FINANCIAL CRISES PROPAGATION TO ALBANIA: A COMPARISON OF THE RUSSIAN AND TURKISH CRISES

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ABSTRACT

This paper examines crisis propagation mechanisms to the Albanian exchange rate market during the 1998 Russian crisis and the Turkish crisis of 2001. It focuses on whether and how the crises spread to this market after interdependencies and common external shocks are accounted for. We present and compare the results for Albania with the effects of these crises on the neighbouring countries of Bulgaria and Croatia. Understanding the propagation mechanisms of crises to Albania and the reaction of this market to such shocks in comparison to trading partners and other countries within Europe is an important issue in the context of the potential accession of Albania to the European Union and the adoption of an inflation targeting framework. We find that Albania has relatively isolated financial markets in comparison with the other countries in the sample and is not affected by contagion.

1 INTRODUCTION

This paper examines crisis propagation mechanisms to the Albanian exchange rate market during the 1998 Russian crisis and the Turkish currency crisis of 2001. It focuses on whether and how the crises

spread to this market after interdependencies and common external shocks are accounted for. The paper is particularly concerned with measuring the importance of 'contagion' to the currency markets of Albania, Bulgaria, Croatia, Germany, Russia and Turkey. Contagion is the unanticipated transmission of a shock across national currency markets during a crisis period.[1]

The importance of understanding the propagation mechanisms of crises to Albania is twofold. i) The main goal of the Bank of Albania is the stability of prices. Albania is a small relatively open economy mainly oriented towards imports, which were 29.17% of GDP in 2003.[2] In this context, the exchange rate pass-through ought to have an important effect on the price setting process. Determining whether external factors and crises affect the exchange rate market is important in the decision making process of the Central Bank, especially given the aim of implementing an inflation targeting (IT) framework in 2007. ii) Shock transmission across national borders within Europe is an important issue in the context of the potential accession of Albania and the other southern-eastern European countries to the European Union.

By comparing the magnitude of the effects of contagion on the set of sample countries, it is possible to glean some understanding about i) how Albania is affected by systemic shocks such as the Russian shock which affected most countries around the world, and ii) shocks which are regional in nature such as the Turkish shock. Comparing the impact of these crises on Albania with Bulgaria and Croatia provides a benchmark on how Albania was affected relative to world shocks in tranquil times.

A multivariate model of contagion is specified by using a latent factor framework. Generalised method of moments (GMM) estimation and variance decomposition techniques are used to identify the relative importance of each crisis on the exchange rate markets in the sample. Examples of modelling contagion in currency markets using latent factor models can be found in Dungey and Martin (2004) and Dungey, Fry and Martin (2003) for the Asian crisis. Dungey, Fry, González-Hermosillo and Martin (2002, 2003c) use latent factor models to examine contagion during the Russian

and LTCM crises in bond and equity markets respectively. Corsetti, Pericoli and Sbracia (2001, 2003), Bekaert, Harvey and Ng (2005) and Rigobon (2003) also use factor models to illustrate the concept of contagion.[3] Rigobon (2003) in particular analyses the Russian crisis, while Kaminsky and Reinhart (2001) use factor analysis in understanding asset market synchronisation during the Russian crisis.

There does not appear to be much written on the subject of contagion from the Turkish crisis in 2000-2001 to other countries within the region. Serwa and Bohl (2003) briefly examine contagion from Turkey to Poland, Hungary and the Czech Republic. They find little evidence of contagion and also find that Eastern European countries do not seem to be as affected by a common factor (as measured by principal components). Others examine causes and implications of the crisis, but don't estimate empirical models of contagion (see for example Özatay and Sack (2002), Yeldan (2002) and Eichengreen (2002)).

In this paper, the reinforcing contagion transmission effects amongst the sample set of countries, as shocks due to contagion feedback amongst the sample, are specifically modelled. Contagion from Russia that transmits to the Balkan countries during the Russian crisis period is important for Bulgaria, Croatia, Turkey and Germany. Albania is the only Balkan country where contagion from Russia is not important, while Croatia was affected the most from the crisis. Some of the effects of the Russian crisis are propagated to Albania via Germany and Turkey and there is little spillover between Croatia and Bulgaria.

The results for the Turkish crisis are similar to those of the Russian crisis, in that Albania, apart from a small amount of contagion from Croatia, is predominately unaffected by contagion. In both the pre-crisis and crisis periods, currency returns are driven mainly by country specific factors rather than world factors. Bulgaria and Croatia seem to be unaffected by Turkey, although there are more important cross contagion effects between these two countries. Overall, the Russian crisis systemically spills over to most countries in the sample, while the Turkish crisis is much more localised.

That Albania is relatively unaffected by the two crises compared to Bulgaria and Croatia can possibly be explained by two hypotheses. The first hypothesis is that Albania managed the crisis well. The second is that Albania's financial markets are relatively less developed than the other Balkan countries in the sample, and hence are driven mainly by idiosyncratic factors. The latter hypothesis is more likely to be the case. However, understanding the impact of such crises on Bulgaria and Croatia is important, as Albania is likely to react to a shock in similar ways as it develops, particularly in light of the potential accession to the European Union and the subsequent integration and development of financial markets that would ensue. The rest of the paper proceeds as follows: Section 2 presents the background to the Russian and Turkish crises along with a brief overview of the exchange rate systems for the sample countries. Section 3 presents the model of contagion and briefly explains the estimation methodology, followed by an overview of the data in Section 4. Section 5 presents the empirical results, while the conclusions are contained in Section 6.

2 BACKGROUND

a. The Russian crisis

Following the collapse of the communist regime in 1989, the newly formed state of the Russian Federation inherited an over-industrialised economy dominated by a highly inefficient heavy industry and endless bureaucracy. The 'give-away' mass privatisation process applied between 1992 and 1994 resulted in the accumulation of most of the productive capacity in the hands of previous company managers. They had little incentive or capital to keep the companies running, or to undertake the desperately needed restructuring of the enterprises (Illarionov (1999)). As can be seen from Table 1, production between 1990-97 was negative, and Russia relied heavily on foreign direct investment and activities performed by the state in order to achieve growth.

