Evaluation of the gender wage gap in Austria

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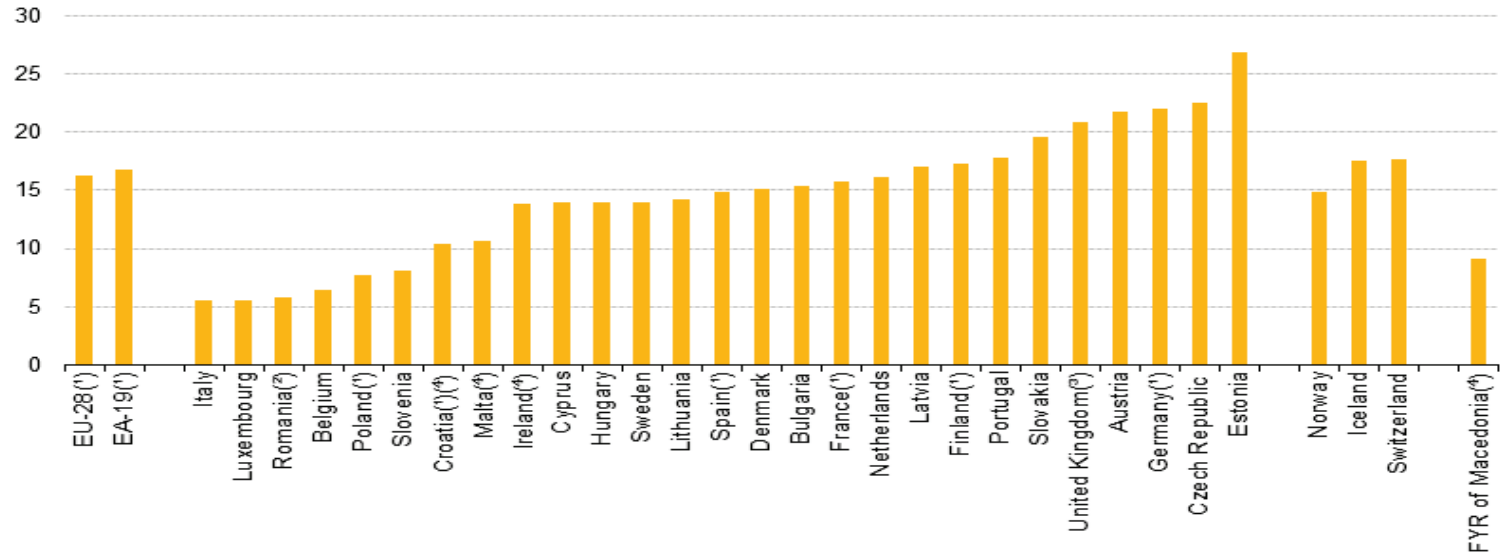
Gender wage gap in Austria

- we estimate and decompose the gender wage gap in Austria using EU-SILC data from 2005-2015 and standard techniques
  - data set consistent over time
  - mean decomposition: Blinder/Oaxaca, Juhn/Murphy/Pierce
  - quantile decomposition: Chernozhukov/Fernandez-Val/Melly
- $\rightarrow$ how much has changed and why?

Comparison across Europe - unadjusted wage gap



Note: For all the countries except the Czech Republic: data for enterprises employing 10 or more employees, NACE Rev. 2 B to S (-O); Czech Republic: data for enterprises employing 1 or more employees, NACE Rev. B to S; no data for Greece.

