INFLATION TRIGGERS IN TRANSITION ECONOMIES: THEIR EVOLUTION AND SPECIFIC FEATURES

Pavle Petrović*
Zorica Mladenović (zorima@eunet.rs) and
Aleksandra Nojković (nojkovic@gmail.com)

University of Belgrade
Economics Faculty,
Kamenička 6,
11 000 Belgrade
Serbia

*Corresponding author
e-mail: pavlep@eunet.rs
+ 381 63 434 103
+ 381 11 30 90 800

Abstract

Analysis of 30 inflation episodes in 16 European transition economies, using the probit panel model with fixed effects, uncovers inflation triggers that overlap with those obtained either in developing or in developed countries, or in both. However we found some transition specific features. Thus the relative contribution of the triggers evolves as transition progresses, such that the early dominance of the output gap, the fiscal deficit and elections are subsequently subdued by a rise in food and oil prices, the exchange rate regime, and the current account deficit. The last two triggers could be linked to deep financial integration in Europe and the consequent large flow of capital towards European transition economies in the 2000s, a phenomenon not observed in any other parts of the world. In addition, the exchange rate regime as an inflation starter in transitional Europe may be due to its convergence with developed Europe and the resulting real appreciation of currency.

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1. Introduction

The aim of this paper is to investigate inflation triggers in transition economies, and to see how they compare with those in developed and developing countries. Moreover, we shall explore whether the relative importance of factors igniting inflation episodes evolves with transition and whether a particular pattern emerges. The paper also examines what started the new global inflation of 2007-2008[1], and specifically what was the role of the novel phenomenon, i.e. the spike in food prices. Finally, our findings on inflation triggers are contrasted with more traditional previous results on inflation drivers in transitional economies.

The paper draws on a methodology advanced by Boschen and Weise (2003) that was applied to OECD countries. Using the same procedure, inflation triggers have been subsequently explored for various sets of developing (cf. Domac and Yucel, 2005, and Vansteenkiste, 2009) and developed (Vansteenkiste, 2009) countries. Thus analyzing inflation starts in transition economies would add to an already existing body of empirical results for developed and developing economies.

The approach is to model the probability of a large upsurge in inflation, thus identifying factors that predict inflation starts. This analysis enhances the understanding of the origins of prolonged inflation episodes, and hence may help policy makers in their efforts to insulate economies against inflation shocks. Notably, findings should suggest what policies are required to safeguard the stable and low inflation environments, and enable identification of the inflation process in its early stage. However, exploring factors associated with the start of an inflation episode is different from the study of overall inflationary developments, a relevant issue on its own. Namely, once inflation has begun, some other factors may aggravate it although they are not triggering events. Moreover, inflation may take different courses, e.g. evolve either in moderate or high inflation, and/or last for a longer or shorter time etc.

While examining inflation starts in transition economies, we shall be looking at inflation triggers that are already advanced and explored in developed and/or developing countries[2]; they are derived from inflation literature that offers a wide variety of inflation starters[3]. This approach would enable the comparisons of our findings for transition economies with those for other sets of countries. Moreover, most of the explored triggers are also put forward and researched as inflation drivers in transitional economies[4]. Although the latter studies address a different issue and hence use different methodological frameworks, one could still make comparisons with regard to whether

[1] See IMF 2008, Ch. 3.
[2] See Boschen and Weise (2003), Bowdler and Nunziata (2006), Domac and Yucel (2005) and Vansteenkiste (2009)
[3] See Boschen and Weise (2003), and Domac and Yucel (2005) for a literature review and references.
[4] See set of recent papers in "What drives inflation in the New EU Member States" European Economy, Occasional Papers 50, 2009.

and to what extent inflation triggers and drivers coincide in transition economies. Lastly, traditionally analyzed inflation determinants exhibit some specific characteristics while interplaying with the transition process, thus one may ask whether the same is true for inflation triggers.

Inflation starters to be explored in transitional economies could be tentatively grouped[5] into those belonging to external or supply side shocks, such as rise in oil and food prices, followed by those capturing the business cycle position, i.e., unemployment and output gap, but also the current account deficit. The latter, Phillips curve explanation of inflation starts could also be linked to the policy mistakes hypothesis when output is pushed above its trend. Other policy related variables include fiscal stance, e.g. fiscal deficit, exchange rate regime, lagged domestic inflation as a proxy for inflation expectations, transmission of foreign inflation, and in a broader sense, the political use of inflation prior to elections. Moreover, recent research (Reinhart and Rogoff, 2010) shows that large external debt, particularly in emerging markets, leads to inflation.

Transitional Europe has however exhibited some distinctive features that might affect inflation triggers. Thus an outstanding characteristic of the analyzed European transition economies is their strong financial and trade integration with developed Europe, especially in the 2000s. The latter points to trade openness as an inflation determinant, also explored in other sets of countries. However, it is the level of financial integration within Europe, only matched by that within the US, that makes the corresponding transition economies distinctive (cf. Abiad et al. 2009).

Specifically, as opposed to other regions, capital has flowed downhill in the Europe of the 2000s, when developed Europe poured its savings into the transitional one (cf. Berglof et al., 2009). This external shock has caused large current account deficits in the most of emerging Europe (cf. IMF 2008, Ch. 6), again a distinctive feature of this set of countries; namely, it is usually found that the current account deficit is driven by domestic factors. A large current account deficit, driven by the inflow of foreign savings, has subsequently propelled fast growth in transitional Europe, thus strongly reinforcing real convergence of these economies with developed Europe. Again the relation between growth and current account deficit has not been found elsewhere (Cf. Abiad et al. 2009).

The aforementioned catching up process has led to another specific characteristic of the considered transition countries, i.e. to the convergence of their price level with that of developed Europe, and to a consequent real appreciation of their currencies (cf. Darvas and Szapary, 2008). This nominal convergence has been found to be an important inflation driver in transition economies (cf. Stavrev, 2009). Nevertheless, its impact depends on the exchange rate regime – with fixed exchange rate price level convergence spills into inflation--while in case of more flexible exchange rate regimes it invokes nominal appreciation and some inflation. The above is supported by empirical evidence showing that in the 2000s transitional Europe experienced real exchange rate appreciation, and that in the fixed exchange rate regime countries the appreciation is

[5] See also Staehr (2009), Table 2, p.43, for a compact classification of inflation drivers in transitional economies.

driven by inflation, while in the more flexible ones by a combination of nominal appreciation and inflation[6].

Nevertheless, in the 1990s the transition economies exhibited a somewhat different pattern. Notably, they did not run high current account deficits, and most of them used fixed exchange rates to anchor expectations and thus curb the initial inflation outburst following price liberalization. This concurs with common wisdom that weak institutions, as they are at the beginning of transition, ask for fixed exchange rate to control inflation, while flexible exchange rate and inflation targeting are more appropriate when institutions become stronger, which should be the case in the late transition.

Specific characteristics of the transition countries described above suggest that different patterns of inflation triggers might emerge relevant to the 1990s and the 2000s, and that particular triggers, notably current account deficit and the exchange rate regime, may show some transition-distinctive features.

Our study of inflation triggers differs from previous ones in that we apply the fixed effects probit panel model in order to capture country-specific characteristics. The use of this model has been generally avoided, despite the likely presence of fixed effects, due to the textbook result that full maximum likelihood estimates of this model are inconsistent (cf. Greene, 2006, 2009). However, recent study of Jin (2009) shows that the method of maximum likelihood gives consistent and asymptotically normal estimators of the probit fixed effects panel model, provided some of the regressors are unit root processes. Therefore, if panel unit root tests indicate nonstationarity of at least one regressor, as they do in our case, the model with fixed effects can be used, and the presence of these effects tested. Their inclusion, if appropriate, would then mark an improvement over previous studies of inflation triggers which tend to ignore individual country characteristics.

The paper proceeds as follows. Section 2 identifies inflation episodes to be studied and offers stylized descriptions of them. In section 3, explanatory variables are tested for the presence of unit roots, and subsequently the probit panel models with and without fixed effects are estimated, and some robustness checks performed. Section 4 reviews the inflation triggers that turned out to be significant, while section 5 confronts them with the previous findings for both developing and developed countries. This section also examines transition-specific features of some triggers. The relative contributions of each inflation starter across episodes are analyzed in section 6 while exploring their changing importance as transition progresses. Section 7 concludes.

2. Inflation episodes and inflation starts: definition and stylized facts

Trend inflation is used while assessing the presence of inflation episodes. This trend is obtained by eliminating short-term variations from the inflation rate, which is commonly done by using a nine-quarter moving average filter (cf. Ball, 1994, Boschen and Weise,

[6] See Beirne (2009), p. 27.

