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MACROECONOMIC BACKGROUND OF PUBLIC LISTING IN CZECHIA AND HUNGARY

Gábor Dávid KISS, Jana VYCHYTILOVÁ

Abstract

The principal objective of this paper is to analyze the common and country-specific aspects in the macroeconomic and political background of the poor public listing in Czechia and Hungary. Vector Autoregressions were tested on country level and a fixed effect panel regression analyzed the cross-country phenomena. As a key result, we cannot support the idea that privatization policies, funded pension pillar, economic crisis or stock market ownership could be useful variable which describes the solution of current situation. Believing that economic growth or the increasing number of companies can solve this problem proved to be also a false hope. Deeper and finer political and market incentives are necessary to highlight the added value of public listing for the targeted sector.

Keywords: public listing, stock exchange, macro variables, Czechia, Hungary

JEL Classification: E44, P12, G18, G20

1 INTRODUCTION

The number of public listed companies decreased significantly since the middle of the nineties not only on developed markets Doidge et al. (2015), but both in Czechia and Hungary as well – presenting a negative attitude towards direct funding channels. The scope of the paper is to decide, which macroeconomic conditions affected public listing in the selected sample countries. A number of policy decisions mitigated constraints or enhanced the potential of equity capital market financing for companies in the region. Privatization trough IPOs increased the number of companies on stock markets in the early nineties; however sample governments had no clear commitment towards this privatization channel. Funded pension pillars provide a stable demand both for bonds and shares with long term investment horizon. Stock markets started to join to conglomerates, providing a more standardized way of listing and services. However, stock markets suffered from crises as well both from financial and institutional point of view (for example the reporting frauds before the dot-com crisis).

Present paper focuses on the Czech and Hungarian markets (due to their common historical background and similar stock market size) between 1996 and 2015, studying the impact of macro-variables and policy-related dummies on the number of public listed enterprises. Can we blame the development pathways of these countries or the exchange rate (for example: the former popular FX based corporate lending), the crises, the privatization or the ownership structure of the stock market for the declining trend of public listing in both countries? Or completely different paths are followed by these countries and we are not able to compare them? The structure of the paper is the following: theoretical background section summarizes the importance of public listing and the story behind the policy-related dummies. Methods contain the description of Vector Autoregression Models (VAR) to summarize country-specific aspects of public listing developments and a fixed effect panel regression model, where individual effect test can show the poolability of sample countries. Results and data section summarizes the key findings of the individual analysis of the countries and their common points.

2 THEORETICAL BACKGROUND

Companies are able to use equity and debt sources to maintain the asset side of their balance sheet. Financial markets provide an alternative channel to raise capital by collecting shareholders' equity and bond issuance – meanwhile listing can be interpreted as a sign of transparency and reliability (Meluzin and Zinecker, 2014, 2015). Markets have an important benchmark function as well to give a picture about asset valuation, volatility and interest rates. However, poor tendencies are questioning the added value of public listing from corporate point of view. Unfortunately, there is a strong demand for equities on the investor side, with a capital export as a consequence of this unsatisfied demand (Fungacova and Hanousek, 2011).

Central East European countries have a mixed capitalism model according to Farkas (2011) and Nyvltova (2008), where companies prefer indirect lending channels and mostly neglecting the direct ways of fund raising (Shellock 2016). Governments tried to motivate economic actors via taxation (discounted dividend taxes on public listed enterprises), by privatisation trough IPOs or with the establishment of the funded pension pillars – however this commitment was not consistent and many accommodating decisions were cancelled later or followed with an even hostile policy (like Hungarian transaction taxes).

Central banks can also expand their transmission channels by replacing private financial activity (Lenza et al. 2010, Bagus and Schiml 2009): purchasing corporate bonds directly on primary and secondary markets as it happens since 2010 in the Euro Area or in Japan . Japanese Quantitative and Qualitative Monetary Easing represented a whole new level, when purchases of Exchange Traded Funds debuted in 2013.

The relative weight of public listing can be represented by listing count per capita, following Doidge et al. (2015). Macroeconomic development can be captured by the changes of log GDP/capita in market prices (source: national statistical offices) and the number of firms per capita. Currency market developments are characterized by real effective exchange rate changes. However, there are some region-specific factors which can affect public listing, namely privatization, mandatory funded pension pillars, stock exchange conglomerates and crises as the next section summarizes.