(2) Estimated
(3) Estimated by Eurostat
(4) 2014 data

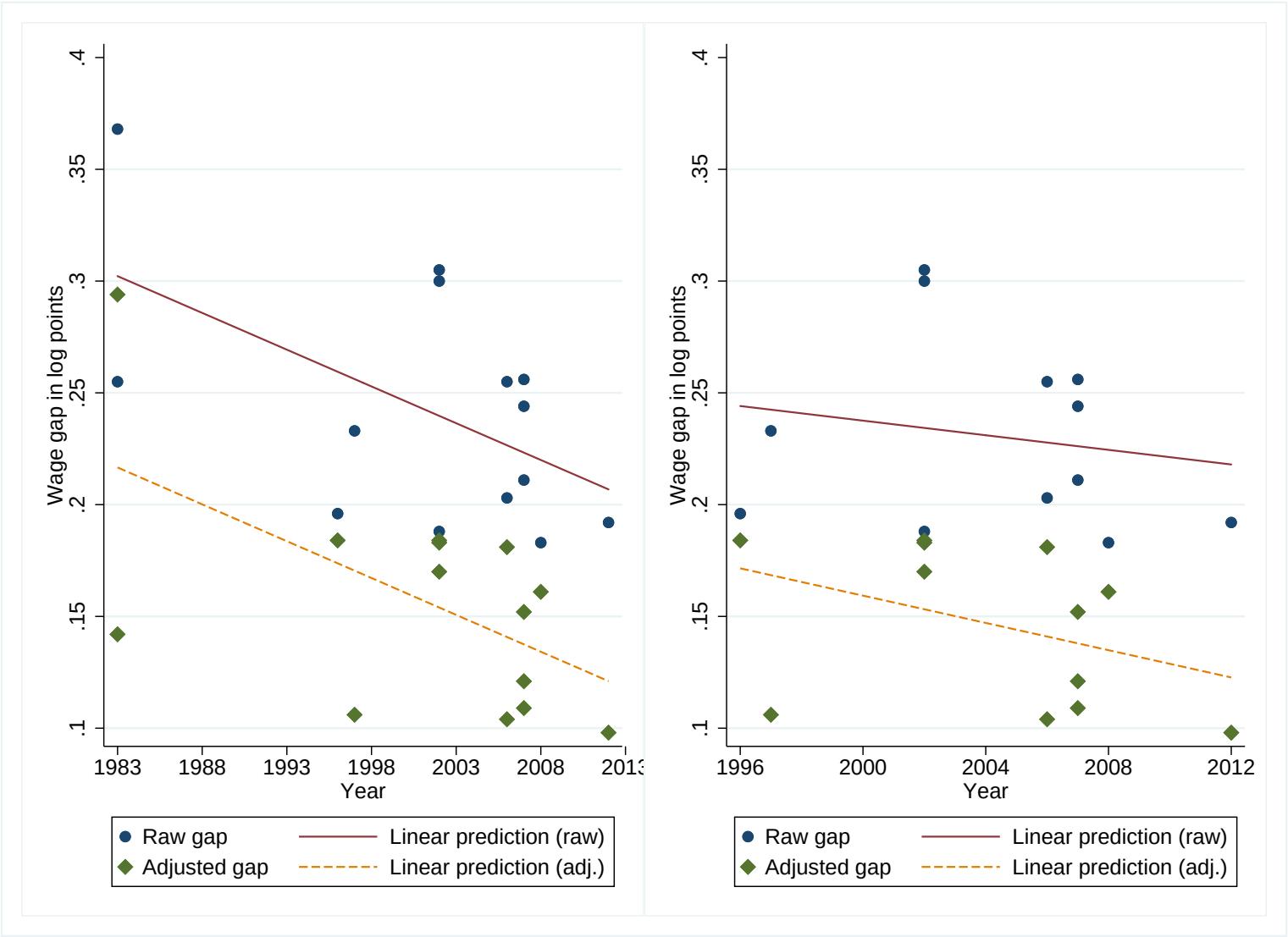
Source: Eurostat

Evolution of the gender wage gap in Austria

Year	Raw wage gap	Unexplained wage gap	Data, sample and method
1983	0.368[a]	0.294	MZ, private sector, net wages, full-time and part-time workers, white collar workers only, male based decomposition
	0.255[b]	0.142	MZ, private sector, net wages, full-time workers, male based decomposition
1996	0.196[c]	0.184	VESTE, private sector, gross wages, full-time and part-time workers, firms with more than 10 employees, female dummy
1997	0.233[b]	0.106	MZ, private sector, net wages, full-time workers, male based decomposition
2002	0.188[c]	0.183	VESTE, private sector, gross wages, full-time and part-time workers, firms with more than 10 employees, female dummy
	0.300[f]	0.170	MZ, tax records and ASSD, private sector, gross wages, full-time and part-time workers, male based decomposition
2006	0.203[d]	0.104	EU-SILC 2004-6, private sector, gross wages, full-time workers, female dummy
	0.255[e]	0.181	VESTE, private sector, gross wages, firms with more than 10 employees, Reimers (1983) decomposition
2007	0.244[f]	0.152	MZ, tax records and ASSD 2007, private sector, gross wages, full-time and part-time workers, male based decomposition
2008	0.183[g]	0.161	EU-SILC, private + public sector, gross wages, full-time and part-time workers, male based decomposition
2012	0.192[h]	0.098	PIAAC, private + public sector, gross wages, full-time and part-time workers, male based (quantile) decomposition

[a] Zweimüller and Winter-Ebmer 1994; [b] Böheim et al. 2007; [c] Pointner and Stiglbauer 2010; [d] Grünberger and Zulehner 2009; [e] Frauenbericht 2010; [f] Böheim et al. 2013a; [g] Grandner and Gstach 2015; [h] Christl and Köppl-Turyna 2017.

Trend of raw and the unexplained wage gap in Austria



Decomposition over time by Juhn, Murphy and Pierce 1992

- wages for a worker i in period t is given by the following equation:

$$Y_{it} = X_{it}\beta_t + \sigma_t\theta_{it}$$

- then, the average male-female wage gap for period t is given by:

$$D_t \equiv Y_{mt} - Y_{ft} = (X_{mt} - X_{ft})\beta_t + \sigma_t(\theta_{mt} - \theta_{ft}) = \Delta X_t\beta_t + \sigma_t\Delta\theta_t$$

- the change in the wage gaps between two periods t and s can then be decomposed as follows:

$$\begin{aligned} D_t - D_s = {} & (\Delta X_t - \Delta X_s)\beta_s + \Delta X_s(\beta_t - \beta_s) + (\Delta X_t - \Delta X_s)(\beta_t - \beta_s) \\ & + (\Delta\theta_t - \Delta\theta_s)\sigma_s + \Delta\theta_s(\sigma_t - \sigma_s) + (\Delta\theta_t - \Delta\theta_s)(\sigma_t - \sigma_s) \end{aligned}$$

