The needle in the haystack: Identifying the Political Economy Drivers of Structural Reforms

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Motivation

Background

- Growing emphasis on structural reforms as key policy lever to both lift potential growth and employment rates over the medium term
- But reforms are typically rare events due to (perceived?) political and economic costs
- **Key question**: What are the driving forces of reforms?
- Surprising disparity of results in the literature, hard to compare hypotheses

Limitations of previous studies

Contribution

- Model uncertainty
  - Hard to identify few “ones” with a potential large list of drivers and limited sample
  - Which type of controls and how many?
  - Classical model selection problem
- Identification of reforms based on indicators
  - Timing
  - Measurement errors
  - Criteria: variances, level shifts, structural breaks based on regulation indicators
  - No consensus on ‘unusually strong fluctuations’?

Contribution

Contribution

- Model uncertainty:
  - BAMLE: Bayesian averaging of maximum likelihood estimators (Moral-Benito, 2012; Dardanoni, et al., 2015)
  - Frequentist model averaging (EBA) as robustness check
  - To the best of our knowledge, first study to use model averaging techniques in this line of literature
  - To the best of our knowledge, first to apply BAMLE to binary Logit models
- Reforms (Duval, Furceri, Jalles and Nguyen, 2017)
  - Actual legislative changes
  - Narrative approach using OECD economic surveys and national sources
  - 1970-2013, 26 OECD countries (also our sample, limited only by data availability)

Preview of key results

Contribution

- First, product and labor market reforms typically occur during periods of recession and high unemployment➔ crises can break the political deadlock over reforms
- Reform pressure is stronger if little action has been taken in the past
- Peer pressure matters: a given country is more likely to undertake reform in a particular when other countries did so
- Political economy of reform most relevant for regular employment protection legislation and unemployment benefits

Outline

1. ~~Motivation and Contribution~~

2. Empirical specification
   a) Reforms
   b) Drivers
   c) Methodology

3. Results
   a) Main results
   b) Methodological robustness (exclusions, priors, model specification)
   c) Overview across reform areas

4. Conclusions and Further Work

Reform areas

Empirical specification

- Product Market Regulation in network industries (**pmr**)
- Employment Protection Legislation (regular) (**epl reg**)
- Employment Protection Legislation (temporary) (**epl temp**)
- Unemployment benefit gross replacement rate (**ub**)

Identification of reforms

Empirical specification

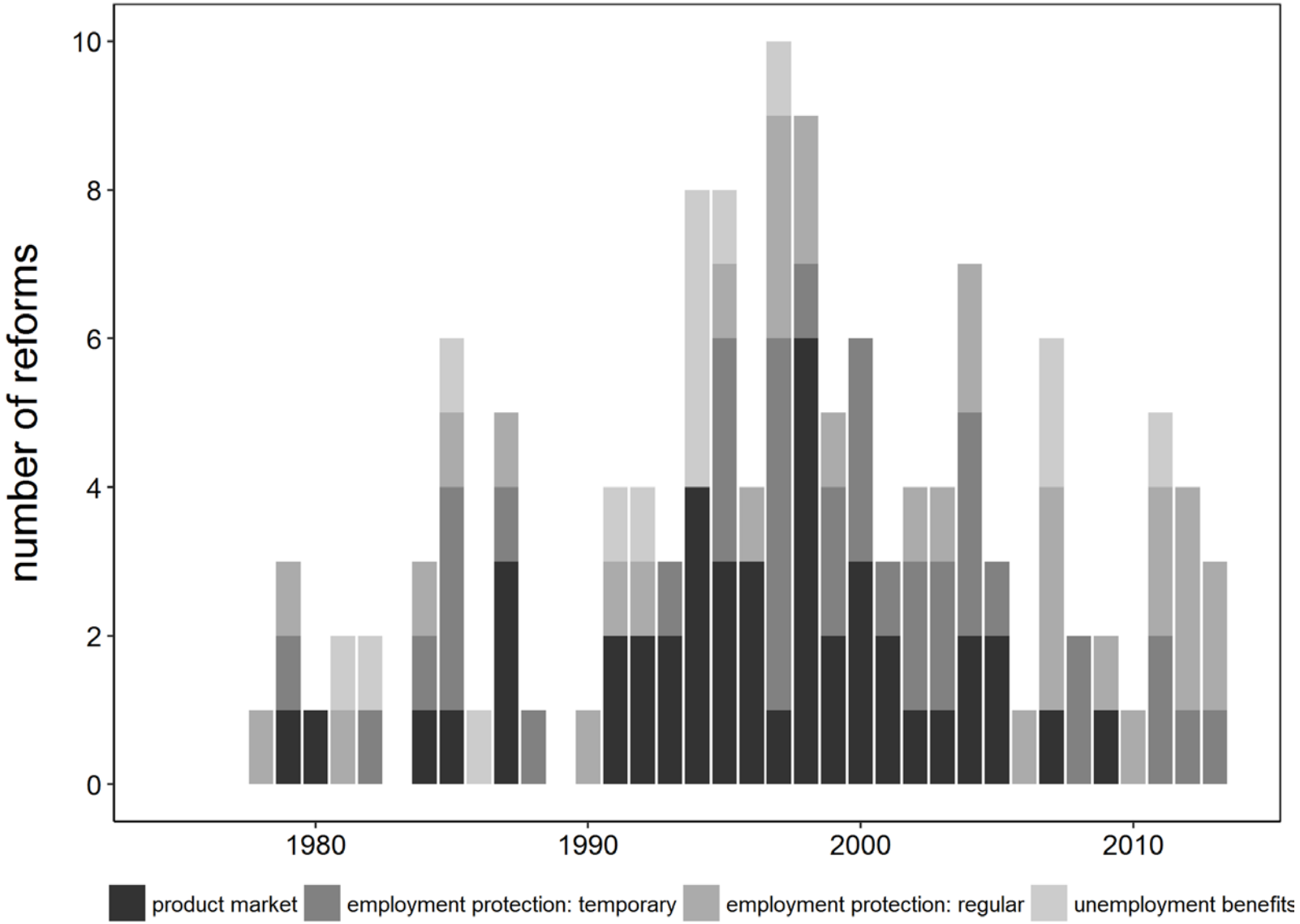
- ‘Narrative’ approach to identify major legislative and regulatory actions (for PMR, EPL, UB) based on *OECD Economic Surveys* and additional country-specific sources