2003). A trough date (local minimum) is defined as the quarter at which trend inflation is lower than its values for the preceding four and succeeding four quarters. A peak date (local maximum) is identified as a quarter during which trend inflation is higher than the corresponding values in the preceding four and the subsequent four quarters. The year following the quarter of local minimum is taken as the beginning of an inflation episode. The year in which the local maximum is achieved represents the end of the inflation episode. The data for the years in which an inflation episode is already ongoing are excluded since it is the triggering of inflation that is modeled, and not its subsequent development.

Thus an inflation episode represents a period of time over which the inflation rate exhibits a significant and continuous upward trend. A continuous rise of the inflation rate is considered to be significant if the difference between the peak and the trough of trend inflation rate exceeds a certain threshold value. Following the preceding studies of emerging and developing countries (cf. Domac and Yucel, 2005, and Vansteenkiste, 2009), we also take this threshold to be 1%. For developed economies, Vansteenkiste (2009) also opted for 1%, while Boschen and Weise (2003) used 2% threshold. Hence choosing a 1% threshold makes also our results comparable with most of the previous findings.

Our sample contains 16 transition economies: Albania, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Russia, Serbia, the Slovak Republic, Slovenia and Ukraine. Data are available for the following time span: first quarter of 1991 (1991:1) to fourth quarter of 2008 (2008:4). The exceptions are Albania with the data starting from the first quarter of 1995 (1995:1) and Serbia, as a latecomer in transition, with the first data point being quarter one in 2001 (2001:1). Due to availability of reliable data, we restrict our sample to European transition countries.

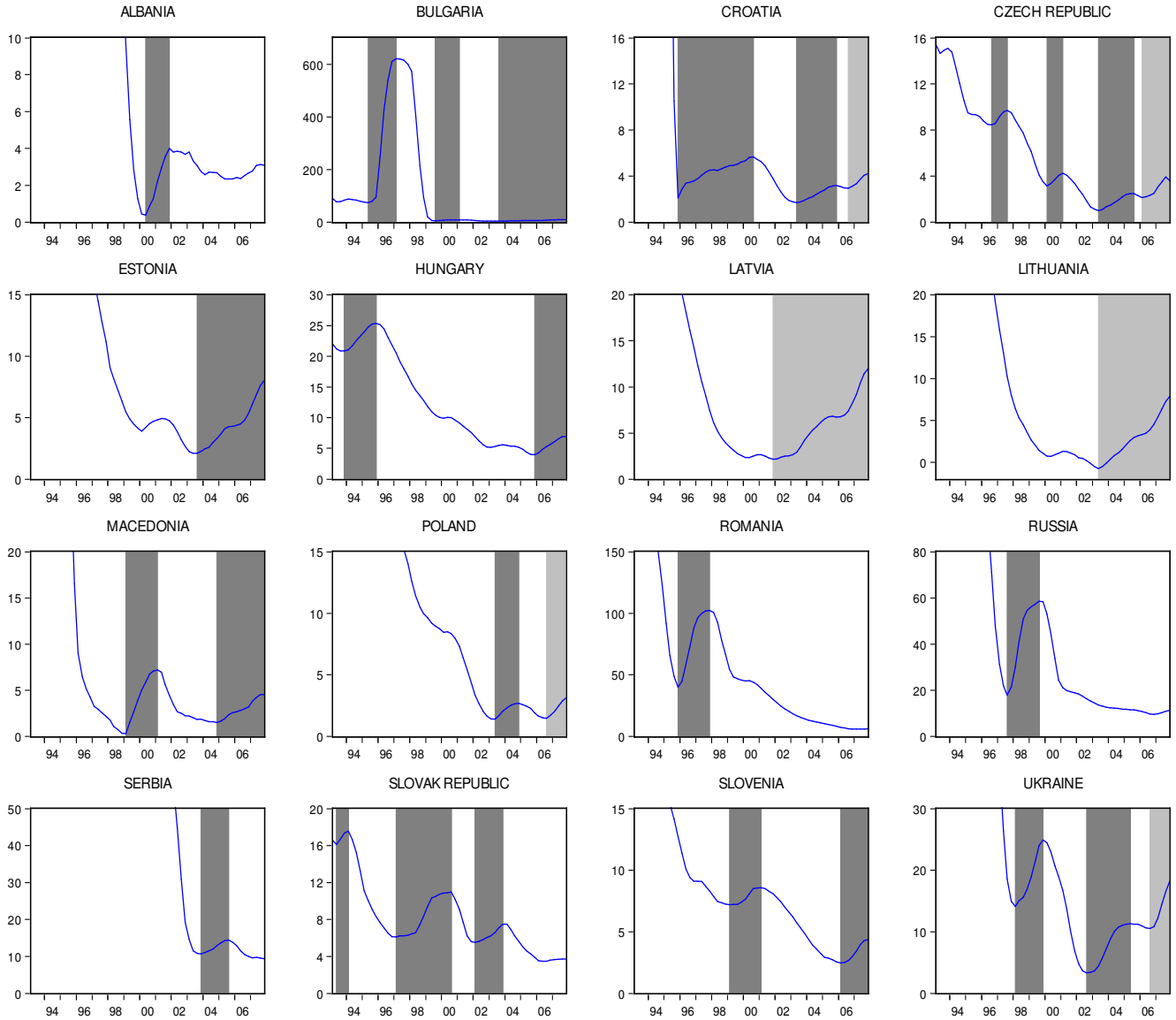
Based on the approach discussed above, 31 inflation episodes are identified for the period 1993 - 2007[7]. Trend inflations, used to determine these episodes, are depicted in Figure 1.

Some specifics of inflation episodes are provided in the Appendix (Table A1), while Figures 2 and 3 capture a number of stylized facts. Thus, the average length of an inflation episode is 9.2 quarters, with a minimum duration of 3 and maximum of 24 quarters. Out of all 31 episodes, 21 lasted fewer than 9 quarters. An extremely long inflation episode is found for Latvia (24), Croatia (19), Lithuania (18), Bulgaria and Estonia (17). Most inflation episodes (13) exhibited an inflation rise of 1 to 3 percentage points; seven episodes experienced a rise of 3 to 5 percentage points; in six episodes inflation increased between 5 and 9 percentage points and in the remaining five episodes the inflation rate changed by more than 9 percentage points. Inflation starts tend to cluster together in the years 2004 and 2007, while they are otherwise more or less country specific (cf. Figure 2).

[7] However the inflation episode for Hungary in 1994 is excluded from the estimation because the data for an explanatory variable (budget deficit) is not available for the previous year (1993).

Review of inflation episodes given in Figure 1 begs additional comment, as it includes such diverse episodes as hyperinflation in Bulgaria and moderate inflation in Poland. However, as explained above, it is inflation starts that are explored here and not how inflation, once started, is subsequently driven. In that respect, one can explore inflation starters within the same framework irrespective of whether the initiated episode later turns into a moderate or high inflation one.

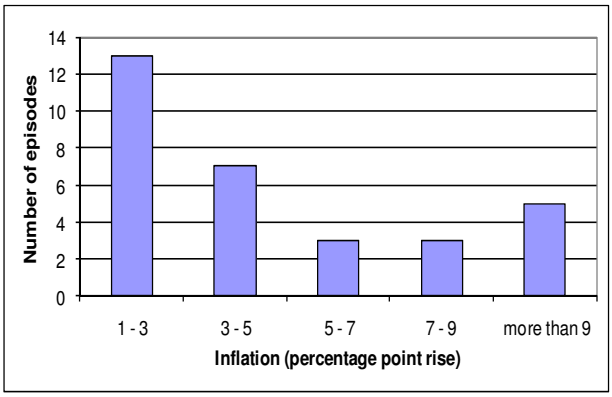
Figure 1: Identified inflation episodes in 16 transition economies



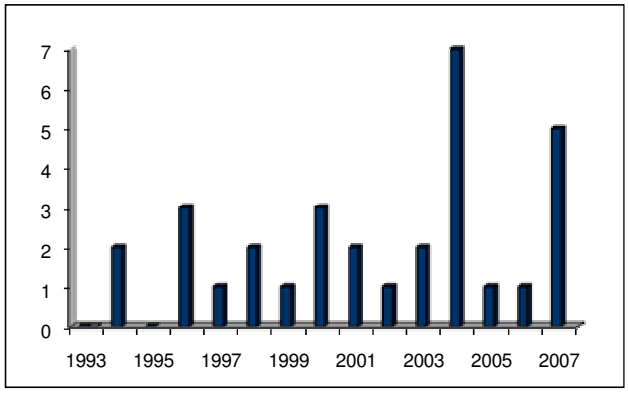
Note: Trend inflation is depicted for each country and used to identify inflation episodes. Shadowed parts of the graphs highlight detected inflation episodes. Slightly lighter shadow indicates inflation episodes that are still ongoing.