August 17, 1998 is marked as the beginning of the Russian crisis as the Rouble was devalued and Russia defaulted on its sovereign debt obligations. Prior to the crisis, the Russian Federation accumulated

huge budget deficits and managed debt poorly. Table 1 presents some key economic indicators for Russia over 1995 to 1998. The constant passage of unrealistic laws seriously destabilized budget fulfilment and the government deficit became an unbearable burden for the Russian economy (Hale (1999)). The constant growth in state debt led to a rise in spending to service it. Interest expenditures amounted to 8.7% of GDP in the first months of 1998, while 60.9% of tax revenues covered interest expenditure. These two factors led to a debt crisis which in turn provoked the currency crash and enhanced the banking crisis.

Table 1: Selected indicators on the Russian economy for the period 1995-98.

Year	1995	1996	1997	1998
Gross Domestic Product (change)	-4.1	-3.5	0.8	-4.8
Unemployment Rate (%)	8.8	9.9	11.3	13.3
Inflation (annual average)	66%	32%	13%	22%
Av. Yield on short -term (3M) T-Bills	168.04	86.1	23.4	n.a.
Gross Forex Debt (in billion $)	120.5	125	130.8	149
Trade Balance (in billion $)	20.4	26.8	19.8	13.3
Exchange Rate (period average)	4.56	5.12	5.78	9.71

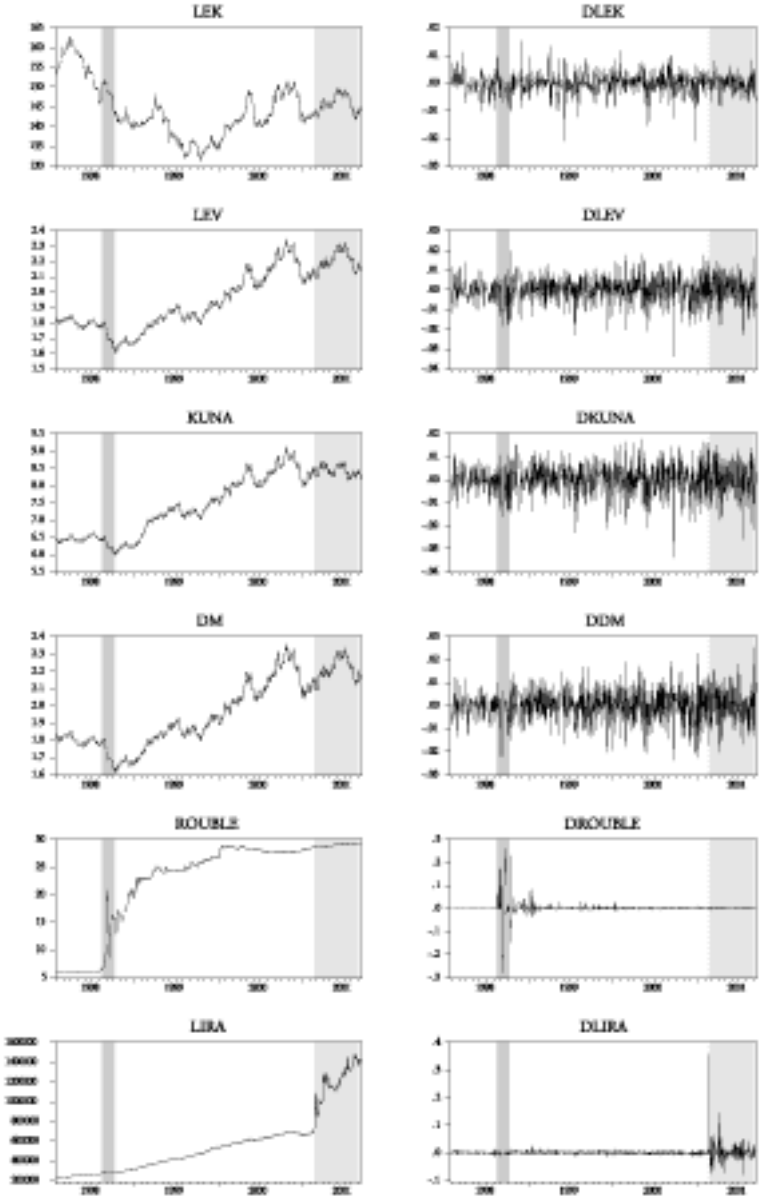
Data source: International Financial Statistics

Despite measures taken by the Russian government to control the crisis, including the attempt to replace debt instruments denominated in Roubles with ones denominated in foreign currency, the currency peg was abandoned on the 17 of August.[4] This had repercussions across world financial markets (Committee on the Global Financial System (1999) and Kharas, Pinto, and Ulatov (2001)), because international financial linkages with Russia prior to the onset of the crisis were strong. At the time of the crisis outbreak, the total exposure of non-residents to the Russian economy in the form of debt and equity amounted to $200-250 billion.[5] Many foreign banks were caught by a double edged sword, because not only were they directly exposed to the Russian bond market (holding 30% of Russia's total debt), but they had lent to Russian banks through repurchase agreements, taking Russian bonds as collateral. This was particularly true of German banks (Van Rijckeghem and Weder (2001, 2003)).

The Russian crisis severely affected credit risk concerns. The liquidation of positions in Russian assets by international investors became very difficult due to the 90-day moratorium on the repayment

of credits received by non-residents of the Russian Federation. The current view is that the abandonment of the Russian currency peg and the default on debt resulted in more conservative behaviour by international investors due to increased risk aversion, and liquidity considerations (Greenspan (1999), Bank of England (2002), Dungey, Fry, González-Hermosillo and Martin (2003)). This led to the unwinding of positions in asset markets outside of Russia especially in Eastern Europe where the Balkan countries pertain. However, unlike previous financial crises affecting emerging markets such as the Asian financial crisis, the Russian crisis was not just a regional crisis contained within Eastern Europe, but spread dramatically to both industrialized and emerging economies alike (see Dungey, Fry, González-Hermosillo and Martin (2002, 2003)). The spread of uncertainty following the Russian default is demonstrated by unusual fluctuations in the currency markets of these countries as can be seen from Figure 1.