- Alternative criteria to identify reforms:
  1. normative language
  2. actions mentioned several times across different surveys \and/or in retrospective assessments
  3. actions corresponding to large changes in OECD indicators

- Advantages compared to existing databases: (i) identification of *major* events, incl. on dimensions not covered by OECD indicators; (ii) exact timing, incl. when decline in OECD indicators is gradual; (iii) exact actions underpinning indicator changes; (iv) larger country and time coverage ; (v) areas of reforms for which no indicator exists (e.g. UB duration, conditionality, design of activation policies); (vi) announcement vs. implementation in some cases

Reforms over time

Empirical specification



Drivers

Empirical specification

- Initial stance based on regulation indicators:
  - **Initial indicator** as well as **lagged indicator** underlying the reforms
  - Captures incentive to reform due to high regulation levels (Giuliano, Mishra and Spilimbergo, 2013), established in financial reform literature (Abiad and Mody, 2005)
  - Lagged level always included, no uncertainty introduced
- Spillovers and packaging:
  - **Domestic reform packaging** of reforms in different areas and **international spillovers** in the same area
  - National reform momentum and international peer pressure (Elhorst, Zandberg and De Haan, 2013)

Drivers

Empirical specification

- Economic conditions and recessions:
  - Low **real gdp growth** and **unemployment** can increase reform pressure but decreases policy space for reforms (discussion: Agnello, Castro, Jalles and Sousa, 2015)
  - **Crises** and **deep recessions:** 'crisis induces reform hypothesis' (Drazen and Easterly, 2001; overview: Galasso, 2014), positive effects expected, perceived need to reform (Tommaso and Velasco, 1995)

- Economic setting:
  - **Real short and long term interest rates** ambiguous effect
  - **Trade openness**: exposure to competition increases reform pressure (Belloc and Nicita, 2011)
  - **Fiscal space**: good fiscal position can increase fiscal space for reforms (Duval, 2008)
  - **Government debt:** ambiguous for labor market reforms, could trigger product market reforms where reform losers have less impact on social spending

Drivers

Empirical specification

- Political Conditions:
  - **Parliamentary instability**: indicates shifts in political power structure, negative effect
  - Centralization of **government** parties in partiament
  - Centralization of **opposition** in parliament
  - **Union density** as a potential reform opponent in labor markets
  - **Vote share** of government parties and **control** of all relevant houses as measures of parliamentary dominance

- Election Timing:
  - Reforms take time to materialize, unlikely shortly before elections (Alesina, Ardagna and Trebbi, 2006)
  - Used: **total months to elections**, **closeness to elections** (dummy <12 months), **years left in current term**, **years executive is in office**

Drivers

Empirical specification

- Ideology:
  - Recent revision of conventional wisdom of 'partisan effect' (Belloc and Nicita, 2011; Roberts and Saeed, 2012), especially during recent crisis episodes (Galasso, 2014)
  - Direction: uncertain
  - Used: dummies for **Center** and **Left** as well as continuous **right-left-center** variable (right=0, center=1, left=2)
- Other Factors:
  - **EMU**: Less policy space due to common exchange rates and stronger fiscal rules: TINA?
  - **Chief executive economics degree**: as a (not confirmed) nod to the profession
  - **Gini coefficient based on net and gross income to capture effects of inequality**
  - **EU directives**: reform requirements for product market reforms (Bouis, Duval, and Eugster, 2016)

BAMLE (1)

- Motivation Model Averaging:
  - exploit information of entire model space
  - employ agnostic approach
  - Include large set of potential drivers
- Motivation Bayesian Averaging of Maximum Likelihood estimates (BAMLE):
  - avoid prior specifications on estimators
  - interpret posterior effects and posterior inclusion probabilities
  - Extend to Logit models

BAMLE (2)

- Estimation based on entire model universe
  - Estimator:

$$E(\beta|y) = \sum_{j=1}^{2^k} P(M_j|y)\,\hat{\beta}_{ML}^{j}$$

  - Posterior:

$$P(M_j|y) = \frac{P(M_j)\exp(-\frac{1}{2}BIC_j)}{\sum_{i=1}^{2^K} P(M_i)\exp(-\frac{1}{2}BIC_i)}$$

  - Classical estimate:

$$\hat{\beta}_{ML}^{j} = \hat{\beta}_{APE}^{j} = \hat{\beta}_{\mathrm{j}} N^{-1} \sum_{i=i}^{N} g(x_i\hat{\beta})$$

BAMLE (3)

Empirical specification

- Method also allows calculation of posterior inclusion probabilities:

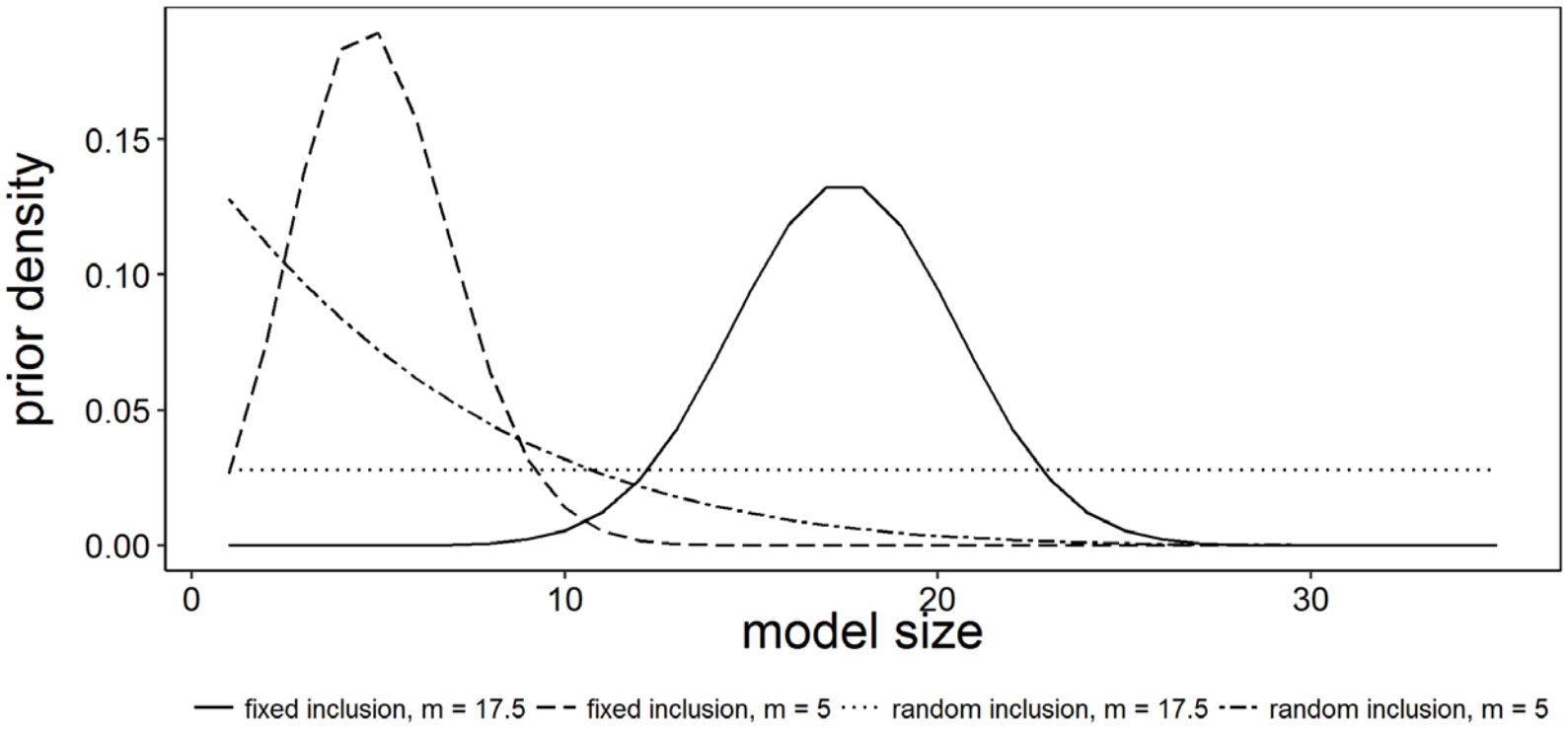
$$PiP(\beta^*) = \sum_{\beta^*=1}^{K^*} P(M_{\beta^*}|y)$$

- Priors $P(M_j)$ based on Ley and Steel (2009), which just requires a prior on model size (W):
- $W \sim Bin(K, \xi)$ with $\xi \sim Be(a, b)$; $a, b > 0$
- $a = 1$ and $b = (K - m)/m$ so only need to assume m, the expected model size to determine binomial-beta distribution from which the actually estimated model sizes are then drawn (Ley and Steel, 2009; Moral-Benito, 2012)

BAMLE (4)

Empirical specification

- Fixed inclusion: Sala-i-Martin, Doppelhofer, and Mill (2004)
- Random inclsusion: Ley and Steel (2009)



Our Specification

Empirical specification

- Idea:
  - As few restrictions as possible
  - Only one fixed variable: lag of an underlying indicator
- Specification:
  - 15.000 random draws for each indicator from total list of drivers out millions (2^K) of possible models
  - Unbiased for reasonably large number of draws (Sala-i-Martin et al., 2004), our experience: results robust starting at 3000-4000 draws
  - Prior on model size: 5, random inclusion (Ley and Steel, 2009)
  - Logit specification as well as LPMs on OECD sample 1970-2013, 26 countries

Employment Protection legislation (regular contracts)

Results

- Main takeaways:
  - Unemployment, deep recessions and fiscal space are most robustly correlated to reforms across the model space
  - Several political economy factors follow but with sign uncertainty
  - No effects of ideology

variable	LPM	
	post.mean	pip
lagged indicator	0.027	1
unemployment	0.008	0.928
deep recessions	0.004	0.158
fiscal space	0.000	0.131
gini based on net income	0.000	0.092
real short term interest rate	0.000	0.091
centralization Opp. parties	0.004	0.076
Chief exec economics degree	-0.002	0.076
union density	0.000	0.068
election next 12 months	-0.002	0.066
gini based on gross income	0.000	0.059
years chief exec in office	0.000	0.052
government debt	0.001	0.039
initial indicator	0.001	0.037
openness	0.000	0.035
real gpd growth	0.000	0.035
years left in current term	0.000	0.033
real long term interest rate	0.000	0.032
EMU membership	0.000	0.029
domestic reform packaging	0.000	0.028
centralization Gvt. parties	0.000	0.027
month to legislative election	0.000	0.027
control of all relevant houses	0.000	0.027
ideology (r,c,l)	0.000	0.025
international spillovers	0.000	0.023
dummy exec right	0.000	0.023
vote share of gvt parties	0.000	0.022
crisis	0.000	0.019
dummy exec left	0.000	0.010
(Intercept)	-0.088	1

Introducing exclusion restrictions

Results

- Models with highly collinear regressors included (unemployment, crisis and deep recession for example)
- 2nd version: In the same model at most one of:
  - Unemployment, crisis, deep recession
  - Fiscal space, government debt, real short or long term interest rate
  - Political power variables, election timing variables, ideology variables, Gini coefficients
- Leads to relatively more models with unrestricted variables
- 3rd version: penalize posterior of overrepresented variables:

$$P_i^*\left(M_j\middle|y\right) = P\left(M_j\middle|y\right) + \delta_{\mathrm{i}}\, P\left(M_j\middle|y\right)$$

$$\delta_{\mathrm{i}} = \frac{\frac{1}{\mathrm{K}}\sum_{i=1}^{K} c_i}{C} - \frac{c_i}{C}$$