Figure 2:

Inflation episodes and average inflation



Number of inflation starts per year



3. Empirical modeling

Inflation triggers to be explored have been reviewed in the Introduction, while variables and corresponding data sources are explained in the Appendix (cf. Table A2). Thus output gap is measured as the difference between actual GDP growth rate and its trend rate. Fiscal deficit refers to that of the central government and is expressed as percentage of GDP. Current account deficit, external debt and trade openness are all measured as a percentage of GDP, where the latter is captured by the share of goods and services imports. Food and oil prices are taken from the standard sources (cf. Table A2), while foreign inflation refers to the Euro area inflation. Elections are encompassed by a dummy variable that takes value 1 in a year when they occur, and 0 otherwise. As to the exchange rate regime variable, we followed Reinhart and Rogoff (2004), in using *de facto* regimes, which differ from *de jure* regimes, and classified them into four groups. The first group comprises the *flexible exchange rate and the managed float* (=0), the second includes *the intermediate regime* (=1), the third is a *soft peg* (=2) and the fourth a *hard peg* – the *currency board* (=3)[8].

Probit analysis is employed with a binary dependent variable taking value 1 if an inflation episode has started in a given country and particular year and value 0 otherwise. As explained above, the inflation episode starts in the year subsequent to the one in which the local minimum of trend inflation is achieved. It ends in the year when trend inflation reaches the local maximum. The data during an inflation episode are excluded from the estimation i.e. treated as 'missing observations'[9].

[8] Source: Reinhart and Rogoff (2004) and IMF's De Facto Classification of Exchange Rate and Monetary Framework in IMF Annual Report on Exchange Rate Arrangements and Exchange Restrictions (various issues).
[9] Cf. Boschen and Weise, (2003), p. 327.

Although quarterly data are used to determine inflation episodes, estimation has been done with annual data. Thus the annual sample runs from 1993 to 2007, except for Albania and Serbia where the sample starts in 1995 and 2001 respectively. Two panel models were estimated: with and without fixed effects, and the method of maximum likelihood (ML) is employed.

When some independent variables are I(1) processes, as may be the case in a panel with a large time series dimension, the method of maximum likelihood provides consistent parameter estimates that are asymptotically normally distributed for the binary panel models with and without fixed effects (cf. Jin, 2009). However, if all explanatory variables are I(0), then maximum likelihood estimates of the nonlinear panel model with fixed effects are severely biased with bias removed at a rate much slower than in the presence of I(1) explanatory variables (cf. Jin, 2009)[10]. Hence, as the first step, it is important to test for the presence of a stochastic trend in independent variables. The results of panel unit root testing are reported in Table 1.

Table 1: Panel unit root test results

[10] The application of the maximum likelihood method in the discrete choice nonstationary models with integrated time series involves non-linear optimization based on non-linear transformation of integrated time series. Asymptotic theory for these transformations suggests that the estimators' convergence rate depends on transformation applied (Park and Phillips, 1999, 2000). In the extended panel setup of Jin (2009) the argument in the probability density function appears as a deviation of a vector of integrated variables from a scaled threshold value. The signal from regressors also includes nonlinear function of integrated variables that is, however, evaluated in the linear form of a deviation from a threshold value (Jin, 2009). Furthermore, arguments of the density function that represent large deviations are downweighted by construction of this function causing the reduction of their overall contribution. One may say that this makes the maximum likelihood method within the framework considered more precise than in the time series models and panel models with only stationary regressors.

Variable	Test for unit root in	IPS W-stat (p-value)	Unit root presence	Hadri Z-stat (p-value)	Unit root presence	Deterministic component
output gap	level	-6.47 (0.00)	*No*	1.20 (0.12)	*No*	individual effect
	1st difference					
budget deficit	level	-0.28 (0.39)	*Yes*	7.45 (0.00)	*Yes*	individual effect and individual trend
	1st difference	-5.15 (0.00)	*No*	0.48 (0.32)	*No*	individual effect
oil price	level	-9.65 (0.00)	*No*	8.94 (0.00)	*Yes*	individual effect
	1st difference			-3.27 (0.99)	*No*	individual effect
food price	level	0.86 (0.81)	*Yes*	3.14 (0.00)	*Yes*	individual effect
	1st difference	-4.14 (0.00)	*No*	-1.19 (0.88)	*No*	individual effect
current account deficit	level	-2.10 (0.00)	*No*	5.73 (0.00)	*Yes*	individual effect and individual trend
	1st difference			0.27 (0.39)	*No*	individual effect

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The application of the IPS weighted average (Im, Pesaran and Shin, 2003) and the Hadri (2000) panel unit root tests clearly suggests a stochastic trend in the percentage change of food price and the budget deficit as a percentage of GDP at the 5% significance level. The Hadri test implies a stochastic trend in the percentage change of the oil price as well as current account deficit, while the IPS test indicates stationarity of these variables. The latter may be due to the possible presence of a structural break in these two variables which may invalidate the use of the IPS test. The output gap is found to be I(0) variable. Since at least two regressors are nonstationary, the ML estimators are asymptotically normal thus offering an opportunity to test for the presence of fixed effects.

Estimation of the probit model starts by including all candidate variables in the model with fixed effects (cf. Appendix Table A3, model a1). As the past domestic inflation has a wrong sign, we dropped it and re-estimated the model again, finding that both trade openness and foreign (Euro zone) inflation are only insignificant variables (cf. Table A3, model a2). We then also skip the latter two variables, and add two more which are in fact alternatives to those already included: unemployment rate capturing economic activity as does the output gap, and external debt as alternative to current account and/or fiscal deficit. It turns out that neither of these variables is statistically significant (cf. Table A3, model b). Thus we end up with the baseline model with fixed effects reported in Table 2 below.

Fixed effects are included in the model as testing does confirm their presence, i.e. the constant term for each country is significant (z-test), and they are different across countries (Wald test). Apart from the baseline estimation, two additional specifications

with fixed effects are estimated, both containing interaction between current account deficit and exchange rate regime, while one also allows for additional impact of current account in the 2000s (cf. Table 2).

Marginal effect estimates, displayed in Table 2, show the percentage increase in the probability of the inflation start (e.g. 2.7%) when a trigger variable (e.g. output gap) increases by one percent. Their significance is tested by z-test, and the corresponding probabilities are reported in parentheses below the estimates.

Table 2: Estimated Marginal Effects of Inflation Starters

(Sample period: 1993 – 2007)

	Model 1	Model 2	Model 3	Model 1a	Model 2a	Model 3a
	N = 16			N = 16		
Independent Variables	fixed effects			w / o fixed effects		
output gap $_{-1}$	0.0277	0.0266	0.0189	0.0181	0.0168	0.0137
	(0.001)	(0.007)	(0.015)	(0.015)	(0.034)	(0.058)
budget deficit $_{-1}$	0.0110	0.0121	0.0123	0.0102	0.0089	0.0105
	(0.130)	(0.087)	(0.007)	(0.133)	(0.222)	(0.096)
elections $_{-1}$	0.0637	0.0659	0.0748	0.1106	0.1059	0.1064
	(0.155)	(0.181)	(0.149)	(0.091)	(0.106)	(0.107)
oil price $_{-1}$	0.0017	0.0019	0.0019	0.0014	0.0014	0.0015
	(0.041)	(0.034)	(0.050)	(0.227)	(0.221)	(0.207)
food price	0.0093	0.0090	0.0104	0.0107	0.0102	0.0111
	(0.002)	(0.006)	(0.003)	(0.013)	(0.022)	(0.013)
exr_regime $_{-1}$*V1999	0.0567			0.0383		
	(0.029)			(0.159)		
current account deficit $_{-1}$	0.0266			0.0089		
	(0.000)			(0.098)		
current account deficit $_{-1}$*exr_regime_1		0.0086	0.0145		0.0010	0.0030
		(0.090)	(0.003)		(0.776)	(0.031)
current account deficit $_{-1}$*V1999		0.0153			0.0073	
		(0.099)			(0.273)	
Log likelihood	-56.4	-58.9	-60.3	-67.9	-69.3	-69.7
Avg. log likelihood	-0.3460	-0.3611	-0.3696	-0.4163	-0.4249	-0.4273
McFadden R^2	0.28	0.24	0.23	0.13	0.11	0.11
No. of observations (0/1)	133/30	133/30	133/30	133/30	133/30	133/30

Note: The marginal effects of the variables, reported in Table 2, are evaluated at their respective means. Robust standard errors are calculated using the Huber-White procedure and corresponding p-values are given in parentheses. V1999 is a dummy variable that takes value 0 before 1999 and 1 otherwise, exr_regime refers to exchange rate regime. N denotes the number of countries included in the sample. The 1994 Hungary episode is skipped due to the missing data for the budget deficit.

