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# Do Good Starts Make Good Finishes? The Case of CEO Pay

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AUCKLAND CENTRE FOR  
**FINANCIAL RESEARCH**  
AUT BUSINESS SCHOOL

# Motivation

Is the market for CEOs  
efficient?



Source:  
[www.newyorker.com](http://www.newyorker.com)

# Outline

- Under focus: CEO pay efficiency
- Key findings
- Cohort effects research & explanations for findings
- Data + Empirical methodology
- Results
- Conclusions

# Key results

- **The market for CEOs is efficient:** initial luck not reflected in CEO pay
  - No evidence of persistent rewards for CEOs for good first job
  - No procyclical cohort effects, rather countercyclical (IV)
  - A higher first CEO compensation if good first job ( $\approx 30\%$  for top-ten firm), dissipates over time

# Cohort effects research

- Neumark (2002): early job mkt stability
- Oyer (2006): PhD economists
- Oyer (2008): MBA investment bankers
- Kahn (2010): US male college graduates
- Kwon et al. (2010): US & Swedish workers (recovery phase of business cycle)
- Oreopoulos et al. (2014): CAN college graduates
- Schoar and Zuo (2013): “recession CEOs”

**> procyclical cohort effects <**

# Cohort effects research - explanations

- Productivity-based explanations (human capital disparities)
  - Initial match quality →
    - procyclical effects
    - countercyclical effects
- Non-productivity based explanations (downward rigidity in jobs, LT contracts, signaling)