Results of introducing exclusion restrictions

Results

model	LPM		LPM		LPM	
version	unrestricted		restricted		penalized	
	post.mean	pip	post.mean	pip	post.mean	pip
lagged indicator	0.027	1	0.026	1	0.026	1
initial indicator	0.001	0.037	0.002	0.063	0.002	0.065
international spillovers	0.000	0.023	0.000	0.041	0.000	0.039
domestic reform packaging	0.000	0.028	0.000	0.043	0.000	0.049
real gpd growth	0.000	0.035	0.000	0.062	0.000	0.055
deep recessions	0.004	0.158	0.005	0.202	0.003	0.105
crisis	0.000	0.019	0.000	0.013	0.000	0.036
unemployment	0.008	0.928	0.008	0.960	0.007	0.896
real short term interest rate	0.000	0.091	0.000	0.085	0.000	0.072
real long term interest rate	0.000	0.032	0.000	0.024	0.000	0.025
openness	0.000	0.035	-0.001	0.058	-0.001	0.057
fiscal space	0.000	0.131	0.000	0.229	0.000	0.226
government debt	0.001	0.039	0.002	0.070	0.001	0.056
centralization Gvt. parties	0.000	0.027	0.000	0.013	0.000	0.007
centralization Opp. parties	0.004	0.076	0.002	0.031	0.005	0.084
union density	0.000	0.068	0.000	0.018	0.000	0.034
vote share of gvt parties	0.000	0.022	0.000	0.013	0.000	0.010
control of all relevant houses	0.000	0.027	0.000	0.038	0.000	0.043
month to legislative election	0.000	0.027	0.000	0.007	0.000	0.006
election next 12 months	-0.002	0.066	0.000	0.008	-0.001	0.037
years left in current term	0.000	0.033	0.000	0.017	0.000	0.020
years chief exec in office	0.000	0.052	0.000	0.029	0.000	0.036
ideology (r,c,l)	0.000	0.025	-0.001	0.068	-0.001	0.069
dummy exec right	0.000	0.023	0.000	0.036	0.001	0.046
dummy exec left	0.000	0.010	-0.001	0.035	0.000	0.019
EMU membership	0.000	0.029	0.000	0.042	0.000	0.045
Chief exec economics degree	-0.002	0.076	-0.003	0.122	-0.003	0.125
gini based on net income	0.000	0.092	0.000	0.054	0.000	0.079
gini based on gross income	0.000	0.059	0.000	0.063	0.000	0.074
(Intercept)	-0.088	1	-0.082	1	-0.085	1

Varying prior specifications

- Sala-i-Martin, Doppelhofer and Mill (SDM, 2004): fixed inclusion probability for each variable: θ=m/K or θ=K/2, problem: penalizes to little for larger model size W
- Ley and Steel (2009), also employed by Moral-Benito (2012)
- K potential variables, first two moments of resulting beta-binomial distribution of model size W:
  - $E(W) = \frac{a}{a+b} K$
  - $var(W) = \frac{ab(a+b+K)}{(a+b)^2(a+b+1)} K$
  - Only have to specify prior model mean size m
- We can clearly confirm the criticism: SDM priors have more influence on results and K/2 leads to very high PiP's

Results of different prior choices

Results

model	LPM		LPM		LPM		LPM	
priors	Ley & Steel m5		Ley & Steel m16		SDM m5		SDM m16	
lagged indicator	0.027	1	0.026	1	0.026	1	0.027	1
initial indicator	0.001	0.032	0.001	0.034	0.001	0.044	0.002	0.109
international spillovers	0.000	0.015	0.000	0.030	0.000	0.025	0.000	0.048
domestic reform packaging	0.000	0.020	0.000	0.048	0.000	0.028	0.000	0.050
real gpd growth	0.000	0.029	0.000	0.032	0.000	0.039	0.000	0.192
deep recessions	0.003	0.139	0.002	0.066	0.005	0.181	0.011	0.413
crisis	0.000	0.021	0.000	0.029	0.000	0.026	0.000	0.021
unemployment	0.008	0.926	0.007	0.908	0.008	0.933	0.007	0.968
real short term interest rate	0.000	0.076	0.000	0.023	0.000	0.096	-0.001	0.106
real long term interest rate	0.000	0.023	0.000	0.012	0.000	0.029	0.000	0.042
openness	0.000	0.027	0.000	0.031	0.000	0.036	-0.002	0.083
fiscal space	0.000	0.115	0.000	0.228	0.000	0.140	0.000	0.431
government debt	0.001	0.030	0.001	0.025	0.001	0.036	0.002	0.096
centralization Gvt. parties	0.000	0.024	0.001	0.047	0.000	0.034	0.001	0.110
centralization Opp. parties	0.004	0.070	0.002	0.038	0.005	0.091	0.009	0.150
union density	0.000	0.062	0.000	0.024	0.000	0.074	0.000	0.265
vote share of gvt parties	0.000	0.022	0.000	0.021	0.000	0.024	0.000	0.032
control of all relevant houses	0.000	0.025	0.000	0.027	0.000	0.031	-0.002	0.129
month to legislative election	0.000	0.023	0.000	0.021	0.000	0.027	0.000	0.049
election next 12 months	-0.001	0.057	-0.003	0.103	-0.002	0.066	-0.003	0.097
years left in current term	0.000	0.028	0.000	0.084	0.000	0.033	0.000	0.066
years chief exec in office	0.000	0.039	0.000	0.029	0.000	0.049	0.000	0.107
ideology (r,c,l)	0.000	0.034	-0.001	0.065	0.000	0.049	0.000	0.058
dummy exec right	0.000	0.015	0.000	0.009	0.000	0.012	0.000	0.021
dummy exec left	0.000	0.018	0.000	0.024	0.000	0.020	-0.002	0.099
EMU membership	0.000	0.015	0.000	0.020	0.000	0.028	-0.001	0.104
Chief exec economics degree	-0.001	0.039	-0.001	0.039	-0.001	0.060	-0.010	0.458
gini based on net income	0.000	0.085	0.000	0.073	0.000	0.091	0.000	0.130
gini based on gross income	0.000	0.039	0.000	0.036	0.000	0.062	0.000	0.052
(Intercept)	-0.085	1	-0.081	1	-0.088	1	-0.081	1

Changes in Model Specification

Results

- Comparing logit models not problematic using average partial effects
- Introducing fixed effects not completely in the spirit with a model averaging exercise
- fixed effects are so common we want to test robustness, based on within-transformed data as in Moral-Benito (2012)
- Initial indicator lost in fixed effects, international spillovers lost in time fixed effects

