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House Price Determinants in Selected Countries of the Former Soviet Union

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Abstract

This Working Paper should not be reported as representing the views of the IMF.
The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This paper analyses the recent boom-bust cycle in the housing markets of selected Former Soviet Union (FSU) countries. The analysis is based on a newly constructed database on house prices in the FSU countries. Our estimations suggest that house price developments can largely be explained by the dynamics of fundamentals, such as GDP, remittances, and external financing. Overall, we find that deviations of house prices from their fundamentals have not been pronounced, suggesting that house price bubbles have not been formed in the FSU countries.

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[1] This paper has benefited from comments by participants in the seminar at the IMF Middle East and Central Asia Department.

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I. Introduction

House price determinants have been a subject of a growing body of analytical work. The rising interest in the issue is triggered by the increasing role of the housing sector in the economy, as well as by the recent plunge in house prices in many countries around the world.

To our knowledge, house price determinants in the countries of the former Soviet Union (FSU) have not yet been analyzed from a cross-country perspective. We aim to contribute toward filling this gap and try to answer the following questions: What have been the key drivers of house prices in these countries? Have house prices departed substantially from their fundamentals?

Our paper examines house price developments in a sample of the FSU countries and estimates price determinants in the context of the recent boom-bust cycle. We use panel data analysis to estimate equilibrium prices for housing in our group of countries. We estimate the deviation of house prices from their fundamentals. Our model employs a new explanatory variable—workers' remittances—which, in our opinion, has contributed to the house price booms in some of the countries included in our analysis. We also use foreign inflows as approximation for the availability of mortgage financing in a number of countries.

Our results show that regular determinants of house prices identified in the research on advanced countries, such as real GDP, also play an important role in the FSU countries. In addition, we find that workers' remittances and foreign inflows are important determinants of house prices. We also find that deviations of house prices from their fundamentals have not been pronounced, suggesting that house price bubbles, similar to those in certain advanced economies, have not been formed in the FSU countries.

The rest of this paper is organized as follows: section II presents a literature overview on the subject; section III describes data and methodology; section IV presents estimation results; and section V concludes and provides policy recommendations.

II. Literature Overview

Housing has unique characteristics because it can be viewed as both an investment and a consumption good. The demand for housing is driven by such fundamentals as household's wealth, population growth, availability of credit, interest rates, and unemployment. Many of these factors could change rapidly with the economy, particularly in the case of developing and transition economies. The supply side of the market is more rigid both because of the shortage of land for housing and the time needed for new construction to be completed. Due to these considerations, most of the studies in empirical literature focus on the demand side when estimating house price determinants.

Another important characteristic of housing is that in many countries it is the most preferred form of collateral for bank loans. Rising house prices increase households' consumption power by making more goods and services available to them through the ―accelerator model,‖ as coined by Bernanke et al. (1996). This implies potential risk for the quality of

banks' assets because house price declines can cause a significant increase in nonperforming loans.

While a substantive body of literature studies house prices, in particular in the current decade, no fixed set of price determinants has been identified. For example, Iossifov and others (2008) focuses on residential property prices in 20 advanced countries in Western Europe and Asia. As determinants of house prices, they employ real per capita GDP, interest rates, unemployment, financial deepening, population, primary fiscal balance, and current accounts, with data covering 1980–2007. The authors find that house prices are aligned with these fundamentals for their sample countries and that more than half of the price adjustment happens within one quarter. The most important variable in their estimation is the short-run real interest rate, with house price elasticity of −3.6.

Klyuev (2008) studies development of house prices in the United States from 1970 to 2008 using two methods: the fundamentals model and the asset pricing approach. In the fundamentals model, he uses real construction cost, average household size, real disposable income, real mortgage rate, unemployment, and regional dummies as determinants of prices. Under the asset pricing approach, Klyuev (2008) links prices with real rents and interest rates. Both methods yield substantial overvaluation in the U.S. housing market, starting from 2001. He also finds that house prices can deviate from their equilibrium values for long periods of time.

Our review of the literature suggests that the main focus of the previous studies of housing markets was on the advanced economies of Asia, North America, and Western Europe. The only study that we are aware of that focused on house prices in Central and Eastern Europe (CEE) is by Egert and Mihaljek (2007). Countries in this region have been undergoing transition to market economies from a centrally planned approach, similar to the FSU countries. The authors find that prices in eight CEE economies were to a large extent driven by such fundamentals as GDP per capita, real interest rate, housing credit availability, and demographic factors. Another finding is that the development of housing markets and housing finance institutions played a significant role in house price dynamics in the region. Coefficients of per capita GDP were high, around 2.0 for Estonia and Lithuania, two countries that also are present in our sample. Appendix 1 presents a summary of other studies on the subject that lists the employed determinants of house prices.

