

# **The Impact of Currency Substitution on the Choice of Exchange Rate Regime: Lessons for EU Accession Countries**

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## **Abstract**

Recent attempts to measure currency substitution in transition countries have shown that the phenomenon is widespread. Neither theory nor policy seem to be adjusted to such cases where clear limits to domestic monetary policy exist. Cross-country regression shows that countries with higher degree of currency substitution have lower monetary depth. If this is interpreted as an indication of lower effectiveness of monetary policy in the presence of currency substitution, following conclusion emerges: Most of candidates or would-be candidates for EU have medium level of currency substitution. While currency substitution may hinder financial and economic development, the size of this negative impact is probably not large enough to induce strong dissatisfaction with existing exchange rate rules on the road to European Monetary Union. Two large transition economies, Hungary and Poland, have relatively low levels of currency substitution and they may feel that they can still have benefits from exchange rate changes. On the other hand, three countries with the highest level of currency substitution – Bulgaria, Croatia and Latvia, would probably have no benefits from exchange rate variations. Their monetary preferences can easily be to adopt Euro early, however, they are not strong enough to induce a required change in monetary rules on the road to EU.

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## ***Introduction***

Almost forty years ago, Ronald McKinnon (1963) reminded that Robert Mundell (1961) in his seminal paper on optimum currency area (OCA) did not imply identity between national territory and OCA when factor mobility within countries is low. McKinnon (1963) clarified the distinction between OCA and national territory by defining OCA as an area where flexible exchange rates can be used to reach full employment and external equilibrium, while keeping domestic price level under control. An obvious implication of this view is that there are countries where full employment, external equilibrium and low inflation cannot be reached simultaneously. Such countries should not be considered optimum currency areas.

Thirty-five years later, McKinnon's (1999) and Mundell's (1999) proposals for fixed or quasi-fixed exchange rates for small and open economies in emerging Europe seemed to be in contrast with economics profession's mainstream. Growing popularity of inflation targeting and fears of short-term international capital flows («hot money»), led many authors to conclude that flexible exchange rates represent the best monetary regime for European emerging markets (e.g. Masson, 1999; Mishkin, 1999a, 1999b). Fluctuating exchange rate was seen as a vehicle of macroeconomic adjustment as well as a vehicle of prevention against volatile short-term international capital flows. It seemed that there is not much to be gained by lowering exchange rate flexibility.

However, there are at least five reasons why this view has to be reconsidered. Firstly, fluctuating exchange rate can serve as an adjustment mechanism only if a country represents an optimum currency area, which is not always the case in McKinnon's sense. Secondly, exchange rate fluctuations can stimulate short-term capital flows thanks to «noise trading», which means that stable exchange rate, if credible, can stabilize international capital flows (Dean and Kasa, 2001). Thirdly, Hausmann, Panizza and Stein (2000) have shown that stable exchange rate can be a solution to the traditional Gordon-Barro central bank's problem if there is a close correlation between nominal interest rate and nominal exchange rate. Fourthly, Calvo and

Reinhart (1999) and Hausmann et. al. (1999) revived the idea of the balance sheet channel of monetary transmission, showing that exchange rate changes may lead to wealth effects and offsetting macroeconomic adjustments when large share of assets and liabilities is denominated or held in foreign currency. Fifthly, recent research (Fratzcher, 2002) has shown that fluctuating exchange rates in European countries in the last 15 years did not imply lower macroeconomic adjustment costs for countries that pursued such policies.

Problem of currency substitution did not play a very important role in this discussion. One reason is probably a consequence of a belief that it cannot be measured (Sahay and Vegh, 1995). However, first estimates of foreign currency in circulation in different countries have been published recently (Feige et. al., 2002; Feige, 2002). It was shown that foreign currency in circulation plays much more important role in some countries than previously thought. The implication is that widely used indicator - share of foreign currency deposits in M3 (e.g. Balino et. al., 1999) - might be misleading for countries where foreign currency in circulation plays more important role than foreign currency deposits with domestic banks. Work of Feige et. al. (2002) also enabled construction of the first «dollarization index», which measures the share of foreign currency and deposits in total domestic and foreign money supply in the country.

