

## Real Time Data

Arlind Rama

Ilir Vika

### Abstract

Interpretation of exchange rate volatility in the light of economic fundamentals comprises an issue of interest for policymakers when it comes to implementing the monetary policy. Understanding the impact of economic news on the Lek exchange rate against two main hard currencies, Euro and US dollar, would serve to better orient the monetary policy and forex market agents positioning in time. Exchange rates volatility on economic news in short-term is an often discussed phenomenon in the economic literature, but through this material we tend to measure these effects in the Albanian foreign currency market and contribute in the literature interpreting foreign currency markets volatility in developing economies. Very often, domestic foreign exchange movements are attributed to developments in large international markets. In the case of Albanian Lek volatility analysis, we tend to find answers regarding the importance of economic news coming from the two main economies in focus, Eurozone and the US. Furthermore, we investigate the importance of the economic information flow in Albania in determining the Lek exchange rate against Euro and US dollar. For a period in focus from January 2007 until July 2012, we try to understand if the exchange rate volatility has been a result of economic fundamentals or financial markets stress related economic news.

*JEL classification:* F31, F42, E52.

**Keywords:** exchange rates; fundamentals; announcements; news; real-time data; Albania, United States; Eurozone

### Introduction

Interpretation of exchange rate volatility in the light of economic fundamentals represents a main issue of interest for policy-makers when it comes to monetary policy implementation. Central bank interventions are often necessary to smooth the undesired volatility, on the scope of protecting the economy from short-term high volatility and long-term "oscillations" that are skewed from the "fundamental" equilibrium. Managing the Foreign Reserve and interventions in monetary market to mark its level constitute a continuous process that requires increased effectiveness.

Economic agents are exposed to the indirect credit risk caused by sudden unpredictable fluctuations of exchange and interest rates. Financial stability reports in the Bank of Albania, repeatedly emphasize that despite of fact the biggest part of the credit uncovered from exchange rate risk is backed by a collateral, deterioration of its' quality represents a problem that should be monitored, in order to identify causes and evaluate expectation for future expectations. Understanding the impact of economic news and relevant information on Lek exchange rate against the two hard currencies, Euro and Dollar, would serve to better orient market actors in their positioning on time, forerunning and averting potential distortions that stem from high volatility in forex markets. Theory suggests that despite the argument that currency volatility permits economy to absorb different shocks, in a long-term horizon, the exchange rate will reflect economic fundamentals. Agents position themselves in markets basing on their expectation on future economic developments in relation to economic fundamentals announcements. High volatility in the forex market increases risk that stems from instability of exchange rate in economy highlighting the importance of decision-making efficiency and dedicating attention to interpreting the exchange rate as a function of economic fundamentals.

According to Vika (2016) non-linear estimations widely confirm empirical findings that repeated deviations of exchange rate in the same direction, could attract attention of Central Bank decision-makers. However, decisions to intervene are deeply discouraged in days of high exchange rate fluctuations, implying in this way a considerable evaluation of Lek being perceived as its' price movement towards a new equilibrium. Very high fluctuations would make the Central Bank hesitant to intervene in the market, and as a consequence more prudent on the optimal evaluation of intervention time depending on exchange rate oscillations.

In the effort to interpret sensitivity of exchange rates on news related to economic fundamentals, our study intends to analyze the impact of main economic news over the exchange rate, considering as news or “surprise” every deviation of the announced value from the expected value for each of fundamental economic indicators in focus of our analysis. Considering currency as an indicator of economic situation and trying to understand factors that determine Lek exchange rate against Euro and Dollar, we focus our analysis on the Albanian economy, Eurozone and US economy treating as positive economic news, announcements over fundamentals that create a positive market perception, the later being reflected in an appreciation of national currency. While as negative economic news are identified developments that as a consequence of negative perception from market agents are followed by a devaluation of the national currency against Euro and Dollar. Our analysis is based on the inter-day exchange rate that allows to understand more clearly the persistence of impact that news on economic fundamentals have in determining the exchange rate value of Lek.

