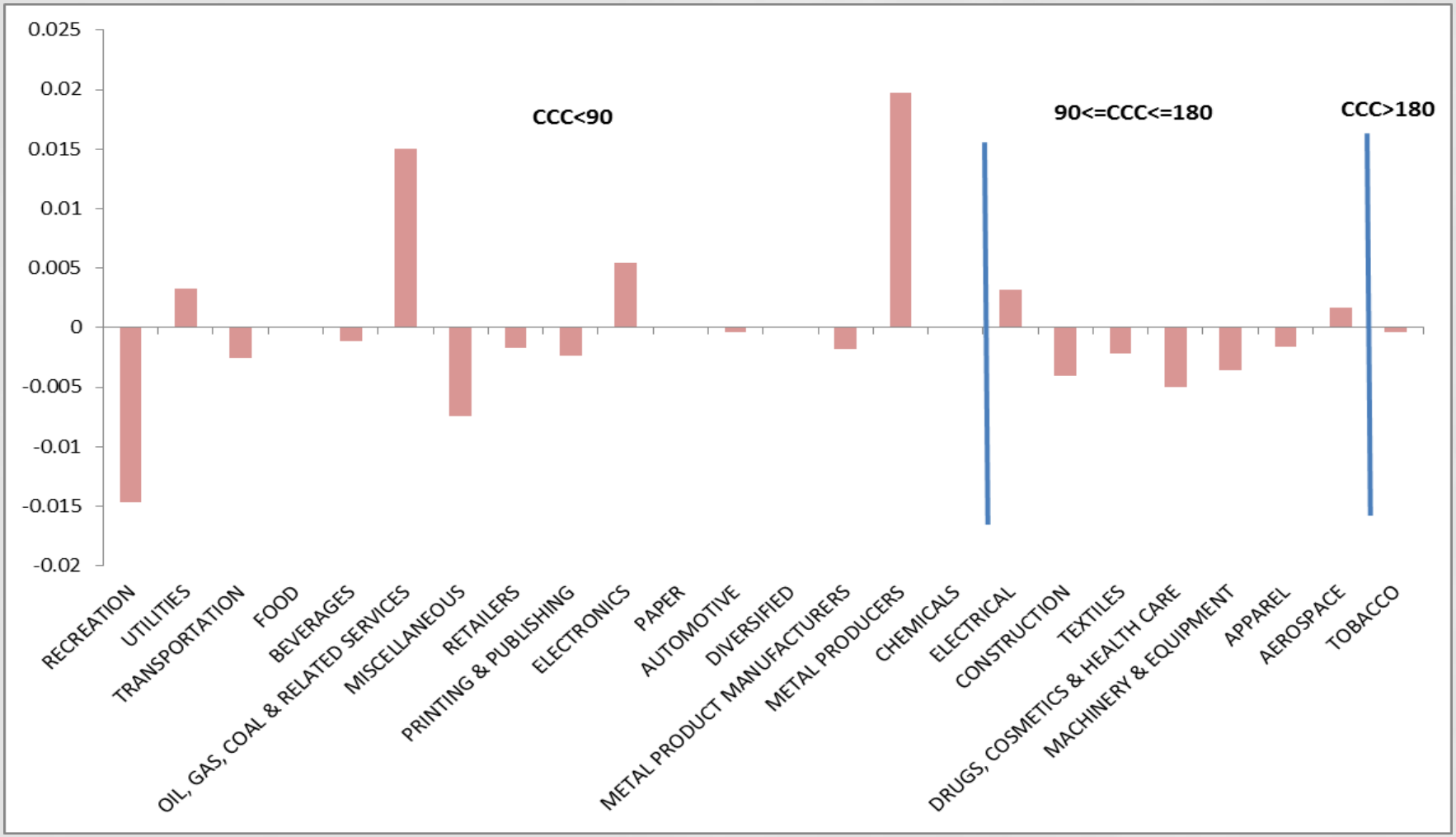

Table 7 Test of H2 – The UK sample

Net outflow of UK firms in industries with 90<CCC<180 from public markets after UK changing from semi-annual to quarterly reporting

	CCC_1Q	CCC_1Q2Q	CCC_2Q
Intercept	-20.775***	22.628***	-237.000***
	(3,587.85)	(4,015.13)	(367.86)
UK	1.074***	-1.156***	0.573
	(939.43)	(1,056.77)	(0.16)
UKQTR	-0.471***	0.512***	-2.820***
	(587.31)	(680.17)	(97.19)
UK*UKQTR	0.293***	**-0.307*** **	-2.608
	(38.84)	**(41.83)**	(0.15)
INDUSTRY_GPM	3.294***	-3.534***	27.548***
	(1,463.81)	(1,656.75)	(208.40)
Ln (INDUSTRY_SALES)	1.004***	-1.090***	9.917***
	(3,966.67)	(4,397.35)	(359.05)
N	98,139	98,139	98,139

Hypothesis III (prediction on within-industry variation)

- Whether to enter the public markets is one choice, and **where to enter** the public markets is *another* choice.