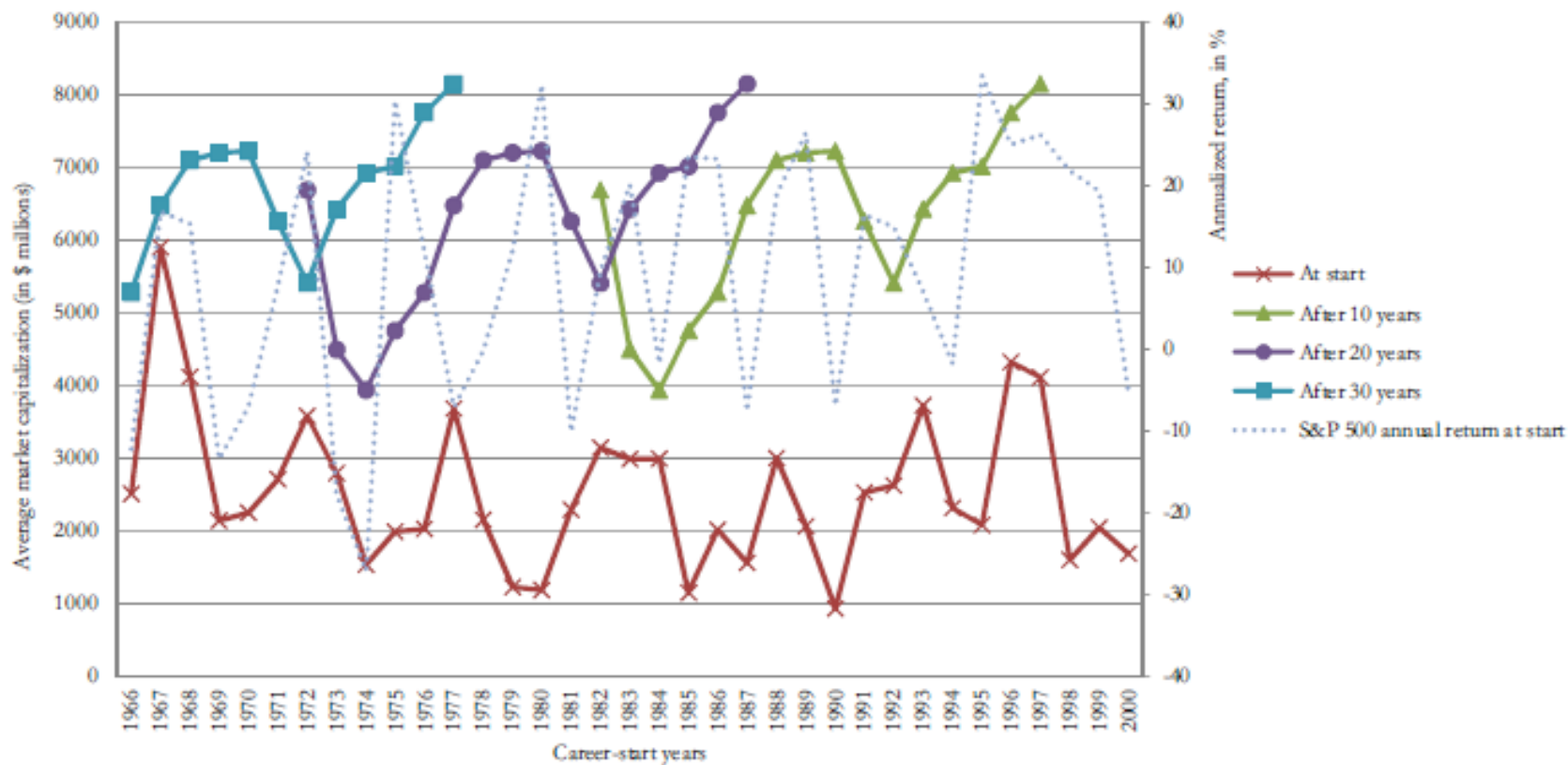
# Data

- S&P 1,500 universe – public CEOs
  - 13,378 obs.; 1,473 companies; 2,184 CEOs
  - ExecuComp (1992-2007), BoardEx
  - Compustat + CRSP
  - NBER, US BLS, Fed
- Full sample + subsamples; CS
- Selection issues



Public CEO

Figure 1: The evolution of in-sample average firm size throughout CEOs' careers (full sample<sup>‡</sup>)



# Empirical methodology

First placement success (firm size) → current placement success (CEO compensation)

- Fixed effects estimation
- Instrumental variables estimation / Two-stage least squares
- Cross-section (*first* CEO pay)
- Robustness checks

# Empirical methodology (IV/2SLS)

## Controls:

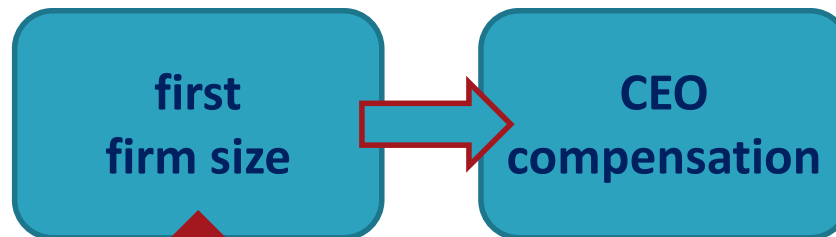
### *Firm-level*

- size
- inv. opportunity
- firm performance
- volatility of firm performance

### *CEO-level*

- tenure
- duality
- external hire
- education
- gender

Mkt. cap, total assets, ...



TDC1, TDC2

CEO talent pipeline



## Instruments:

- **Related to macroeconomic conditions:** recession indicator, U.S. unemployment rate, investment-grade bond yield spread
- **Related to financial markets:** 1-yr volume chng., 1-yr return, 2-yr std. dev. of S&P 500 index

Table 2: Pooled OLS, least square dummy variable and fixed effects regressions with *First Market Capitalization* as the main regressor