To our knowledge, our paper is the first to look at the development and determinants of house prices in the FSU countries. Real estate prices in this part of the world only recently started to close the gap with those observed in advanced economies. As market price formation was suppressed under centrally planned economies, property prices started to increase rapidly in the current decade, along with rising incomes. This happened in parallel with a financial deepening process that occurred in most countries in our sample. The rapid increase in real estate prices from 2000 to 2008 created construction booms that initially helped to boost GDP growth. Subsequent reversal in property prices and halt in construction became one of the main reasons for the severe growth shocks to many economies in the

current crisis.[2] Falls in prices of real estate, which served as the main collateral for lending, added to the pressure on banking systems in the FSU countries, where many banks still remain under stress.

III. DATA AND METHODOLOGY

Data collection for our analysis turned out to be a challenging task. In most countries of our sample, official statistics do not publish house price data, and we had to search various publications and private sector sources to obtain the necessary data. To our knowledge, the database we have put together for this paper is the first attempt at gathering house price data for the FSU countries. The data covers the following countries: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, and Ukraine.[3] Data frequency and data spans vary widely from country to country (Table 1). The earliest data comes from 1994, and the latest observations in most cases are for the third quarter of 2009. The house price data either covers the capital cities or represents country averages.

Table 1. Span, Coverage, and Sources of Data

	First Observation	Last Observation	Coverage	Source
Armenia	Q2 2002	Q3 2009	Country Average	State Cadastre
Azerbaijan	Q4 2000	Q3 2009	Capital Average	Real Estate Agency
Belarus	Q3 2005	Q3 2009	Capital Average	Real Estate Agency
Estonia	Q1 1997	Q3 2009	Capital Average	Statistics Office
Georgia	Q3 2003	Q1 2009	Country Average	National Bank
Kazakhstan	Q1 2001	Q3 2009	Country Average	HAVER
Latvia	Q1 2005	Q3 2009	Capital Average	Real Estate Agency
Lithuania	Q1 1994	Q3 2009	Country Average	Real Estate Agency
Moldova	Q2 2007	Q3 2009	Capital Average	Real Estate Agency
Russia	Q1 2002	Q3 2009	Capital Average	Statistics Office
Tajikistan	Q1 2005	Q2 2009	Capital Average	National Bank
Ukraine	Q2 2000	Q3 2009	Capital Average	Real Estate Agency

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[2] See, for example, the staff report for the 2009 Article IV consultation for Kazakhstan (SM/09/149) and the Second review under the stand-by arrangement for Armenia (EBS/09/155).

[3] We were not able to obtain house price data for Kyrgyzstan, Turkmenistan, and Uzbekistan.

Our data series are constructed in the form of indices based on housing prices in U.S. dollars. Use of U.S. dollars reflects actual house pricing practices in most FSU countries and allows us to address the problem of inflation differentials across the countries of our sample. As data shows (Figure 1), house prices have been growing at an accelerating pace until the second half of 2008, from which point a plunge in house prices is observed in all countries of our sample.