Figure 1: Levels and returns (in natural logs) of the exchange rates of the Albanian Lek, the Bulgarian Lev, the Croatian Kuna, the German Mark, Russian Rouble and the Turkish Lira from January 1998 to September 2001 (the Russian crisis is marked in light shading and the Turkish crisis in dark shading).



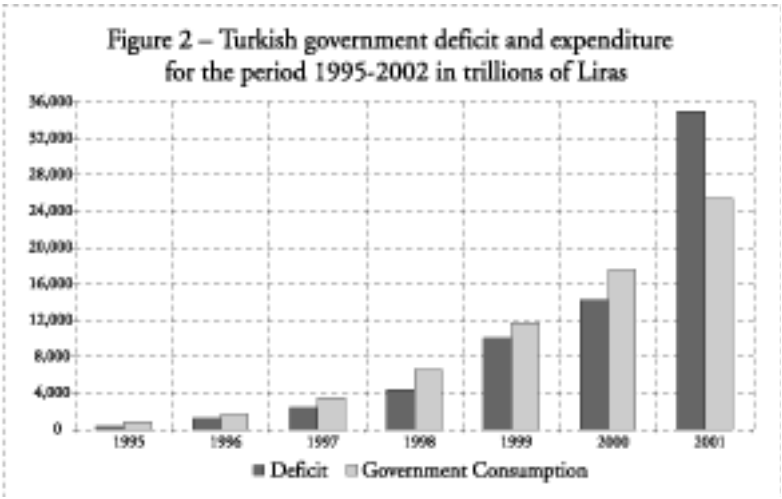
b. The Turkish crisis

Turkey experienced several crises during the 1990's and early 2000's. During this period, Turkey had high levels of inflation, and as a result, negative real GDP growth (see Table 2). Economic growth in the mid 1990's was mainly driven by government consumption and financed by extensive government deficits (see Figure 2). Towards the end of 1999 when the public deficit was running at 23% of GDP, short-term debt was larger than reserves and the current account deficit had reached 5% of GDP, partly due to an overvalued currency.

Table 2 – Turkish macroeconomic indicators for the period 1995-2002

	1995	1996	1997	1998	1999	2000	2001	2002
Inflation	80%	86%	85%	65%	55%	54%	45%	25%
Unemployment	6.6	5.8	6.9	6.2	7.3	6.6	8.4	10.3
GDP Growth	90%	95%	81%	48%	61%	43%	55%	30%

Data source: International Financial Statistics



Due to the large current account deficit accumulated by 2000 and the expanding public deficit (domestic and foreign), Turkey was hit by a liquidity crisis in November 2000. Despite the short time span, the crisis had longer term implications for the financial system due to the erosion of the Central Bank reserves. The IMF intervened by giving Turkey an emergency loan in December 2000, which was a

temporary measure. On February 22, 2001 Turkey had to adopt a free floating exchange rate policy.

c. Exchange rate regimes

To complete the background information, this section briefly discusses the exchange rate regimes of Albania, Bulgaria and Croatia in order to put them into context in understanding the empirical results. These countries follow different exchange rate regimes. The Bank of Albania operates under a "dirty" floating regime[6], which means that the bank intervenes sporadically in the exchange rate market. Modes and frequency of intervention vary, but the bank mainly intervenes in periods of significant changes in supply due to the arrival of expatriates that work in Europe, mainly in April, July/ August and December.

Since its establishment in 1994, Croatia has operated a managed floating exchange rate regime where most of the time the exchange rate against each foreign currency reflects the equilibrium of supply and demand. On certain occasions, the Central Bank intervenes in the exchange rate market in order to prevent the occurrence of major fluctuations in terms of both appreciations and depreciations. The Central Bank does not have a predetermined band for the exchange rate but until now the Kuna has fluctuated within a 6% band against the Deutsch Mark/Euro.

Bulgaria, on the other hand, is different to the other two countries. Since the hyperinflation of 1996-7, a currency board arrangement has been in place, where the Lev is pegged to a basket of currencies.

3 THE MODEL

This section specifies a model of financial market contagion in currency markets using a latent factor framework (see King, Sentana and Wadhwani (1994), Diebold and Nerlove (1989), Ng, Engle and Rothschild (1992) and Mahieu and Schotman (1994)). This methodology was developed in Dungey and Martin (2004) and extended in Dungey, Fry and Martin (2004) for currency markets.

The model of contagion aims to capture both interdependencies between the financial markets of Albania (A), Bulgaria (B), Croatia (C), Germany (G), Russia (R) and Turkey (T), as well as any contagion effects which transmit across this set of countries during the crises periods. To model these relationships, a factor framework commonly used in the finance literature is utilized, where financial market returns are a function of systematic and idiosyncratic risk (Solnik (1974) and Campbell, Lo and MacKinley (1997)).

a. Pre-crisis period relationships

Let $s_{i,t}$ denote the continuously compounded percentage return of the i^{th} asset ($s_{i,t}$) at time t, which is calculated by taking the daily difference of the natural logarithm of the currency data; that is

$$s_{i,t} = 100 \times (\ln(S_{i,t}) - \ln(S_{i,t-1})). \quad (1)$$

The currency returns are then demeaned and denoted $z_{i,t}$, where

$$z_{i,t} = s_{i,t} - \bar{s}_i \quad (2)$$

and is the sample mean of the i^{th} currency return.