Data and sample

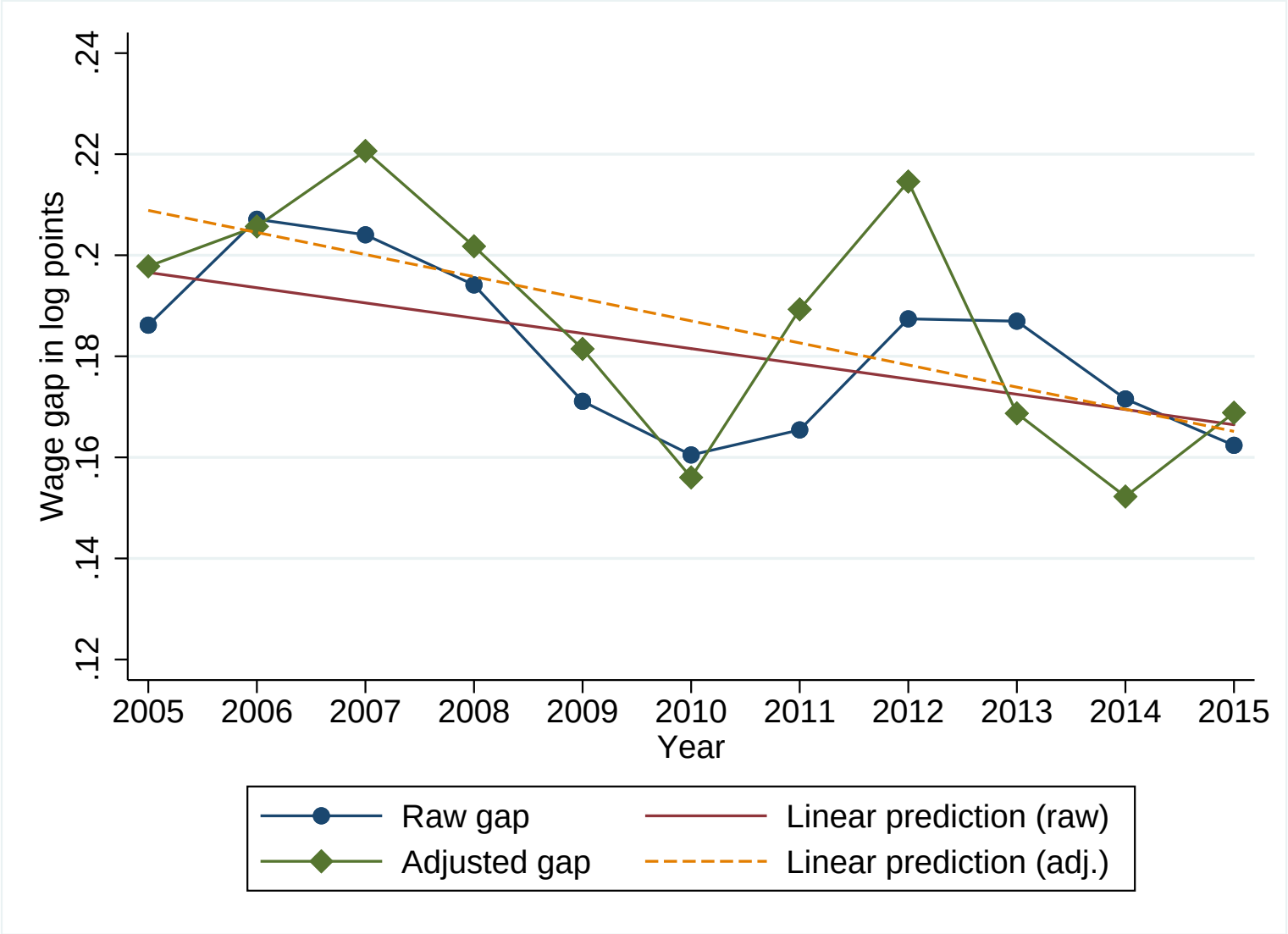
- Austrian part of the European Union Statistics on Income and Living Conditions (EU-SILC) for the years 2005 until 2015
  - surveys private households and their current members each year and collects data on income, poverty, social exclusion, housing, labor, education, and health on the household and individual level
  - on average 6,010 households and 13,929 persons are surveyed per year
- sample
  - persons between 20 and 60 years old
  - private and public sector
- we calculate the hourly gross wage by dividing the usual monthly earnings (including overtime and bonuses) by the number of usual hours worked, 2014 CPI adjusted

Average wages, usual hours and some explanatory variables, 2005–2015

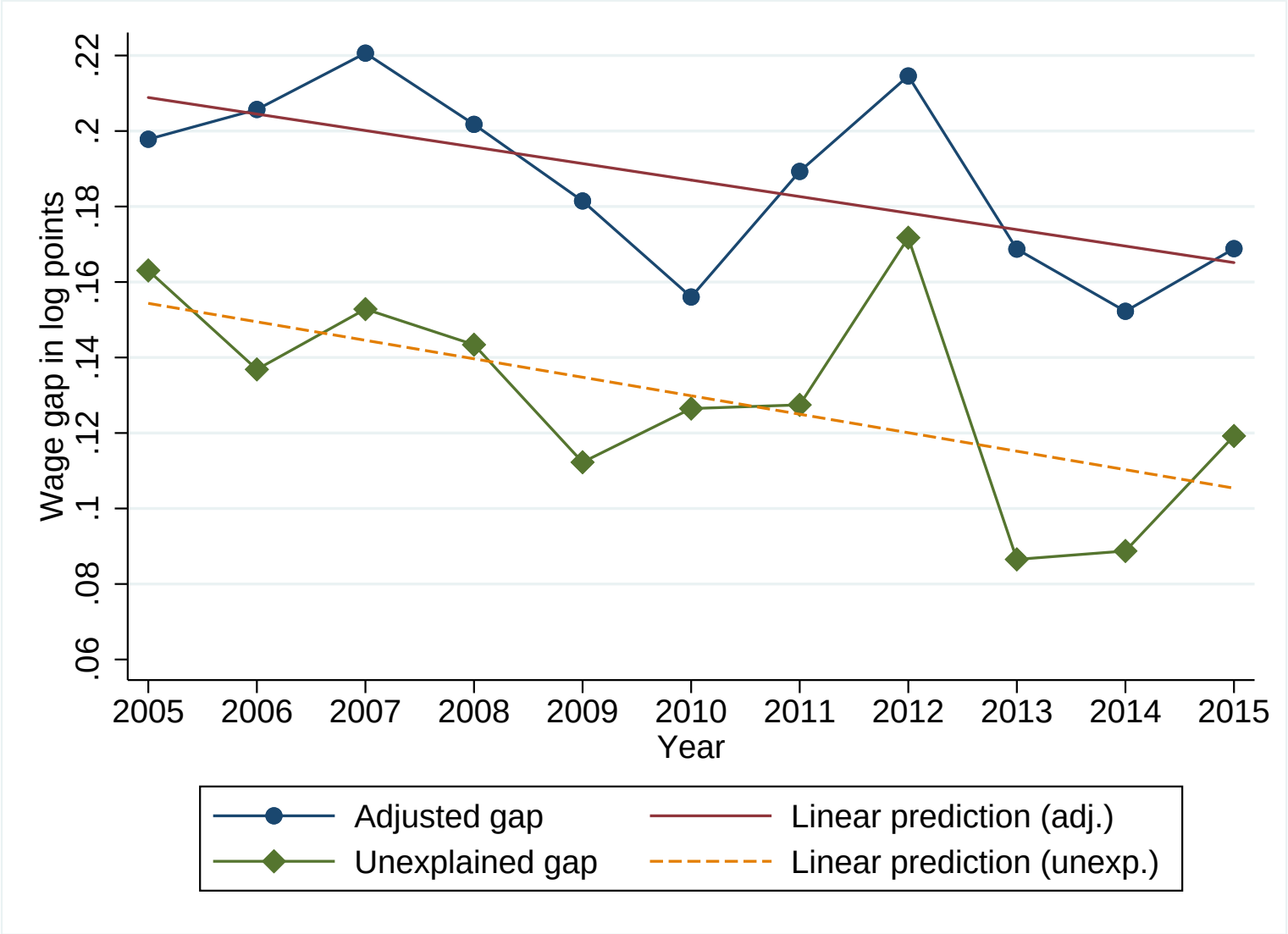
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Men											
Average wages	15.35	15.50	15.60	15.23	16.24	16.40	16.21	16.14	16.11	16.30	16.27
Usual hours worked	41.04	40.64	42.01	42.19	41.74	41.33	40.95	41.26	41.32	40.47	40.79
Number of observations	2390	2691	2991	2359	2303	2499	2445	2263	2280	2277	2276
Women											
Average wages	13.02	12.77	12.78	12.61	13.81	13.88	13.63	13.41	13.37	13.76	13.82
Usual hours worked	33.19	33.48	32.85	33.47	33.08	33.25	33.07	32.63	33.13	32.27	32.30
Number of observations	1942	2255	2567	2067	2094	2295	2315	2227	2148	2166	2218