Figure 1. House Price Indices in FSU Countries, Q1 2008 = 100
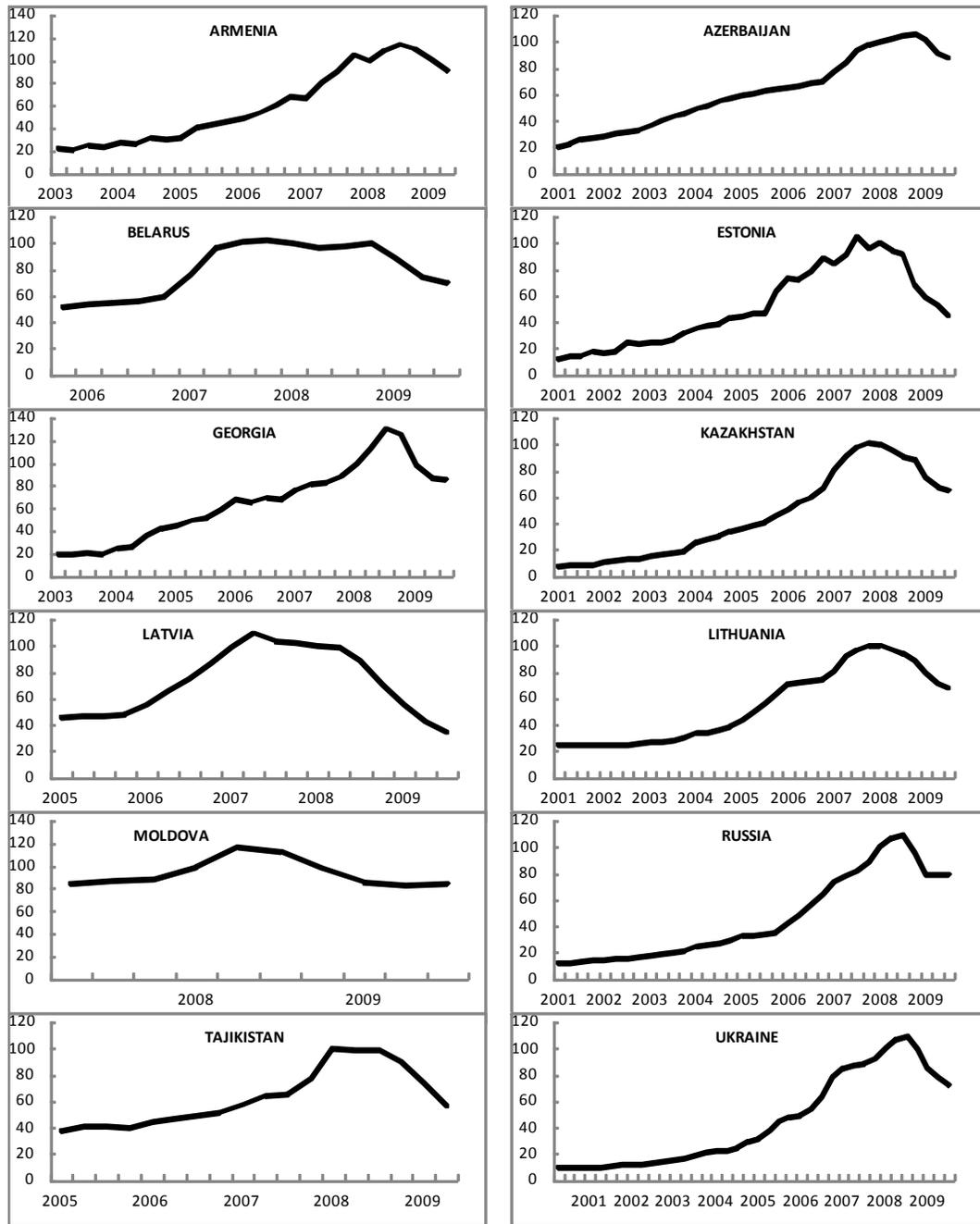
Source: Authors' calculations.

The observed decline in house prices was not unique to the FSU countries. Many advanced and emerging economies also experinced sharp price declines in 2008 and 2009. Figure 2 compares house price developments in the FSU countries with a selected set of advanced economies.[4] A similar pattern of growth can be observed starting in 2001: it seems that the FSU countries were catching up with more advanced economies in terms of price increases. While beginning-2008 house prices started to decline in advanced economies, the FSU countries entered the decline phase only in late 2008 or early 2009.

Figure 2. House Price Indices, Q1 2008 = 100
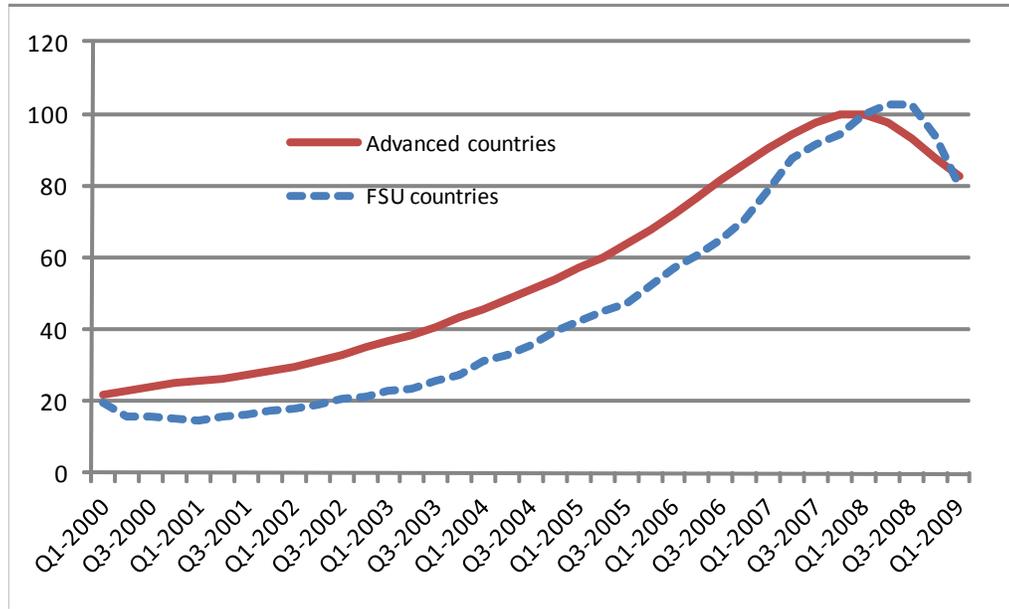
Source: IMF WEO October 2009