- Different listing exchanges impose different frequencies of mandatory reporting for publicly traded companies.

H3: Conditional on the choice of being public, firms with longer cash conversion cycles relative to industry peers are more likely to list on exchanges that require less frequent mandatory disclosure to minimize disclosure frequency induced earnings-cash flow conflict.

Sample for testing H3

- Two groups:
  - UK domiciled firms listed in the US subject to quarterly reporting (USLIST=1)
  - UK domiciled firms listed in the UK subject to semi-annual reporting (USLIST=0)
- Industry adjusted CCC:
  - CCC_DM1: firm CCC - industry average CCC computed every year using firms with USLIST=0
  - CCC_DM2: firm CCC - industry average CCC computed every year using both groups
- Final sample: 8,120 firm-year observations from 2002 to 2006

Regression (5):

$$USLIST_{i,t} = \alpha + \boldsymbol{\beta_1 CCC\_DM1}_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Ln(SALES)_{i,t} + \varepsilon_{i,t}$$

$$USLIST_{i,t} = \alpha + \boldsymbol{\beta_1 CCC\_DM2}_{i,t} + \beta_2 ROA_{i,t} + \beta_3 Ln(SALES)_{i,t} + \varepsilon_{i,t}$$

Table 8 Panel A Descriptive statistics for variables testing H3

		CCC	CCC_DM1	CCC_DM2	ROA	SALES
Full Sample (N=8,120)	Mean	-22.79	-1.91	0.00	-0.08	1,334.15
	Median	44.34	61.80	65.32	0.05	66.09
USLIST=1 (N=574)	Mean	-57.66	-27.06	-25.40	-0.08	6,591.98
	Median	47.31	57.00	58.00	0.07	2,872.99
USLIST=0 (N=7,546)	Mean	-20.14	0.00	1.93	-0.08	934.20
	Median	43.94	62.10	66.00	0.05	55.31

Table 8 Test of H3

UK firms with longer CCC relative to industry peers are more likely to list on UK exchanges that require less frequent mandatory disclosure

	Dependent Variable: USLIST		
Intercept	-5.556***	-5.508***	-5.506***
	(1,334.78)	(1,331.85)	(1,332.01)
CCC	-0.038***		
	(36.31)		
CCC_DM1		**-0.029*** **	
		(16.78)	
CCC_DM2			**-0.029*** **
			(16.48)
ROA	-0.311***	-0.316***	-0.316***
	(34.15)	(33.47)	(33.46)
Ln (SALES)	0.523***	0.516***	0.516***
	(606.79)	(598.28)	(598.18)
N	8,120	8,120	8,120

Summary of main findings

- An increase in the cash conversion cycle is associated with an additional decrease in the proportion of public firms in industries whose cash conversion cycles are longer than the frequency of mandatory disclosure.
- When the mandatory reporting frequency increases from semi-annual to quarterly, there is a sharper decline in the percentage of public firms from industries whose cash conversion cycles are between one quarter and two quarters both in the US around 1970 and in the UK around 2007.
- Conditional on being public, firms with longer cash conversion cycles relative to industry peers are more likely to list on exchanges that require less frequent mandatory disclosure.

Conclusions and contributions

- Our results provide new evidence on the economic consequences of the frequency of mandatory disclosure.
  - To the best of our knowledge, this is the first study to investigate whether the disclosure frequency induced earnings-cash flow conflict influences a firm's decision to be public and its choice of the listing exchange.
- Provides new insights into the ongoing debate on the frequency of mandatory disclosure.
  - The primary argument for (against) increased disclosure frequency rests on enhancing timeliness and transparency (inducing managerial myopic behaviors). Our findings suggest that, while deliberating an increase in the frequency of mandatory reporting, regulators need to consider the impact of such a change on the types of firms that choose to be public and the choice of listing exchanges.
- Contributes to the literature on listing choice in an international context
  - Prior studies largely examine such decisions from the perspective of country-level investor protection (e.g., Karolyi, 2012). This study, in contrast, examines the choice from the new angle of the disclosure frequency induced earnings-cash flow conflict.