Panel A: Full sample regressions<sup>‡</sup>

	Log(Total compensation 1) <sub>t</sub>				Log(Total compensation 2) <sub>t</sub>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Market capitalization) <sub>t,k</sub>	0.0275*** (3.31)	0.0182** (2.23)	0.0179** (2.28)	0.0152 (1.24)	0.0199** (2.15)	0.00287 (0.32)	0.00340 (0.39)	-0.000224 (-0.02)
Log(Market capitalization) <sub>t,1</sub>	0.454*** (42.74)	0.438*** (41.29)	0.449*** (43.15)	0.311*** (11.67)	0.440*** (37.82)	0.413*** (36.06)	0.424*** (37.36)	0.350*** (12.53)
(Market to book) <sub>t,1</sub>	-0.0513*** (-4.14)	-0.0525*** (-4.23)	-0.0759*** (-5.59)	0.00586 (0.38)	-0.0563*** (-4.04)	-0.0526*** (-3.89)	-0.0678*** (-4.53)	0.0283 (1.50)
(Stock return) <sub>t</sub>	3.249*** (11.08)	3.638*** (11.61)	3.792*** (12.07)	3.240*** (9.92)	6.301*** (19.80)	6.627*** (19.32)	6.747*** (19.71)	6.274*** (16.98)
(Stock return) <sub>t,1</sub>	1.484*** (5.40)	1.642*** (5.74)	2.019*** (7.13)	1.205*** (4.85)	4.682*** (13.86)	4.869*** (13.92)	5.120*** (14.60)	3.675*** (11.18)
(Return on assets) <sub>t</sub>	0.272 (1.63)	0.464*** (2.81)	0.281* (1.71)	0.781*** (4.32)	1.057*** (5.17)	1.248*** (6.31)	1.102*** (5.56)	1.719*** (8.19)
(Return on assets) <sub>t,1</sub>	-0.388** (-2.44)	-0.330** (-2.04)	-0.414*** (-2.59)	-0.131 (-0.79)	-0.669*** (-3.35)	-0.433** (-2.18)	-0.510** (-2.56)	-0.346* (-1.67)
(Stock return volatility over 5 years) <sub>t</sub>	6.801*** (10.22)	5.653*** (8.35)	4.451*** (6.48)	1.913** (2.54)	3.429*** (4.86)	2.643*** (3.74)	1.928*** (2.70)	-0.284 (-0.34)
Log(CEO tenure) <sub>t</sub>	0.00167 (0.11)	-0.0212 (-1.37)	-0.0268* (-1.80)	-0.00409 (-0.29)	0.140*** (8.55)	0.0894*** (5.57)	0.0852*** (5.40)	0.126*** (8.18)
(External hire indicator) <sub>t</sub>	0.0817*** (2.62)	0.0809*** (2.66)	0.0955*** (3.32)	0.131*** (3.13)	-0.000892 (-0.03)	0.00669 (0.21)	0.0173 (0.56)	-0.000126 (-0.00)
(CEO & Chairman indicator) <sub>t</sub>	0.106*** (3.59)	0.158*** (5.41)	0.168*** (5.94)	0.0229 (0.86)	0.0677** (2.11)	0.168*** (5.42)	0.173*** (5.75)	0.0315 (1.01)
MBA degree indicator	0.103*** (3.65)	0.0886*** (3.18)	0.0764*** (2.92)	0.0476 (1.35)	0.101*** (3.14)	0.0814*** (2.63)	0.0747** (2.50)	0.0294 (0.64)
Female indicator	0.0556 (0.50)	-0.00981 (-0.09)	-0.0362 (-0.32)	0.141 (1.22)	0.0963 (0.81)	-0.00371 (-0.03)	-0.0212 (-0.18)	0.0551 (0.46)
Constant	4.044*** (37.60)	3.585*** (27.86)	3.634*** (29.13)	4.379*** (20.10)	3.482*** (29.43)	3.206*** (23.59)	3.210*** (24.20)	3.521*** (15.26)
Year dummies		yes	yes	yes		yes	yes	yes
Industry dummies			yes				yes	
Firm fixed effects				yes				yes
No. of obs.	11001	11001	11001	11001	11066	11066	11066	11066
Adj. R <sup>2</sup>	0.470	0.503	0.523	0.716	0.428	0.488	0.498	0.668

Table 2: Pooled OLS, least square dummy variable and fixed effects regressions with *First Market Capitalization* as the main regressor

Panel A: Full sample regressions<sup>‡</sup>

	Log(Total compensation 1) <sub>t</sub>				Log(Total compensation 2) <sub>t</sub>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Market capitalization) <sub>t,k</sub>	0.0275*** (3.31)	0.0182** (2.23)	0.0179** (2.28)	0.0152 (1.24)	0.0199** (2.15)	0.00287 (0.32)	0.00340 (0.39)	-0.000224 (-0.02)
Year dummies		yes	yes	yes		yes	yes	yes
Industry dummies			yes				yes	
Firm fixed effects				yes				yes
No. of obs.	11001	11001	11001	11001	11066	11066	11066	11066
Adj. R <sup>2</sup>	0.470	0.503	0.523	0.716	0.428	0.488	0.498	0.668

Panel B: Subsample 1 regressions<sup>‡</sup>

	Log(Total compensation 1) <sub>t</sub>				Log(Total compensation 2) <sub>t</sub>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Market capitalization) <sub>t,k</sub>	0.0316*** (3.63)	0.0213** (2.44)	0.0216** (2.56)	0.00805 (0.55)	0.0287*** (2.89)	0.00956 (0.99)	0.0108 (1.13)	-0.000512 (-0.03)
No. of obs.	8425	8425	8425	8425	8468	8468	8468	8468
Adj. R <sup>2</sup>	0.469	0.504	0.526	0.730	0.430	0.494	0.506	0.684

