

New Firm Formation in Turkey

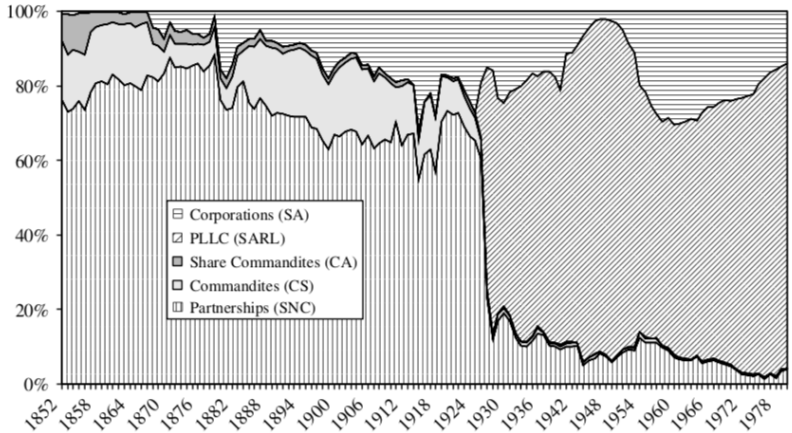
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May 3, 2019

Prepared for All Izmir Workshop, DEU

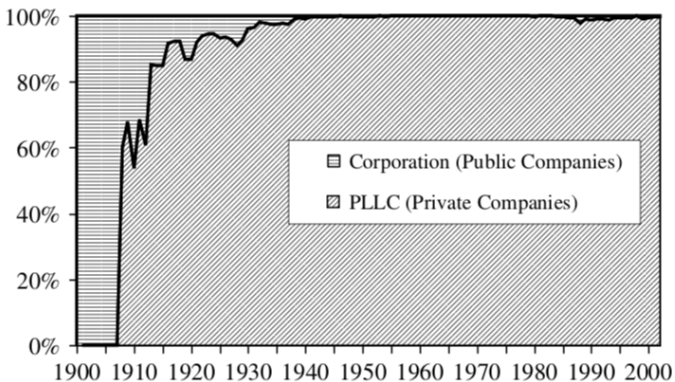
Introduction and Motivation

- PLLC is dominant in Europe, especially in UK
- Corporations (joint-stock companies) are favoured by large firms, PLLC for small firms
- Transaction costs
- Different legal traditions; common versus custom law countries



Source: *Annuaire de la Justice* (Paris, 1840-1978).

Note: Figures for the years 1914-1914 were interpolated using totals for Paris collected at the *Archives de Paris*.



Source: U.K. Board of Trade, *General Annual Report under the Companies (Winding-up) Act of 1890* (London, 1900-1921); U.K. Board of Trade, *Report* (London, 1922-2000).

Source: Guinnane et. al. (2007)

- Turkey follows Swiss-French-German-Italian commercial law
- Three major changes in years 1926, 1956 and 2012
- By the new millennium, 90 percent of new firms were adopting the limited liability company form.
- However, it took longer to adopt to PLLC in Turkey

- the new Turkish Commercial Code eased the formalities of setting up any type of business but has resulted in the creation of a greater number of new joint stock corporations relative to limited liability companies
- Previously, at least five shareholders were required to establish a joint stock corporation as opposed to only two for limited liability companies.
- Under the new law, a single shareholder is sufficient to found a company of either type

- Limited liability companies still have lower initial capital requirements (currently 10,000TL-around US\$1769 as of April 2019- for limited liability companies versus 50,000TL for joint stock corporations whereas before July 2012, it was 5,000TL for limited liability companies versus 50,000TL for joint stock corporations) but it is higher in relation to minimum capital requirements for joint stock corporations.
- Joint stock corporations have more stringent compliance rules, however, this is perceived to be an advantage as they are believed to have easier access to finance as a result.

- We consider the following pure structural change model with m breaks and $m + 1$ regimes:

$$y_t = z_t' \delta_j + u_t \quad (1)$$

for $t = T_{j-1} + 1, \dots, T_j$ and $j = 1, \dots, m + 1$, where t and j are indices for time and regimes, respectively, y is the dependent variable, z is a $(q \times 1)$ vector of independent variables, δ_j is the corresponding $(q \times 1)$ vector of coefficients and u is the error term.

- The first sup F type test is of the null no structural break $m = 0$ against the alternative hypothesis of $m = k$ breaks. For a partition (T_1, \dots, T_k) such that $T_i = T\lambda_i$ for $i = 1, \dots, k$ where T is the sample size, it is defined as $\sup F_T(k; q) = \sup_{(\lambda_1, \dots, \lambda_k) \in \Lambda_\epsilon} F_T(\lambda_1, \dots, \lambda_k; q)$ where $\Lambda_\epsilon = \{(\lambda_1, \dots, \lambda_k); |\lambda_{i+1} - \lambda_i| \geq \epsilon, \lambda_1 \geq 1, \lambda_k \leq 1 - \epsilon\}$ for an arbitrarily small and positive ϵ .

