Is the Glass Ceiling Cracking in Denmark?

The Gender Pay Gap in Top Corporate Jobs

Work-in-progress!

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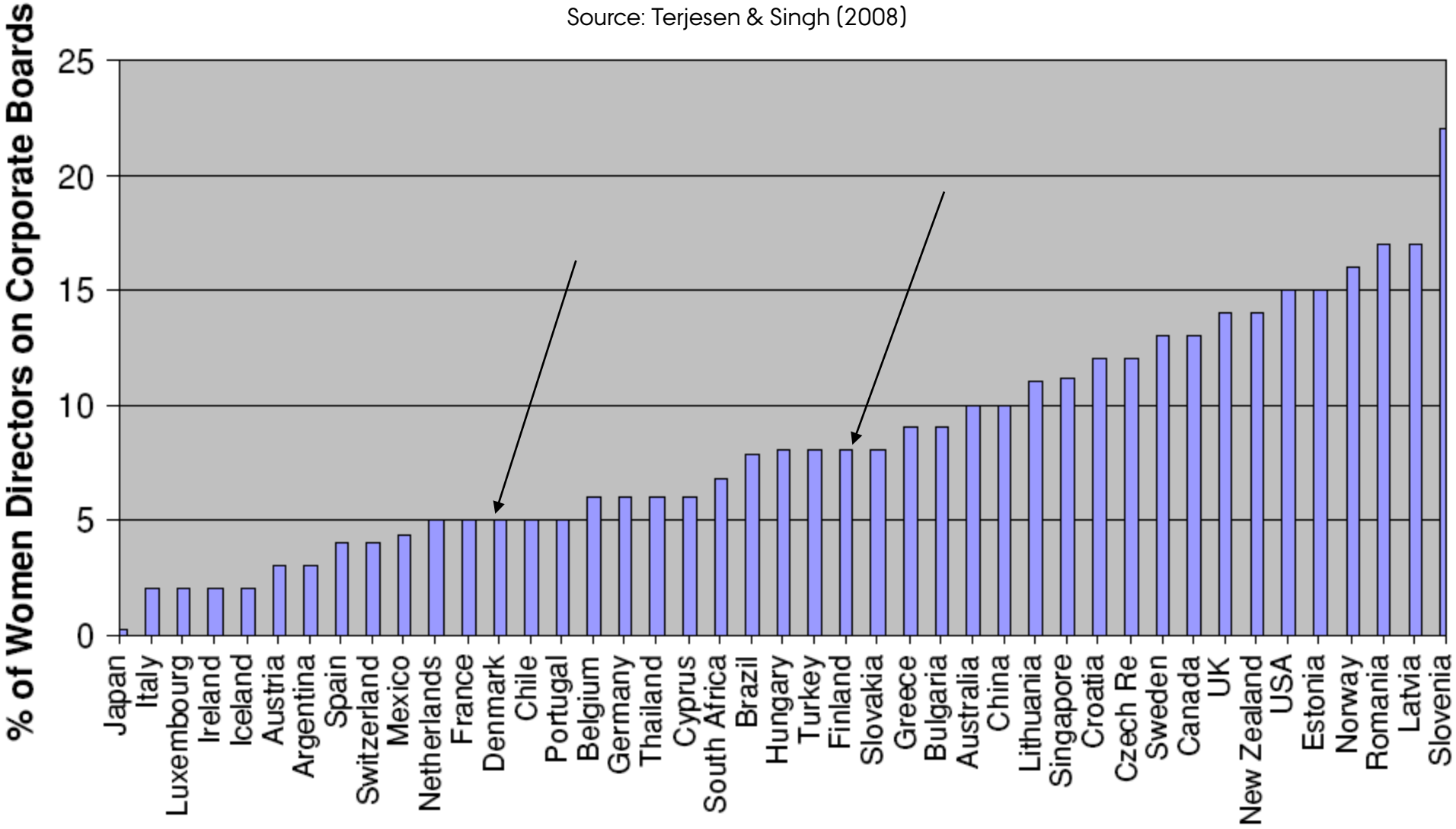
Motivation

- Much focus on women in top management, diversity management and firm performance etc. etc.
  - A number of studies from different countries documents that diversity among board of directors and top management may improve firm performance.
    - For Denmark: Smith et al. (2006)
  - But there are very few female top managers (CEOs) or members of board of directors in most countries, incl. Nordic countries, despite many years of 'equal opportunity policies' and 'family friendly policies' in Nordic countries

Percentage of women directors on corporate boards

Source: Terjesen & Singh (2008)



Motivation for analysing COMPENSATION

- Only few empirical studies on gender pay gap in top management which controls for ***both firm and family effects*** and which are ***not restricted to listed firms***
  - Labour economics: Large empirical literature on gender wage gap (human capital theory, family obligations etc.).
    - For instance: Gupta, Oaxaca ans Smith (2006) and Albrecht and Wroman (2001): Danish and Swedish women in the upper end of the skill distribution have been sliding down in the wage distribution while unskilled women have improved their position in the wage distribution. For the US the development is exactly opposite!
    - Why?
    - Gupta, Smith and Verner (2008) and a number of recent papers: The family friendly Scandinavian Welfare State has 'boomerang effect' on skilled Scandinavian women (long maternity leave periods etc)

Theories on Gender Gap in Top Management Compensation

- Theories on top Management Compensation (HC vs theories from corporate governance literature)
- Gender aspects:
  - Glass Ceiling – theories
    - Women's absolute comparative advantages -> they are not promoted into top positions to the same extent as comparable men, Lazear & Rosen (1990)
    - Statistical Discrimination and risk averse employers Coute & Loury (1993)
  - Sticky Floors theory
    - Women tend to have fewer outside opportunities (children, spouse) compared to comparable men. Therefore, they are not promoted to the same extent, Booth et al. (2003)
  - Women-led firms and segregation theories
    - Bell (2005), Female CEOs pay higher salaries to female manager at lower levels or females on the board implies higher compensation for a female CEO.
    - Or the opposite: the 'Queen Bee Syndrome'

More recent theories

- Experimental studies:
  - Men and women behave differently, especially with respect risk behaviour
  - Niderle and Westerlund (2007)
  - Booth (2009)

Previous empirical studies on gender differences in top management compensation

- Bertrand and Hallock (2001), US
- Lausten (2001), DK
- ++
- ----------
- Bell (2005): Women-led firms pay higher salaries to female managers
- Holst and Busch (2009), Germany: The gap persists after controlling..
- Yurtoglu and Zulehner (2009), US: Quantile regressions
- Bertrand, Goldin, Katz (2009), MBAs from Harvard: The importance of household responsibilities

Main conclusion in most previous studies:

Gender Pay Gap disappears/dimishes when controlling for occupational category, and other observed explanatory variables (firm variables).