The model of contagion can be built up by first considering a period in which there is no financial crisis, generally, a pre-crisis period. The data set $z_{i,t}$ can be separated into a set of pre-crisis period observations $x_{i,t}$ containing t1 observations, and a set of crisis period observations containing t2 observations. Returns for each country in the pre-crisis period are specified formally as follows,

$$x_{i,t} = \lambda_i W_t + \theta_0 V_t + \gamma_i C_{i,t} \quad i = A, B, C, G, R, T, \quad (3)$$

where each return is a linear function of three independent factors. The first factor is a world factor (W_t) which impacts on each series with loadings λ_i. The second factor is a numeraire factor, or fixed factor (V_t) with loading θ_0. The numeraire factor is included in the model for currency returns to capture the impact of expressing currency returns in a common currency, namely, the US dollar.

These two common factors capture interdependencies across the six currency markets. These are the factors which capture systematic risk. The third factor for each country is a country specific factor ($C_{i,t}$) with loading γ_i. This factor captures information that is unique to each countries asset return, and captures the idiosyncratic risk referred to above.

b. Crisis period relationships

Contagion is defined as the unanticipated transmission of a shock across financial markets, over and above those which exist during tranquil times. To formally model such crisis period linkages, the model in (3) can be augmented by allowing for shocks from a source crisis country to the other countries in the model. Using a simple example to illustrate, consider the impact of contagion from Russia to Albania. Currency returns in the crisis period are denoted as $y_{i,t}$. The returns for Russia follow a similar process to that in equation (3), with the addition of a structural break in the country specific factor, denoted σ_R which captures the crisis in Russia. That is

$$y_{R,t} = \lambda_R W_t + \theta_0 V_t + \sigma_R \gamma_R C_{R,t}. \quad (4)$$

Contagion from Russia to Albania is modelled by allowing the country specific shock in Russia to impact on the asset returns of Albania during the crisis period. Returns for Albania can be expressed as

$$y_{A,t} = \lambda_A W_t + \theta_0 V_t + \gamma_A C_{A,t} + \delta_A C_{R,t}. \quad (5)$$

The Albanian returns are still a function of the world and country specific factors, but now, the country specific factor for Russia ($C_{R,t}$) transmits to Albania with loading δ_A.

The model of contagion can be generalized for all *i* and augmented to allow for additional contagious linkages, so that the expression above becomes

$$y_{i,t} = \lambda_i W_t + \theta_0 V_t + \gamma_i C_{i,t} + \sum_1^J \delta_{i,j} C_{j,t} \quad i = A, B, C, G, T, R, \quad \forall i \neq j. \quad (6)$$

Finally, all factors are iid with zero mean and unit variance.

c. Variance decomposition

An advantage of the assumption that the factors are independent is that the relative importance of the factors in (3) and (6) can be determined quite simply by calculating variance decompositions. Using the simple example from above, the expression for the variance in the pre-crisis period is expressed as

$$\text{var}(x_{i,t}) = \lambda_i^2 + \theta_0^2 + \gamma_i^2. \qquad (7)$$

The variance of the pre-crisis asset returns can be decomposed into its constituent factors, whereby, the contribution of world shocks as a proportion of the total variance can be expressed as

$$\left(\frac{\lambda_i^2}{\text{var}(x_{i,t})}\right). \qquad (8)$$

The contribution of the numeraire factor can be expressed as

$$\left(\frac{\lambda_i^2}{\text{var}(x_{i,t})}\right). \qquad (8)$$

and the contribution of the country specific factor can be expressed as

$$\left(\frac{\gamma_i^2}{\text{var}(x_{i,t})}\right). \qquad (10)$$

A similar decomposition is calculated for the crisis period from (6), where for all countries except Russia, the total variance is expressed as

$$\text{var}(y_{i,t}) = \lambda_i^2 + \theta_0^2 + \gamma_i^2 + \sum_i^j \delta_{i,j}^2 \quad \forall i \neq j, \qquad (11)$$

while for Russia the total variance is,

$$\text{var}(y_{R,t}) = \lambda_R^2 + \theta_0^2 + (\sigma_R \gamma_R)^2 + \sum_i^j \delta_{R,j}^2 \quad j = A, B, C, G, T. \qquad (12)$$

Following the above formulae, the contribution of contagion to the total variance in the crisis period is

$$\frac{\sum_{j}^{J}\delta_{i,j}^{2}}{\mathrm{var}(y_{i,t})} \qquad \forall i \neq j \qquad (13)$$

The analysis of the crisis episodes in Section 5 will be undertaken in the variance decomposition framework in order to quantify the relative importance of contagion compared to world and country specific factors.

d. Estimation methodology

The model in equations (3) and (6) is estimated by GMM (see Hamilton (1994), Chapter 14, and Hansen (1982)).[7] The set of unknown parameters in (3) and (6) denoted θ are estimated by equating the sample moments with the theoretical moments derived from the model. To estimate the model, moments are calculated for each of the distinct pre-crisis and crisis period. The variance-covariance matrix from the pre-crisis period is used to estimate the world, numeraire and country specific factors, while the variance-covariance matrix of the crisis period data is used to estimate the contagion parameters. This means that where there are 6 asset markets, up to $\frac{6 \times 7}{2} = 21$ unique parameters can be estimated for each of the pre-crisis and crisis periods. The Newey-West optimal weighting matrix is also used to account for possible autocorrelation.

e. Russian crisis model

As noted above, a possible 21 parameters can be estimated in both the crisis and pre-crisis period. Thus, in order to identify the model, some restrictions must be imposed on the contagious linkages estimated, as the total number of possible combinations of contagious linkages is 30. The pre-crisis period model as presented in equation (3) has a total of 13 parameters to be estimated using the pre-crisis period moments. Thus, there are 8 over identifying restriction in the pre-crisis model.