Panel C: Subsample 2 regressions<sup>‡</sup>

	Log(Total compensation 1) <sub>t</sub>				Log(Total compensation 2) <sub>t</sub>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Market capitalization) <sub>t,k</sub>	0.0337*** (2.80)	0.0257** (2.16)	0.0185 (1.62)	0.0443 (1.25)	0.0222 (1.61)	0.00838 (0.64)	0.00424 (0.33)	0.0785* (1.85)
No. of obs.	3752	3752	3752	3752	3767	3767	3767	3767
Adj. R <sup>2</sup>	0.513	0.553	0.575	0.744	0.454	0.520	0.530	0.684

Table 3: Instrumental variables regressions with *First Market Capitalization* as the instrumented variable (full sample<sup>‡</sup>)

Panel A: Regressions using a set of financial-markets-related excluded instruments

	Log(Total compensation 1) <sub>t</sub>			Log(Total compensation 2) <sub>t</sub>		
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Market capitalization) <sub>t-k</sub> <sup>Δ</sup>	0.0113 (0.11)	-0.495* (-1.89)	-0.435* (-1.90)	0.196* (1.65)	-0.564** (-1.97)	-0.483* (-1.95)
Log(Market capitalization) <sub>t-1</sub>	0.462*** (9.14)	0.680*** (5.53)	0.661*** (6.17)	0.353*** (5.84)	0.681*** (5.05)	0.652*** (5.64)
(Market to book) <sub>t-1</sub>	-0.0520*** (-3.83)	-0.0718*** (-3.22)	-0.0945*** (-4.23)	-0.0484*** (-3.00)	-0.0734*** (-3.07)	-0.0870*** (-3.73)
(Stock return) <sub>t</sub>	3.258*** (11.12)	3.868*** (8.98)	4.012*** (9.82)	6.201*** (18.56)	6.898*** (14.27)	6.991*** (15.64)
(Stock return) <sub>t-1</sub>	1.445*** (3.97)	0.284 (0.36)	0.872 (1.26)	5.090*** (10.87)	3.417*** (3.95)	3.924*** (5.24)
(Return on assets) <sub>t</sub>	0.274 (1.63)	0.623** (2.38)	0.459* (1.81)	1.040*** (4.85)	1.396*** (4.72)	1.272*** (4.53)
(Return on assets) <sub>t-1</sub>	-0.414* (-1.78)	-1.076** (-2.37)	-1.078*** (-2.66)	-0.386 (-1.36)	-1.238** (-2.42)	-1.210*** (-2.65)
(Stock return volatility over 5 years) <sub>t</sub>	6.844*** (9.58)	6.664*** (5.08)	5.140*** (4.34)	2.950*** (3.63)	3.797*** (2.63)	2.689** (2.12)
Log(CEO tenure) <sub>t</sub>	-0.00717 (-0.13)	-0.315** (-2.04)	-0.282** (-2.11)	0.236*** (3.50)	-0.235 (-1.39)	-0.189 (-1.32)
(External hire indicator) <sub>t</sub>	0.0970 (0.99)	0.564** (2.23)	0.524** (2.35)	-0.167 (-1.42)	0.540* (1.95)	0.477** (1.99)
(CEO & Chairman indicator) <sub>t</sub>	0.107*** (3.48)	0.231*** (3.57)	0.229*** (4.01)	0.0544 (1.52)	0.247*** (3.53)	0.237*** (3.90)
MBA degree indicator	0.106*** (3.34)	0.152** (2.43)	0.137** (2.40)	0.0759* (1.91)	0.153** (2.20)	0.140** (2.25)
Female indicator	0.0686 (0.49)	0.363 (1.23)	0.293 (1.10)	-0.0424 (-0.30)	0.400 (1.23)	0.326 (1.13)
Year dummies		yes	yes		yes	yes
Industry dummies			yes			yes
No. of obs.	11001	11001	11001	11066	11066	11066
R <sup>2</sup> (centered)	0.4703	-0.2502	-0.0884	0.3635	-0.3032	-0.1070
Overidentification test of all instruments - Hansen J stat. (p-val)	1.978 (0.3719)	0.562 (0.7552)	0.476 (0.7884)	0.054 (0.9732)	0.001 (0.9997)	0.086 (0.9581)
Endogeneity test of endogenous regressor	0.015 (0.9013)	11.718 (0.0006)	10.851 (0.0010)	2.587 (0.1078)	11.809 (0.0006)	10.002 (0.0016)