Furthermore, it was shown by Šonje (2002) that dollarization index, when used as an indicator of currency substitution, probably has a negative impact on monetary depth (measured by M3 to GDP ratio, where M3 is an official measure of broad money supply which usually does not include foreign cash in circulation). This was shown by using a sample of 15 transition countries. If there is a positive correlation between monetary depth and effectiveness of monetary policy, this result implies that dollarization reduces the effectiveness of monetary policy. This may be the case since dollarization usually represents an outcome of ineffective past monetary policy that led to high inflation, eruptive exchange rate depreciation and the loss of credibility. On the other hand, if credibility can be rebuilt and dollarization eliminated, M3 to GDP ratio may not be a good indicator of monetary policy effectiveness. This leads to the conclusion that monetary policy freedom and/or

effectiveness should be measured directly if monetary effectiveness and dollarization can be linked in any meaningful way.

The ideal approach is to use the uncovered interest parity model to estimate freedom of monetary policy, and then to calculate the correlation between this parameter and unified dollarization index. According to this approach, freedom of monetary policy is reflected in the country's ability to move interest rates independently from foreign interest rates. The hypothesis is: there is a negative link between currency substitution (measured by dollarization index) and freedom of monetary policy. If this hypothesis is true, it has a direct policy implication: countries with higher currency substitution would have lower costs from early stabilization of exchange rates and / or adoption of euro, because they cannot extract benefits from independent monetary policy i.e. exchange rate movements.

This possibility is ignored by European policy makers. Broadly speaking, they tend to overlook significant structural and historical monetary differences between the former candidates, now members of EMU, and present candidates for EU. The official standing is that the same rules that were applied to now-ins, should be applied for today's candidates. However, the same rules won't necessarily lead to optimal outcomes, especially for countries with a high degree of usage of foreign currency. This is the central theme of this paper.

In the first section we define terms and measurement of currency substitution. In the second section we discuss problems of measurement of monetary policy effectiveness. In the third section we show the empirical results about links between currency substitution and effectiveness of monetary policy. In the fourth section we discuss policy implications.

## ***I. Currency Substitution – Terms and Measurement***

When currency substitution is here used as a synonym for dollarization, we mean wide currency substitution. We prefer the term currency substitution over the term dollarization, because in some countries in CEE substitute currency was D mark, not US dollar. Therefore, the term currency substitution allows us to avoid vague terms like D-markization, euroization and the like.

Currency substitution, in its narrow sense, occurs when the foreign currency displaces the domestic currency as a medium of exchange. Technically, this is a phenomenon which takes place within money supply M1. For measuring it, we need to know foreign cash in local circulation (FCC) and foreign currency demand deposits (FCDD) with domestic banks<sup>2</sup>, in order to compare it with the sum of domestic and foreign component of total money supply. Following Feige et. al. (2002) and Feige (2002), total money supply M1 defined this way is called effective narrow money (ENM):

$$\text{ENM} = \text{M1} + \text{FCC} + \text{FCDD},$$

where M1 is defined as in national monetary statistics. Therefore, narrow currency substitution can be measured by currency substitution index (CSI) defined in the following way:

$$\text{CSI} = (\text{FCC} + \text{FCDD})/\text{ENM}.$$

Foreign monetary assets are also used as a store of value. Following standard practice in the literature, this effect is called asset substitution. Technically, this is a phenomenon which takes place within higher monetary aggregates (M2, M3 or M4), and is usually recorded by national monetary statistics if collection of foreign currency deposits (FCD) is allowed by local regulation. Phenomenon is measured by asset substitution index (ASI):

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<sup>2</sup> It makes sense to ignore resident's foreign currency demand deposits abroad, because for simplicity we may assume that such deposits, if they are significant (like in Latin America), are held for other non-transactional purposes (savings).

$$ASI = FCD/QM,$$

where QM is all deposits and quasy deposits except demand deposits which are included in money supply M1.

Three technical points are worth mentioning here. Firstly, definitions differ from definitions in Feige (2002) regarding treatment of demand deposits. Feige (2002) includes them in the denominator of asset substitution index, which is convenient because in that case currency substitution index measures only cash substitution. Here, we follow classification logic of functions of money (means of payment vs. store of value), which has no practical implication, because we aim at measuring broad currency substitution (CSI'), i.e. the sum of narrow currency substitution and asset substitution:

$$CSI' = CSI + ASI = (FCC+FCDD)/ENM + FCD/QM$$

It should be noted that Feige et. al. (2002) and Feige (2002) call this measure unofficial dollarization index (DI or UDI), but when countries of CEE are taken into account, dollarization is a confusing term because of a widespread use of European currencies. Therefore, broad currency substitution, or simply currency substitution (CSI') is the term used in the rest of the paper.