The choice of the restrictions to identify the model in the crisis period is motivated by large versus small economy assumptions, as well as relationships based on regional trading relationships. The first key assumption is that contagion from Russia being the origin of the crisis transmits to all other currency markets during the crisis period. Second, Germany being one of the largest economies in Europe, with high exposure to the Russian and Eastern European markets, is also potentially an important conduit of the crisis as a common financial centre through which shocks may transmit (Kaminsky and Reinhart (2003)). Third, Turkey, as a historically major trading partner, transmits contagion to Albania, Bulgaria and Croatia, but does not receive contagion from these countries. Finally, linkages due to contagion between Albania, Bulgaria and Croatia exist, due to the inter-linkages through trading relationships and similar levels of development. Given these relationships, the equation for each currency market is formally specified below. However, for ease of reference, Table 3 summarises succinctly the direction in which contagion is hypothesized to transmit. For Albania, Bulgaria and Croatia the model of contagion is specified as

$$y_{i,t} = \lambda_i W_t + \theta_0 V_t + \gamma_i C_{i,t} + \sum_j^j \delta_{i,j} C_{j,t}, \quad i = A,B,C, \; j = A,B,C,G,R,T \quad \forall i \neq j, \quad (14)$$

while for Germany, Russia and Turkey,

$$y_{i,t} = \lambda_i W_t + \theta_0 V_t + \gamma_i C_{i,t} + \sum_j^j \delta_{i,j} C_{j,t}, \; i = G,R,T, \; j = G,R,T \; \forall i \neq j. \quad (15)$$

Note that the structural break defined in (6) is not included in the specification for Russia. Estimating the structural break for the Russian country specific factor proved to be explosive. Instead, the country specific factor across the pre and crisis periods was held constant.

Table 3: Summary of linkages due to contagion in the Russian crisis period

Contagion	Contagion to					
from	Albania	Bulgaria	Croatia	Germany	Russia	Turkey
Albania	n.a.	yes	yes	no	no	no
Bulgaria	yes	n.a.	yes	no	no	no
Croatia	yes	yes	n.a.	no	no	no
Germany	yes	yes	yes	n.a.	yes	yes
Russia	yes	yes	yes	yes	n.a.	yes
Turkey	yes	yes	yes	no	no	n.a.

f. Turkish crisis model

The inclusion of Germany in the Turkish crisis was problematic, potentially due to multicollinearity between the two exchange rates, as Turkey operated a crawling peg to a weighted basket of the US Dollar and Euro currencies. This did not seem to be a problem in the estimation of the Russian crisis model, probably because the Euro and Deutsch Mark were separate currencies in 1998. Estimation of interdependencies and contagion is thus confined to Albania, Bulgaria, Croatia, Russia and Turkey.

Table 4 summarises the direction of contagion hypothesized to transmit across countries. The formal equation for Albania, Bulgaria and Croatia during the Turkish crisis period is specified as

$$y_{i,t} = \lambda_i W_t + \theta_0 V_t + \gamma_i C_{i,t} + \sum_{j}^{J} \delta_{i,j} C_{j,t}, \; i = A,B,C, \; j = A,B,C,R,T \quad \forall i \neq j, \quad (16)$$

Russia is included as a control to capture events in Eastern Europe, and is a recipient of contagion, but is not a transmitter. Thus, the equation for Russia during the crisis period is the same as that for the pre-crisis period. Namely

$$y_{R,t} = \lambda_R W_t + \theta_0 V_t + \gamma_R C_{R,t} + \delta_{R,T} C_{T,t}. \quad (17)$$

The specification for Turkey includes the structural break in the country specific factor, but it is assumed that no contagious linkages flow back to Turkey as follows

$$y_{T,t} = \lambda_T W_t + \theta_0 V_t + \sigma_T \gamma_T C_{T,t}. \quad (18)$$

Table 4: Summary of linkages due to contagion in the Turkish crisis period

Contagion	Contagion to				
from	Albania	Bulgaria	Croatia	Russia	Turkey
Albania	n.a.	yes	yes	no	no
Bulgaria	yes	n.a.	yes	no	no
Croatia	yes	yes	n.a.	no	no
Russia	no	no	no	n.a.	no
Turkey	yes	yes	yes	yes	n.a.

4 THE DATA

The data used are daily exchange rates of Albania, Bulgaria, Croatia, Turkey, Russia and Germany versus the US dollar.[8] Missing observations due to weekends and holidays are deleted.[9]

a. The Russian crisis

The sample period for the estimation of the factor model for the Russian crisis is defined as from January 30, 1998 until October 14, 1998. The pre-crisis period extends from January 30 until August 13, 1998, for a total of 127 observations. This period is chosen to avoid the effects of the 1997 pyramid scheme collapse in Albania, and ends just prior to the effective sovereign bond default in Russia. The crisis period begins on August 14 (just before the Russian default) until October 14, 1998, for a total of 38 observations. This date is chosen as it is just before the LTCM near collapse in the United States. Inclusion of the LTCM period would make it difficult to disentangle the impact of the Russian and LTCM crises on Albania, Bulgaria and Croatia. Given that ultimately this paper is interested in commenting on the impact of shocks within Europe on these three Balkan countries, the LTCM period is excluded.

Table 5 – The Russian pre and crisis sample statistics for the log returns

Country	Period	Mean	Median	Maximum	Minimum	Std. Dev.
Albania	Pre	-0.0002	-0.0003	0.0112	-0.0103	0.0035
	Crisis	-0.0006	-0.0007	0.0096	-0.0094	0.0044
Bulgaria	Pre	-0.0003	-0.0006	0.0139	-0.0118	0.0046
	Crisis	-0.0019	0.0000	0.0198	-0.0181	0.0085
Croatia	Pre	-0.0001	-0.0001	0.0114	-0.0121	0.0046
	Crisis	-0.0013	0.0012	0.0109	-0.0160	0.0077
Germany	Pre	-0.0002	0.0004	0.0122	-0.0135	0.0048
	Crisis	-0.0018	-0.0012	0.0114	-0.0218	0.0070
Russia	Pre	0.0003	0.0003	0.0014	-0.0003	0.0002
	Crisis	0.0181	0.0011	0.2588	-0.2779	0.0940
Turkey	Pre	0.0016	0.0012	0.0127	-0.0093	0.0037
	Crisis	0.0005	0.0002	0.0128	-0.0090	0.0043

During the crisis period the mean of the returns of the exchange markets decreased significantly for all currencies and the spread between the minimum and maximum returns increased significantly. Furthermore, the volatility of returns at least doubled for most of the

exchange rates (see Table 5). Comparison of the correlation matrices of the pre and crisis periods in Table 6 shows a significant change in the correlations between all the countries. More specifically, there is an increase in the correlations of all the countries with Russia and Turkey. This hints that the investigated markets might have been affected by the crisis and that relationships between them changed.