Economic thought of last years has evolved bringing in literature development of two main approaches in analyzing and interpreting the exchange rate course: technical analysis and fundamentals analysis. As treated from Allen and Taylor (1990); De Grauwe and Dewachter (1993) and Cheung and Chinn (1999) technical analysis has a specific importance to understand major fluctuations or over appreciation of currencies in cases when market actors follow technical trading rules in the forex market, not taking economic fundamentals as a reference for the analysis. Later, Evans and Lyons (2002) argument that in short-term horizons the exchange rate is oriented by traded volumes, meaning supply and demand equilibriums in a specific moment of time in the forex market, determined by massive sales and purchases of currency from the side of agents. This reflects another mechanism for processing economic information far from the main economic fundamentals analysis. But, Love and Payne (2002) as Evans and Lyons (2003) find that are exactly economic fundamentals those that determine a major part of traded volumes in currencies market.

To perform analysis, we have selected the most important economic fundamentals that literature considers as determinant in understanding exchange rate volatility and on their basis analyzed effects that economic news have in appreciation of Lek against the two hard currencies, Euro and Dollar. We aim to study the impact of economic news in the attitude of forex market agents and be able to understand how their positioning varies depending on announcements dynamics over the fundamental macroeconomic indicators. As in Andersen, Bollerslev, Diebold and Vega (2003), Faust, Rogers, Wang and Wright (2003), Galati and Ho (2003) or Ehrmann and Fratzscher (2004) we use real time data for all important macroeconomic announcements and monetary policy decisions in US, Eurozone and Albania, in the quality of economic fundamentals. After creating the database with real time data on a monthly and quarterly frequency, we test their impact in determining the daily exchange rate of Lek with Euro and the US Dollar for the period January 2007 – July 2012. Forecasts taken from Bloomberg, FED’s SPF<sup>1</sup> and ECB as well as forecasts of the Bank of Albania for macroeconomic indicators in focus, allow us to understand real-time deviations from their predicted values, perceived by market participants as “economic news”. Through this database, our study tries to provide reliable explanatory answers in interpreting exchange rate volatility of Lek against the two hard currencies in the forex market, Euro and Dollar.

## Data and methodology

### Defining the “news”

In economic literature do exist many ways to define “news”, basing on which the economic research investigates their impact in the real economy. But, following the aims of this study we define “news” as the “surprise” measured by the difference between actual spot values of macroeconomic variable in announcement day and the forecasted variable’s value expected for that precise day. While the actual spot values of the macroeconomic variables are extracted from the official announcements released in the predicted days according to official announcements calendar, the expected market variable’s value is taken from reliable and reputed institutional forecasters. Treating the currency market value as an indicator of state for country’s economy and aiming to understand the Lek exchange rate against the two main hard currencies we focus our data research in three main economies important to determine it, respectively Albania, US and Eurozone economies. Once we obtained the full dataset of actual spot data and expected values for each variable, we analyze the effects of “surprises” on the exchange rates of that day or the successive one. In our analysis, we consider a positive “news”, one which is perceived positively for the state of the economy by the market agents, leading thus in an evaluation of the national currency against other two other currencies in focus. On the other side, a negative “news” is negatively perceived by market agents being reflected in a depreciation of the national currency. Detailed statistics about

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<sup>1</sup> Survey of Professional Forecasters

the economic “news” deriving from the macroeconomic announcements for the three economies could be found as following, table 1 for the Albanian economy, table 2 for the Eurozone economy and table 3 for the US economy.

Table 1. Summary statistics for macroeconomic announcements, surveys, and surprises Albania

	Announcement		Survey		Surprise	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
<b>Albania Announcement</b>						
CPI YoY (%)	2.93	0.95	3.13	0.91	-0.12	1.10
GDP YoY (%)	3.10	2.67	2.41	1.80	0.69	2.84
Current Account YoY (%)	0.22	0.40	0.03	0.19	0.19	0.33
Trade Balance of Goods YoY (%)	9.14	17.23	2.78	6.24	6.65	16.24
M3 YoY (%)	10.96	3.47	10.27	3.16	0.69	2.98

Source: Bank of Albania, INSTAT, IMF Country Reports, Authors' calculations

Table 2. Summary statistics for macroeconomic announcements, surveys, and surprises Eurozone