Secondly, this measure takes no account of resident's foreign currency deposits held abroad. It is not only due to the hardship in obtaining these data on accounts which are often held illegally. It is also the principle of account residency, not of account's owner residency, which is applied here. If the second principle should apply, counting resident's balances held abroad would also imply subtracting non-resident's balances at accounts with domestic banks.

Thirdly, it should be noted that the traditional measure of dollarization and/or currency substitution, as used for example in Balino et. al. (1999), is:

$$FCD/(M1+QM)$$

Value of this measure approaches to CSI's value as FCC (foreign cash in circulation) converges to zero. Therefore, it is crucial to estimate FCC. The higher it is, the greater the difference between CSI' and traditional measure will be. Details on measurement are presented in Feige et. al. (2002) and Feige (2002). What follows is just a brief review.

Any person or institution carrying across the US border more than 10,000 USD must report the amount in a Report of International Transportation of Currency or Monetary Instruments (CMIR). CMIR data allowed construction of time series of flows of US dollars to and from different destinations around the world. However imperfect these may be, there are indications that they do not contain systematic one-sided error. In addition, data were adjusted for the effects of Extended Custodial Inventory programme, since FED in 1996 has chosen a few sites around the world for disseminating and collecting USD bills circulating at other continents. This induced a change in the estimated time series. This was corrected in the final estimates for the year of 1999.<sup>3</sup> On the top of it, Feige (2002) has taken into account the results of Gallup research<sup>4</sup> on non-US dollar foreign currency holdings in Europe prior to euroconversion, because these estimates proved to be very reliable ex post.

At the aggregate level, estimates seemed to be very reasonable. It has been estimated that 57% of value of US dollar bills is held abroad, while 23% of value of DM bills has been estimated to be in transition countries. Both results were in line with most previous studies and experience.

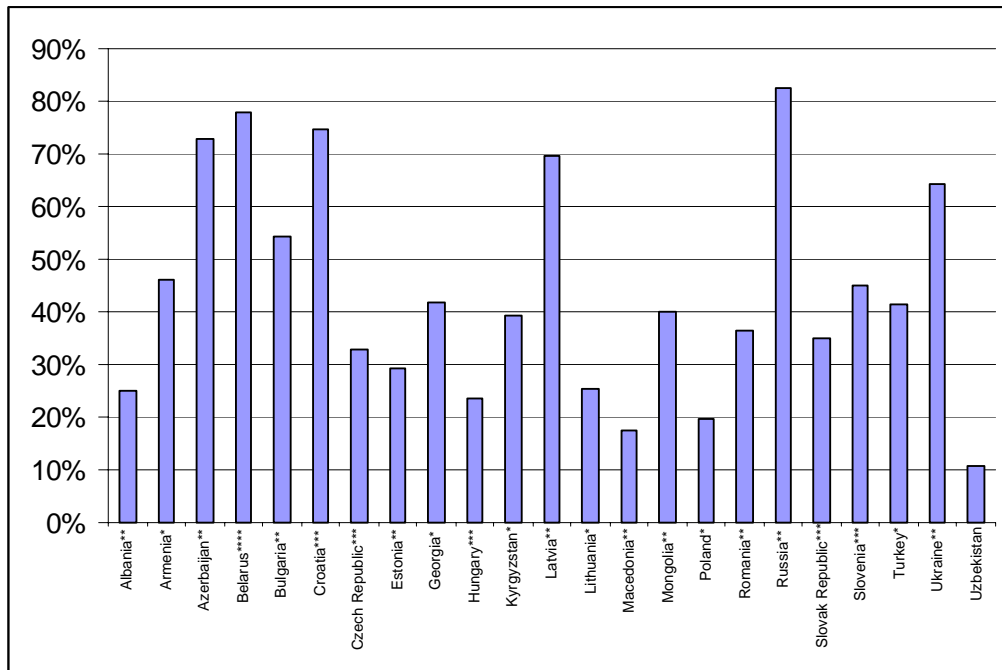
Figure 1 shows estimates for transition countries including Turkey.