- education
  - share of only compulsory schooling decreased: 0.1330 $\rightarrow$ 0.1104 (males) and 0.2199 $\rightarrow$ 0.1749 (females)
  - share of academic degrees increased from about 10 (11)% to 14 (17)% for males (females)
- difference in experience decreased from 4.5 years to 3.95 years
- difference in having a leading position increased from 5 to 8.6 pp
- difference in being in a large firm decreased from 15 to 9 pp
- technical professionals: 0.1967 $\rightarrow$ 0.1877 (males) and 0.1117 $\rightarrow$ 0.2143 (females)
- manufacturing: 0.3448 $\rightarrow$ 0.2623 (males) and 0.1831 $\rightarrow$ 0.0899 (females)

Evolution of the gender wage gap



Evolution of adjusted and unexplained gender wage gap



Decomposition results

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Prediction											
males	2.6647	2.6661	2.6683	2.6449	2.6964	2.7050	2.6973	2.7034	2.7074	2.7186	2.7138
females	2.4786	2.4590	2.4642	2.4507	2.5253	2.5446	2.5319	2.5160	2.5204	2.5470	2.5514
Difference											
unadjusted	0.1862	0.2071	0.2040	0.1941	0.1711	0.1605	0.1654	0.1874	0.1870	0.1716	0.1624
adjusted	0.1972	0.2063	0.2252	0.2058	0.1863	0.1600	0.1867	0.2177	0.1670	0.1565	0.1697
Difference											
explained	**0.0462**	**0.0682**	**0.0662**	**0.0597**	**0.0815**	**0.0475**	**0.0818**	**0.0574**	**0.0970**	**0.0777**	**0.0536**
unexplained	**0.1510**	**0.1381**	**0.1590**	**0.1461**	**0.1048**	**0.1125**	**0.1050**	**0.1603**	**0.0700**	**0.0789**	**0.1161**
# of obs											
all	4332	4946	5558	4426	4397	4794	4760	4490	4428	4443	4494
males	2390	2691	2991	2359	2303	2499	2445	2263	2280	2277	2276
females	1942	2255	2567	2067	2094	2295	2315	2227	2148	2166	2218