- The second sup F type test is a test of l breaks against the alternative of $(l + 1)$ breaks denoted as $\sup(F_T(l + 1|l))$. This test is applied by testing $(l + 1)$ hypothesis of no break versus a single break in each of the $(l + 1)$ segments with break points estimated in the l break model such that

$$\sup F_T(l+1|l) = \{S_T(\hat{T}_1, \dots, \hat{T}_l) - \min_{1 \leq i \leq l+1} \inf_{\tau \in \Lambda_{i,\eta}} S_T(\hat{T}_1, \dots, \hat{T}_{i-1}, \tau, \hat{T}_i, \dots, \hat{T}_l)\}$$

- where $\hat{\sigma}^2$ is a consistent estimator of σ^2 , $S_T(\hat{T}_1, \dots, \hat{T}_l)$ is the sum of squared residuals of the l break model and $\Lambda_{i,\eta} = \{\tau; \hat{T}_{i-1} + (\hat{T}_i - \hat{T}_{i-1})\eta \leq \tau \leq \hat{T}_{i-1} - (\hat{T}_i - \hat{T}_{i-1})\eta\}$.

- Union of Chambers and Commodity Exchanges of Turkey (TOBB) data
- From May 1995 to Jan 2019
- In the nineties the number of joint stock corporations relative to limited liability companies were on average higher but more volatile than the period before January 2012.
- The marked increase in the number of new joint stock corporations relative to new limited liability companies after July 2012 is apparent

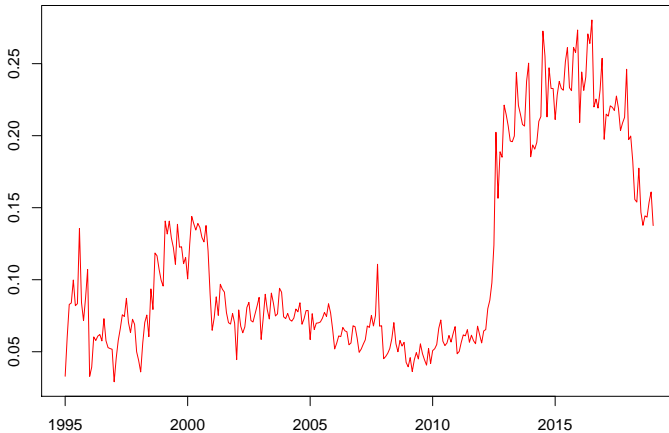


Figure: Ratio of New Corporations to New Limited Liability Companies

Table 1. Summary statistics for new companies: The ratio of corporations to limited liability companies

Summary statistics						
Mean	Std. Dev.	Min	Max	Skewness	Excess Kurtosis	Jarque-Bera
0.111902	0.068019	0.02911	0.2803	0.957511	-0.526727	47.501412
Test results						
Null Hypothesis	Probability value	Test statistic				
Skewness=0	0.000					
Excess Kurtosis=0	0.076					
Normal Distribution (JB)	0.000					
Unit root (ADF)	0.676	-1.858				
No autocorrelation						
Q(2)	0.000	534.986				
Q(5)	0.000	1294.831				
Q(10)	0.000	2433.796				
No ARCH effects	0.023	14.684				

Notes: * indicates statistical significance at 5 %. Lag length for the ADF unit root test is 2 and was chosen by sequential t-test. The test equation includes a constant and a trend. The Q(k) is the BoxPierce Q-statistic at lag k. The test for ARCH effects is the Lagrange Multiplier test of autoregressive conditional heteroskedasticity up to lag 6 which was chosen by the AIC.

- The new established joint stock corporations are on average 11% of the number of newly established limited liability companies with a standard deviation of 7%
- In January 1997, the ratio was at its minimum, the new established joint stock corporations were only 2.9% of new established limited liability companies.
- The maximum was in July 2016, at 28%.
- The distribution of the series is more skewed than the normal distribution, and does not pass the Jarque-Bera test of normality.