2.1 Policy-related dummies

There was a listing peak in the early nineties due to mass privatization processes in transitional Central European countries (Bornstein 1997). Voucher-privatization in Czechia resulted more than thousand listed companies on Prague Stock exchange until 1997 (Svejnar 2013) with a constant consolidation until 2002-2015 period when this number became two digit (Fungacova and Hanousek 2011). Hungarian governments preferred the non-public channels of privatization, a small number of companies were introduced on the market after an IPO and some of them was even delisted later. According to OECD (2006) Economic Survey, both countries have a very small venture capital market, moreover one of the lowest levels of venture capital investment in international comparison, when measured relative to GDP. This fact contraindicates with the access to financing, which is one of the key constraints for innovative SMEs – and without venture capital exits, the potential IPO number will be lower as well (Meluzin 2009).

Pension system theoretically can be divided on four pillars: zero pillar provides social aid for old aged people from tax incomes, while first pillar covers the pay-as-you-go systems, where pension payments are provided from pension contribution – with a support from the public budget if it is necessary. Funded pillars can be mandatory (second) or volunteer (third) or can be based on individual savings without any kind of institutional background (fourth). The quality of these pillars depends on contributions in the past, income accruing from the

investment in the future, and managerial costs and fees during the accumulation period – besides demographic and labor market conditions (Simonovits 2002).

The first systemic pension reform in Central and Eastern Europe was approved in Hungary in 1997 with the introduction of a privately-managed mandatory pension funds (MPF) as second pillar. MPF assets had increased to 9,7 percent of GDP in 2006, while third pillar (operating since 1993) was able to accumulate 2.6 percent of GDP. Returns of mandatory funded pillar followed the MNB base rate – partially due to the conservative bond-oriented investment strategies and high transactional costs (PSZÁF 2008, Czajlik and Szalay 2006).The modification of the government edict 282/2001 with the introduction of eligible portfolios in 2006 increased the weight of equities to 40% and holding of venture fund units were allowed with 3% or 5% share. After these regulatory changes, government bonds remained as a dominant component in the portfolio (51%), while shares and investment funds had an increasing role (33%) at the end of 2007 (Gaál 2007, Impavido and Rocha 2006). However, the entire second pillar was nationalized and used up to finance public budget in 2010. Czechia has a short liaison with second pillar between 2012 and 2015 only, and the second pension pillar was officially cancelled as of 1 January 2016 by the Act 376/2015, which came from the results of the Professional Committee for Pension System Reform. (CSSZ, 2016).

Czech and Hungarian stock markets were owned by local financial institutions until the first half of 2000s, when they were acquired by the Wiener Börse to form the CEESE Group (CEESEG).

Trust in financial markets can be eroded under crises: willingness of IPOs decreases due to poor funding environment, while investors can reallocate their capital after corporate scandals. Sample markets were affected by the Russian crisis in 1998 (some blue chips like Richter had a significant market share in Russia), dot-com bubble between 2000-2002, sub-prime crisis in 2007 and 2008. These periods were defined as crisis periods in the Euro-zone[1], to define external funding and market conditions.

3 METHODS

Czech and Hungarian data was tested individually with a VAR model, then together via panel regression to see their common characteristics.

Vector autoregressive (VAR) processes can describe the data generation process of a small set of time series variables, where all of them are treated as being a priori endogenous, and allowance is made for rich dynamics. This procedure captures the dynamic interactions for a set of *K* time series variables $y_t = (y_{1t}, \dots, y_{Kt})'$. The basic model of order *p* VAR has the form of (1) (Lütkepohl and Kratzig, 2004).

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + u_t \qquad (1)$$

Where the A_i's are *(KxK)* coefficient matrices and $u_t = (u_{1t}, \dots, u_{Kt})'$ is an unobservable error term, assumed to be a zero-mean independent white noise process with a time-invariant, positive definite covariance matrix: $u_t \sim (0, E(u_t, u_t'))$. The lack of autocorrelation in the residuals was tested with Ljung-Box test.