Previous studies of inflation triggers have not included fixed effects (cf. Boschen and Weise, 2003, Domac and Yucel, 2005, and Vansteenkiste, 2009). Therefore for sake of comparisons we also estimated our specifications without fixed effects despite their significance (cf. Table 2, models 1a, 2a and 3a). One can see that the results with and without fixed effects do differ considerably. Since fixed effects, in the case of transition

countries, are significantly different from zero, one should keep them in the model and hence opt for models 1, 2 and 3 above. However the same applies to other studies, i.e. the presence of fixed effects should first be tested and if their presence is accepted they have to be included in the model. Otherwise the model might be misspecified, and as shown in Table 2 the two sets of estimates may qualitatively differ. Thus estimates without fixed effects would erroneously leave out oil price, both the exchange rate regime and its interaction with current account deficit, and the additional impact of the current account deficit in the 1990s as significant inflation triggers.

The robustness of estimated models 1 to 3 reported above (Table 2) is checked by exclusion of certain sets of countries. Thus Baltic countries are first excluded as they operate under a very fixed exchange rate regime and also run extremely high current account deficits. Alternatively a couple of flexible exchange rate regime countries also with large current account deficit are dropped, notably Romania and Hungary, where the latter also has a large budget deficit. The results, summarized in the Appendix (Table A4), show that almost the same set of inflation triggers remains significant.

Specifically, when Baltic countries are excluded, the exchange rate regime becomes insignificant in model 1; the additional impact of current account deficit in the 2000s also becomes insignificant in model 2. This seems plausible since Baltic countries have both rigid exchange rate regimes and huge current account deficits. Nevertheless, model 3 still suggests that the exchange rate regime is a significant inflation trigger, albeit while interacting with current account deficit, i.e. a higher deficit reinforces the impact of the rigid exchange rate regime (cf. Table A4). Finally, excluding Baltic countries somewhat strengthens the significance of budget deficit and elections across all three models.

Leaving out Romania and Hungary from the sample, the significance of budget deficit deteriorates somewhat, but the impact of the current account is still highly significant. The significance of elections also improves (cf. model 1, Table A4). Models 2 and 3 are almost identical with (Table 2) or without Romania and Hungary (cf. Table A4), although the significance of budget deficit decreases a bit and that of elections improves. Almost the same results are obtained when Poland is also left out from the sample, i.e. the country with flexible exchange rate regime but moderate current account deficit.

Lastly, comparing marginal effects estimated for the full sample (Table 2) with those obtained from the restricted samples (Table A4) shows that they are similar, thus additionally supporting the robustness of the obtained results.

4. Empirical findings

The results presented in Table 2 indicate that across the three specifications employed, most of the potential inflation triggers are statistically significant, and that they appear with the expected sign.

Starting with external, supply side "shocks", hikes in food and oil prices have emerged respectively as important inflation triggers. The set of estimates referring to business cycle position, point first to a significant positive relationship between the output gap and the inflation starts. The latter supports the Phillips curve explanation, and concurs with the Taylor (1992)–DeLong (1997)–Sargent (1999) policy mistake hypothesis. An alternative measure of economic activity, the unemployment rate, however, turns out to be insignificant.

The current account deficit does appear as an essential inflation starter in transitional Europe. Positive and statistically significant coefficient (cf. model 1, Table 2) shows that a larger current account deficit raises the probability of triggering an inflation episode.

As to the variables related to economic policy, the fiscal deficit (yet another indicator of imprudent macroeconomic stance), as expected, increases the probability of inflation starts.

The exchange rate regime becomes an important inflation trigger in the later period of transition i.e. in the 2000s, and operates in such a way that the more rigid the regime, the higher the probability of triggering an inflation episode (cf. model 1, Table 2). The above follows from the significant positive coefficient on the exchange rate regime variable multiplied by dummy V1999 that takes value zero before 1999 and one otherwise[11].

Additional analysis of current account deficit and exchange rate regime as inflation triggers is offered by estimated models 2 and 3 (see Table 2). Thus there is some empirical support that the current account deficit has a stronger impact on inflation start in the 2000s than in the 1990s, as in the 2000s it triggers inflation both per se and while interacting with the exchange rate regime (cf. model 2, Table 2). Moreover, there is some empirical evidence that the exchange rate regime now starts inflation only through interaction with the current account deficit (cf. variable: current account deficit*exr_regime in models 2 and 3).

Elections also seem to be an essential factor in triggering inflation, thus supporting the political explanations of inflation starts (cf. Nordhaus, 1975, Lindbeck, 1976, Rogoff and Sibert, 1988). Although this variable is significant only at 15 to 18% for the whole sample (cf. Table 2), robustness analysis indicates that elections become a significant inflation trigger upon excluding some countries (cf. Table A4 in Appendix). We also tested whether the timing of elections is endogenous (cf. Alesina and Roubini, 1997, and Boschen and Weise, 2003), i.e., whether they are held when the economy is doing well and avoided otherwise, and rejected this hypothesis[12].

[11] An alternative specification is also estimated whereby the exchange rate regime variable is multiplied by a trend to capture the varying effects of the regime over time. However, basically the same result is obtained i.e. that the impact of the exchange rate regime increases as one moves from the 1990s to the 2000s.

[12] The fixed effects probit panel data model, where the binary dependent variable (elect) captures the holding (or not) of elections, while the set of independent variables contains GDP growth (gdp), the inflation rate (inf) and the budget deficit as % of GDP (bd) is estimated:

Neither foreign (Euro zone) nor past domestic inflation turned out to be significant inflation starters, and the same applies to trade openness and external debt.

5. Inflation Triggers in Transition Economies in Comparative Perspective

We now turn to exploring how inflation triggers in transition economies compare with those found in developed and developing countries respectively, and if and to what extent triggers obtained above exhibit specific features. Also, comparisons with inflation drivers in transition economies are done with the caveat that the two sets of findings answer somewhat different questions, and hence are obtained using alternative methodological frameworks.

The summary of findings for transition economies and those for developed and developing countries are given in Table 3, thus lending an opportunity for comparison.

Table 3: Comparative Overview of Inflation Triggers

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elect = 0.0182 $gdp_{(-1)}$ + 0.0003 $inf_{(-1)}$ + 0.0391 $bd_{(-1)}$.
(0.37) (0.09) (0.17)

p-values are in parentheses, showing that neither explanatory variable (lagged one period) significantly affects holding elections or not. Also, the p-value for the test that all coefficients except country individual effects are 0 is 0.21, indicating their joint insignificance. The same results are obtained with current levels of explanatory variables.

Inflation triggers	European transition economies	OECD economies [a]	Developed economies [c]	Developing economies I [b]	Developing economies II [c]	Latin America economies [c]
	sample: 1993-2007	sample: 1960-1995	sample: 1960-2006	sample: 1980-2001	sample: 1960-2006	
	N=16	N=19	N=28	N=15	N=63	
Increase in GDP growth above trend, output gap	(+)	(+)	(+)	(+)	o	(+)
Fiscal policy, budget deficit	(+)	o	o	(+)	(/)	(/)
Occurrence of general elections	(+)	(+)	(/)	(/)	(/)	(/)
Oil price shocks	(+)	o	o	o	o	o
Food price shocks	(+)	o	o	(+)	(+)	(+)
Exchange rate regime	(+)	(+)	(+)	(/)	(+)	(+)
Current account deficit	(+)	(/)	o	(/)	o	o
Private capital flows	(/)	(/)	(/)	(-)	(/)	(/)
External debt	o	(/)	o	(/)	(+)	(+)
Openness to international trade	o	(-)	o	(/)	(-)	o
International inflation	o	(+)	(+)	(/)	o	o
Past domestic inflation	*Wrong sign*	(/)	o	(/)	(+)	(+)

Note: Results are from: [a] Boschen and Weise (2003), and Bowdler and Nunziata (2006), [b] Domac and Yucel (2005), and [c] Vansteenkiste (2009). The entries in Table 3 marked with (+) or (-) indicate statistically significant triggers that respectively rise and lower the probability of an inflation start. The sign (o) refers to an inflation starter which is not statistically significant, while (/) indicates that the corresponding factor has not been considered.

Overall the review of inflation trigger estimates above shows that transition countries are in almost the same number of cases akin to either developed or developing countries. Nevertheless, the triggers found in transition economies also reveal some specific characteristics.