Results of changes in model specification

Results

model	Logit		LPM		LPM		LPM	
fixed effects	none		none		country		country & time	
	post.mean	pip	post.mean	pip	post.mean	pip	post.mean	pip
lagged indicator	0.001	1	0.027	1	0.011	1	0.027	1
initial indicator	0.000	0.047	0.001	0.037				
international spillovers	0.000	0.024	0.000	0.023	0.000	0.032		
domestic reform packaging	0.000	0.018	0.000	0.028	0.000	0.033	0.000	0.036
real gpd growth	0.000	0.034	0.000	0.035	0.000	0.042	0.000	0.042
deep recessions	0.001	0.084	0.004	0.158	0.004	0.154	0.009	0.283
crisis	0.000	0.032	0.000	0.019	0.000	0.036	0.000	0.034
unemployment	0.007	0.852	0.008	0.928	0.002	0.317	0.002	0.228
real short term interest rate	0.001	0.055	0.000	0.091	0.000	0.056	0.000	0.035
real long term interest rate	0.000	0.033	0.000	0.032	0.000	0.043	0.000	0.083
openness	0.000	0.033	0.000	0.035	0.000	0.034	-0.003	0.055
fiscal space	0.001	0.043	0.000	0.131	0.000	0.220	0.000	0.245
government debt	0.001	0.064	0.001	0.039	0.008	0.122	0.004	0.077
centralization Gvt. parties	0.000	0.028	0.000	0.027	-0.005	0.069	-0.005	0.068
centralization Opp. parties	0.001	0.063	0.004	0.076	0.002	0.043	0.005	0.066
union density	0.000	0.036	0.000	0.068	0.000	0.039	0.000	0.036
vote share of gvt parties	0.001	0.030	0.000	0.022	0.000	0.033	0.000	0.035
control of all relevant houses	0.000	0.027	0.000	0.027	0.000	0.036	0.000	0.034
month to legislative election	0.000	0.032	0.000	0.027	0.000	0.036	0.000	0.040
election next 12 months	0.001	0.098	-0.002	0.066	-0.003	0.112	-0.003	0.110
years left in current term	0.001	0.038	0.000	0.033	0.000	0.050	0.000	0.051
years chief exec in office	0.001	0.045	0.000	0.052	0.001	0.110	0.001	0.114
ideology (r,c,l)	0.001	0.058	0.000	0.025	-0.001	0.069	-0.001	0.079
dummy exec right	0.000	0.017	0.000	0.023	0.001	0.036	0.000	0.033
dummy exec left	0.001	0.032	0.000	0.010	-0.001	0.028	-0.001	0.040
EMU membership	0.000	0.029	0.000	0.029	0.000	0.040	0.000	0.036
Chief exec economics degree	0.004	0.225	-0.002	0.076	-0.011	0.283	-0.011	0.282
gini based on net income	0.001	0.043	0.000	0.092	0.000	0.040	0.000	0.036
gini based on gross income	0.001	0.083	0.000	0.059	0.001	0.151	0.001	0.114

Changes in Model Specification

- Results for other reform areas (pmr, epl temporary, unemployment gross replacement rates) summarized, for details see appendix
- Main drivers: deep recessions and unemployment
- International spillovers as well as EU directives drive pmr reforms
- Domestic reform packaging and initially high regulation relevant for reforms of employment protection legislation in temporary contracts
- Unemployment most robustly associated with reforms of the gross replacement rate but few reforms (and few results) for that area
- Results still preliminary

Overview of Results

Results

Category	Variable	Area of Reform			
		PMR	EPL temporary	EPL regular	UB
Initial Stance and Spillovers	lagged indicator				
	initial indicator		x		
	international spillovers	x			
	domestic reform packaging		x		
Recessions / Weak economic conditions	real gpd growth				
	deep recessions		x	x	
	crisis				
	unemployment	x		x	x
Economic Setting	real short term interest rate				x
	real long term interest rate		x		x
	openness	x			
	fiscal space		x		
	government debt	x			
Political Conditions	centralization Gvt. parties				
	centralization Opp. parties				
	union density				
	vote share of gvt parties				x
	control of all relevant houses				
Election Timing	month to legislative election				
	election next 12 months			x	
	years left in current term				
	years chief exec in office				
Ideology	ideology (r,c,l)				
	dummy exec right				
	dummy exec left				
Others	EMU				
	Chief exec economics degree			x	
	gini based on net income				
	gini based on gross income		x	x	
	EU directives	x			

Sign certainty via extreme bounds analysis

- Frequentist Model Averaging (FMA) in growth literature:
- Extreme Bounds Analysis (Leamer, 1978; Levine and Renelt, 1992): reject if β changes sign or 5% significance
- Sala-i-Martin (1997) focuses on cdf on both sides of 0:

1. With normality across estimators calculate cdf(0) with:

$$\bar{\beta} = \sum_{j=1}^{M} w_j \, \hat{\beta}_j \qquad \bar{\sigma}^2 = \sum_{j=1}^{M} w_j \, \hat{\sigma}_j^{\,2}$$

2. Without normality assumption, based on single sampling distributions:

$$\Phi(0) = \sum_{j=1}^{M} w_j \; \phi_j(0 \mid \hat{\beta}_j, \hat{\sigma}_j^{\,2}) \qquad w_j = R_j^{2\,MF} = 1 - \frac{\ln(L_{Mj})}{\ln(L_{0j})}$$

- Weights as indication of having calculated the 'true' model: McFaddens (1974) likelihood ratio index, we use BIC here

Results

Testing for sign certainty

Category	Variable	Area of Reform			
		PMR	EPL temporary	EPL regular	UB
Initial Stance and Spillovers	lagged indicator	+	+	+	
	initial indicator		+		
	international spillovers	+	+		
	domestic reform packaging		+		
Recessions / Weak economic conditions	real gpd growth				
	deep recessions		+		
	crisis				
	unemployment			+	+
Economic Setting	real short term interest rate				
	real long term interest rate		+		
	openness				
	fiscal space				
	government debt	+			
Political Conditions	centralization Gvt. parties				
	centralization Opp. parties				
	union density				
	vote share of gvt parties				
	control of all relevant houses				
Election Timing	month to legislative election				
	election next 12 months				
	years left in current term				
	years chief exec in office				
Ideology	ideology (r,c,l)				
	dummy exec right				
	dummy exec left				
Others	EMU				
	Chief exec economics degree			-	
	gini based on net income				
	gini based on gross income				
	EU directives	+			