Panel regression requires consistent, balanced and fixed database to group (individual-specific) effects, time effects, to manage heterogeneity that can or cannot be observed (Park 2011). Our paper uses Panel Data Toolbox[2], following Álvarez, Barbero and Zofio (2015). Panel data (2) contains data matrices (with *i* columns and *t* rows) that were observed over a long period of time with *y* dependent and *X* independent variables with the following representation:

[1] http://cepr.org/content/euro-area-business-cycle-dating-committee
[2] http://www.paneldatatoolbox.com

$$y_{it} = \alpha + \beta X_{it} + \mu_i + v_{it}, \text{ i=1,…, n, t=1,…, } T_i. \quad (2)$$

where μ_i represents the i-th invariant time individual effect (or unobserved component, latent variable, and unobserved heterogeneity) and $v_{it} \sim i.i.d(0, \theta_v^2)$ refers to the disturbance. In panel data models μ_i is called as a ‘‘random effect’’ when it is assumed as a random variable and a ‘‘fixed effect’’ when it is treated as a parameter to be estimated for each cross section observation i. It means that fixed effect approach allows arbitrary correlation between the unobserved effect μ_i and the observed explanatory variables X_{it}. Fixed effects analysis is more robust than random effects analysis, but time-constant factors cannot be included as X_{it} – this approach is for time-varying explanatory variables (Wooldridge 2010).

The Im and Pesaran (2003) panel unit root test (3) assumes the cross-sectional independence, with individual effects and no time trend:

$$\Delta y_{i,t} = \alpha_i + \rho_i y_{i,t-1} + \sum_{z=1}^{p_i} \beta_{i,z} \Delta y_{i,t-z} + \varepsilon_{i,t} \quad (3)$$

Null hypothesis: ρ_i=0 for all i=1,…,N and alternative hypothesis is ρ_i<0 for i=1,…,N_1 and ρ_i =0 for i=N_1+1,…,N, with 0<N_1 ≤N alternative hypothesis allows for some (but not all) of the individual series to have unit roots. This test uses separate unit root tests for each cross-section units based on the (augmented) Dickey-Fuller statistics averaged across groups. (Hurlin – Valérie 2007).

Serial correlation in the error term biases the standard errors and causes loss of efficiency. Wooldridge’s test (4) has a null hypothesis of no serial correlation in the error term of a fixed effects model, time demeaned errors of a within regression are negative serially correlated: $\rho = -1/(T-1)$. This test regresses within $\hat{v}_{it}$ estimation residuals over their lag, $\hat{v}_{i,t-l}$ using a Wald test with clustered standard errors:

$$\hat{v}_{it} = \alpha + \rho \hat{v}_{it} + \epsilon_{it} \quad (4)$$

Random effects models can be tested by Baltagi and Li's Lagrange multiplier test for first-order serially correlated errors with the joint null hypothesis of serial correlated and random individual effects. The LM test is based on the OLS residuals and it is asymptotically distributed as a X_2^2.

4 RESULTS AND DATA

This section summarizes the key information about the dataset, then the two countries are analyzed separately to identify country-specific aspects. Later the common points are highlighted by a panel regression.

Czech company number per capita ratio was lower during the entire sample as Fig. 1 presents, but both of them presented a continuous increase – while listed per capita ratio suffered from continuous decrease. Hungarian listing remained stable, compared the monotone decrease in the Czech case. First years were characterized with privatization only, while crises were defined for the following intervals: 1998, 2000-2002, 2008-2009, 2011-2013 (as they appeared in the Euro-zone as the main export market of both countries).