Table 6 - The correlation matrix for the Russian pre and crisis (in bold) period

Pre/ Crisis	Albania	Bulgaria	Croatia	Germany	Russia	Turkey
Albania		-0.03	0.03	0.04	0.01	-0.01
Bulgaria	0.11		0.89	0.32	0.31	0.80
Croatia	0.03	0.54		0.43	0.33	0.72
Germany	-0.01	0.34	0.51		0.25	0.33
Russia	-0.02	-0.08	-0.12	-0.12		0.05
Turkey	0.15	0.51	0.29	0.25	-0.08	

b. The Turkish crisis

The sample period for the Turkish crisis extends from January 3, 2000 to September 10, 2001. The pre-crisis period runs until February 21, 2001, the day before Turkey had to give up its peg. The crisis period is defined as February 22 to September 10, 2001, to avoid capturing any effects from the financial markets turmoil due to the terrorist attacks on the World Trade Centre.

Table 7– The Turkish pre and crisis sample statistics for the log returns

		Mean	Median	Maximum	Minimum	Std. Dev.
Albania	Pre	0.0002	0.0004	0.0117	-0.0208	0.0038
	Crisis	0.0000	0.0006	0.0082	-0.0082	0.0031
Bulgaria	Pre	0.0006	0.0010	0.0181	-0.0336	0.0073
	Crisis	0.0000	0.0004	0.0168	-0.0228	0.0068
Croatia	Pre	0.0003	0.0007	0.0178	-0.0336	0.0074
	Crisis	-0.0002	-0.0001	0.0151	-0.0259	0.0074
Russia	Pre	0.0002	0.0000	0.0253	-0.0070	0.0027
	Crisis	0.0002	0.0000	0.0038	-0.0036	0.0010
Turkey	Pre	0.0008	0.0010	0.0145	-0.0112	0.0040
	Crisis	0.0050	0.0011	0.3569	-0.0789	0.0405

Standard deviations in the Turkish crisis did not change much over the pre and crisis periods, except for the Turkish Lira, which changed dramatically. This can be taken as evidence that the Turkish crisis was not systemic like the Russian crisis. The correlation matrices in Table 8 further reinforce this hypothesis, as there is little change

in correlations between the pre and crisis period, except Turkey and Croatia.

Table 8 - The correlation matrix for the Turkish pre and crisis (in bold) period

	Albania	Bulgaria	Croatia	Russia	Turkey
Albania		- 0.01	0.02	0.12	0.11
Bulgaria	0.05		0.06	0.06	- 0.05
Croatia	0.07	- 0.00		- 0.18	0.08
Russia	0.04	- 0.02	0.06		- 0.09
Turkey	- 0.00	0.16	0.63	- 0.04	

5 EMPIRICAL RESULTS

Tables 9 and 10 present the volatility decompositions of USD exchange rates of the sample of countries for the Russian and Turkish crises respectively. In each table, the first panel presents the decomposition for the pre-crisis period, while the second panel presents the decomposition for the crisis period.[10]

a. Pre-crisis decompositions

In each pre-crisis period, the country specific factor is the most important factor for Albania. Over the pre-Russian crisis period 99.87% of Albania's volatility is due to country specific factors (panel 1 of Table 9) compared to 90.99% for the pre-Turkish crisis period (panel 1 of Table 10). This result contrasts with those for Bulgaria and Croatia whose decompositions are remarkably similar prior to the Russian crisis with 77% and 70% of volatility in currency markets explained by world factors, and the remainder by idiosyncratic shocks. The similarity of Albania with Bulgaria and Croatia becomes apparent during the pre-Turkish crisis period, as in this sub-sample, Bulgaria and Croatia are affected predominantly by country specific factors (90.10 and 95.72% respectively). This marked difference in results for Bulgaria and Croatia compared to the Russian crisis period is probably explained by the fact that Germany is missing from the Turkish crisis sample due to the multicollinearity issue discussed previously.

Germany and Turkey are quite similar before the Russian crisis with around 60 percent of their volatility from country specific

factors. Turkey on the other hand is driven by world factors before its crisis period, probably because of its success in managing to retain the crawling peg exchange rate system (against the Euro and USD) in late 2000. Prior to both crises, Russia is mainly driven by country specific factors (99 and 94.59%). The numeraire is unimportant for the Russian crisis estimation, but has more of an impact for the Turkish crisis estimation. Again, this is probably due to the omission of Germany from this set of results. The numeraire might be picking up some of the effects that Germany may have had on the set of countries considered.

b. Crisis decompositions

The Russian shock is systemic and spread to all countries excluding Albania (Table 9). Even Germany is severely affected with 33.57% of volatility in the market for Deutsch Marks caused by contagion from Russia. It can be noticed that contagion from Russia that spills over to the Balkan countries (excluding Albania) is important accounting for large changes in their exchange rate markets. Compared to all other countries in the sample, Croatia is most affected by Russia in percentage terms. The Wald tests for joint contagion, in Table A4 of Appendix 2, indicate that contagion is jointly significant during the Russian crisis, from Russia and overall.

Feedback effects from the Russian shock to the other countries in the sample result in Germany, Turkey and Bulgaria becoming sources of contagion as well. Germany in particular, is also a source of contagion to Bulgaria (28%), Turkey (19%), and Albania (12.9%). In fact, most of the repercussions for Albania are filtered through Germany and a little through Turkey, while there is very little direct impact from Russia or from the other countries of the region.

The similarities between Bulgaria and Croatia carry through to the Russian crisis period. The currency markets for the Lev and the Kuna experience a similar amount of volatility from total contagion, albeit from slightly different sources. The combined impact of contagion to Bulgaria is 63.64% of total volatility, compared to 65.89% for Croatia. There is also a degree of spillover between these two markets in the Russian crisis period, particularly from Bulgaria to Croatia.