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<sup>3</sup> Different estimates for the same countries in Feige et. al. (2002) and Feige (2002) should be primarily attributed to this correction as well as to different year of estimate – 1997 in Feige et. al. (2002) and 1999 in Feige (2002).

<sup>4</sup> The reported results were blown up by factor five at the basis of US research experience (people naturally tend to admit manifold lower amounts than they actually hold).

Figure 1



Source: Feige (2002)

It seems reasonable to group countries into three categories. First, low currency substitution countries (CSI' up to 25%) are: Albania, Hungary, Macedonia, Poland and Uzbekistan. Second, moderate to high currency substitution countries (CSI's between 25% and 50%) are: Armenia, Czech Republic, Estonia, Georgia, Kyrgyzstan, Lithuania, Mongolia, Romania, Slovenia, Slovakia, Turkey. Third, very high currency substitution countries, where more than half of total money supply is held in foreign currency, are: Azerbaijan, Belarus, Bulgaria, Croatia, Latvia, Russia, Ukraine.

Out of 13 sure or prospect candidates for EU in our sample, only Hungary, Poland, Albania and Macedonia belong to the low currency substitution group of countries. What are the implications of these results for the conduct of monetary policy?



## ***II. Measuring Freedom of Domestic Monetary Policy***

Theoretical and practical intuition points to the conclusion that currency substitution sets strong limits over conduct of monetary and exchange rate policy. There are at least four arguments for that. Firstly, high degree of currency substitution can be taken as a clear empirical evidence that the country is not an optimum currency area. This means that it cannot use domestic monetary and exchange rate policy to obtain low unemployment, stable prices and external equilibrium simultaneously (McKinnon's definition – recall the Introduction). Secondly, high degree of currency substitution means that the base for extracting seigniorage is low (actually, foreign base has been imported), which would probably reduce political interest for domestic currency and monetary policy. Thirdly, high degree of currency substitution is usually a consequence of a past policy mistake (e.g. hyperinflation) which may have irrevocably destroyed policy makers' credibility. Fourthly, high degree of currency substitution is an indication of a very high elasticity of substitution between different denominations of assets, which may lead to large portfolio shifts induced by small changes in assets prices (one of the most important being the exchange rate). Since portfolio shifts can alleviate policy effects, «optimum» fluctuations in assets' prices may be lower in high elasticity environment. Can these arguments be tested? For answering this question, one needs to measure the effectiveness of monetary policy and analyse its relation to currency substitution.

There are three ways how to measure effectiveness of monetary policy. One way is to estimate monetary policy reaction function, i.e. to look at parameters which measure the impact of output gap and inflation deviations on interest rates (Clarida, Gali, and Gertler, 1999). Another way is to look at correlation between foreign and domestic interest rates based on uncovered interest parity theory – UIP (Fratzcher, 2002).

Uncovered interest parity model is:<sup>5</sup>

$$i_t = \alpha + \sum_{j=0}^J (\beta_j i_{t-j}^{US} + \chi_j i_{t-j}^{EU}) + \sum_{s=0}^{T-t} (\delta_s \Delta e_{t+s}^{US} + \phi \Delta e_{t+s}^{EU}) + \varepsilon_t,$$

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<sup>5</sup> See also Fratzcher (2002).

where  $i$  stands for nominal interest rate and  $e$  stands for spot exchange rate. The key point is to estimate  $\beta$ 's and  $\chi$ 's. If these parameters are low, then there is a room for domestic monetary policy reflected in domestic interest rates movements which do not depend on foreign interest rates and exchange rate changes.

Both approaches say nothing about the actual impact of monetary policy on output and/or prices. They just look at how intermediary monetary targets behave, given the information on output gap, inflation gap, and/or foreign interest rates movements. However, it is hard to conclude about policy effectiveness by watching movements of intermediary targets. We can conclude only about the necessary condition for effectiveness, which is the freedom for the central bank to act. That is why we should talk about potential effectiveness or freedom of monetary policy. However, if we are talking about potential effectiveness of monetary policy, then the third approach may be employed. It is an attempt to find a relation between currency substitution and monetary depth (e.g.  $M3/GDP$ ). This approach assumes positive link between monetary depth and monetary policy effectiveness. Hence, if higher currency substitution leads to lower monetary depth, then it may also lead to lower effectiveness of monetary policy. Rationale behind it is pretty intuitive, resting upon the idea of a credit channel of monetary transmission: if currency substitution induces actors to hold less monetary assets, lower intermediation may lead to imperfect transmission of monetary policy impulses through the banking system.