Starting with supply side shocks, food price turned to be a statistically insignificant trigger in developed countries, while it is an important inflation starter in transition countries as well as in a set of developing (II) and Latin American economies respectively. There is also some indirect evidence supporting its impact in another sample of developing economies (I)[13]. This result is plausible since food has a much larger share in total consumption in both developing and transition countries compared to developed ones. Nevertheless, oil price turned out to be a significant inflation starter only in

[13] Namely, the food production index was used instead of corresponding prices, indirectly suggesting a significant positive impact of food prices in triggering inflation (see Table 3 and Domac and Yucel, 2005).

transition economies, and this might be partly due to our sample that encompasses recent hikes in oil price.

Turning to demand side triggers, the output gap seems to be a common trigger for all three groups of countries, the only outlier being a subset of developing countries (II), and it operates in the same direction. The fiscal deficit, however, is a significant factor in transition economies and developing countries, but not in developed economies.

The holding of general elections contributes to triggering inflation both in transition and in developed countries (OECD), while its impact has not been explicitly assessed in developing countries. However, the durability of the political regime is found to be a significant factor in lowering the probability of an inflation start (cf. Vansteenkiste, 2009), thus rendering some indirect support for election occurrence as an inflation starter. As to the timing of elections it can not be predicted by economic variables, neither in transition countries nor in developed ones (cf. Alesina and Roubini, 1997, and Boschen and Weise, 2003).

The exchange rate regime appears to be a significant inflation trigger across all sets of economies: transition, developed, and developing including subset of Latin American economies (cf. Table 3). Moreover, in all these cases, the regime works in the same direction, i.e. harder fixing of the exchange rate raises the probability of an inflation start.

Transition countries nevertheless exhibit a somewhat specific pattern, i.e. the exchange rate regime becomes an important inflation trigger only in the 2000s, while insignificant in the 1990s (cf. Table 2, model 1). As hinted in the Introduction, this may be due to two transition-specific phenomenon. The first one is that these countries widely used the exchange rate as an anchor to curb inflations' outburst at the beginning of transition in the early 1990s. This could have then offset the impact of hard fixing on inflation starts, hence making the exchange rate regime a statistically insignificant trigger. In the 2000s, as high inflation was brought under control, transition countries ceased to use extensively the exchange rate as inflation anchor, and the pattern common in other sets of counties could emerge. Secondly, this pattern is most likely reinforced by price level convergence of emerging Europe to developed Europe, particularly pronounced in the 2000s, implying significant real appreciation of domestic currency. Under fixed exchange rate regimes, real appreciation could have been achieved only through inflation, while under flexible rate ones mostly through nominal appreciation.

Inflow of capital has been tried and found a significant factor just in one set of developing countries (I), suggesting that larger inflows reduce the probability of inflation starts. On the other hand, an alternative indicator of capital inflows - current account deficit is important inflation trigger in transition economies (cf. Table 3). Also, there is some empirical evidence to support the current account deficit as a substantial inflation starter in the 1970s in a merged sample of both developed and developing countries[14]. However in both cases, in contrast to developing countries (I), a larger current account

[14] Namely, the result is reported only for the sample encompassing 'all countries', i.e. developed, developing II and Latin American ones put together. Cf. Vansteenkiste (2009).

deficit increases the probability of inflation starts. In the case of transitional European economies this is due to its specific feature i.e. to its deep financial integration with 'old' Europe that is more akin to that within the US than among other regions or countries in the world. (cf. Abiad et al., 2009). An important consequence of the above is the strong--and indeed in number of cases excessive--inflow of capital that led to large current account deficits, credit booms and rapid expansions in both consumption and investment (cf. Berglof et al., 2009), hence triggering inflation.

Focusing on the 2000s, when capital flows to transitional Europe were particularly pronounced (cf. Abiad et al., 2009, and Berglof et al. 2009), it is found that current account deficit is an important inflation trigger per se but that it also interacts with the exchange rate regime (cf. model 2, Table 2). Thus large inflows of capital when combined with the more rigid exchange rate regimes substantially increase the probability of an inflation start. Namely, under a fixed exchange rate, capital inflow spills over into inflation, while under floating into nominal appreciation.

External debt as a potential inflation trigger is related to inflow of capital and current account deficit. The evidence suggests that it is a significant inflation starter in a set of developing (II) and Latin American countries respectively, but not in transition and developed economies (cf. Table 3). Transition countries did not experience large external debts during most of the period considered. Thus in our sample covering the 1993 to 2006 period, median debt was as low as 40% of GDP, and for two thirds of observations it was below the critical level for emerging markets of 60% of GDP level[15] (cf. Reinhart and Rogoff, 2010). Nevertheless, large inflows of capital and resulting current account deficits that emerging Europe experienced (notably in the second half of the 2000s), led to 40 percentage points increase in debt to GDP ratio, thus reaching the average level above 90% of GDP[16]. Therefore, the external debt to GDP ratio may soon become an important inflation trigger in the transitional Europe.

Results related to trade openness, a factor that is expected to lower the probability of an inflation start, are mixed. It is found to be significant in the OECD and a set of developing (II) countries, but insignificant in another set of developed countries, Latin American and transition countries (cf. Table 3).

A clear pattern emerges with respect to international inflation as a potential inflation trigger. It is significant starter in both samples of developed countries (OECD and 'developed', cf. Table 3) while insignificant in transition economies and in developing countries where explored (developing II, and Latin American, cf. Table 3). An explanation could be that in the latter set of countries, the difference between domestic

[15] Out of 154 data points, i.e. 16 countries from 1993 to 2006, in 52 instances external debt as percentage of GDP is higher than 60%.

[16] A caveat is due that data above are not fully comparable with our sample. Namely they refer to 2003-2009 period, i.e. include three more years: 2007-2009, and cover 10 out of 16 countries in our sample: 9 EU transition countries and Croatia, as well as Turkey. See Reinhart and Rogoff, 2010, Figure 6, p.19.

and foreign inflation is considerably higher than in the former, thus rendering insignificant the impact of foreign inflation on domestic.

High domestic past inflation may raise inflation expectations and hence trigger inflation episodes. The results suggest that past inflation is a significant inflation starter in developing (II) and Latin American economies, but not so in developed and transition economies. Strictly speaking, domestic inflation is dismissed as an inflation trigger in transition economies since the obtained estimate has the wrong sign implying that high past inflation lowers the probability of triggering a new inflation episode. This statistical fluke may be a consequence of a prolonged overall decreasing inflation trend in transition economies that started from high level at the beginning of transition. Therefore it may well be that inflation has actually decreased prior to inflation starts thus giving the statistical result above, i.e. that lower past inflation rises the probability of triggering a new episode.

We now turn to exploring how the inflation triggers found in this paper compare with inflation drivers obtained in more conventional studies of inflation in transition economies. Two caveats are due: first, different approaches are used, posing somewhat different questions. Second, the comparator set of transition countries encompasses new EU member states of Central and Eastern Europe, i.e. ten out sixteen countries in our sample, mostly over the 1997 through 2008 period.

Thus supply side shocks, notably hikes in energy/oil and food prices, turned out to be both significant inflation starters and its drivers (cf. Beirne, 2009, Staehr, 2009, Stavrev, 2009, and Egert, 2009). As to the business cycle position and/or Phillips curve explanation, output gap seems to be both an inflation trigger and its driver (cf. Egert, 2009, and Stavrev, 2009), and the same holds for current account deficit (cf. Darvas and Szapary, 2008, Beirne, 2009, and Staehr, 2009). Nevertheless, the employment/unemployment rate appears to be an important inflation driver (cf. Staehr, 2009), while an insignificant trigger. As to the fiscal policy, the two sets of results broadly concur: fiscal deficit is important trigger, while public debt, revenue (cf. Staehr, 2009) and expenditure (cf. Beirne, 2009) are significant inflation drivers. On the other hand, trade openness is found to be an insignificant factor in both contexts (Table 3 above, and Staehr, 2009). Interestingly enough, the exchange rate regime is found to be a significant driver in the 2002 – 2007 period but not before (cf. Beirne, 2009, p.30), thus concurring with our result that the regime is an important trigger only in the 2000s. As expected, the exchange rate regime, either as a driver or as a trigger, affects inflation in the same direction. There is some empirical support for imported inflation as a significant inflation driver (cf. Staehr, 2009, and Stavrev, 2009), while it turned out to be an insignificant trigger. Past domestic inflation looks to be a significant driver of the inflation process (cf. Beirne, 2009, Staehr, 2009), but nevertheless appears as an insignificant inflation starter. Overall it appears that inflation triggers and drivers mostly overlap.

6. Does the Relative Importance of Inflation Triggers Change as Transition Evolves?

The review of the results above suggests that inflation triggers in transition economies may have evolved as these economies have been maturing since the initiation of their early reforms[17]. We now turn to exploring this conjecture, and the decomposition of the individual inflation starts across time and/or sets of episodes provides an opportunity for doing so.