Overall, contagion is not significant individually in the Turkish crisis, apart from the case of Turkey to Albania and Turkey to Croatia. Inspection of Table 10 reveals that although these linkages are significant, they contribute less than 2.5 percent to total volatility of returns. The joint tests of contagion in Table A4 show that overall, contagion from Turkey to the other four countries is significant, and contagion to Albania and Bulgaria from Croatia is also significant.

The similarities between Bulgaria and Croatia are not as obvious during the Turkish crisis period (Table 10). Croatia is still the main country where contagion is important with 23.35% of total volatility due to contagion. Surprisingly, contagion from Bulgaria is the largest source of contagion to Croatia, accounting for 13.95% of volatility. There is more cross market contagion amongst the Balkan countries during the Turkish crisis, than in the Russian crisis.

One of the key implications of these results for Albania relative to its regional partners is that being driven by country specific factors appears to make it immune to shocks due to contagion. This may indicate that contagion has a smaller impact on Albania due to its country specific nature, rather than its choice of exchange rate regime. The currency board system in Bulgaria and the managed float system within the 6% band system of Croatia did not insulate either of these countries from contagion during the crises periods.

There are two hypotheses that may explain why Albania seems to be unaffected by contagion compared to its partners Bulgaria and Croatia. The first hypothesis is that monetary policy and market intervention in Albania at the time contributed to the aversion of the crisis. This hypothesis is not likely to be the case particularly during the Russian shock, which affected countries such as Germany and the United States, who were presumably more able to fend off such crises. The second hypothesis is that Albania's financial markets are relatively less developed than those of Bulgaria and Croatia, and are not a large part of the emerging market portfolios of international investors and so escaped the 'panic' buying and selling of their national currencies. This level of development of the Albanian financial markets may have acted as a kind of natural capital control. The case of Albania can be compared to that of Cambodia and Laos

as well as Chile, which although being geographically right beside Thailand and Mexico respectively, were relatively unscathed in terms of financial market turmoil by the Asian (Okonjo-Iweala et al (1999)) and Mexican (Edwards (1998)) financial crises. Awareness of the impact of external shocks on Bulgarian and Croatian markets provides insight to potential influences of future shocks on Albania, as its financial markets develop.

Table 9: Volatility Decomposition Russian crisis

Factor	Albania	Bulgaria	Croatia	Germany	Russia	Turkey
pre-crisis period						
World	0.13	77.12	69.79	38.53	0.07	36.17
Country	99.87	22.88	30.21	61.47	99.93	63.83
Numeraire	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00
crisis period						
World	0.10	28.04	26.57	25.59	0.07	24.32
Country	81.66	8.32	11.50	40.84	98.60	42.91
Numeraire	0.00	0.00	0.00	0.00	0.00	0.00
Contagion from						
Albania	-	0.01	0.04			
Bulgaria	0.00	-	7.13			
Croatia	0.01	3.76	-			
Germany	12.90	28.00	6.64	-	1.33	19.00
Russia	0.90	29.93	44.79	33.57	-	13.77
Turkey	4.43	1.94	3.33	-		
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 10: Volatility Decomposition Turkish Crisis

Factor	Albania	Bulgaria	Croatia	Russia	Turkey
pre-crisis period					
World	0.80	1.76	1.24	0.09	99.47
Country	98.07	98.10	95.72	94.69	0.01
Numeraire	1.12	0.14	3.04	5.21	0.51
Total	100.00	100.00	100.00	100.00	100.00
crisis period					
World	0.79	1.63	0.94	0.09	0.51
Country	90.98	90.95	72.80	93.14	99.49
Numeraire	1.03	0.12	2.31	5.13	0.00
Contagion from					
Albania	-	0.47	8.31		
Bulgaria	0.53	-	13.95		
Croatia	4.22	6.33	-		
Russia				-	
Turkey	2.48	0.49	1.69	1.64	-
Total	100.00	100.00	100.00	100.00	100.00

6 CONCLUSIONS

This paper investigated the impact of the Russian and Turkish crises of 1998 and 2001 on Albanian currency markets with the effects of these crises on the neighbouring countries of Bulgaria and Croatia. Germany, Russia and Turkey were also included in the sample as either a control variable in the case of Germany, or as a control variable and source of the crises in the case of Russia and Turkey.

It is important to understand how potential European Union accession countries are affected by shocks from their trading counterparties and key economies within the region. Albania, Bulgaria and Croatia are all connected directly and indirectly through trade and financial linkages with both crises countries.

The results from the estimation of Russian and Turkish crises models are quite different. The Russian crisis, being a global shock, was jointly and individually contagious for all the countries in the sample, but to a lesser extent to Albania. Bulgaria and Croatia appear to be quite similar in terms of the driving factors of their currency markets, which were mainly world specific. On the other hand the Turkish crisis appears to be country specific and did not spread through the region; there was little significant contagion in this crisis.

In both crises Albania was relatively unaffected and was repeatedly driven by country specific factors. This is in stark contrast with the other two Balkan countries considered, who were more influenced by global shocks. The main reason behind Albania's resilience to the crises could lie in the low level of development of its asset markets.

However, understanding the impact of external shocks on Bulgarian and Croatian markets provides insight to potential influences of future shocks on Albania, as its financial markets develop. These results are concurrent with those reached by Dornbusch, Park and Claessens (2000) that the higher the degree of financial market integration, the more pronounced the contagious effects of shocks will be.

7 APPENDICES

Appendix 1: Data Sources

Table A1: Data sources and codes.