	Announcement		Survey		Surprise	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
<b>Eurozone Announcement</b>						
ECB Ref. Rate 2-week	2.19	1.20	2.38	1.45	-0.19	0.31
Unemployment (%)	8.95	1.41	8.93	1.41	0.02	0.11
HICP YoY (%)	2.04	1.10	2.05	1.09	-0.003	0.05
GDP YoY (%)	0.53	2.48	0.57	2.47	-0.05	0.13
Retail sales MoM (%)	-0.14	0.54	0.10	0.34	-0.24	0.45
Industrial Production MoM (%)	-0.08	2.13	0.12	1.07	-0.20	1.63
PPI YoY (%)	2.62	4.20	2.65	4.18	-0.02	0.24
Trade Balance	871.6	5642.0	514.2	3922.6	357.4	3551.1
Ifo Business Climate Index	101.52	9.08	101.30	8.96	0.21	1.36
M3 YoY (%)	5.13	4.29	5.14	4.23	-0.01	0.48

Source: Bloomberg, ECB SPF, Reuters, Authors' calculations

Table 3. Summary statistics for macroeconomic announcements, surveys, and surprises US

	Announcement		Survey		Surprise	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
US Announcement						
Fed. Funds Target Rate US	2.38	2.19	2.05	2.01	0.33	0.32
Consumer Confidence SA	63.41	21.58	21.14	63.78	-0.37	5.41
Housing starts	798.88	328.44	801.58	326.29	-2.70	57.06
Trade Balance	-47.45	10.58	-47.74	10.38	0.35	3.70
Retail sales MoM (%)	0.18	0.92	0.18	0.69	-0.004	0.56
PPI MoM (%)	0.28	0.99	0.21	0.65	0.07	0.50
Unemployment (%)	7.65	2.06	7.66	2.09	-0.01	0.17
Nonfarm Payrolls MoM (%)	-26.87	234.77	-14.80	233.51	-12.07	67.57
Industrial Production MoM (%)	0.05	0.77	0.12	0.50	-0.07	0.46
CPI MoM (%)	0.18	0.402	0.18	0.33	0.01	0.14
GDP Q/Q annual. (%)	1.42	2.74	1.45	2.87	-0.03	0.25

Source: Bloomberg, FED SPF, Reuters, Authors' calculations

## Methodology

Aiming to understand and interpret the relevance of real time data of fundamental indicators on exchange rates at a daily frequency, our empirical analysis uses Lek – Euro as well as Lek – US Dollar daily returns and real-time macrofinancial data during the period January 2007 and July 2012.

The real-time data consists of the data releases for important macroeconomic variables as well as of monetary policy decisions, reflecting in *real time* the information that becomes available to the markets every day. However, it should be emphasised that on the day of the announcement, we can expect the markets to react only to the unexpected component, or “news” or “surprise”, of an announcement. The remaining component of the announcement has been incorporated into the market previously, but since we cannot determine the exact timing of when this occurred, we cannot measure its impact on the markets to the same degree of accuracy.

$$S_{k,t} = \frac{A_{k,t} - E_{k,t}}{\Omega_k}$$

Our measure of news is therefore the surprise component ( $S_{k,t}$ ) of the announcement  $k$ , which is defined as the difference between the actual announcement ( $A_{k,t}$ ) and the market's prior expectation ( $E_{k,t}$ ), normalised by dividing by the sample standard deviation  $\Omega_k$  of each announcement in order to allow a comparison of the relative size of the coefficients in the econometric model:

## The data

As abovementioned, we treat the currency market value as an indicator of state for a country's economy and try to understand the Lek exchange rate against the two hard currencies, US Dollar and Euro, focusing our real-time data research on the main macroeconomic announcements in the three focus economies primarily important to determine the rates.

Regarding the variables and related macroeconomic announcements, literature offers a broad set of them that can be used to explain/predict foreign exchange movements making it hard to determine them, especially during the financial crisis