The estimated models reported in Table 2 enable one to calculate the relative contribution of each inflation trigger in starting an individual inflation episode. Thus, the index function of the estimated probit model with fixed effects (model 1, Table 2) is broken down and the relative contribution of each statistically significant trigger (*i*) calculated for an individual inflation episode recorded in a transition country (*j*), at the year of an episode start (*t*) [18].

Specifically, the index function, $\sum_i X_{i,jt}\beta_i$, where $X_{i,jt}$ refers to trigger *i* in country *j* and year of an episode start *t*, while β_i are the estimated coefficents from Model 1 (Table 2), is used to calculate relative contributions ($cont_{i,jt}$) in the following way:

$$cont_{i,jt} = \frac{\beta_i\left(X_{i,jt} - \bar{X}_i\right)}{\sum_i \beta_i\left(X_{i,jt} - \bar{X}_i\right)}. \quad (1)$$

The nominator in (1) represents the impact of a given trigger (*i*), while the denominator gives the cumulative impact of all triggers, in each case referring to a certain country (*j*) and the year (*t*). Moreover, the trigger variables in (1) are expressed as deviations from their respective sample means ($\bar{X}_i$)[19]. The decomposition (1) ensures that the relative contributions of triggers and country specific effects sum up to one, and they are reported in Table 4.

The first column in Table 4 reports the fitted values of probabilities of the inflation start e.g. in country *j* and year *t* ($prob_{jt}$) determined as:

$$prob_{jt} = 1 - \mathrm{F}\left(-\sum_i X_{i,jt}\beta_i\right), \quad (2)$$

where F (.) is the cumulative density function from normal distribution.

[17] The preliminary results in Petrovic and Nojkovic (2008) indicate that relative importance of triggers might change over the considered period.
[18] Cf. Boschen and Weise (2003), pp. 338-39.
[19] Cf. Boschen and Weise (2003), pp. 338-39.

As the robustness of results for an individual episode depends on the estimated probability of its occurrence (cf. first column, Table 4), in the analysis that follows we have dropped six out of 30 episodes where this probability is below 20%. Namely, in these cases the estimated model has very low explanatory power.

Table 4: Relative Contribution of Inflation Triggers in Individual Inflation Episodes

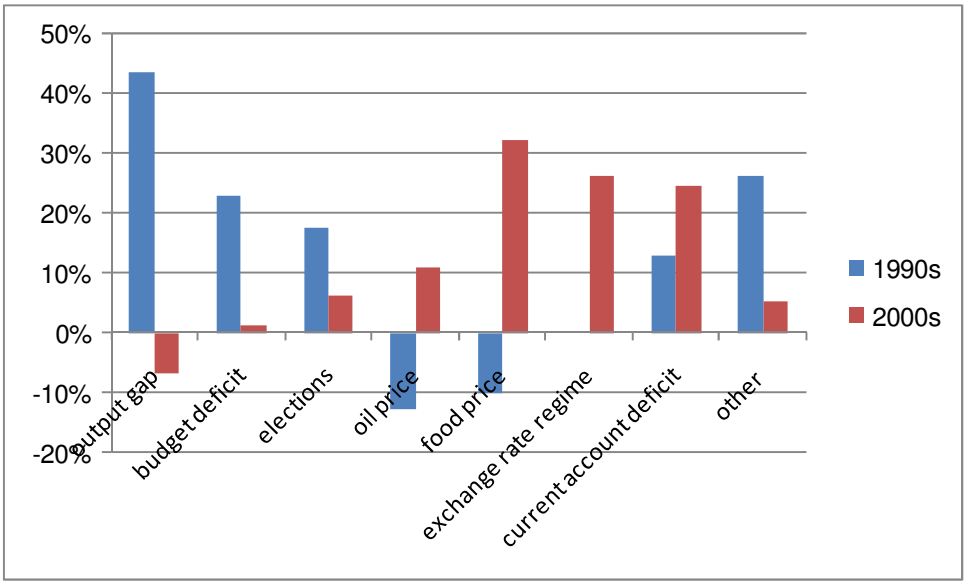
			Percent Due to [b]							
		Probability	output	budget		oil	food	exchange	current	
		of occurrence[a]	gap	deficit	elections	price	price	rate regime	account	other [c]
	Country							* V_{1999}	deficit	
A)	**1990's Episodes**									
1994	Slovak Rep.	**0.32**	-0.36	1.52	0.00	-0.21	0.04	0.00	0.14	-0.13
1996	Bulgaria	**0.35**	0.65	0.01	0.28	-0.03	0.23	0.00	-0.26	0.11
1996	Croatia	**0.82**	0.47	-0.04	0.15	-0.02	0.12	0.00	0.29	0.03
1996	Romania	**0.20**	1.53	-0.05	0.00	-0.05	0.34	0.00	0.31	-1.09
1997	Czech Rep.	**0.46**	0.27	0.00	0.23	0.08	-0.40	0.00	0.35	0.46
(1998)	(Russia)	**0.17**	0.54	0.20	0.00	-0.29	-1.00	0.00	-0.80	2.34
(1998)	(Slovak Rep.)	**0.09**	1.08	0.50	0.00	-0.52	-1.79	0.00	2.11	-0.37
1999	Ukraine	**0.22**	0.04	-0.07	0.39	-0.54	-0.94	0.00	-0.06	2.19
	Average	**0.39**	**0.43**	**0.23**	**0.17**	**-0.13**	**-0.10**	**0.00**	**0.13**	**0.26**
B)	**Episodes 2000-2003**									
2000	Bulgaria	**0.45**	-0.02	-0.15	0.00	0.20	0.01	0.71	0.16	0.09
2000	Slovenia	**0.39**	0.09	0.00	0.00	0.22	0.01	0.26	-0.02	0.44
(2000)	(Macedonia, FYR)	**0.12**	0.76	-0.48	0.00	0.55	0.03	0.66	-0.51	0.00
(2001)	(Albania)	**0.04**	-3.50	5.13	0.00	10.81	-4.48	0.00	3.98	-10.93
2001	Czech Rep.	**0.39**	0.04	0.02	0.00	0.42	-0.18	0.00	0.17	0.51
(2002)	(Latvia)	**0.19**	0.09	-0.09	0.00	-0.35	0.09	0.89	0.86	-0.49
2003	Slovak Rep.	**0.49**	-0.10	0.20	0.22	-0.08	0.15	0.23	0.47	-0.09
(2003)	(Ukraine)	**0.17**	-0.02	-0.34	0.49	-0.17	0.32	0.98	-2.52	2.26
	Average	**0.43**	**0.01**	**0.02**	**0.06**	**0.19**	**0.00**	**0.30**	**0.19**	**0.24**
C)	**Episodes 2004-2007**									
2004	Czech Rep.	**0.65**	-0.10	0.11	0.00	0.06	0.34	0.00	0.24	0.36
2004	Poland	**0.22**	-0.27	0.22	0.00	0.12	0.74	0.00	-0.24	0.43
2004	Bulgaria	**0.68**	-0.06	-0.07	0.00	0.05	0.33	0.52	0.17	0.05
2004	Croatia	**0.65**	-0.03	0.10	0.18	0.06	0.34	0.00	0.32	0.04
2004	Estonia	**0.50**	-0.20	-0.20	0.22	0.07	0.42	0.67	0.83	-0.81
2004	Lithuania	**0.32**	0.33	-0.10	0.00	0.10	0.57	0.91	0.47	-1.27
2004	Serbia	**0.64**	-0.29	-0.07	0.18	0.06	0.35	0.00	0.35	0.42
2005	Macedonia, FYR	**0.43**	0.01	-0.14	0.00	0.18	-0.12	0.49	0.57	0.00
2006	Hungary	**0.22**	-0.10	0.33	0.00	0.26	0.53	0.40	0.77	-1.19
2007	Czech Rep.	**0.55**	0.03	-0.02	0.20	0.04	0.43	0.00	-0.08	0.40
2007	Poland	**0.32**	-0.20	0.17	0.00	0.09	0.56	0.00	-0.11	0.49
2007	Croatia	**0.41**	-0.15	-0.01	0.00	0.04	0.53	0.00	0.53	0.05
2007	Slovenia	**0.43**	-0.05	-0.09	0.00	0.04	0.51	0.25	-0.08	0.41
2007	Ukraine	**0.86**	-0.15	-0.06	0.14	0.02	0.28	0.27	-0.12	0.62
	Average	**0.49**	**-0.09**	**0.01**	**0.07**	**0.09**	**0.41**	**0.25**	**0.26**	**0.00**
D)	**2000's Episodes**	**0.48**	**-0.07**	**0.01**	**0.06**	**0.11**	**0.32**	**0.26**	**0.24**	**0.05**
	Average									
E)	**Episodes 1993-2007**									
	Average	**0.46**	**0.06**	**0.07**	**0.09**	**0.05**	**0.22**	**0.20**	**0.22**	**0.11**

Note: The estimated Model 1 (Table 2) with fixed effects is used for the decomposition reported in Table 4.
(a) Probability figures are fitted values from the probit regression model 1 determined by eq. (2). (b) The

relative contribution of each variable is calculated using eq. (1). (c) Country-specific effect. (d) Averages exclude episodes with probability of occurrence lower than 20% (displayed in parentheses): Russia (1998), the Slovak Republic (1998), FYR Macedonia (2000), Albania (2001), Latvia (2002) and Ukraine (2003).