Table 8: Cross-section regressions on *First CEO Compensation*

	First Log(Total compensation 1) <sub>t</sub>					□	First Log(Total compensation 2) <sub>t</sub>					
	(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)	(10)	(11)
Log(Market capitalization) <sub>t,k</sub>	0.0418*** (4.39)			0.0414*** (3.88)			0.0292*** (2.96)			0.0294** (2.51)		
Log(Total assets) <sub>t,k</sub>		0.0340*** (3.65)			0.0285*** (2.70)			0.0240*** (2.58)			0.0213* (1.90)	
(Top ten) <sub>t,k</sub>			0.270*** (4.01)			0.229*** (3.23)			0.0987 (1.40)			0.0546 (0.73)
Log(Market capitalization) <sub>t,1</sub>	0.437*** (31.88)		0.429*** (35.45)	0.432*** (27.40)		0.421*** (29.63)	0.388*** (29.28)		0.385*** (31.85)	0.377*** (24.20)		0.377*** (26.07)
Log(Total assets) <sub>t,1</sub>		0.374*** (27.80)			0.374*** (23.78)			0.344*** (25.74)			0.342*** (21.60)	
(Market to book) <sub>t,1</sub>	-0.0156 (-1.02)	0.162*** (10.89)	-0.0132 (-0.96)	-0.0172 (-0.82)	0.173*** (8.73)	-0.00183 (-0.09)	-0.0448*** (-2.76)	0.124*** (7.69)	-0.0329** (-2.17)	-0.0494** (-2.28)	0.125*** (5.94)	-0.0297 (-1.40)
(Stock return) <sub>t</sub>	2.485*** (4.46)	1.993*** (3.75)	2.423*** (4.66)	2.400*** (3.15)	2.339*** (3.17)	2.682*** (3.70)	4.727*** (8.50)	4.282*** (8.21)	4.667*** (8.97)	5.412*** (7.53)	5.058*** (7.24)	5.333*** (7.66)
(Stock return) <sub>t,1</sub>	-0.0758 (-0.15)	0.355 (0.77)	-0.257 (-0.57)	-0.989 (-1.59)	-0.477 (-0.79)	-0.976* (-1.68)	4.145*** (8.03)	4.034*** (8.27)	3.464*** (6.99)	4.383*** (6.67)	4.299*** (6.73)	3.815*** (5.86)
(Return on assets) <sub>t</sub>	0.598* (1.85)	0.630** (2.07)	0.525* (1.71)	0.887** (2.04)	0.992** (2.32)	0.820* (1.93)	1.408*** (4.21)	1.485*** (4.72)	1.414*** (4.47)	1.550*** (3.34)	1.774*** (3.94)	1.665*** (3.69)
(Return on assets) <sub>t,1</sub>	-0.664** (-2.15)	-0.00393 (-0.01)	-0.468 (-1.61)	-0.978** (-2.40)	-0.367 (-0.92)	-0.826** (-2.11)	-1.123*** (-3.47)	-0.637** (-2.13)	-1.081*** (-3.59)	-1.381*** (-3.11)	-0.884** (-2.09)	-1.359*** (-3.23)
(Stock return volatility over 5 years) <sub>t</sub>	7.774*** (8.28)	7.588*** (8.30)	7.625*** (8.55)	7.480*** (6.34)	8.127*** (7.25)	8.618*** (7.91)	3.940*** (4.34)	4.204*** (4.84)	4.258*** (4.96)	3.897*** (3.30)	4.516*** (3.93)	4.979*** (4.36)
Log(CEO tenure) <sub>t</sub>	-0.0454*** (-2.60)	-0.0613*** (-3.78)	-0.0757*** (-5.07)	-0.0475** (-2.32)	-0.0766*** (-4.05)	-0.0836*** (-4.80)	0.0495*** (2.82)	0.0459*** (2.95)	0.0302** (2.04)	0.0539** (2.53)	0.0349* (1.90)	0.0248 (1.41)
(External hire indicator) <sub>t</sub>	0.210*** (5.66)	0.216*** (6.13)	0.237*** (7.30)	0.310*** (6.68)	0.305*** (6.87)	0.317*** (7.66)	0.0774** (2.05)	0.0778** (2.23)	0.0957*** (2.91)	0.134*** (2.74)	0.146*** (3.22)	0.163*** (3.82)
(CEO & Chairman indicator) <sub>t</sub>	0.0199 (0.55)	-0.0103 (-0.29)	0.0149 (0.44)	-0.00848 (-0.20)	-0.0233 (-0.57)	0.00767 (0.20)	0.0214 (0.57)	-0.0151 (-0.43)	0.0152 (0.44)	-0.0259 (-0.57)	-0.0392 (-0.93)	-0.00597 (-0.14)
MBA degree indicator	0.0628* (1.92)	0.0802** (2.50)	0.0967*** (3.18)	0.0766* (1.87)	0.102*** (2.59)	0.120*** (3.17)	0.0593* (1.74)	0.0737** (2.26)	0.0880*** (2.77)	0.0374 (0.88)	0.0613 (1.56)	0.0743* (1.93)
Female indicator	0.0283 (0.29)	0.0857 (0.85)	0.0760 (0.81)	-0.0346 (-0.26)	0.0415 (0.31)	0.00922 (0.07)	0.101 (1.02)	0.142 (1.49)	0.131 (1.39)	0.103 (0.88)	0.149 (1.29)	0.123 (1.08)
Constant	4.091*** (34.48)	4.190*** (32.96)	4.428*** (41.73)	4.154*** (28.69)	4.221*** (26.64)	4.446*** (35.22)	4.009*** (34.50)	3.952*** (31.90)	4.196*** (38.88)	4.136*** (29.00)	4.005*** (26.43)	4.253*** (32.30)
No. of obs.	2397	2933	2944	1560	1920	1929	2432	2987	3000	1581	1958	1968
Adj. R <sup>2</sup>	0.423	0.359	0.394	0.442	0.382	0.414	0.370	0.329	0.346	0.361	0.326	0.339
Data <sup>†</sup>	Subsample CS			Subsample CS1			Subsample CS			Subsample CS1		