This study (DK) – a few main points:

- The proportion of female CEOs increased during 1996-2005 .
- The estimated gender compensation gap only reduced slightly for CEOs, not for VDs
- A considerable gender pay gap among CEOs and Vice-directors which does dot disappear when controlling for a large battery of observed variables (firm + individual/household variables) and time constant unobserved heterogeneity
- The career of the spouse is important for your career if you want to become a CEO!!(females)
- Female CEOs are a highly selected group of women who experience no 'child penalty'

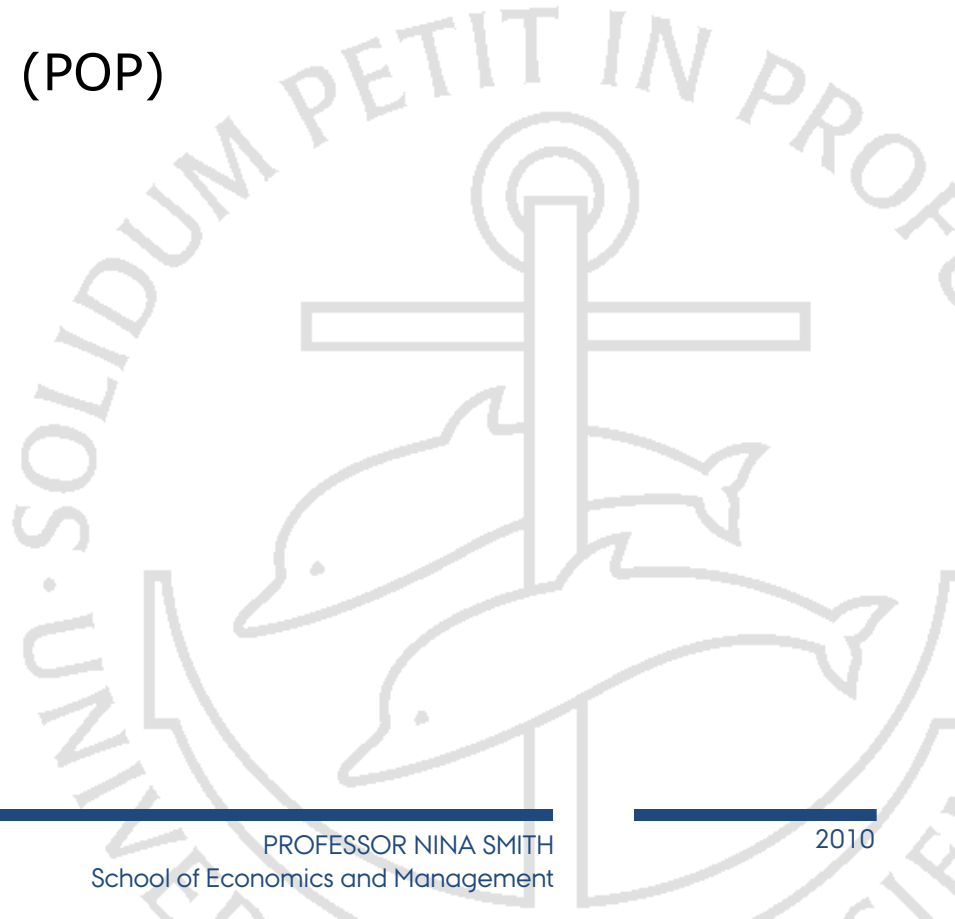
Data

- Employer-employees-data
  - Administrative registers + account data base on firms=Experian/KOB
  - Individual human capital var, spouse information, children, firm information ...
- 5000 largest Danish companies, 1996-2005
  - Largest wrt. total capital among companies with more than 50 employees
  - Selection criteria imply a sample of around 2000 companies
- Compensation: Annual earnings, incl. bonus, excl. stock options, non-taxable fringe benefits

Top Managers:

- CEO
- Vice-directors
- Pool of Potential CEOs or Vice-directors (POP)

- 2005:
  - 8% CEO (1,867 observations)
  - 36% VD (8,261 observations)
  - 56% POP (13,100 observations)