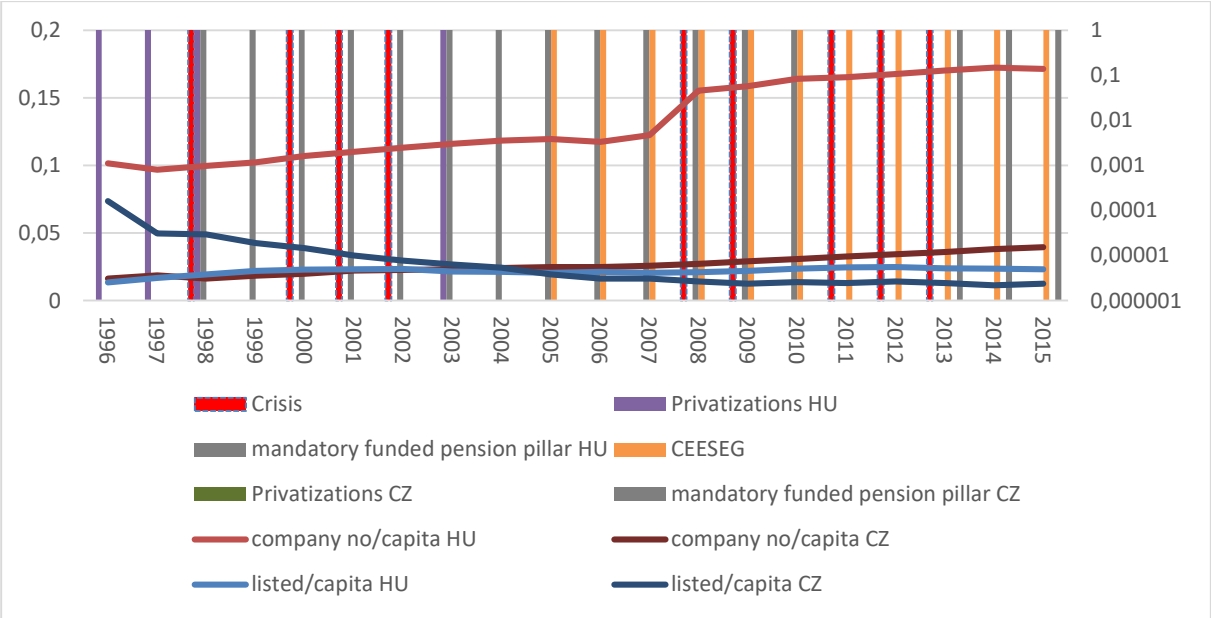

Fig. 1 – Listing, company number and dummies. Source: own edition, stock markets, Hungarian and Czech statistical offices

Hungarian listing has a declining behavior (Tab.1), represented by the negative coefficient of the 2 year lagged data. Funding of new companies can have a minor positive impact on the listing. Previous real effective exchange rate changes can have significant negative impact (it can be interpreted as the result of the popularity of FX based corporate lending), however their coefficient was close to zero. Crisis in the Euro-zone, privatization and funded second pillar had significant impact on listing, while the ownership-structure had no significance.

Tab. 1 – Vector Autoregressive Model on Hungarian yearly data (1996-2015) with 2 lag. Source: own edition, JPL Toolbox for Matlab

Dependent Variable = listed/capita
R-squared = 0.9970
Rbar-squared = 0.9879
sige = 0.0000
Q-statistic = 3.0603
Nobs, Nvars = 17, 13
****

Variable		Coefficient	t-statistic	t-probability
listed/capita	lag1	0.291447	1.868912	0.135001
listed/capita	lag2	-0.278103	-2.561490	0.062539*
lgdp/capita	lag1	-0.000000	-0.206781	0.846280
lgdp/capita	lag2	-0.000000	-0.197827	0.852827
company no/capita	lag1	0.000002	0.661917	0.544212
company no/capita	lag2	0.000029	5.753354	0.004526***
dREER	lag1	-0.000000	-0.927630	0.406105
dREER	lag2	-0.000000	-4.768462	0.008850*
Crisis d		0.000000	2.995355	0.040125**
Privatisation d		-0.000000	-2.657131	0.056559*
2nd pillar d		-0.000001	-7.961110	0.001349***
CEESEG d		-0.000000	-0.371413	0.729167

constant	0.000011	3.918019	0.017277**

Notes: ***: significant at 99%, **: significant at 95%, *: significant at 90%
Ljung-Box test on residuals (lag 2): p(1)=0.24, p(2)=0.26

Variable set was not significant for the Czech market, only the 2 year memory was present in listing per capita (Tab. 2). This result suggests that poor listing has different macro background in both countries.