Country	Source	Database/ Code
Albania	Monetary Operations Department, Bank of Albania	
Bulgaria	Websites of the Central Bank of Bulgaria from Jan 29th - November 29th 1998; DataStream for the period November 30th 1998 – December 31st 1999.	BULGLV$
Croatia	DataStream	CROATK$
Germany	DataStream	USWGMRK
Russia	DataStream	RSUSDSP
Turkey	Reuters Terminal	TRLUSD

Appendix 2: Parameter estimates

Table A2: Russian crisis – currency markets. Parameter estimates (t statistics in parentheses)

Factor	Albania	Bulgaria	Croatia	Germany	Russia	Turkey
World	0.011	0.321	0.304	0.273	0.020	0.176
	(0.397)	(10.078)	(8.174)	(6.465)	(0.389)	(5.957)
Country	0.307	0.175	0.200	0.345	0.770	0.234
	(12.385)	(3.816)	(7.163)	(13.198)	(10.511)	(7.883)
Numeraire	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Contagion from						
Albania		0.006	-0.040			
		(0.073)	(-0.214)			
Bulgaria	0.003		-0.900			
	(0.027)		(-0.934)			
Croatia	0.014	0. 588				
	(0.181)	(0.243)				
Germany	0.353	-0.931	-0.441		-0.259	-0.452
	(2.127)	(-2.553)	(-1.775)		(-0.474)	(-3.414)
Russia	0.042	-0.431	-0.513	-0.406		-0.172
	(0.582)	(-2.391)	(-3.790)	(-3.414)		(-2. 460)
Turkey	-0.305	0.361	0.459			
	(-1.842)	(0.587)	(1.201)			

Table A3: Turkish crisis – currency markets. Parameter estimates (t statistics in parenthesis)

Factor	Albania	Bulgaria	Croatia	Russia	Turkey
pre-crisis period					
World	-0.022 (-1.304)	0.093 (2.674)	-0.017 (-2.237)	0.366 (18.603)	-0.004 (-0.392)
Country	0.246 8.146)	-0.695 (21.166)	-0.147 -(15307)	0.004 (0.095)	0.112 (10.954)
Numeraire	-0.026 (-1.794)	-0.026 (-2.522)	-0.026 (-2.522)	-0.026 (-2.522)	-0.026 (-2.522)
Structural break					-1264.139 (-0.095)
Contagion from					
Albania		0.203 (0.435)	-0.208 (-0.600)		
Bulgaria	0.027 (0.460)		0.093 (1.971)		
Croatia	0.359 (0.570)	-1.244 (-1.308)			
Turkey	0.008 (2.327)	-0.010 (-0.975)	0.004 (1.983)	-0.003 (-1.153)	

Table A4: Wald test statistics for contagion during the Russian and Turkish crises.
*denotes significance at the 10% level of significance.
**denotes significance at the 5% level of significance.

Source	Russian Crisis	Turkish Crisis
Albania	0.194[a]	2.045[a]
Bulgaria	0.846[a]	0.460[a]
Croatia	0.029[a]	7.825**[a]
Turkey	3.320[b]	104.016[d]**
Russia	22.385[d]**	
Germany	8.781[d]	
Joint contagion	91.360[c]**	36.250[f]**

(a) Critical value chi-squared 2: 5% = 5.991; 10% = 4.605
(b) Critical value chi-squared 3: 5% = 7.815; 10% = 6.251
(c) Critical value chi-squared 4: 5% = 9.488; 10% = 7.779
(d) Critical value chi-squared 5: 5% = 11.071; 10% = 9.236
(e) Critical value chi-squared 19: 5% = 30.144 10%= 27.204
(f) Critical value chi-squared 10: 5% = 18.307; 10% = 15.987

2-July-97	Bank of Thailand announces a managed float of the Baht.
23-Oct-97	The Hong Kong stock market losses 23% and overnight interest rates shoot to 250%.
17-Nov-97	Korea abandons defence of won.
14-Jul-98	Announcement that Russia will receive $22.6 billion from the IMF and other donors.
20-Jul-98	IMF approved additional assistance to Russia of $11.2 billion.
6-Aug-1998	Russian Bond market initial crash.
11-Aug-98	Foreign investors seemed to be the main driving force behind the market drop. Fears of a weaker yen and the prospect of devaluation in China sent shock waves throughout the world.
13-Aug-98	Russian shares lost more than 10 percent on growing fears of a liquidity crisis among Russian banks.
17-Aug-98	Announcement of the devaluation of the Rouble.
20-Aug-98	Concern Russian banks may fail and Venezuela may devalue.
21-Aug-98	Russia's Central Bank stated that some Russian banks could go bankrupt accentuating the Russian financial crisis. In Germany (a major lender to Russia) stocks plunged, triggering downfalls in London and Paris. LTCM losses $550 million.
26-Aug-98	Stocks fall as Russia announces its debt-restructuring plan.
27-Aug-98	Russia's government unable to sell its newly restructured GKO bills spreading fear that global crisis will continue.
21-Sep-98	LTCM losses another $550 million.
20-Nov-00	Liquidity crisis in Turkey.
6-Dec-00	IMF $10 billion financial package for Turkey.
22-Feb-01	Abandonment of Turkish Lira peg.
11-Sep-01	Terrorist attacks on the World Trade Centres.

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[1] For a review of contagion definitions and estimation methodologies, see Dornbusch, Park and Claessens (2000), Dungey, Fry, González-Hermosillo and Martin (2003b), Pericoli and Sbracia, (2003) and Pesaran and Pick (2003)).

[2] The openness indicator is 37%, as measured by the average level of the ratio between exports plus imports and GDP for the period 1996-2003.

[3] Other methods of modeling contagion include, but are not limited to the bivariate correlation test of Forbes and Rigobon (2002), the multivariate threshold tests of Bae, Karolyi and Stulz (2003), Eichengreen, Rose and Wypolz (1995, 1996) and Faverro and Giavazzi (2002).

[4] For a chronology of events please refer to Appendix 3.

[5] C.Harris and J.Grant, Financial Times, 28 Aug 1998.

[6] Edwards and Savastano (1999), p.7.

[7] The models are estimated using Gauss 5.0.

[8] Data sources and codes are contained in Table A1 of Appendix 1.

[9] Data is available on a seven day a week basis for Albania, Bulgaria and Croatia, but not for the other countries in the sample.

[10] Parameter estimates along with their t-statistics are contained in Tables A2 and A3 in Appendix 2.