Female proportion among CEOs, VDs and Pool of Potentials

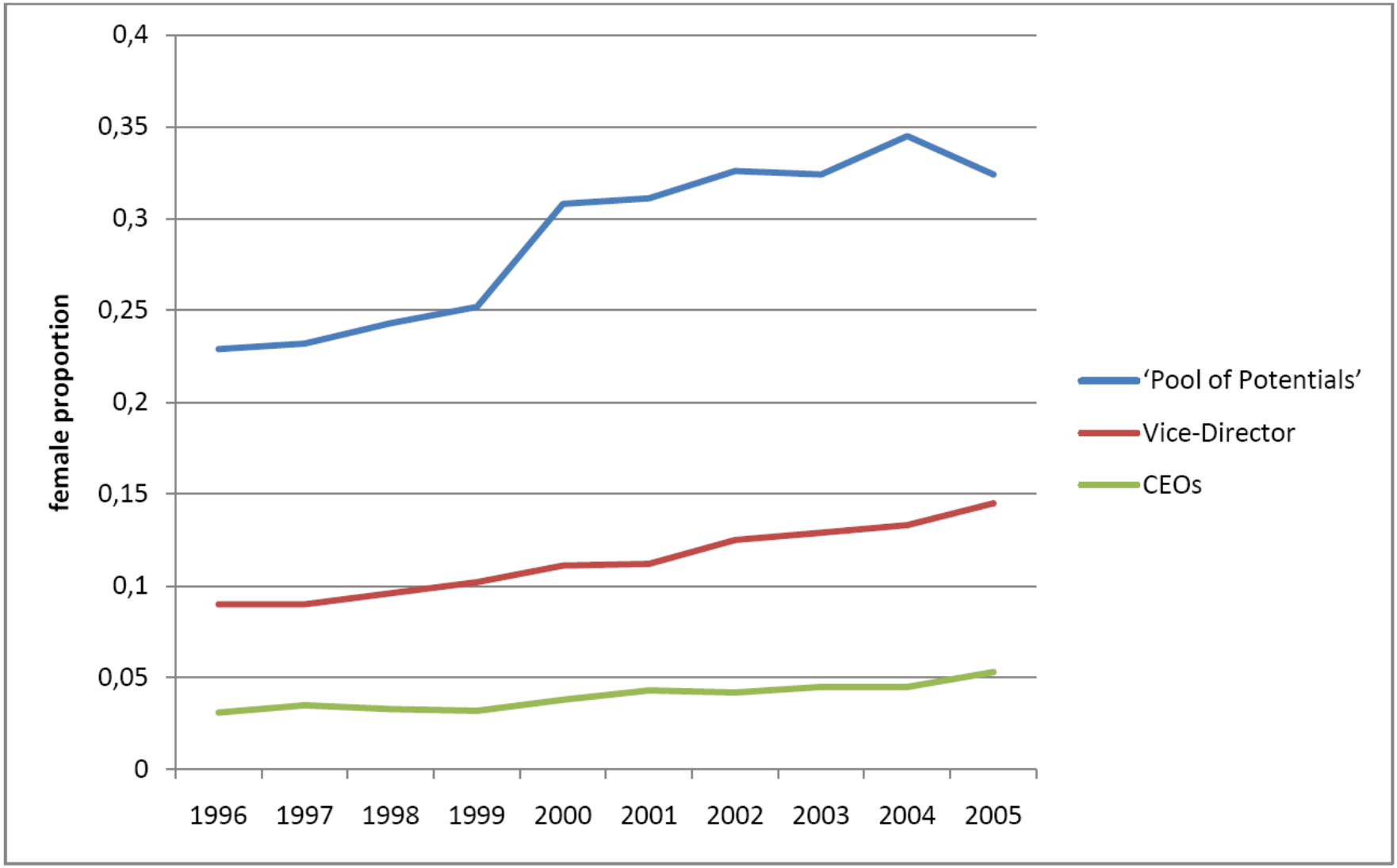
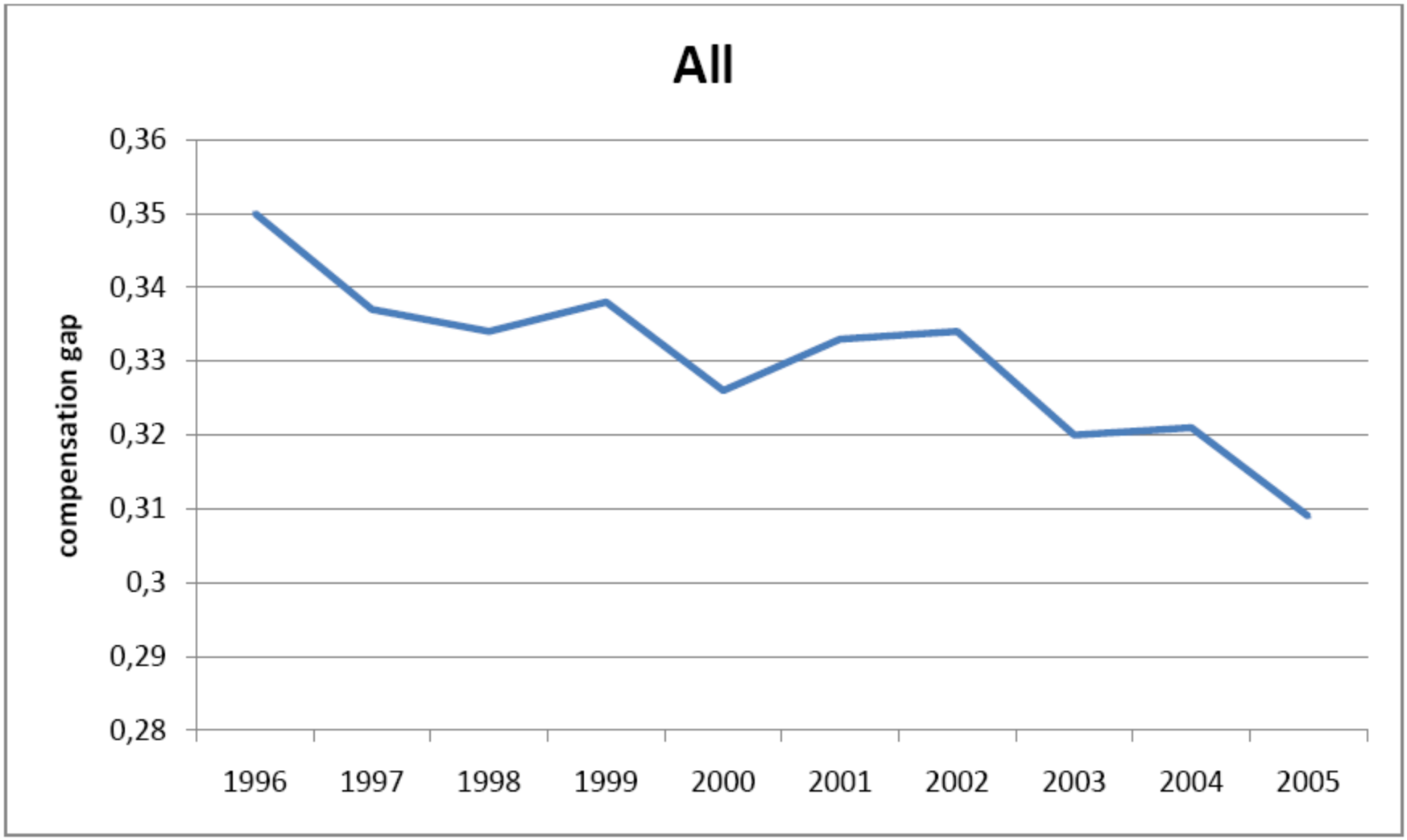


Table 1. Female proportion among CEOs, VDs and Pool of Potentials.

	'Pool of Potentials'	Vice-Director	CEOs
1996	0.229	0.090	0.031
1997	0.232	0.090	0.035
1998	0.243	0.096	0.033
1999	0.252	0.102	0.032
2000	0.308	0.111	0.038
2001	0.311	0.112	0.043
2002	0.326	0.125	0.042
2003	0.324	0.129	0.045
2004	0.345	0.133	0.045
2005	0.324	0.145	0.053
No of obs.1996-2005	96,152	82,270	20,264
No of obs. 2005	13,100	8,261	1,867

Gender Compensation gap: All exec.
(1-Ef/Em)



Gender Compensation gap: CEO, VD, POP
(1-Ef/Em)