As we already mentioned, in addition to real GDP as a proxy for household wealth and to lending rate as a proxy for affordability of credit, we employ two new house price determinants. We find that in some countries of our sample, remittances are an important source of income for households (Figure 3), while in others there have been relatively large foreign inflows (other than foreign direct investment [FDI]), mostly in the form of bank borrowing from abroad (Figure 4).[5] Figure 3 and Figure 4 depict these two variables in percent of GDP in 2007, when they were at their peak levels. Thus, we also introduce these explanatory variables as determinants of house prices in the countries of our sample.

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[4] These include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, Switzerland, the United States, and the United Kingdom.

[5] Foreign inflows consist of domestic banks' other investment liabilities and portfolio investment liabilities.

Figure 3. Remittance Inflows to Selected FSU Countries, 2007 (in percent of GDP)
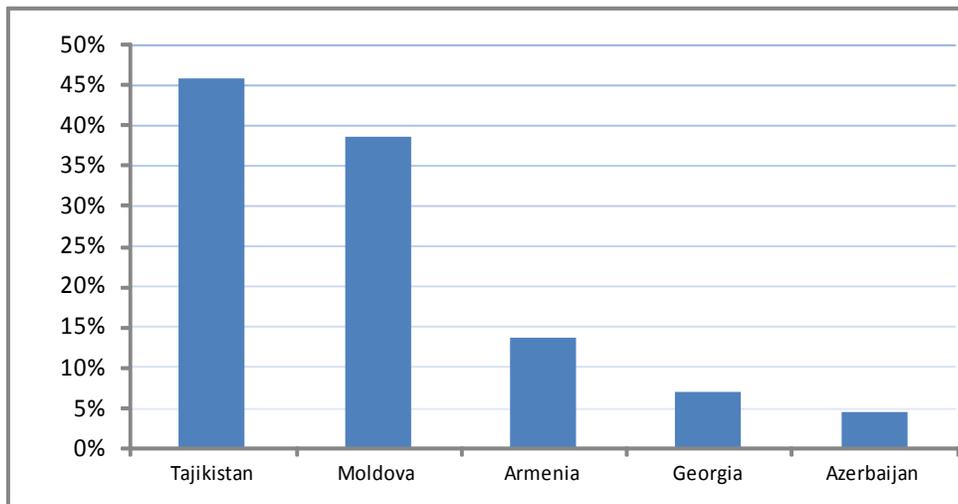
Source: IMF and World Bank databases.

Figure 4. Foreign inflows to Selected FSU Countries, 2007 (in percent of GDP)
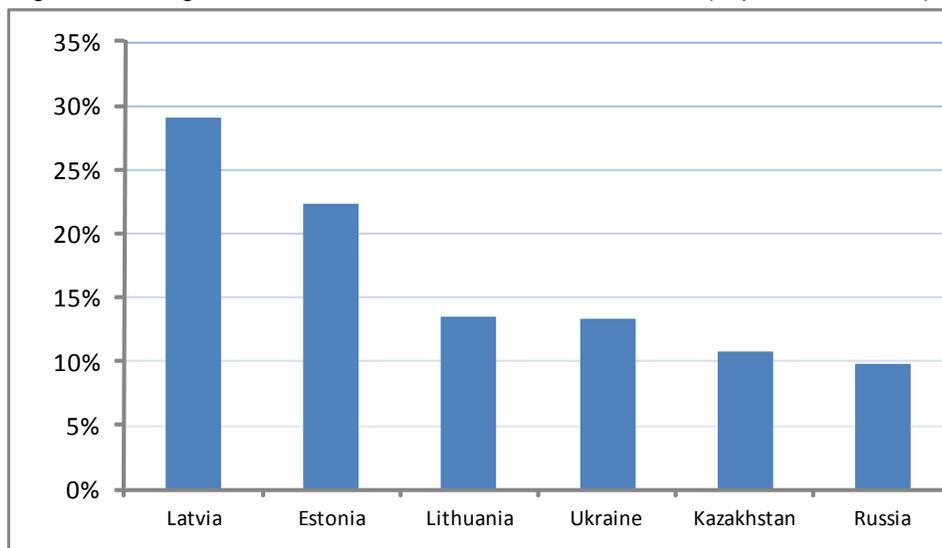
Source: IMF IFS database.