### ***III. The Results***

The results presented in this section are produced by applying the third approach. Attempts to estimate uncovered interest parity based on monthly or quarterly data failed due to hardships in proper accounting of effects of structural changes in transitional banking systems, which influenced interest rate movements. On top of it, capital mobility regulation was changing frequently during transition, which may have also contributed to the estimation problems. Therefore, interpretation of results critically depends on the assumption / belief, that the freedom and effectiveness of monetary policy are somehow correlated to monetary depth. Estimation strategy was to look for an impact of currency substitution on monetary depth at the basis of cross-country data. The hypothesis is that there is a negative impact of currency substitution (CSI) on monetary depth.

Many empirical studies revealed positive link between GDP per capita and monetary depth (Levine, 1997). Therefore, GDP p.c. in nominal USD was also used on the explanatory side of the equation. This variable was constructed as three year (1998, 1999, 2000) average at the basis of the World Bank's World development database (WDI). (<http://devdata.worldbank.org>).

Currency substitution index (CSI) was used from two pieces of research. Feige (2002) estimated CSI' for 23 transition countries, including Mongolia and Turkey (Figure 1), and Feige et. al. (2002) estimated CSI' for a wider sample of countries, including some Asian and Latin American economies. Besides CSI's and GDPp.c., two binary variables were added on the explanatory candidates list. The first variable (LA) equaled one for Latin American countries. The purpose of this variable was to control for (possibly) higher monetary depth in the sub-sample of countries where market economies functioned before 1990. The second binary variable (C\_S) equaled one for Slovakia and Czech Republic because the two countries shared the same history in the common federation under communism, and their high indicators of monetary depth were largely administratively induced i.e. inherited at the beginning of transition.

Dependent variable was monetary depth defined as liquid liabilities to GDP ratio (for simplicity, we term it as M3/GDP). In order to ensure methodological comparability of the variable, it was taken from a unique source – A New Database on Financial Development and Structure designed by Beck, Demirguc-Kunt and Levine (1999) for the World Bank. The latest observation (but not earlier than 1995) from this database was taken as an indicator of monetary depth. Since some of the countries were missing, the sample was finally reduced to 21 country: Belarus, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Russia, Slovakia, Turkey, Ukraine, Argentina, Costa Rica, Indonesia, Israel, Peru, Saudi Arabia and Venezuela. Sample is dominated by transition countries, but is not regionally homogeneous, which contributes to its quality. Data used for estimation are shown in the Annex. Results are shown in the table below.

Table 1: Estimation Results (t-values in parentheses)

	<b>Equation no. 1</b>	<b>Equation no. 2</b>	<b>Equation no. 3</b>
<b>Dependent variable</b>	M3/GDP	M3/GDP	M3/GDP
<b>Constant</b>	0.382 (3.83)	0.289 (4.49)	0.305 (4.77)
<b>GDP p.c.</b>	0.000025 (2.50)	0.000028 (4.50)	0.000028 (4.67)
<b>CSI'</b>	-0.329 (-1.95)	-0.237 (-2.23)	-0.239 (-2.31)
<b>C_S</b>		0.414 (5.43)	0.398 (5.29)
<b>LA</b>			-0.076 (-1.37)
<b>Rsquared</b>	0.426	0.790	0.812
<b>F</b>	6.687	21.364	17.320
<b>Jarque Berra</b>	4.389	1.219	1.787

Results show the existence of a negative link between currency substitution and monetary depth on a cross-country basis. Sign and significance of the parameter are robust, but when the effect of former Czechoslovakian data is captured by the binary variable, the size of the impact decreases somewhat (but the value of t-test increases). Since binary variable which equals one for Latin American countries is not significant, we may conclude that history of market economy makes no difference in this respect.

One should not take these results too far in making conclusions. Serious limit comes from low data quality. These are the first estimates of currency substitution and they certainly may be refined in the future. However, theoretical intuition and experience point out limits set by currency substitution to monetary development, and this seems to be supported by the data.