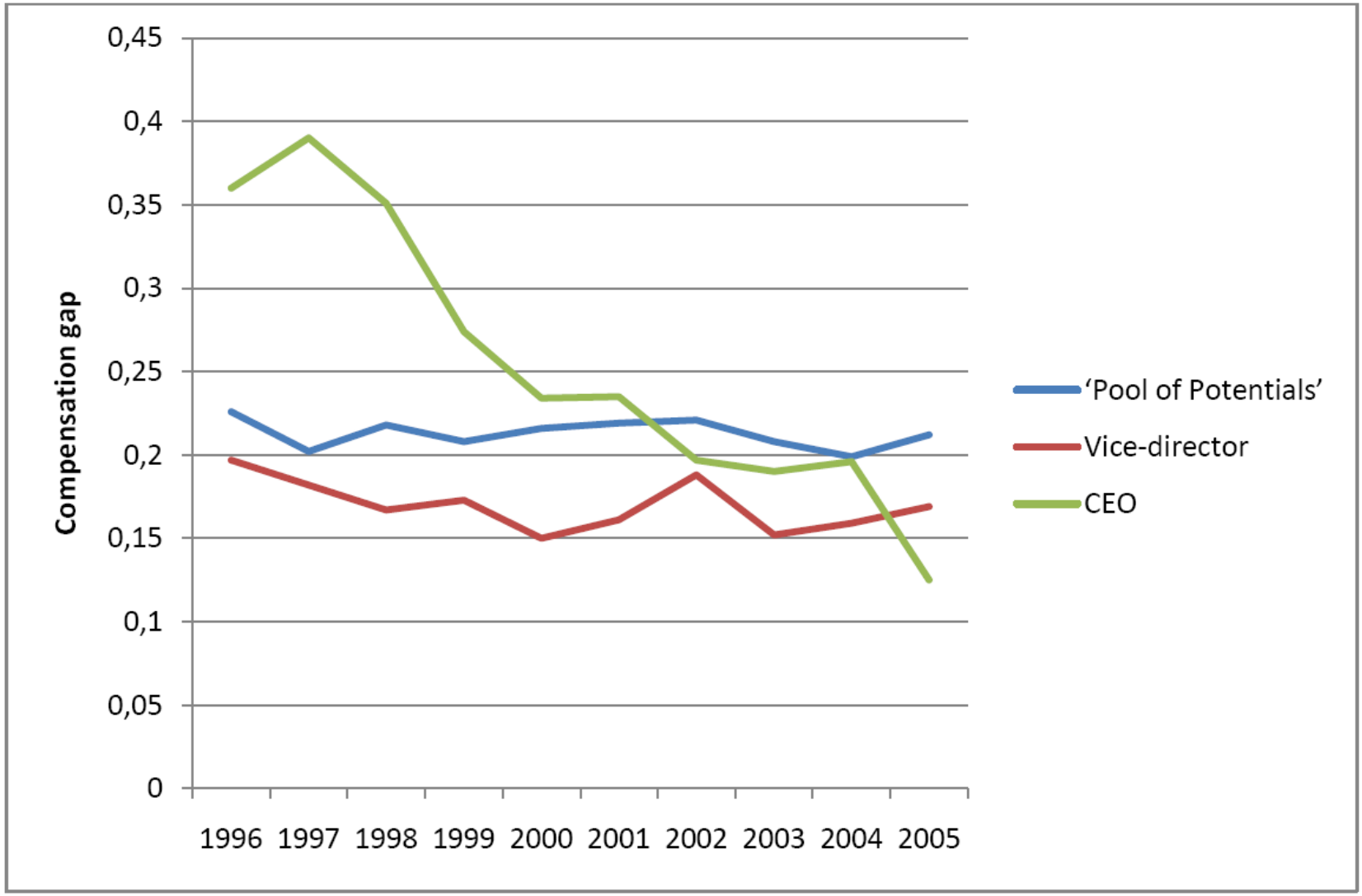
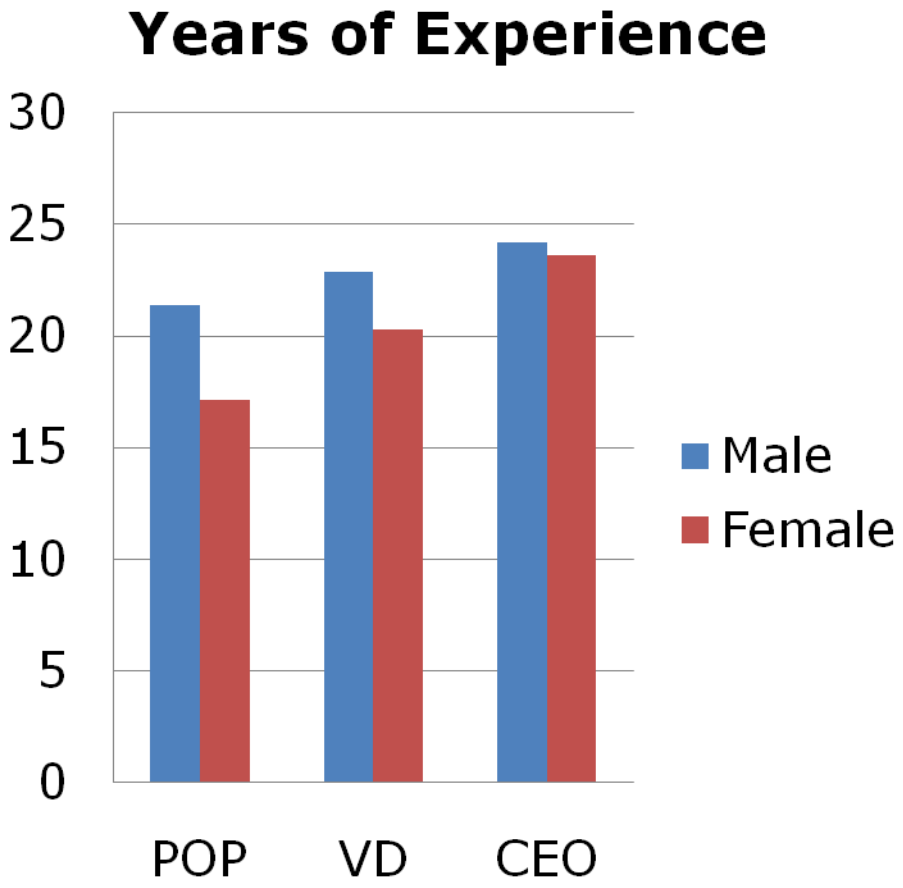


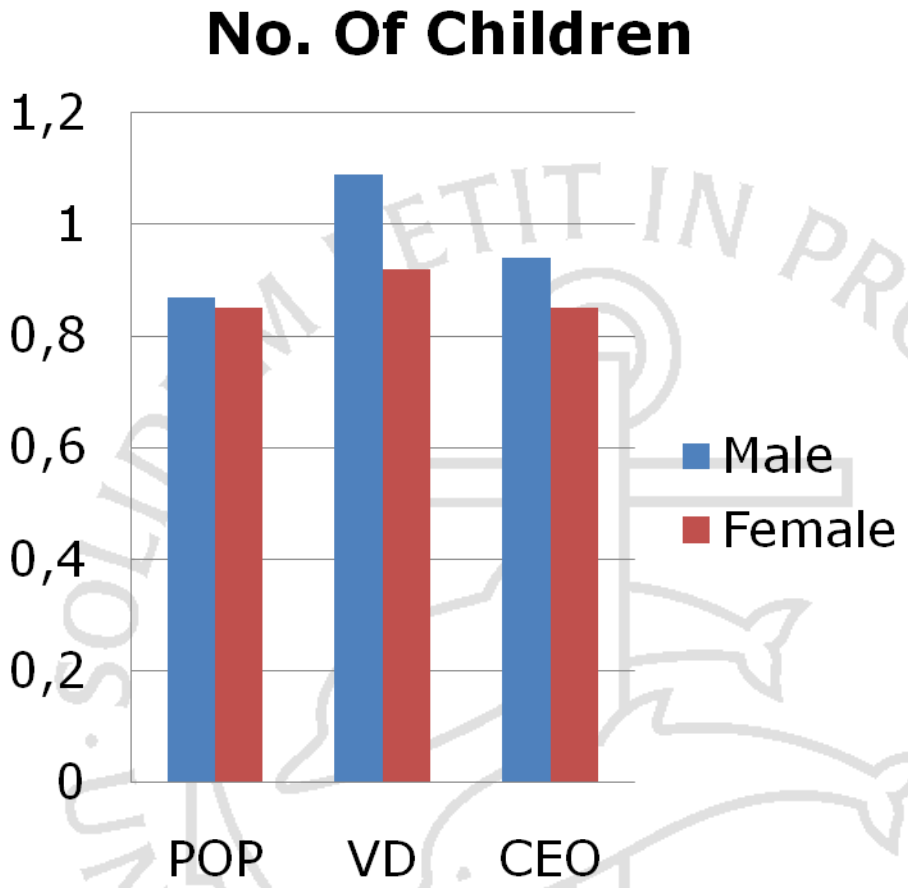
Table 2. The gender gap in compensation (annual earnings).[1)]

	All	'Pool of Potentials'	Vice-director	CEO
1996	0.350	0.226	0.197	0.360
1997	0.337	0.202	0.182	0.390
1998	0.334	0.218	0.167	0.351
1999	0.338	0.208	0.173	0.274
2000	0.326	0.216	0.150	0.234
2001	0.333	0.219	0.161	0.235
2002	0.334	0.221	0.188	0.197
2003	0.320	0.208	0.152	0.190
2004	0.321	0.199	0.159	0.196
2005	0.309	0.212	0.169	0.125

1) The gender gap is calculated as $1-E_{ft}/E_{mt}$, where E_{ft} and E_{mt} are average female and male annual earnings in year t respectively.