Tab. 2 – Vector Autoregressive Model on Czech yearly data (1996-2015) with 2 lag. Source: own edition, JPL Toolbox for Matlab

Dependent Variable = listed/capita
R-squared = 0.9986
Rbar-squared = 0.9954
sige = 0.0000
Q-statistic = 2.2924
Nobs, Nvars = 17, 12

Variable	Coefficient	t-statistic	t-probability
listed/capita lag1	-0.093857	-0.347920	0.742069
listed/capita lag2	0.562524	2.796539	0.038149**
logGDP/capita lag1	-0.000008	-1.438245	0.209884
logGDP/capita lag2	0.000008	1.228310	0.273990
company no/capita lag1	-0.000745	-1.814031	0.129399
company no/capita lag2	0.000007	0.043852	0.966720
dREER lag1	0.000000	1.591701	0.172328
dREER lag2	-0.000000	-0.623466	0.560313
Crisis dummy	0.000000	0.687657	0.522261
2nd pillar dummy	0.000000	0.486530	0.647167
CEESEG dummy	0.000001	1.069217	0.333850
constant	0.000013	0.426582	0.687427

Notes: ***: significant at 99%, **: significant at 95%, *: significant at 90%
Ljung-Box test on residuals (lag 2): p(1)=0.28, p(2)=0.30

To test the common points between Czechia and Hungary, a fixed effects panel regression was fitted on the data. It indicated that log GDP per capita and privatization were significant variables, with negative coefficients (so there is no reason to say that poor listing can be grown out, or privatization can be a sole solution). Both countries were significant at the test of individual effects, making the sample structure reasonable, while the input table had no unit root and the panel provided non autocorrelated residuals (Tab. 3).

Tab. 3 – Panel: Fixed effects (within) (FE) on Czech and Hungarian data. Source: own edition, Panel Data Toolbox for Matlab

Dependent Variable = listed/capita
N = 40 n = 2 T = 20 (Balanced panel)
R-squared = 0.31250 Adj R-squared = 0.13508
Wald F(7, 31) = 2.013014 p-value = 0.0852

RSS = 0.000000 ESS = 0.000000 TSS = 0.000000

variable	Coefficient	Std. Error	t-stat	p-value
logGDP/capita |	-0.000072	0.000022	-3.2093	0.003 ***
company no/capita |	0.000581	0.000399	1.4535	0.156
dREER |	0.000001	0.000001	1.4288	0.163
Crisis dummy |	-0.000010	0.000008	-1.3317	0.193
Privatisation dummy |	-0.000038	0.000018	-2.1520	0.039 **
2nd pillar dummy |	0.000004	0.000011	0.4171	0.679
CEESEG dummy |	0.000006	0.000013	0.4927	0.626

Individual Effects

id |	ieffect	Std. Error	t-stat	p-value
Czechia |	0.000905	0.000274	3.3013	0.002 ***
Hungary |	0.000974	0.000295	3.3050	0.002 ***

Wooldridge's test for serial correlation p-value = 0.3133

Im and Pesaran (2003) Panel Unit Root Test

P-value of the W_bar statistic = 0.0318**

P-value of the Z_bar statistic = 0.0326**

P-value of the Z_bar_DF statistic = 0.0000***

Notes: ***: significant at 99%, **: significant at 95%, *: significant at 90%

5 CONCLUSION

There are different myths and ideas about the poor level of public listing in Czechia and Hungary. Current paper tested the possible macroeconomic and political determinants to check, how privatisation, pension system, crisis and stock market ownership background affected corporate attendance on local equity markets. Economic development was involved via the inclusion of GDP and general corporate number. There were significant differences between Czechia and Hungary as individual VAR models suggested, however none of the variables were identified as a super weapon candidate which can be used to change the tide. Our results are suggesting that the decreasing number of public listing is not an issue what can be outgrow, or not even a problem what can be sustainably managed through future privatisations. Despite the different development paths since the transition, the individual effects in the panel regressions supported the idea to involve both countries in the sample.

Poor venture capital involvement remained an unsettled issue in our dataset, because of the small and mixed portfolio of such companies. Listing costs were non transparent, while private sector profitability would be biased by many factors so they were excluded from our research.

The main theoretical implication of this study is that we cannot interpret poor public listing with macro or political variables only, this agenda requires a more sophisticated and structural approach to find those key factors which can highlight the added value of stock markets for companies.

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