Thus, looking first at the overall average relative contributions of respective inflation triggers for the selected 24 episodes (Table 4, Panel E), one finds that the strongest impact comes from the current account deficit and food prices, followed by the exchange rate regime, which is on the other hand effective only in the 2000s. The overall impact of demand side factors such as output gap and fiscal deficit is however negligible. Nonetheless, a closer look at individual inflationary episodes indicates that they are not homogenous over the considered 1993 – 2007 period.

Figure 4. Relative Importance of Inflation Triggers in the 1990s and the 2000s



As already noted above and shown in fig. 4, the set of episodes in the 1990s exhibits a different pattern from those in the 2000s. In the former set, the main contributing factors (Table 4, Panel A and Figure 4) are on the demand side: the output gap and the fiscal deficit followed by elections and current account deficit. The impact of supply side shocks (rise in food and oil prices) is unimportant and so is the effect of the exchange rate regime.

The above pattern completely reverses in the 2000s. The main inflation triggers now become supply side shocks, notably the surge in food prices and, to a lesser extent, the rise in oil prices, on one hand, and the exchange regime and current account deficit on the other (Table 4, Panel D). The role of demand side factors (the output gap and the fiscal deficit) vanishes, while the contribution of elections halves.

While inspecting episodes in the 2000s, one may further partition them into those from 2000 to 2003, and the subsequent ones: 2004 – 2007. Thus, already in the first sub-period

(Table 4, Panel B and Figure 4), the main pattern of the 2000s emerges, the only exception being the insignificance of food prices as an inflation trigger. That is, the demand side shocks fade out as inflation starters; the effect of elections halves while the exchange rate regime and the oil price now strongly enter into the picture, whereas the impact of the current account deficit greatly increases. In the following 2004 – 2007 period (Table 4, Panel C), food price increases join the club becoming the leading inflation trigger thus igniting the latest inflation of 2007-2008. The rise in oil prices systematically, over all episodes, influences their starts, albeit now with a relatively small impact. Moreover, the exchange rate regime is still a very important trigger, while current account deficit further enhances its importance as inflation starter. The latter could be attributed to large inflows of capital in transitional Europe that peaked in 2004 – 2007 period.

7. Conclusions

The paper has explored inflation starters across 30 inflation episodes in 16 European transition economies, using the probit panel model with fixed effects. Testing the presence of fixed effects is feasible as the obtained maximum likelihood estimates are asymptotically normal. Namely, upon applying panel unit roots tests we found that at least two explanatory variables are I(1) processes thus implying that attained ML estimates are consistent and asymptotically normal (cf. Jin, 2009). These two steps--testing for the unit roots and, if present, testing for the fixed effects--are absent in the previous studies, which may have distorted their results. That is, if significant, individual effects should be included in the model since, as shown in this paper, the two sets of estimates (with and without fixed effects) may differ considerably.

Inflation triggers found to be significant in transition economies are mainly those suggested by theory, and generally overlap with those obtained either in developing or in developed countries, or in both. The latest global inflation of 2007-2008 is also investigated, and the results obtained for transition economies show that it is triggered by a novel phenomenon - the spike in food prices. In addition to the above, we found some transition-specific features.

As transition economies were going through a transformation from command socialist economies to market based ones, the relative importance of inflation triggers evolved as well. Thus at the beginning, i.e. in the 1990s, the output gap, the fiscal deficit and elections are the main factors igniting inflation, while later on in the 2000s, the main determinants are supply side shocks, such as food and oil prices, but also the exchange rate regime and current account deficit. These results suggest that weak macroeconomic policy and an unreformed public sector are to be blamed for starting inflation in the early days of transition. However, as reforms in these countries have progressed, and the quality of macroeconomic policy has improved, the main triggers become exogenous

factors such as rises in food and oil prices, and the large inflow of capital from developed Europe.

The 'downhill' flow of capital towards transitional Europe notably in the 2000s, brought up large current account deficits, pulled up domestic demand and triggered inflation in some of these economies. In addition, the capital inflow impact is reinforced under the fixed exchange rate regime where inflow spills over into inflation, while in more flexible arrangements into both nominal appreciation and some inflation. The above interaction between the current account deficit and the exchange rate regime is confirmed by our estimates.

The large inflow of capital has also propelled high growth in transitional Europe, hence driving its real and nominal convergence to developed Europe, which is another distinctive feature of the considered transition economies. This process led to real appreciation of domestic currency which triggers inflation under the more rigid exchange rate regime. Thus the exchange rate regime, as our estimates show, appears as a significant inflation starter in the 2000s irrespective of the size of the current account deficit.

Inflation triggers found in this paper by and large coincide with inflation drivers obtained in previous studies in transition economies, thus enhancing the robustness of both sets of results although these two approaches ask somewhat different questions and use distinct methodologies.

The above empirical findings on inflation triggers lay the groundwork for some policy recommendations aimed at preserving the stable and low inflation in emerging Europe. A first message is that policy makers should contain excessive inflow of capital, and the resulting current account deficit, which may resume after the current (2008-2010) crisis due to deep financial integration in Europe. Large prospective inflow of capital may lead to macroeconomic imbalances, but also to an excessive level of external debt, both potential inflation triggers. In addition, the prolongation of real and nominal convergence of transitional Europe, would lead to further currency real appreciation in the future. The latter speaks in favor of a more flexible exchange rate regime if inflation is to be contained, and against early fixing of exchange rate practiced by a number of European transition countries hoping to facilitate its entry into the Euro zone.

Although budget deficit does not appear as the important inflation trigger in the 2000s, its significance may reemerge since the current financial crisis could easily spill over into fiscal crisis in a number of transition countries, hence starting new inflation. In the same manner, external debt is found to be an insignificant inflation starter in transition economies while an important starter in developing, including Latin American, economies. Namely, emerging European countries due to a low initial level did not experience large external debts during most of the period considered, i.e. 1993 – 2006. Nevertheless, the large current account deficits notably in the second half of the 2000s, have already led to excessive external debt level in the European transition economies (cf. Reinhart and Rogoff, 2010), which in turn may become a significant prospective

inflation trigger. Thus lowering external debt, by containing foreign borrowing, should be high on economic policy agenda in transitional Europe.

After being subdued by the current crisis, the increasing trend of food prices will most probably resume, thus raising the probability of inflation starts in both transition and developing countries. Being vulnerable to food price spikes and having already experienced the related inflation episode, policy makers in the transition countries should resist substantial accommodation of any prospective large increase in food prices. The same may hold for the oil price shocks.