Sample means, by gender and position, 2005





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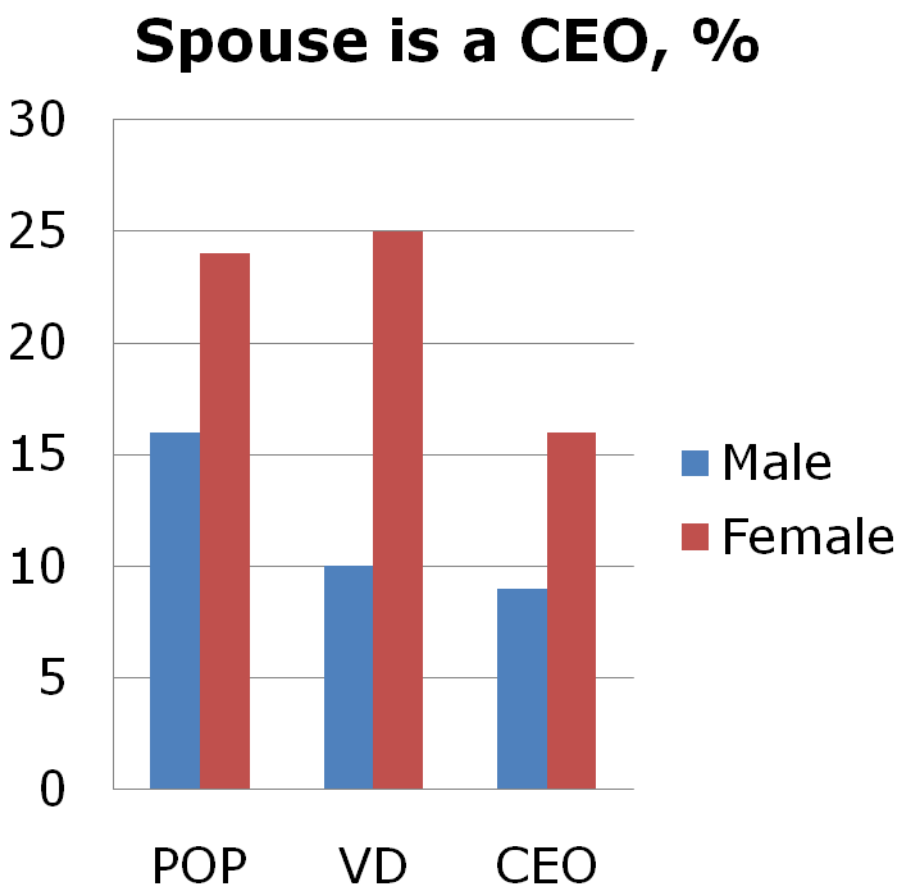
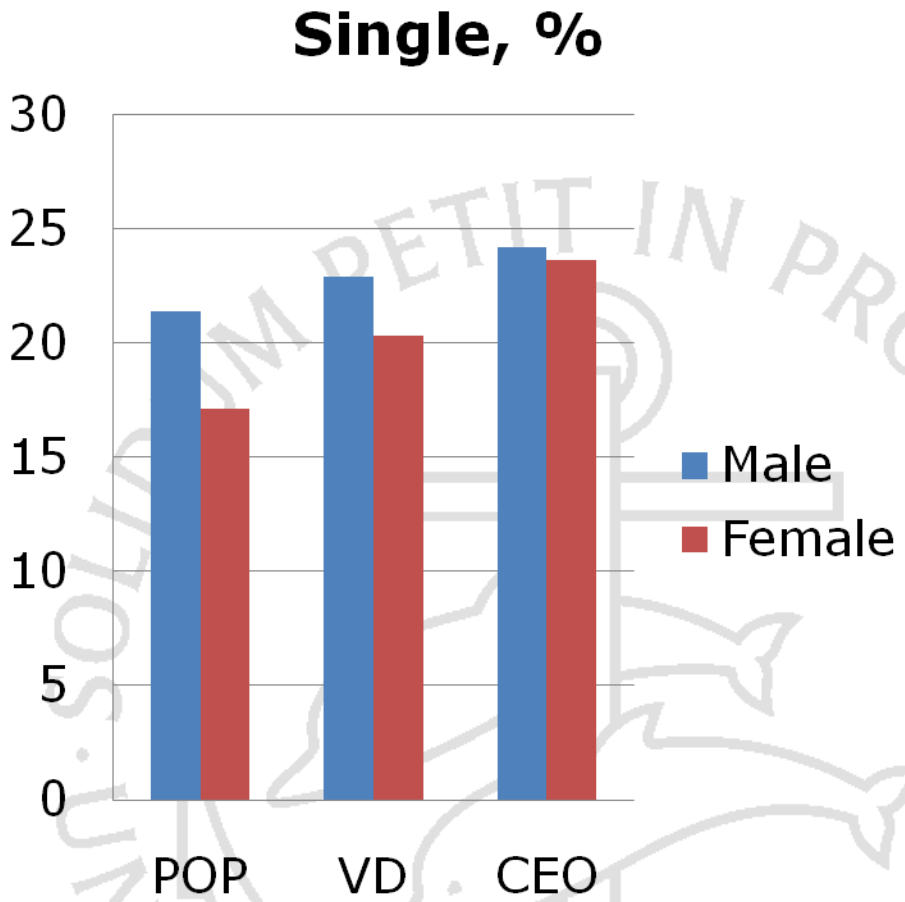
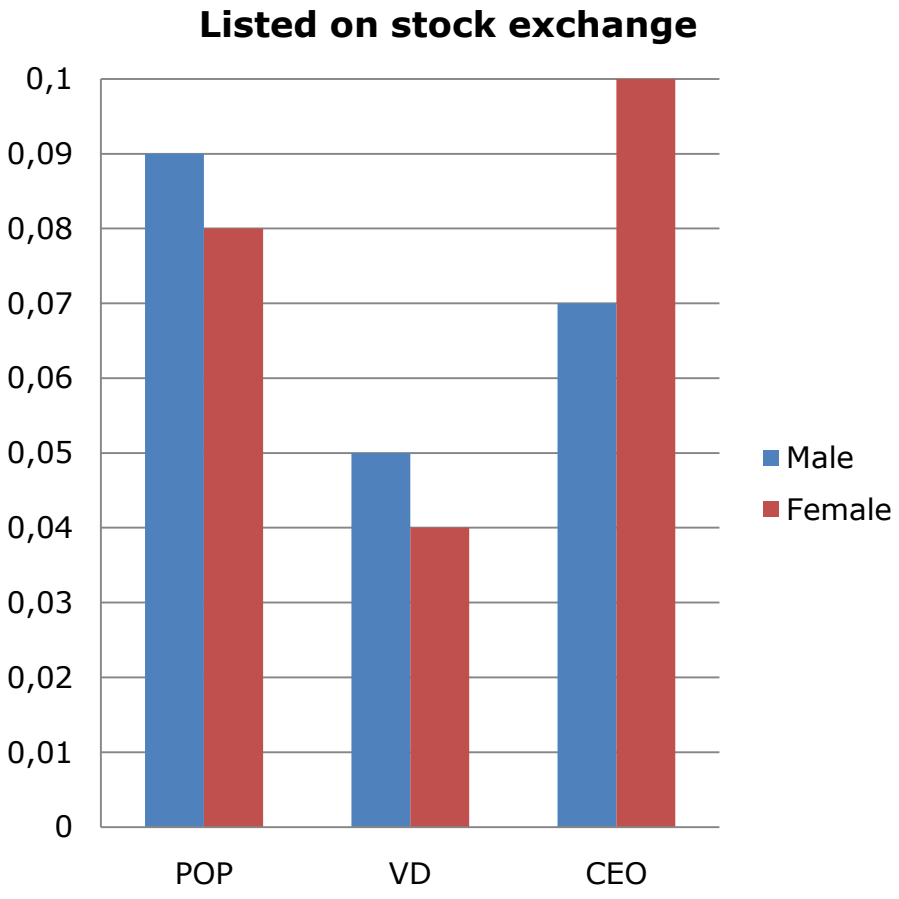
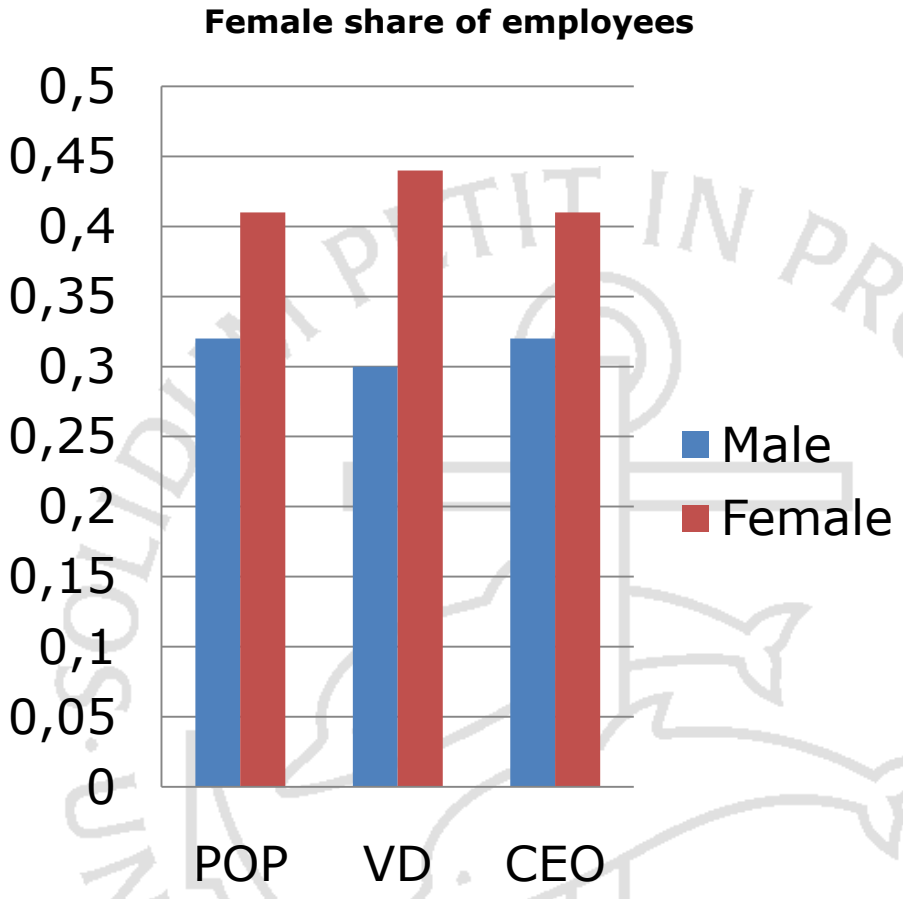