Summary of Results

Conclusions

- First, product and labor market reforms typically occur during periods of recession and/or high unemployment ➔ crises can break the political deadlock over reforms
- Reform pressure is stronger if little action has been taken in the past, all lags
- Peer pressure matters: a given country is more likely to undertake reform in a particular area when neighboring countries and trade partners do so
- Political economy of reform most relevant for regular employment protection legislation and unemployment benefits
- Some surprising non-results: ideology has no strong impact, political setting is not crucial, election timing at most marginal
- Deeper political economy story in reform of employment protection legislation of regular contracts

Future Research

Conclusions

- New areas of reforms (e.g. female participation, minimum wage, pension reforms beyond retirement age, conditionality in unemployment benefits)
- Deeper analysis of ideology: actions vs. reforms
- Deeper analysis of the political economy narrative of employment protection legislation in regular contracts and unemployment

Thank you!

The needle in the haystack: Identifying the Political Economy Drivers of Structural Reforms

Romain Duval (IMF)

Davide Furceri (IMF)

Jakob Miethe (DIW Berlin)

Structural Reforms and European Integration

London, Monday, 8th of May 2017

Examples of Reforms

Appendix

Announcement Year	Implementation /Scored Year	Area	Country	Content	Normative language	Mention in reports	Large change in OECD indicator
1982	1984	Product market (telecommunications)	USA	antitrust suit against AT&T	The most important deregulatory move in telecommunications came with the antitrust suit against AT&T by the U.S. ...Competition for long-distance voice services entered a new phase in 1984..	1986, 1989, 2004	no
1993	mid-1994/1995	Employment protection legislation	Spain	a draft law modifying the current law regulating employment. It introduces….dismissals of permanent workers;	... far-reaching labor market reforms aimed at lifting barriers to job creation. A decree was passed at the end of December 1993 and a draft has been presented to Parliament and is expected to become law by the middle of 1994	no	yes for 1995
n.a.	1994	Unemployment benefits	Denmark	Labor market reforms of 1994: activation of the unemployed, limiting the period of unemployment benefits, enforcing job availability criteria, compulsory full-time activation, stricter eligibility criteria.	The measures taken ...are steps in the right direction,...raining and education offers are fully operational, a foundation has been established for reducing the duration of unemployment benefits on a sustainable basis..	2000	yes for 1994 (replacement rate), other aspects (duration, eligibility, active policies) not captured

Extensive literature but few areas of consensus

Appendix

	Reference	Data	Sign
Crisis	Bonfiglioli and Gancia, 2016	Recessions (based on WDI GDP), Laeven & Valencia (2012) banking and currency crises; sovereign debt default dummy	-
	Giuliano, Mishra and Spilimbergo, 2013	Inflation crises	(-)
	Campos, Hsiao and Nugent, 2010	Political (and economic) crises	+
	Agnello, Castro, Jalles and Sousa, 2015	8 reforms, 5 crisis indicators	(+)
	Elhorst, Zandberg and De Haan, 2013	DPI, explaining financial system reform	+
Ideology (left)	Bonfiglioli and Gancia, 2016	World Bank Database on Political Institutions	+
	Giuliano, Mishra and Spilimbergo, 2013	World Bank Database on Political Institutions	(-/+)
	Wiese, 2014	Potrafke (2009) ideology index	insignifican
	Roberts and Saeed, 2012	World Bank Database on Political Institutions	fluctuating
	Giuliano, Mishra and Spilimbergo, 2013	World Bank Database on Political Institutions	(+)
	Elhorst, Zandberg and De Haan, 2013	DPI, explaining financial system reform	+

Detailed list of included variables

Appendix

variable	time	source	definition
lagged indicator	t-1	OECD	Value of related OECD indicators
initial inidicator	t0	OECD	Related OECD indicator at beginning of sample
domestic reform packaging	t-2:t+2	Reform Database	Sum of reforms in other 3 fields
international spillovers	t-1:t-3	Reform Database	Sum of reforms in other countries in the same field
real gdp growth	t	WEO	Real gdp growth rate
deep recessions	t	Based on real gdp growth	Sums consecutive periods of gdp growth in lowest 15%
crisis	t-1:t-3	Valencia & Laeven (2012)	=1 in case of banking, currency, or sov. debt crisis or sov. debt restructuring
unemployment rate	t-1	OECD	in %
short term real interest rate	t-1	WEO 04/2014	model based estimations of short term real interest rate
long term real interest rate	t-1	WEO 04/2014	model based estimations of long term real interest rate
openness	t-1	WEO	(mgsvd+xgsvd)/gdpvd
fiscal space	t	WEO, OECD	(g-r)D/Y
government debt	t	WEO, IMF	government debt in % GDP
centr. gvt. parties	t	DPI	The sum of the squared seat shares of all parties in the government
centr. Opp parties	t	DPI	The sum of the squared seat shares of all parties in the opposition
union density	t	WEO	OECD's De Serres union density in %
vote share of gvt parties	t	DPI	Vote share of Government Parties
control of all relevant houses	t	DPI	Does party of executive control all relevant houses?
month to legislative election	t	Gupta, Liu, & Mulas-Granados (2016)	month left to next parliamentary election
election next 12 months	t	Based on months to election	dummy if election within next 12 months
years left in current term	t	DPI	Years left in current term
years chief exec in office	t	DPI	How many years has the chief executive been in office?
ideology (r,c,l)	t	DPI	ideology of party of chief executive (right=1, center=2, left=3)
dummy exec right	t	DPI	=1 if party of chief executive categorized as 'right'
dummy exec left	t	DPI	=1 if party of chief executive categorized as 'left'
EMU membership	t	Accession time	=1 if country has joined the monetary union
Chief exec economics degree	t	Bordon, Ebeke, & Shirono (2016)	=1 if the chief executive has at least one economics degree
gini based on net income	t	SWIID	gini coefficient based on net income
gini based on gross income	t	SWIID	gini coefficient based on gross income
EU directives	t-1:t-3	Bouis, Duval, & Eugster (2016)	Competition relevant EU directives