- We estimate two pure structural change models for the ratio of new established corporations to limited liability companies.
- We first consider a change in the mean process only and estimate the following model:

$$y_t = \alpha_j + u_t, \quad \text{if } t = T_{j-1} + 1, \dots, T_j, \quad \text{for } j = 1, \dots, m+1 \quad (2)$$

- We test the presence of a maximum of three breaks by the procedure outlined with $\epsilon = 0.2$

Table 2. Empirical results: Structural changes in the mean process of the ratio of new established corporations to limited liability companies

Specifications						
$Z_t=\{1\}$	$q=1$	$M=3$	$h=60$			
	Tests					
# of breaks	BIC	LWZ	sup $F_T(m)$ test		sup $F_T(m+1 m)$ test	
0	-5.36	-5.34				
1	-7.14	-7.09	sup $F_T(1)$	1445.36*		
2	-7.23*	-7.13*	sup $F_T(2)$	836.21*	sup $F_T(2 1)$	39.29*
3	-7.22	-7.08	sup $F_T(3)$	571.42*	sup $F_T(3 2)$	7.80
Estimates with two breaks						
α_1	α_2	α_3	T_1	T_2		
0.083* (0.002)	0.060* (0.003)	0.214* (0.003)	11/2005 (03/2005-09/2011)	07/2012 (04/2012-08/2012)		
Adjusted R^2 F(2,286)		0.85 839.15*				

Notes: * indicates statistical significance at 5 %. Standard errors and 95 % confidence intervals are in parenthesis. Critical values for the sup(F_T) tests have been computed using estimated surface response regressions in Bai and Perron (2003b)

- Both information criteria choose 2 breaks.
- The $\sup F_T(m)$ test which tests no breaks against m breaks is rejected for 1 to 3 breaks which indicates the presence of at least one break.
- The $\sup(F_T(2|1))$ test which tests the null of one break against the alternative hypothesis of two breaks is rejected and the $\sup(F_T(3|2))$ test which tests the null of two breaks against the alternative hypothesis of three breaks is not rejected, confirming the previous tests and choosing two breaks.
- The two break dates chosen are November 2005 and July 2012. The coefficients for the three regimes are 0.083, 0.06 and 0.214, in that order, and all coefficients are highly significant.

We estimate an autoregressive model of order 1 as below:

$$y_t = \alpha_j + \beta_j y_{t-1} + u_t, \quad \text{if } t = T_{j-1} + 1, \dots, T_j, \quad \text{for } j = 1, \dots, m+1 \quad (3)$$

The autocorrelation function of our series was suggestive of an AR(1) process and with this specification we do not allow serial correlation in the errors. The fit of the model improves, adjusted R^2 increasing from 85 percent to 94 percent. The $\sup F_T(m)$ test which tests no breaks against m breaks is rejected for 1 to 3 breaks which indicates the presence of at least one break. The $\sup(F_T(2|1))$ and $\sup(F_T(3|2))$ tests both cannot be rejected indicating a single break which is confirmed by BIC and LWZ as well.

Table 3. Empirical results: Structural changes in the mean and AR(1) processes process of the ratio of new established corporations to limited liability companies

Specifications						
$Z_t=\{I, y_{t-1}\}$	$q = 2$	$M = 3$	$h = 60$			
	Type					
# of breaks	BIC	LWZ	sup $F_T(m)$ test		sup $F_T(m+1 m)$ test	
0	-8.00	-7.95				
1	-8.09*	-8.02*	sup $F_T(1)$	17.83*		
2	-8.06	-7.92	sup $F_T(2)$	10.83*	sup $F_T(2 1)$	3.57
3	-8.03	-7.82	sup $F_T(3)$	8.63*	sup $F_T(3 2)$	3.87
Estimates with one break						
α_1	α_2	β_1	β_2	T_1		
0.013* (0.004)	0.061* (0.011)	0.827* (0.048)	0.716* (0.053)	06/2012 (06/2011-07/2012)		
Adjusted R^2 F(3,284)	0.94 1419.43*					

Notes: * indicates statistical significance at 5 %. Standard errors and 95 % confidence intervals are in parenthesis. Critical values for the sup(F_T) tests have been computed using estimated surface response regressions in Bai and Perron (2003b)

- The break point is June 2012 and, therefore, there are two regimes.
- The first regime covers the period from January 1995 through May 2012.
- The second regime starts in June 2012 and as in the previous model corresponds to the period when the Turkish Commercial Code has been in effect
- The mean in the first regime is 0.013 versus 0.061 in the second regime
- Our results provide evidence that entrepreneurs' choice of organizational form is influenced primarily by institutional framework and not by economic, political or social events.

- Turkey is a country where the economic and political climate can be very volatile.
- The sample period covers the earthquake of 1999 which killed close to 20,000 people the 2001 economic crisis, 2008 global financial crisis
- Syrian migration
- Only the introduction of new Turkish Commercial Code is associated with a structural break.

- Does institutional change lead to a structural break? Yes.
- New Turkish Commercial Code (effective as of July 2012) caused a structural break
- It is rather robust as very significant shocks have been observed; crises, earthquake and Syrian migration
- For further research we want to extend the data back and control for other variables such as capital per firm, interest rates.