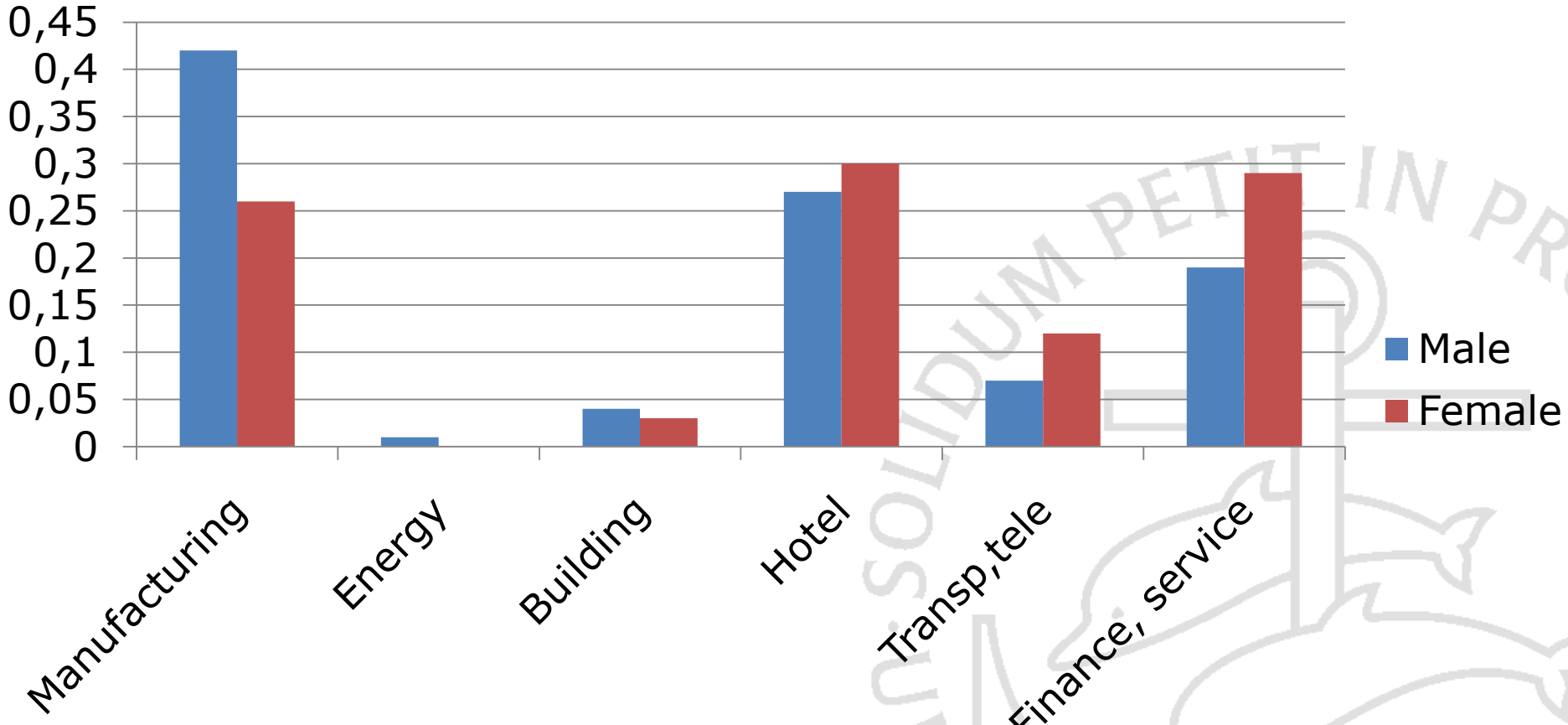


Sample means, by gender and position, 2005





CEOs distribution on industries, 2005



Hypotheses and Empirical model

Hypotheses to be analysed:

- Is the gender gap among top executives 'explained'? (Or do we find indications of 'glass ceilings or sticky floors'?)
- Does the gap vary between groups (CEO, VD, POP)?
- Has the gap declined – is the glass ceiling cracking?
- The importance of household responsibilities, firm characteristics and female leaders in firm

Empirical Model I

$$\ln E_{ijt} = F_i\lambda + CEO_{ijt}\phi_1 + VD_{ijt}\phi_2 + X_{it}\beta_1 + X_{jt}\beta_2 + D_t\gamma_t + \varepsilon_{ijt}$$

Annual Earnings

Gender Dummy

Individual spec. var.