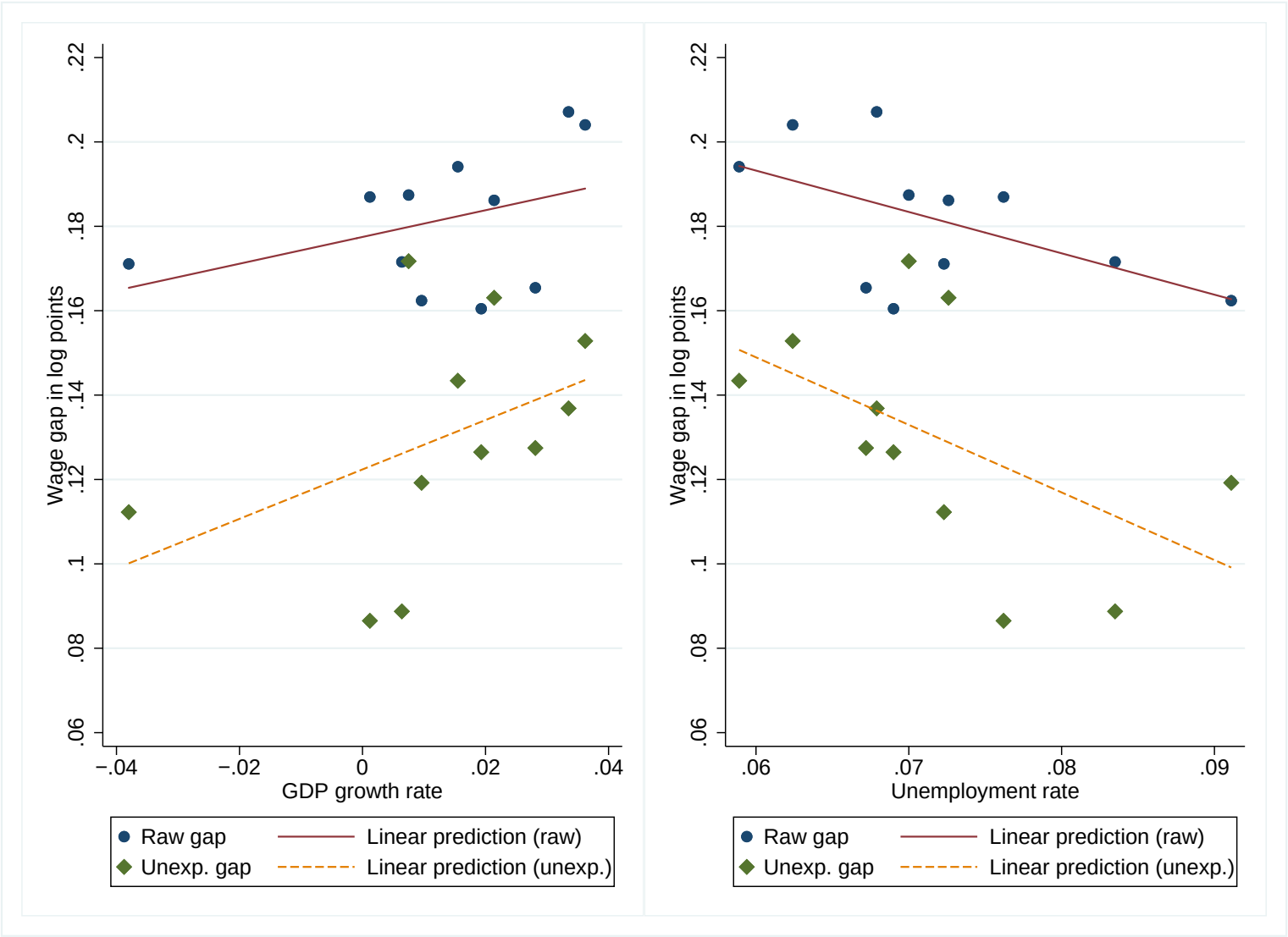
Results for decomposition over time

		Wage gap	Δ	Quantity effect	Price effect	Interaction effect
Change from 2005-2015	.1862	.1627	-.0235			
Explained gap	.0530	.0590	.0060	-.0127	.0155	.0032
Unexplained gap	.1332	.1034	-.0298	-.0296	-.0028	-.0030
Change from 2007-2015	.2040	.1627	-.0414			
Explained gap	.0692	.0590	-.0102	-.0253	.0152	.0002
Unexplained gap	.1348	.1034	-.0314	-.0211	-.0113	.0010

Decomposition of explained gap over time

	Wage gap		Δ	Quantity effect	Price effect	Interaction effect
Explained gap	.0692	.0590	-.0102	-.0253	.0152	.0002
Origin			.0032	.0021	-.0010	.00212
Urban			.0001	-.0018	.0004	.0016
Eduction			.0037	-.0037	.0070	.0004
Experience			-.0024	-.0028	.0035	-.0032
Occupation			-.0128	-.0072	-.0001	-.0056
Industry			.0237	-.0047	.0182	.0101
Leading position			.0010	.0020	-.0016	.0007
Married			-.0014	-.0015	-.0001	.0001
Status			-.0083	-.0030	-.0037	-.0018
Firm size			-.0054	-.0049	-.0008	.0002
Part-time			-.0138	.0016	-.0131	-.0023
Lambda			.0024	.0012	-.0062	-.0026

Gender wage gap and the business cycle



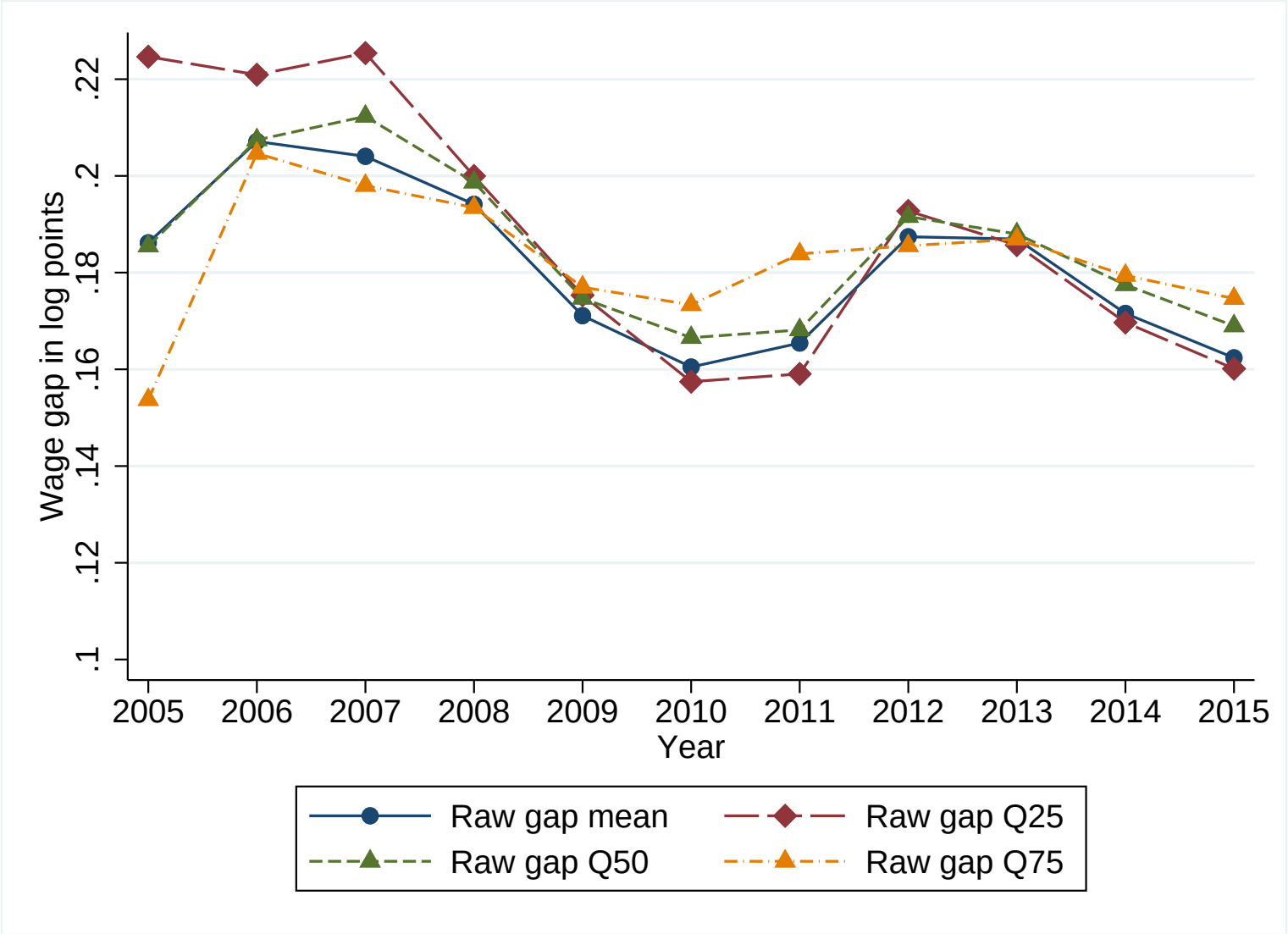
Quantile Decomposition

- q-th conditional quantile of the logarithmic wage distribution as a linear function of characteristics:

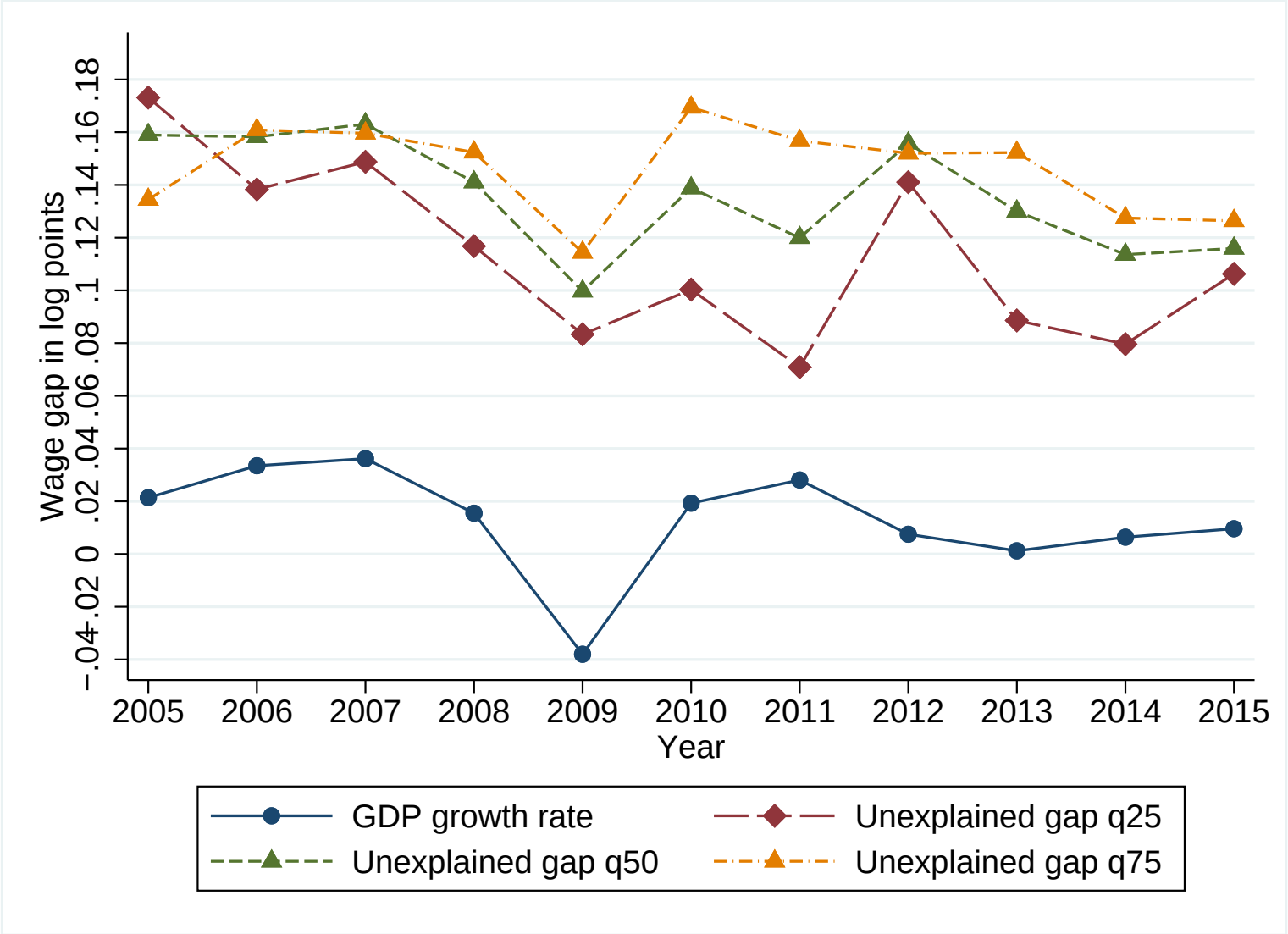
$$\ln y_{iq} \quad = \quad \beta_{iq} X_i + \epsilon_{iq}, \qquad i = M, W, \tag{1}$$

- where $q \in (0, 1)$ and $E[\epsilon_{iq}|X_i] = 0$
- for each quantile q, we estimate one equation for men, M, and for women, W and estimate counterfactual distributions following Melly 2006