period, but our selection is based taking into reference the typically used ones in several studies and specific indicators important in defining the crisis of financial markets. Our analysis attempts to comprise data from the real economy, prices, leading indicators and policy variables. Thus, because of the unusual period of external shocks, we decided to include some measures of foreign financial tensions and risk aversion that are often used in the recent literature on asset prices. It is noted that market participants anticipated with their positioning ECB policy rate well (only 4 surprises). FED funds rate, too, has been close to zero since December 08. FED has thereafter used other monetary policy instruments to affect the cost of borrowing toward the desired levels. Due to unavailability of money growth expectations, we add 3month T-bills rate as a proxy of FED policy intentions. In Albania economy, expectations about BoA's policy rate were deemed confusing and uninformative, thus we rely solely on M3 indicator. Also, fiscal news was not possible to construct; instead, we use the spread between 12-months T-bills and 1-week repo rate and spread of the 10-years bonds of Italy, Greece and Spain from their German counterpart. We include also CBOE Market Volatility index (VIX) and the Australian dollar - Swiss franc exchange rate. While yields spreads and VIX Index aim at capturing vulnerabilities to the US and Euro crises, the last variable. proxies investors' risk aversion, or external exposure, where Swiss Franc acted as a "safe haven" currency in carry trade transactions .den-stop hypothesis. In order to reflect the big and important economic weight of German economy in Eurozone, we include IFO Business Climate Index as well.

We use the daily US dollar – Euro / Lek rate in the end of the day, at 14.30, which implies that European and Albanian news are reflected in the exchange rate on the same day, while the US news in the following day. Albanian data releases are sourced from INSTAT and Bank of Albania, while expectations of these releases come from IMF Country Reports and World Economic Outlook database. On the other hand, Eurozone and US data were collected mainly from Bloomberg, but also from ECB, Reuters, Eurostat, IFO Institute, Bureau of Labor Statistics, Bureau of Economic Analyses and the Federal reserve. Our data set includes about 66 news for most of the variables, given the time period from January 2007 to July 2012 and the fact that announcements for most of variables occur on a monthly frequency.

A brief description of the Albania, US and Euro area macroeconomic announcements selected for this study are shown in Table 4.

**Table 4. Macroeconomic announcements, release dates and times**

Announcement	Period		Nr. of announ.	Nr. of observations
<b>Eurozone</b>				
ECB refirate 2week	Jan-07	5-Jul-12	67	4
Unemployment MoM	Jan-07	31-Jul-12	68	30
HICP, EZ CPI headline YoY	Jan-07	18-Jul-12	67	16
GDP EZ (Q/Q) ann. change	Mar-07	15-Jun-12	22	10
Retail sales EZ (mom)	Jan-07	4-Jul-12	67	60
Industrial Production EZ (mom)	Jan-07	14-Jul-12	67	65
EZ PPI (yoY)	Jan-07	3-Jul-12	67	51
Trade Balance EZ n.s.a	Jan-07	16-Jul-12	67	67
Ifo Business Climate Index	Jan-07	25-Jul-12	67	66
M3 EZ (%) YoY	Jan-07	26-Jul-12	67	65

Announcement	Period		Nr. of announ.	Nr. of observations
<b>USA</b>				
Fed. Funds Target Rate US	Jan-07	20-Jun-12	60	5
Consumer Confidence SA	Jan-07	31-Jul-12	67	67
Housing starts	Jan-07	18-Jul-12	67	65
Trade Balance	Jan-07	11-Jul-12	66	65
Retail sales Monthly % Change	Jan-07	16-Jul-12	67	59
PPI MoM SA	Jan-07	13-Jul-12	67	62
Unemployment Rate	Jan-07	6-Jul-12	67	48
Nonfarm Payrolls MoM Net Change SA	Jan-07	17-Jul-12	67	67
Industrial Production MoM	Jan-07	17-Jul-12	67	60
CPI MoM SA	Jan-07	17-Jul-12	67	46
GDP Q/Q annualised	Jan-07	27-Jul-12	23	15

Announcement	Period		Nr. of announ.	Nr. of observations
<b>Albania</b>				
CPI MoM	Jan-07	6-Jul-12	66	63
GDP Q/Q	Jan-07	9-Jul-12	15	14
Current Account Q/Q	Jan-07	11-Jun-12	23	23
Trade Balance MoM	Jan-07	24-Jul-12	62	62
M3 (%) YoY	Jan-07	30-Jul-12	61	61
Tre. Bills 12m Yield	Jan-07	10-Jul-12	140	