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Appendix

Table A1 Detected Inflation Episodes for Each Economy: Some Basic Facts

	Trough date	Peak date	Trough inflation percent	Peak inflation percent	Length (quarters)
1. Albania	2Q2000	4Q2001	0.37	4.00	6 Q
2. Bulgaria	2Q1995	1Q1997	73.96	620.64	7 Q
	3Q1999	1Q2001	5.27	8.78	6 Q
	3Q2003	4Q2007	4.14	9.94	17 Q
3. Croatia	4Q1995	3Q2000	2.10	5.67	19 Q
	2Q2003	4Q2005	1.69	3.18	10 Q
	3Q2006	**4Q2007**	**2.94**	**4.23**	**5Q**
4. Czech Republic	3Q1996	3Q1997	8.45	9.69	4 Q
	1Q2000	1Q2001	3.13	4.24	4 Q
	2Q2003	3Q2005	0.99	2.48	9 Q
	1Q2006	**4Q2007**	**2.13**	**3.59**	**7 Q**
5. Estonia	3Q2003	4Q2007	2.08	8.04	17 Q
6. Hungary	4Q1993	4Q1995	20.84	25.34	8 Q
	4Q2005	4Q2007	3.98	6.95	8 Q
7. Latvia	**4Q2001**	**4Q2007**	**2.17**	**12.04**	**24Q**
8. Lithuania	**2Q2003**	**4Q2007**	**-0.74**	**7.87**	**18Q**
9. Macedonia	1Q1999	1Q2001	0.31	7.19	8 Q
	4Q2004	4Q2007	1.49	4.56	12 Q
10. Poland	2Q2003	4Q2004	1.41	2.67	6 Q
	3Q2006	**4Q2007**	**1.47**	**3.13**	**5 Q**
11. Romania	4Q1995	4Q1997	40.00	102.15	8 Q
12. Russia	3Q1997	3Q1999	17.81	58.54	8 Q
13. Serbia	4Q2003	3Q2005	10.63	14.42	7 Q
14. Slovak Republic	2Q1993	1Q1994	16.14	17.57	3 Q
	1Q1997	3Q2000	6.11	10.98	14 Q
	1Q2002	4Q2003	5.5	7.50	7 Q
15. Slovenia	1Q1999	1Q2001	7.20	8.59	8 Q
	1Q2006	4Q2007	2.46	4.38	7 Q
16. Ukraine	1Q1998	4Q1999	14.13	24.91	7 Q
	3Q2002	2Q2005	3.30	11.32	11 Q
	3Q2006	**4Q2007**	**10.54**	**18.18**	**5 Q**

Note: Ongoing episodes are displayed in bold.

Table A2 Data Definitions and Sources

Variable	Definition	Sources
inflation	CPI inflation rate, quarterly data (in %).	WIIW Monthly Database on Central, East and Southeast Europe:
		http://mdb.wiiw.ac.at/
		data for Macedonia: http://www. stat.gov.mk/
		data for Serbia : http://webrzs.statserb.sr.gov.yu
gdp	Real GDP growth.	WIIW Handbook of Statistics
		Countries in Transition 2008,
		CD-ROM
output	Deviation of the real GDP growth from it's trend,	WIIW Handbook of Statistics
gap	which is computed using Hodrick-Prescott	Countries in Transition 2008,
	filter with a smoothness parameter of 100.	CD-ROM
unemployment	Unemployment rate - LFS	WIIW Handbook of Statistics
rate	(in %, average).	Countries in Transition 2008,
		CD-ROM
budget	Central government budgete balance as a	WIIW Handbook of Statistics
deficit	percentage of GDP. A positive entry denotes a deficit.	Countries in Transition 2008, CD-ROM;
external	Gross external debt (end of period), percent of GDP.	WIIW Handbook of Statistics
debt		Countries in Transition 2008,
		CD-ROM
elections	Dummy: 1 if an election was held in that year,	Data on Elections around the world:
	0 otherwise.	http://www.electionworld.org.
		Data has been redirected from a Electionworld page to Wikipedia:
		http://en.wikipedia.org/wiki/User:Electionworld/Electionworld
oil	Percentage change in dollar price of crude oil.	Federal Reserve Economic Data (FRED)
price		http://www.economagic.com/
		http://www.ioga.com/
food	Percentage change in index of food commodity prices	International Monetary Fund Data
price	(2005=100).	http://www.imf.org/
international	Euro area CPI inflation rate, annual change in %.	Data on Euro area CPI inflation:
inflation		http://epp.eurostat.ec.europa.eu/
domestic	CPI inflation rate, annual change in %.	WIIW Handbook of Statistics
inflation		Countries in Transition 2008,
		CD-ROM
openness to	Share of imports of goods and services, percent of GDP.	WIIW Handbook of Statistics
international		Countries in Transition 2008,
trade		CD-ROM
exchange	Actual (de facto) exchange rate regime in a country,	data from 1993 to 2002: Reinhart and Rogoff (2002)
rate	four categories classification: from 0 (for float) to 3 (for hard peg).	data from 2003 to 2007: IMF's Annual Report on Exchange Rate
regime		Arrangements and Exchange Restrictions (various issues)
current	Current account balance as a	WIIW Handbook of Statistics
account	percentage of GDP. A positive entry denotes a deficit.	Countries in Transition 2008,
deficit		CD-ROM

Table A3 Estimated Marginal Effects of Inflation Starters: Alternative Model Specifications
(Sample period: 1993-2007)

	Model a1	**Model a2**	**Model b**
	N = 16		
Independent Variables	fixed effects		
output gap $_{-1}$	0.0027	0.0227	0.0367
	(0.003)	(0.002)	(0.001)
budget deficit $_{-1}$	0.0014	0.0107	-0.0079
	(0.033)	(0.093)	(0.384)
elections $_{-1}$	0.0149	0.0873	0.0711
	(0.022)	(0.042)	(0.187)
oil price $_{-1}$	0.0002	0.0013	0.0018
	(0.055)	(0.086)	(0.075)
food price	0.001	0.0107	0.0106
	(0.001)	(0.000)	(0.004)
exr_regime $_{-1}$*V1999	0.0003	0.0519	0.0363
	(0.927)	(0.041)	(0.238)
current account deficit $_{-1}$	0.0029	0.0263	0.0358
	(0.000)	(0.000)	(0.000)
trade openness $_{-1}$	-0.0003	-0.0022	
	(0.135)	(0.197)	
international inflation $_{-1}$	0.001	-0.0406	
	(0.932)	(0.375)	
past domestic inflation $_{-1}$	-0.0006		
	(0.033)		
external debt $_{-1}$			0.0007
			(0.715)
unemployment rate $_{-1}$			-0.0044
			(0.733)
Log likelihood	-48.2	-51.9	-52.0
Avg. log likelihood	-0.3032	-0.3263	-0.3539
McFadden R^2	0.36	0.31	0.27
No. of observations (0/1)	130/29	130/29	119/28

Note: The marginal effects of the variables, reported in Table A3, are evaluated at their respective means. Robust standard errors are calculated using the Huber-White procedure and corresponding p-values are given in parentheses. V1999 is dummy variable that takes value 0 before 1999 and 1otherwise, exr_regime refers to exchange rate regime. N denotes the number of countries included in the sample. The 1994 Hungary episode is skipped due to the missing data for the budget deficit.

Table A4 Estimated Marginal Effects of Inflation Starters: Robustness Checks (Sample period: 1993-2007)

	without Baltic states			without Romania and Hungary		
Independent Variables	**Model 1.1.** N = 13 fixed effects	**Model 2.1.** N = 13 fixed effects	**Model 3.1.** N = 13 fixed effects	**Model 1.2.** N = 14 fixed effects	**Model 2.2.** N = 14 fixed effects	**Model 3.2.** N = 14 fixed effects
output gap $_{-1}$	0.0327	0.0292	0.0243	0.0277	0.0264	0.0161
	(0.004)	(0.019)	(0.024)	(0.002)	(0.015)	(0.048)
budget deficit $_{-1}$	0.0142	0.0166	0.0168	0.0110	0.0121	0.0126
	(0.108)	(0.054)	(0.046)	(0.174)	(0.157)	(0.108)
elections $_{-1}$	0.1025	0.1008	0.1050	0.0862	0.0939	0.0986
	(0.106)	(0.131)	(0.123)	(0.119)	(0.113)	(0.112)
oil price $_{-1}$	0.0027	0.0028	0.0028	0.0020	0.0019	0.0021
	(0.024)	(0.025)	(0.029)	(0.044)	(0.083)	(0.065)
food price	0.0088	0.0084	0.0091	0.0098	0.0082	0.0107
	(0.023)	(0.044)	(0.032)	(0.005)	(0.037)	(0.010)
exr_regime $_{-1}$*V1999	0.0490			0.0664		
	(0.260)			(0.035)		
current account deficit $_{-1}$	0.0301			0.0317		
	(0.003)			(0.000)		
current account deficit $_{-1}$*exr_regime_1		0.0128	0.0171		0.0092	0.0167
		(0.115)	(0.025)		(0.116)	(0.004)
current account deficit $_{-1}$*V1999		0.0110			0.0211	
		(0.360)			(0.067)	
Log likelihood	-51.7	-53.3	-53.7	-51.5	-53.3	-55.0
Avg. log likelihood	-0.3861	-0.3974	-0.4005	-0.3676	-0.3804	-0.3932
McFadden R^2	0.23	0.21	0.20	0.27	0.24	0.21
No. of observations (0/1)	107/27	107/27	107/27	112/28	112/28	112/28

Note: The marginal effects of the variables, reported in Table A4, are evaluated at their respective means. Robust standard errors are calculated using the Huber-White procedure and corresponding p-values are given in parentheses. V1999 is dummy variable that takes value 0 before 1999 and 1 otherwise, exr_regime refers to exchange rate regime. N denotes the number of countries included in the sample. The 1994 Hungary episode is skipped due to the missing data for the budget deficit.