Detailed results PMR

Appendix

model	Logit		LPM		LPM		LPM	
fixed effects	none		none		country		country & year	
	post.mean	pip	post.mean	pip	post.mean	pip	post.mean	pip
lagged indicator	0.013	1	0.019	1	0.026	1	0.078	1
initial indicator	0.000	0.019	0.000	0.017				
international spillovers	0.017	0.980	0.010	0.981	0.010	0.985		
domestic reform packagin	0.000	0.030	0.000	0.028	0.000	0.024	0.000	0.034
real gpd growth	0.000	0.033	0.000	0.052	0.000	0.036	0.000	0.038
deep recessions	0.000	0.023	0.000	0.017	0.000	0.018	0.000	0.033
crisis	0.001	0.045	0.002	0.050	0.003	0.070	0.006	0.112
unemployment	0.001	0.086	0.000	0.086	0.001	0.125	0.000	0.057
real short term interest ra	0.000	0.030	0.000	0.038	0.000	0.024	0.000	0.032
real long term interest rat	0.000	0.023	0.000	0.019	0.000	0.026	0.000	0.037
openness	0.002	0.099	0.000	0.030	0.030	0.223	0.018	0.160
fiscal space	0.000	0.029	0.000	0.028	0.000	0.025	0.000	0.030
government debt	0.004	0.259	0.021	0.346	0.014	0.166	0.003	0.063
centralization Gvt. parties	0.001	0.036	0.001	0.022	0.000	0.021	0.000	0.033
centralization Opp. partie	0.000	0.032	0.002	0.045	0.001	0.029	0.002	0.042
union density	0.000	0.024	0.000	0.028	0.000	0.017	0.000	0.047
vote share of gvt parties	0.001	0.042	0.000	0.037	0.000	0.025	0.000	0.034
control of all relevant hou	0.000	0.019	0.000	0.017	-0.001	0.033	-0.002	0.069
month to legislative elect	0.000	0.019	0.000	0.020	0.000	0.024	0.000	0.034
election next 12 months	0.000	0.030	0.000	0.029	0.000	0.021	0.000	0.038
years left in current term	0.000	0.019	0.000	0.021	0.000	0.022	0.000	0.032
years chief exec in office	0.000	0.034	0.000	0.036	0.000	0.047	0.000	0.053
ideology (r,c,l)	0.001	0.052	-0.001	0.054	-0.001	0.059	-0.001	0.102
dummy exec right	0.000	0.035	0.001	0.052	0.000	0.010	0.001	0.038
dummy exec left	0.000	0.019	0.000	0.009	-0.001	0.045	-0.002	0.065
EMU membership	0.000	0.031	0.000	0.026	0.000	0.018	0.002	0.064
Chief exec economics deg	0.000	0.021	0.000	0.022	0.000	0.027	0.000	0.046
gini based on net income	0.000	0.019	0.000	0.042	0.000	0.023	-0.001	0.124
gini based on gross incom	0.000	0.018	0.000	0.030	0.000	0.026	0.000	0.048
EU directives	0.002	0.099	0.002	0.111	0.004	0.168	0.115	0.763

Appendix

Detailed results EPL temporary

model	Logit		LPM		LPM		LPM	
fixed effects	none		none		country		country & time	
	post.mean	pip	post.mean	pip	post.mean	pip	post.mean	pip
lepl_temp	0.018	1	0.028	1	0.034	1	0.039	1
init_epl_temp	0.008	0.830	0.006	0.220				
intspill_shock_eplt	0.001	0.053	0.001	0.112	0.002	0.168		
dompack2_shock_eplt	0.007	0.349	0.022	0.557	0.010	0.265	0.010	0.260
dgdpv	0.001	0.040	0.000	0.023	0.000	0.023	0.000	0.038
deep_rec_gdp	0.006	0.278	0.020	0.433	0.020	0.462	0.059	0.913
crisis	0.000	0.013	0.000	0.011	0.000	0.012	0.000	0.012
lunr	0.001	0.060	0.001	0.112	0.002	0.204	0.003	0.228
lrrate_3m_md	0.001	0.029	-0.002	0.174	-0.005	0.369	0.000	0.008
lrrate_10yr_md	0.005	0.267	0.005	0.402	0.010	0.645	0.001	0.076
lopen	0.001	0.055	-0.001	0.032	0.000	0.008	0.000	0.015
fiscalspace	0.002	0.103	0.000	0.360	0.000	0.280	-0.001	0.771
gvt_debt	0.000	0.013	0.001	0.026	0.000	0.011	0.000	0.011
herfgov	0.000	0.022	0.001	0.018	0.000	0.008	0.001	0.022
herfopp	0.000	0.013	0.001	0.015	0.000	0.010	0.000	0.010
un_den	0.000	0.018	0.000	0.016	0.000	0.010	0.000	0.014
numvote	0.000	0.019	0.000	0.023	0.000	0.009	0.000	0.012
allhouse	0.000	0.018	0.000	0.011	0.000	0.011	0.000	0.006
m_to_legelec	0.000	0.017	0.000	0.009	0.000	0.009	0.000	0.012
m12elec	0.000	0.013	0.000	0.011	0.000	0.016	0.000	0.009
yrcurnt	0.000	0.016	0.000	0.014	0.000	0.010	0.000	0.010
yrsoffc	0.000	0.012	0.000	0.016	0.000	0.010	0.000	0.012
execrcl_cont	0.000	0.015	0.000	0.007	0.000	0.009	0.000	0.009
exec_right	0.000	0.002	0.000	0.005	0.000	0.005	0.000	0.005
exec_left	0.000	0.011	0.000	0.004	0.000	0.004	0.000	0.004
EMU	0.000	0.015	0.000	0.008	0.000	0.011	-0.001	0.025
econdegree	0.000	0.020	0.000	0.022	-0.001	0.032	-0.001	0.037
gini_net	0.000	0.021	0.000	0.045	0.002	0.183	0.003	0.261
gini_market	0.002	0.087	0.000	0.093	0.000	0.056	0.001	0.085