HC, Children

Firm Spec. var.

Size, Industry etc.

Time Indicators

Problems to address

- Omitted variable bias (OVB):
  - Potential correlation between F and error term. For instance: If women in general have less ambitions -> F and error term negatively correlated => estimate of λ (gender gap) is biased downwards – exagerate gender gap
- Estimate a panel data model (FE/RE/FEVD): Control for time constant unobserved heterogeneity (for instance 'ambitions')
  - Problem: If ambitions vary across lifecycle (the 'Fixed Effect critique', see Lundberg (2005)) the panel estimators will not address OVB
- Add controls (spouse variables) which are proxies for 'life cycle changes', i.e. correlated with 'ambitions etc' but not with compensation
  - Our control variable may be 'bad controls' is they are actually endogenous and decided by long term career plans etc.
- Sensitivity and robustness analyses

Empirical Model II

Panel estimates (1996-05, FE, RE and Fixed Effect Vector Decomp. Estimation)

$$\ln E_{ijt} = F_i\lambda + CEO_{ijt}\phi_1 + VD_{ijt}\phi_2 + X_{it}\beta_1 + X_{jt}\beta_2 + Spouse_{it-1}\eta + D_t\gamma_t + \alpha_i + \alpha_j + \varepsilon_{ijt}$$

Gender Dummy

Spouse_controls

FE/RE indiv.

FE/RE firm

Pooled OLS estimates of Gender gap

Table 4. Gender gap in compensation:
Robust Pooled OLS estimates of the coefficient of the female indicator (λ). [1].

	Control variables included in estimation					
	(0) Time indicators	(1) = (0)+ CEO+VD	(2) = (1)+ CEO+VD +spouse controls	(3) = (1)+ CEO+VD +spouse controls +HC var	(4) = (1)+ CEO+VD +spouse controls +HC var +Child var	(5) = (1)+ CEO+VD +spouse controls +HC var +Child var +Firm var
Indicator for being Female	-0.368 (0.025)	-0.218 (0.016)	-0.215 (0.014)	-0.173 (0.011)	-0.169 (0.011)	-0.170 (0.008)
R-squared	0.077	0.339	0.359	0.436	0.440	0.481
Number of obs.	198,686	198,686	198,686	198,686	198,686	198,686

1. All coefficients are significant at a 1 percent level.

Alternative panel estimators - robustness

Table 5. Alternative estimates of indicators for being Female, CEO and Vice-Director[1]. Full model specification.

	Estimator					
	(1) Pooled OLS Robust *j*	(2) RE Indiv *i*	(3) RE Firm *j*	(4) FE Indiv. *i*	(5) FE Firm *j*	(6) FEVD Indiv. *i*
Indicator for being Female	-0.170	-0.201	-0.142	-	-0.143	-0.223
	(0.008)	(0.005)	(0.002)		(0.002)	(0.001)
Indicator for being CEO	0.960	0.660	1.135	0.523	1.124	0.523
	(0.015)	(0.004)	(0.003)	(0.005)	(0.003)	(0.002)
Indicator for being VD	0.456	0.322	0.579	0.274	0.574	0.274
	(0.012)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Other RHS variables:						
Spouse occupation	Yes	Yes	Yes	Yes	Yes	Yes
HC variables						
Child variables						
Firm Characteristics						
R-square overall	0.481	0.453	0.418	0.396	0.422	(0.918)
Number of observations	198,686	198,686	198,686	198,686	198,686	198,686

1. All coefficients are significant at a 1 percent level

Table 5:

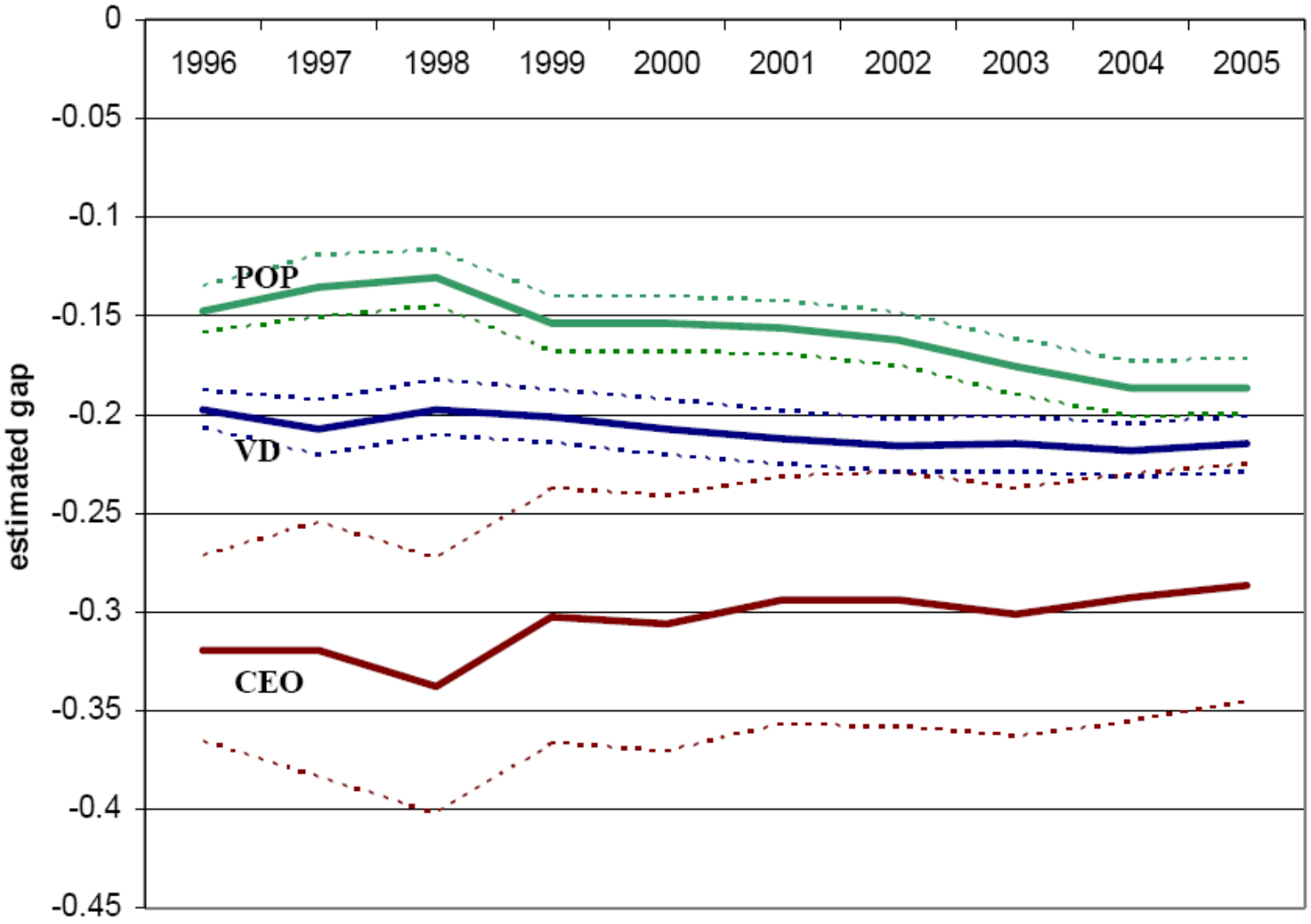
- There is a robust gender gap in compensation:
  - Lower estimate 14%
  - Upper estimate 22%
- Panel estimates - control for unobserved characteristics:
  - Female coefficient:
  - **Individual level: gender gap increases** – female top executives tend to have unobserved characteristics which permanently improve compensation
  - **Firm level: gender gap decreases** – som firms tend to pay permanently lower compensation to their female top executives
  - CEO and VD coefficients
    - Individuals who reach CEO-level have unobserved characteristics which increase their compensation (’animal spirit’)
    - Some firms pay permanently higher salaries to their top CEOs when controlling for firm size, ….