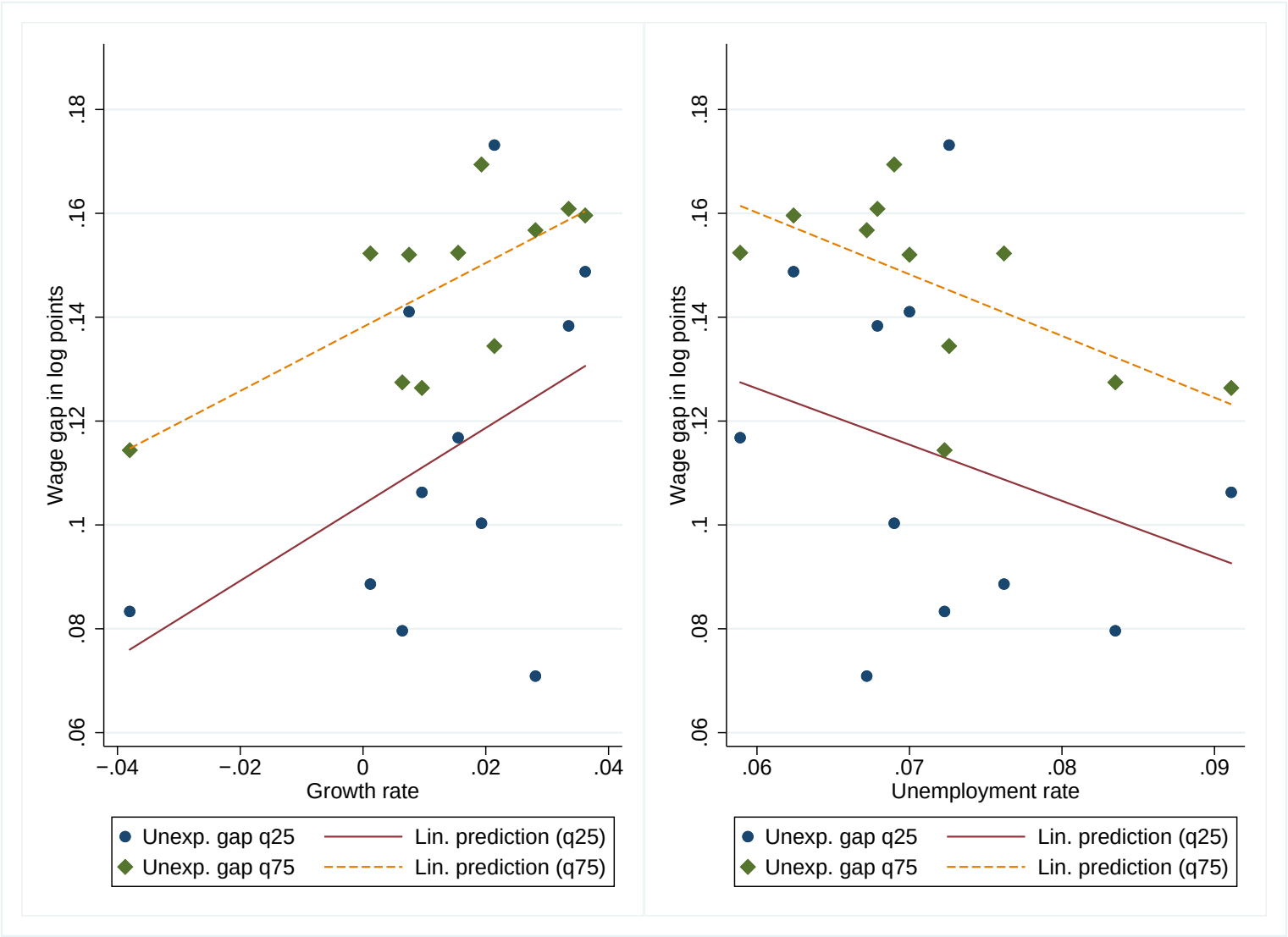
Raw gap – quantiles



Unexplained gap – quantiles



Quantiles and the business cycle



Estimated correlation

	Adjusted gap Q25		Adjusted gap Q75	
Constant	0.1040***	0.1912	0.1381***	0.2314***
	0.0112	0.0834	0.0046	0.0363
Growth rate	0.7361		0.6160**	
	0.4831		0.1997	
Unemployment rate		-1.082		-1.1870**
		1.1519		0.5005
R-squared	0.2051	0.0893	0.5140	0.3845
R-squared adjusted	0.1167	-0.0119	0.4600	0.3162
# obs	11	11	11	11

Conclusions

- using EU-SILC data from 2005-2015 and standard decomposition techniques, we estimate and decompose the gender wage gap in Austria
- results show that the gender wage gap is decreasing over time
- reasons are the following
  - explained part decreases as differences in observables as education and occupation became narrower
  - unexplained part is decreasing as well
  - unexplained part at the 75th percentile is highly correlated with the business cycle
- $\rightarrow$ gives direction for potential policy measures

Summary statistics I

	2005		2010		2015	
	male	female	male	female	male	female
Age	38.8286	39.6201	39.5929	40.4798	40.2732	41.0310
Married	0.6709	0.6924	0.6049	0.6414	0.6154	0.6554
Children aged 0-2	0.1124	0.0766	0.1007	0.0600	0.1049	0.0631
Children aged 3-5	0.1004	0.1038	0.0950	0.0952	0.0848	0.0904
Children aged 6-9	0.1299	0.1522	0.1087	0.1340	0.1139	0.1261
Children aged 10-18	0.2019	0.2317	0.2797	0.3387	0.1658	0.2091
Austria	0.8429	0.8440	0.8037	0.7867	0.7902	0.7584
EU15	0.0161	0.0208	0.0359	0.0366	0.0394	0.0432
High urbanization	0.3655	0.3819	0.3643	0.4015	0.3141	0.3252
Medium urbanization	0.2486	0.2380	0.2591	0.2517	0.2859	0.3082
Low urbanization	0.3859	0.3801	0.3766	0.3468	0.4000	0.3666
Experience	19.6847	15.1789	20.7016	16.7904	21.4340	17.4839
Compulsory schooling	0.1330	0.2199	0.1380	0.2028	0.1104	0.1749
Apprenticeship, Craftsmen diploma	0.4676	0.3114	0.4287	0.2689	0.4287	0.2787
Intermediate vocational education	0.0606	0.1482	0.0572	0.1490	0.0859	0.1759
Upper secondary (academic)	0.0688	0.0696	0.0860	0.1117	0.0591	0.0694
Upper secondary (techn. and voc.)	0.1715	0.1405	0.1702	0.1300	0.1734	0.1325
Academic degree	0.0985	0.1105	0.1199	0.1376	0.1426	0.1686
Managerial authority	0.4429	0.3202	0.5114	0.3665	0.5197	0.3632
Leading position	0.1401	0.0895	0.2044	0.1355	0.2030	0.1168
Firm with more than 10 employees	0.8024	0.6506	0.7903	0.6739	0.7883	0.6983
Part-time	0.0410	0.3817	0.0631	0.4397	0.0558	0.4859
N	2912	3136	3091	3376	2819	3113