## Results

Table 5 displays the sensitivity of Lek/Eur exchange rate

	Coef.	t-Stat.		Coef.	t-Stat.
<b>Eurozone news effects</b>			<b>US news effects</b>		
GDP	-0.1700	-0.50	GDP	-0.1307	-0.63
Industrial production	0.0402	1.58	Industrial production	-0.0075	-0.31
Retail sales	0.0197	0.76	Retail sales	-0.0156	-0.44
Trade balance	0.0557 **	2.21	Trade balance	0.0051	0.07
Unemployment rate	-0.3295	-1.26	Unemployment rate	0.7770	1.49
IFO	0.1096	0.96	Non-farm payroll	-0.0024	-0.04
HICP	-0.0505	-0.10	House starts	0.0207	0.22
PPI	-0.4422	-1.12	Consumer confidence	0.0385	0.41
M3	0.1711	0.62	CPI	0.0336	0.75
REFI	-0.2175	-1.30	PPI	-0.0099	-0.15
			FFR	-0.0914	-0.44
			T-Bill,3M	-0.0049	-1.18
<b>Albanian news effects</b>			<b>Effects of liquidity, sovereign, and credit risk fears</b>		
Balance of Goods	-0.0103	-0.41	Spread (AL)	0.0040	0.42
CA balance	-0.0265	-0.71	AUD/CHF	0.3123	0.67
GDP	0.1433 *	1.67	Spread (EZ)	-0.0045 **	-2.03
M3	-0.0236	-0.89	VIX	0.0003	0.53
CPI	-0.0253 *	-1.81			

Notes: \*, \*\*, \*\*\* denotes significance at 90, 95, 99 percent levels

### Reaction to news about real economy

Albania's net export of goods and Current Account balance appear to have correct positive sign, meaning that a volume increase would lead to appreciation of Lek; however, good news about domestic GDP are associated with Lek depreciation. Eurozone's "good" economic news lead to weakening of the Albanian currency, except for related positive news about Eurozone's GDP that favor the lek or negative ones that would disservice it;

US news effects are mixed: good news about US trade balance, house starts, and consumer confidence are bad news for Albanian lek; on the other hand, better GDP, industrial production, retail sales, non-farm payrolls, and lower unemployment rate surprises are also perceived as good news for lek position against euro.

### Reaction to monetary policy indicators

Restrictive policies by ECB and FED seem to lend a hand to lek, as they have negative signs. The US 3-months T-bill rate "confirms" the negative relationship, although the coefficient is much smaller. Based on interest parity theory, one would expect a sudden tightening of ECB policy rate to raise euro currency value. However, if markets perceive such policy to worsen the real economy and reduce asset prices, such as equities, it might result in a weaker euro (and vice versa).

### Reaction to price surprises

Impact of prices is, again, ambiguous, as it depends on market's perception about Central Bank's commitment to price stability. If this commitment is perceived as high, policy tightening would cause appreciation; otherwise, as PPP Theory suggests higher inflation would require nominal depreciation. Higher than expected price developments in Eurozone seem to be good news for Albanian currency; opposite is true in the case of US headline inflation; In addition, bad news for domestic inflation is found to be good news for the local currency. The coefficient is statistically significant and comes in line with findings by *Clark and West* (2007) that investigate countries with inflation targeting that follow Taylor rule reaction functions.

### Reaction to measures of financial risk indicators

The overall response of lek/euro exchange rate to risk expectations by market actors is as expected. Higher domestic sovereign spreads look detrimental to local currency position. Also, lek does not seem much immune at times of capital flight to 'safe havens'. On the other hand, risk fears about the common currency grip Albania's thin foreign exchange market, as euro currency holders manifest reaction by getting rid of it.

## Conclusions

Although most of the estimated coefficients in our analysis had the expected sign, the empirical investigation brought in evidence an overall lack of significant news effects, be they foreign or domestic ones. It might be partly a result of market conditions during the unusual period under consideration, and does not necessarily mean that Exchange Rate responses are not systematic.

Thus, further testing will be required to check about the importance and significance of domestic vis-a-vis foreign shocks. Testing for asymmetries in the responses to news appear imperative, too, as asset prices are shown to react more strongly to negative than to positive shocks. Similarly, larger shocks are found to cause larger adjustment of Exchange Rates.

Nevertheless, with a few exceptions, our findings are broadly similar with the size and sign of the parameter estimates in the study for USD-EUR exchange rate responses conducted by Ehrmann and Fratzscher (2004), which suggests that the price discovery process abroad is closely followed by local Forex market participants; Finally, digging more into the literature on modeling exchange rates that combines together the news effects, order flows and chartist behavior may also prove worthy to sort out these issues in the future.

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