# Results (1)

- FEs (firm fixed effects): <4% / no effects *or* lack of support in the data?  
(firm rank 6-12% TDC1, top ten firm 12-14.5% TDC1)
- IV: 30%-50% countercyclical cohort effects  
(single instrument, reduced-form regressions)
- Cross-section: *first* CEO pay up to 30% higher if top-ten firm

## Results (2)

- Robustness:
  - IV with employment growth rate: no cohort effects
  - Cross-section: stable coefficients
  - Weak-instrument robust estimation with CLR confidence sets: first firm size elasticity relat. to current CEO compensation  $< -1\%$

Table 11: Weak-instrument robust estimation for IV regressions with *First Market Capitalization* as the instrumented variable  
(Full sample<sup>‡</sup>)

**Panel A: Regressions using a set of financial-markets-related excluded instruments**

	Log(Total compensation 1) <sub><i>i</i></sub>			Log(Total compensation 2) <sub><i>i</i></sub>		
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Market capitalization) <sub><i>i,t</i></sub> <sup>Δ</sup>	0.0113 (0.21)	-0.495*** (-4.01)	-0.435*** (-4.01)	0.196*** (2.91)	-0.564*** (-4.05)	-0.483*** (-3.99)
Year dummies		yes	yes		yes	yes
Industry dummies			yes			yes
No. of obs.	11001	11001	11001	11066	11066	11066
Adj. R <sup>2</sup>	0.470	-0.175	0.001	0.363	-0.182	0.009
LIML estimate of Log(Market capitalization) <sub><i>i,t</i></sub> <sup>Δ</sup>	0.0092	-0.5554	-0.4731	0.1965	-0.5639	-0.4906
Conditional LR confidence set (p-val.)	[-0.1129,0.1287] (0.8748)	[-0.9705,-0.3383] (0.0000)	[-0.8065,-0.2842] (0.0000)	[0.0688,0.3467] (0.0025)	[-0.9638,-0.3418] (0.0000)	[-0.8299,-0.2896] (0.0000)
<b>Selected first-stage diagnostics</b>						
F-statistics on excluded instruments (p-val.)	21.99 (0.0000)	9.58 (0.0000)	10.87 (0.0000)	21.99 (0.0000)	9.58 (0.0000)	10.87 (0.0000)
Adj. R <sup>2</sup>	0.265	0.270	0.278	0.265	0.270	0.278

# Conclusions / Contributions

- another test of CEO market efficiency
- existence and persistence of cohort effects seems to depend on the segment of labor market
- **efficient** market for CEOs:  
initial luck not reflected in CEO pay

Thank you.