Summary statistics II

	2005		2010		2015	
	male	female	male	female	male	female
Blue-collar worker	0.4320	0.2055	0.4469	0.2238	0.4320	0.2175
White-collar worker	0.4303	0.6462	0.4393	0.6391	0.4486	0.6280
Civil servant	0.1377	0.1482	0.1137	0.1371	0.1194	0.1545
Managerial	0.0406	0.0169	0.0694	0.0245	0.0504	0.0313
Professional	0.0672	0.0888	0.0903	0.1279	0.1545	0.1876
Technical and ass. professional	0.1967	0.1117	0.2345	0.2024	0.1877	0.2143
Clerical support	0.1068	0.3103	0.0876	0.2293	0.0576	0.1541
Service and sales	0.1339	0.2841	0.0755	0.2253	0.0968	0.2364
Skilled agriculture	0.0073	0.0021	0.0083	0.0075	0.0146	0.0058
Skilled trades	0.2646	0.0451	0.2194	0.0169	0.2429	0.0230
Plant/machine operatives	0.0917	0.0086	0.1016	0.0175	0.1222	0.0162
Elementary	0.0913	0.1322	0.1134	0.1489	0.0735	0.1313
Agriculture, forestry, mining	0.0265	0.0104	0.0126	0.0065	0.0151	0.0088
Manufacturing	0.3448	0.1831	0.2502	0.0996	0.2623	0.0899
Energy, water, waste	0.0278	0.0065	0.0153	0.0044	0.0271	0.0068
Construction	0.1064	0.0230	0.1449	0.0202	0.1251	0.0202
Trade	0.0842	0.1469	0.1372	0.1814	0.1102	0.1723
Transport, information, communication	0.0552	0.0277	0.1123	0.0454	0.1162	0.0430
Accommodation, food services	0.0257	0.0479	0.0337	0.0665	0.0368	0.0666
Finance, insurance, real Estate	0.0340	0.0587	0.0470	0.0546	0.0336	0.0463
Professional services	0.0901	0.0877	0.0575	0.0923	0.0743	0.0926
Public services	0.1431	0.2993	0.1577	0.3832	0.1757	0.4070
Other services	0.0624	0.1089	0.0316	0.0459	0.0236	0.0465
N	2912	3136	3091	3376	2819	3113

Estimated coefficients I

	2005		2010		2015	
	male	female	male	female	male	female
Constant	2.1745***	1.9326***	2.0538***	1.9885***	1.9834***	2.0128***
Austria	0.1089***	0.0857**	0.1159***	0.1065***	0.1338***	0.0549*
EU15	0.1124	0.1773*	0.0938*	0.1538***	0.0587	-0.0036
Medium urbanisation	0.0000	-0.0083	0.0336	-0.0273	0.0295	0.0040
Low urbanisation	-0.0098	-0.0395*	-0.0175	-0.0708***	0.0114	-0.0160
Apprenticeship, Craftsmen diploma	0.0327	0.1126***	0.0497*	0.0104	0.0387	-0.0109
Intermediate voc. education	0.0898**	0.2277***	0.1526***	0.1004***	0.0878**	0.0579
Upper secondary (academic)	0.1307***	0.2333***	0.2544***	0.1564***	0.0633	0.0208
Upper secondary (techn. and voc.)	0.1532***	0.2915***	0.1602***	0.1691***	0.1113***	0.0749*
Academic degree	0.2681***	0.4235***	0.3593***	0.3148***	0.1802***	0.2130***
Cohabiting partner	0.0219	-0.0208	0.0889***	-0.0105	0.0543***	-0.0134
Experience	0.0125***	0.0135***	0.0169***	0.0161***	0.0209***	0.0121***
Experience sq.	-0.0140*	-0.0121	-0.0196**	-0.0192*	-0.0272***	-0.0096
Managerial position	0.0775***	0.0945***	0.0665***	0.0574***	0.0551***	0.0525***
Highly skilled/senior employees	0.1069***	0.0547	0.1355***	0.1236***	0.1580***	0.1688***
Firm size $>$ 10	0.0843***	0.0986***	0.0793***	0.0756***	0.1060***	0.0918***
Part-time	-0.0098	0.0317	-0.0145	0.0168	0.0098	0.0762***
	0.0497	0.0540	0.0609	0.0502	0.0611	0.0577
lambda	-0.0367	0.0016	-0.0289	-0.0253	-0.0484	-0.0176
# obs censored	522	1194	592	1081	543	895
# obs	2912	3136	3091	3376	2819	3113

Estimated coefficients II

	2005		2010		2015	
	male	female	male	female	male	female
Blue-collar worker	-0.0369*	-0.0567*	-0.1128***	-0.0072	-0.0782***	-0.0622**
Civil servant	0.0188	0.0858**	0.0579*	0.0720**	0.0504*	0.0476*
Managerial	0.2291***	0.1871**	0.1040**	0.2251***	0.2277***	0.2701***
Professional	0.1865***	0.2157***	0.1132**	0.1920***	0.1877***	0.2661***
Technical & ass. professional	0.1472***	0.1351***	0.0701*	0.1482***	0.0865**	0.1977***
Clerical support	0.0940***	0.0502*	-0.0041	0.0901***	0.0378	0.0894***
Skilled agricult.	-0.1509*	-0.7019***	-0.1074	-0.1041	-0.0818	-0.0890
Skilled trades	0.0618*	-0.0130	0.0051	-0.0312	0.0037	-0.0303
Plant, machine operatives	0.0339	0.0936	-0.0012	-0.0050	-0.0904*	-0.0108
Elementary	-0.0458	-0.0457	-0.1159***	-0.0911***	-0.0731*	-0.0406
Agriculture, forestry, mining	-0.0445	-0.0589	-0.1269	-0.0138	0.0403	-0.0727
Manufacturing	-0.0362	-0.0392	0.0999**	0.0722*	0.1297***	0.1354***
Energy	-0.0270	-0.0111	0.1092*	0.0769	0.1173*	0.0632
Construction	-0.0659*	-0.0373	0.0907*	0.0891	0.0951**	0.0960
Trade	-0.0952**	-0.0851**	-0.0096	-0.0323	0.0201	0.0204
Transport, information, communication	-0.0659	-0.0307	-0.0161	-0.0076	0.0356	0.0231
Accommodation, food services	-0.1987***	-0.0993*	-0.1609***	-0.1517***	-0.1569**	-0.0883**
Finance, insurance, real Estate	0.1248**	0.0856*	0.1212*	0.1670***	0.1809***	0.2042***
Public services	-0.0501	-0.0115	-0.0178	0.0405	-0.0265	0.0074
Other services	-0.0854*	-0.0667*	-0.1133*	-0.0315	0.0406	-0.0241