#### ***IV. Conclusion: On Policy Lessons***

Recent attempts to measure currency substitution in transition countries have shown that the phenomenon is widespread. In some transition and Latin American countries, foreign monetary assets dominate over domestic monetary assets, which should be interpreted as a clear indication that the country is not an optimum currency area. This finding poses questions about the effectiveness of monetary policy in the described monetary environment.

It is also important to note that the present degree of currency substitution is not necessarily a consequence of policy mistakes made during the transition. Currency substitution may be very persistent, and in some cases may be irreversible due to network externalities in the usage of currency (Dowd and Greenaway, 1993). In such cases, currency substitution may be the consequence of policy mistakes made in the 80's that led to hyperinflation (e.g. Argentina, Croatia).

Neither theory, nor policy seem to be adjusted to such cases where clear limits to domestic monetary policy exist. Policy makers tend to overlook significant structural and historical monetary differences between the former candidates, now members of EMU, and present candidates for EU.

Three groups seem to be emerging out of the candidate or quasy-candidate (plus Turkey and Croatia) group. The first group contains EU accession forerunners who have low currency substitution. These are Poland and Hungary. Current EU stance is best suited for these two countries which may still have some use from exchange rate adjustment mechanism. Elasticity of substitution between different denominations of assets seems to be rather low and the attainment of policy credibility seems to be

easier in these countries than elsewhere. While this is not a guarantee that these countries may enjoy benefits from exchange rate fluctuations, at least there are no strong arguments against exchange rate flexibility.

The second group of countries comprises Czech Republic, Estonia, Lithuania, Romania, Slovenia, Slovakia and Turkey. These countries have relatively high currency substitution (between 25% and 50%). However, if we believe the regression result, which shows that the impact of currency substitution is not very high, it is hard to expect that these countries will have a lot to complain regarding exchange rate policy that they have to comply to on their road to monetary union. They may have no use from the exchange rate fluctuation, but they cannot have a lot of harm from it. From the other point of view, they may have no big use of fixed exchange rate or even early adoption of euro.

This leaves us with the third group, comprising Bulgaria, Croatia and Latvia. These countries have currency substitution of Latin American type. In comparison to Hungary and Poland, these countries have 50 percentage points higher currency substitution on average. Either at the basis of our regression result or at the basis of experience, we may conclude that such difference must have significant real effects in terms of lower or absent monetary policy effectiveness. Elasticity of substitution between different denominations of monetary and financial assets may be so high that even a small exchange rate change induces large portfolio shifts with uncertain wealth effects. Furthermore, even small exchange rate volatility may induce a self-fulfilling speculation. Taking into account that the seigniorage argument is weak in such circumstances, one may assume that these countries would prefer earlier adoption of euro since they see no benefit, just harm, arising from exchange rate flexibility.

Of course, policy is a matter of reality. Three countries taken together have 15 million inhabitants and produce 38 billion USD of GDP in 2000. It is very hard to expect a radical shift of the European policy because of three relatively insignificant European countries which are not among the first wave of accession candidates. One can only hope to see pragmatic solutions in cases when policy moves benefits European accession process as well as the economy of a candidate country.

### ***Annex: The Data***

	<b>CSI'</b>	<b>GDPp.c.</b>	<b>M3/GDP</b>	<b>LA</b>	<b>C_S</b>
Belarus	0.78	1260	0.125	0	0
Croatia	0.75	4600	0.294	0	0
Czech Republic	0.33	3594	0.711	0	1
Estonia	0.29	3644	0.26	0	0
Hungary	0.24	4599	0.404	0	0
Latvia	0.7	2764	0.242	0	0
Lithuania	0.25	1226	0.167	0	0
Poland	0.2	4507	0.354	0	0
Romania	0.36	1211	0.217	0	0
Russia	0.82	1679	0.166	0	0
Slovakia	0.35	3712	0.74	0	1
Slovenia	0.45	9631	0.358	0	0
Turkey	0.41	2974	0.267	0	0
Argentina	0.69	7904	0.217	1	0
Costa Rica	0.41	4092	0.398	1	0
Indonesia	0.21	623	0.498	0	0
Israel	0.18	17040	0.821	0	0
Peru	0.54	2141	0.228	1	0
Saudi Arabia	0.36	7321	0.491	0	0
Venezuela	0.09	4500	0.187	1	0
Ukraine	0.69	699	0.119	0	0

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