Table 6. Panel estimates of the coefficient of the female indicator *F*. Within groups of CEOs, VDs and Pool of Potentials.

	Pooled OLS Robust *j*	RE Individual effects *i*	FEVD Individual effects *i*
CEO	-0.283*	-0.325*	-0.304*
	(0.040)	(0.027)	(0.007)
'Vice-Director	-0.167*	-0.189*	-0.209*
	(0.010)	(0.007)	(0.002)
Pool of potentials	-0.150*	-0.151*	-0.161*
	(0.010)	(0.007)	(0.002)
Other RHS variables:			
Time indicators	Yes	Yes	Yes
Spouse occupation			
HC variables			
Child variables			
Firm Characteristics			

*) Coefficient is significant at a 1 percent level

Figure 1. Estimated Gender Gap in Compensation[1].



1.Panel estimates (FEVD) of the coefficients of $F + F^*D_t$.
The dotted lines indicate 95% confidence bands.

Table 7. Selected Coefficients from FE Estimations of Gender Specific Earnings Functions. 1996-2005.

	Pool of potentials		Vice-Director		CEOs	
	Male	Female	Male	Female	Male	Female
Child aged 0-2 (0/1)	0.009¤	-0.110*	-0.013*	-0.057*	-0.028*	0.018
	(0.004)	(0.007)	(0.003)	(0.009)	(0.009)	(0.051)
1 child (0/1)	0.004	-0.073*	0.007¤	-0.025*	-0.010	0.060
	(0.004)	(0.009)	(0.003)	(0.009)	(0.008)	(0.059)
2 children (0/1)	0.009	-0.156*	0.018*	-0.031*	0.010	0.082
	(0.005)	(0.012)	(0.004)	(0.012)	(0.011)	(0.081)
3+ children (0/1)	-0.000	-0.234*	0.030*	-0.081*	0.007	-0.074
	(0.008)	(0.019)	(0.006)	(0.021)	(0.016)	(0.134)
Spouse: CEO (Excl. 'single')	0.028*	0.002	0.016¤	0.024¤	0.038¤	-0.174*
	(0.009)	(0.010)	(0.008)	(0.012)	(0.019)	(0.051)
Share of women in firm	-0.166*	-0.111*	0.036*	0.023	-0.091*	-0.132
	(0.021)	(0.038)	(0.013)	(0.034)	(0.037)	(0.182)
Women on board (0/1)	0.001	0.001	0.003	0.002	0.005	-0.014
	(0.003)	(0.006)	(0.002)	(0.005)	(0.005)	(0.027)
Female CEO (0/1)	-0.023*	-0.052*	-0.007	0.002	-	-
	(0.005)	(0.011)	(0.004)	(0.011)		
Female VD (0/1)	-0.008*	-0.009¤¤	-	-	-	-
	(0.002)	(0.005*)				

* Significant at 1 percent, ¤ significant at 5 percent, ¤¤ significant at 10 percent

Results continued: firm variables

Firm variables						
Log firm size (employees) (0/1)	0.018*	0.011*	0.031*	0.030*	0.050*	0.041
	(0.002)	(0.003)	(0.002)	(0.006)	(0.005)	(0.036)
Listed on stock exchange (0/1)	0.012¤	0.024¤¤	0.003	0.025	0.011	0.156
	(0.006)	(0.013)	(0.005)	(0.021)	(0.014)	(0.111)
Share of women in firm	-0.166*	-0.111*	0.036*	0.023	-0.091*	-0.132
	(0.021)	(0.038)	(0.013)	(0.034)	(0.037)	(0.182)
Perfomance (ROE)	0.019	0.047	-0.047	-0.055	0.010	0.258
	(0.608)	(0.126)	(0.030)	(0.150)	(0.008)	(0.644)
Industry (Excl. manufacturing)						
Energy	0.061	0.016	0.037	0.072	0.241*	-
	(0.050)	(0.092)	(0.029)	(0.099)	(0.069)	
Building & Construction	-0.072*	0.017	-0.010	0.013	0.043¤¤	-
	(0.016)	(0.043)	(0.010)	(0.038)	(0.026)	
Trade	-0.022*	-0.029	0.005	0.019	0.013	0.144
	(0.007)	(0.018)	(0.004)	(0.013)	(0.012)	(0.115)
Transportation &	0.006	0.051	0.012	-0.030	0.080¤	0.449¤¤
telecommunication	(0.014)	(0.032)	(0.011)	(0.035)	(0.034)	(0.242)
Financial sector and other private	-0.005	0.008	0.017*	0.037¤	0.007	0.025
services	(0.007)	(0.019)	(0.004)	(0.015)	(0.012)	(0.099)

Summing Up – Main Results

1. Gender pay gap among Danish top executives and potential top executives, 1996-2005:

	All	POP	VD	CEO
No control	0.33	0.21	0.17	0.26
Pooled OLS	0.17	0.15	0.17	0.28
Panel (FEVD - indiv)	0.22	0.16	0.21	0.30

1.The **raw** gap among top exec. decreased 1996-2005, especially for CEOs

2. Controlling for unobserv. the gap decreased for CEOs, not VD and POP

3. An increasing proportion of top executives are women

1+2+3 => A cracking glass ceiling or less sticky floors?

- More women are promoted into top executives position and at the top (CEOs) they get better compensation, relative to men … -> some cracks in glass ceiling
- VD and POP experience an increasing compensation gap -> more sticky floors
- -> a new selected group of top executives who are 'super women' while the majority of female managers are quite traditional and do not reach the top??? But the 'super women' still faces a considerable pay gap.

- Gender specific estimations – selected results:
  - Children significant and large negative effects for group of female 'potential top managers'
  - Controlling for spouse's career, children do **NOT** have negative effects on female CEO compensation (same results found in Bertrand, Goldin, Katz (2009))
  - No positive 'women-led' effects – indication of 'queen bee syndrome'