Detailed results Unemployment Benefits

Appendix

model	Logit		LPM		LPM		LPM	
fixed effects	none		none		country		country & time	
	post.mean	pip	post.mean	pip	post.mean	pip	post.mean	pip
lgrr	0.000	1	0.000	1	0.000	1	0.000	1.000
init_grr	0.000	0.044	0.000	0.039				
intspill_shock_grr	0.000	0.036	0.000	0.031	0.000	0.048		
dompack2_shock_grr	0.000	0.045	0.000	0.044	0.000	0.036	0.000	0.044
dgdpv	0.000	0.061	0.000	0.046	0.000	0.040	0.000	0.041
deep_rec_gdp	0.000	0.049	0.000	0.041	0.000	0.046	0.000	0.044
crisis	0.000	0.059	-0.001	0.051	-0.001	0.056	-0.002	0.076
lunr	-0.001	0.613	0.003	0.790	0.008	0.979	0.006	0.817
lrrate_3m_md	0.000	0.169	0.000	0.111	0.000	0.077	0.000	0.045
lrrate_10yr_md	0.000	0.110	0.000	0.081	0.000	0.037	0.000	0.047
lopen	0.000	0.051	0.000	0.056	-0.002	0.075	0.001	0.046
fiscalspace	0.000	0.061	0.000	0.052	0.000	0.037	0.000	0.046
gvt_debt	0.000	0.044	0.000	0.036	0.000	0.043	0.002	0.080
herfgov	0.000	0.060	-0.001	0.062	-0.001	0.056	-0.002	0.053
herfopp	0.000	0.046	-0.001	0.059	0.001	0.029	0.000	0.046
un_den	0.000	0.044	0.000	0.042	0.000	0.070	0.000	0.048
numvote	0.000	0.094	0.000	0.076	0.000	0.067	0.000	0.065
allhouse	0.000	0.042	0.000	0.040	0.000	0.041	0.000	0.046
m_to_legelec	0.000	0.043	0.000	0.040	0.000	0.039	0.000	0.043
m12elec	0.000	0.042	0.000	0.038	0.000	0.026	0.000	0.047
yrcurnt	0.000	0.040	0.000	0.039	0.000	0.040	0.000	0.040
yrsoffc	0.000	0.055	0.000	0.059	0.000	0.068	-0.001	0.205
execrcl_cont	0.000	0.052	0.000	0.048	0.000	0.042	0.000	0.046
exec_right	0.000	0.022	0.000	0.013	0.000	0.032	0.000	0.032
exec_left	0.000	0.037	-0.001	0.056	0.000	0.007	0.000	0.016
EMU	0.000	0.065	-0.002	0.102	-0.001	0.055	0.000	0.043
econdegree	0.000	0.049	0.000	0.039	0.001	0.063	0.001	0.066
gini_net	0.000	0.049	0.000	0.043	0.000	0.038	0.000	0.058
gini_market	0.000	0.051	0.000	0.047	0.000	0.044	0.000	0.050

Detailed results Unemployment Benefits

Appendix

model	Logit		LPM		LPM		LPM	
fixed effects	none		none		country		country & time	
	post.mean	pip	post.mean	pip	post.mean	pip	post.mean	pip
lgrr	0.000	1	0.000	1	0.000	1	0.000	1.000
init_grr	0.000	0.044	0.000	0.039				
intspill_shock_grr	0.000	0.036	0.000	0.031	0.000	0.048		
dompack2_shock_grr	0.000	0.045	0.000	0.044	0.000	0.036	0.000	0.044
dgdpv	0.000	0.061	0.000	0.046	0.000	0.040	0.000	0.041
deep_rec_gdp	0.000	0.049	0.000	0.041	0.000	0.046	0.000	0.044
crisis	0.000	0.059	-0.001	0.051	-0.001	0.056	-0.002	0.076
lunr	-0.001	0.613	0.003	0.790	0.008	0.979	0.006	0.817
lrrate_3m_md	0.000	0.169	0.000	0.111	0.000	0.077	0.000	0.045
lrrate_10yr_md	0.000	0.110	0.000	0.081	0.000	0.037	0.000	0.047
lopen	0.000	0.051	0.000	0.056	-0.002	0.075	0.001	0.046
fiscalspace	0.000	0.061	0.000	0.052	0.000	0.037	0.000	0.046
gvt_debt	0.000	0.044	0.000	0.036	0.000	0.043	0.002	0.080
herfgov	0.000	0.060	-0.001	0.062	-0.001	0.056	-0.002	0.053
herfopp	0.000	0.046	-0.001	0.059	0.001	0.029	0.000	0.046
un_den	0.000	0.044	0.000	0.042	0.000	0.070	0.000	0.048
numvote	0.000	0.094	0.000	0.076	0.000	0.067	0.000	0.065
allhouse	0.000	0.042	0.000	0.040	0.000	0.041	0.000	0.046
m_to_legelec	0.000	0.043	0.000	0.040	0.000	0.039	0.000	0.043
m12elec	0.000	0.042	0.000	0.038	0.000	0.026	0.000	0.047
yrcurnt	0.000	0.040	0.000	0.039	0.000	0.040	0.000	0.040
yrsoffc	0.000	0.055	0.000	0.059	0.000	0.068	-0.001	0.205
execrcl_cont	0.000	0.052	0.000	0.048	0.000	0.042	0.000	0.046
exec_right	0.000	0.022	0.000	0.013	0.000	0.032	0.000	0.032
exec_left	0.000	0.037	-0.001	0.056	0.000	0.007	0.000	0.016
EMU	0.000	0.065	-0.002	0.102	-0.001	0.055	0.000	0.043
econdegree	0.000	0.049	0.000	0.039	0.001	0.063	0.001	0.066
gini_net	0.000	0.049	0.000	0.043	0.000	0.038	0.000	0.058
gini_market	0.000	0.051	0.000	0.047	0.000	0.044	0.000	0.050