Our methodological approach is based on panel data analysis. Such analysis for house price determinants can be performed using several alternative approaches. One approach is to pool the data and apply a panel data estimation technique that allows for group-specific intercepts (e.g., fixed-effect panel data estimator). This approach was used by Almeida and others (2006), Annett (2005), Iossifov and others (2008), Égert and Mihaljek (2007), and Terrones and Otrok (2004) for an international sample of housing markets. The main problem with this approach is that it relies on the assumption of homogenous slope coefficients and produces inconsistent estimates in the presence of slope heterogeneity.

Another approach is to employ the mean-group (MG) estimator of Pesaran and Smith (1995), which relaxes this restrictive assumption and produces consistent estimates. However, the

MG estimator assumes the availability of sufficiently long time series in the panel and relies on estimating group-specific time series regressions and averaging the obtained coefficients. This approach was pursued by Égert and Mihaljek (2007) for a sample of CEE countries and Holly et al. (2007) for a disaggregated data study of U.S. states.

Finally, panel data analysis of house prices can be performed using the pooled mean group (PMG) estimator of Pesaran et al. (1999), which imposes homogeneity restriction on the long-run relationship between house prices and their fundamentals across groups. The main advantage of the PMG estimator is that it relies on the long-run relationship between house prices and their fundamental determinants derived from the economic theory, and produces more efficient estimates than the MG estimator, if the homogeneity restrictions imposed by the theory are valid. The PMG method was applied by Kholodilin and others (2008) for analyzing house price determinants in an international sample of countries and by Koetter and Poghosyan (2009) for analyzing determinants of house prices in German regions.

We apply the PMG estimator[6] for analyzing determinants of house prices in CIS countries. Similar to previous studies, we use real GDP as a main determinant driving house prices.[7] In addition, to account for the importance of external flows for the national income in CIS countries, we include remittances from abroad and foreign inflows as a determinant of house prices. The long-run relationship between house prices and their fundamentals takes the following form:

$$HP_{it} = \theta_0 + \theta_1 GDP_{it} + \theta_2 REM_{it} + \mu_i + \varepsilon_{it} \tag{1}$$

where i and t indicate country and time, respectively; HP is the logarithm of a house price index, GDP is the logarithm of a real GDP index, REM is the logarithm of a remittances index, and μ_i is the country specific fixed effect. All variables are indexed using the first quarter of 2008 as a base. If the variables are I(1) and cointegrated, then the error term ε_{it} is I(0) for all i. The autoregressive distributed lags (ARDL(1,1,1)) dynamic panel representation of the long-run equation (1) is:

$$HP_{it} = \delta_{10i} GDP_{it} + \delta_{11i} GDP_{it-1} + \delta_{20i} REM_{it} + \delta_{21i} REM_{it-1} + \lambda_i HP_{it-1} + \mu_i + \varepsilon_{it} \tag{2}$$

Given the relatively short time dimension of our panel, we lag variables by one period. The error-correction representation of equation (2) can be written as:

$$\Delta HP_{it} = \phi_i (HP_{it-1} - \theta_{0i} - \theta_{1i} GDP_{it-1} - \theta_{2i} REM_{it-1}) + \delta_{10i} \Delta GDP_{it} + \delta_{20i} \Delta REM_{it} + \varepsilon_{it} \tag{3}$$

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[6] We conducted the Hausman test to analyze the difference between the MG and PMG models. In all cases, the null hypothesis of no systematic differences between coefficient estimates was not rejected, as reported in the next section, giving preference to the PMG model.

[7] We also have run our model using lending rates as an explanatory variable. In line with empirical literature, we obtained a significantly negative effect of lending rates on house prices. However, we ran into convergence problems when we added lending rates to the general specification.

where $\phi_i = -(1-\lambda_i)$, $\theta_{0i} = \dfrac{\mu_i}{1-\lambda_i}$, $\theta_{1i} = \dfrac{\delta_{10i}+\delta_{11i}}{1-\lambda_i}$, and $\theta_{2i} = \dfrac{\delta_{20i}+\delta_{21i}}{1-\lambda_i}$.

The PMG estimator imposes homogeneity restriction on coefficients of long-run house price determinants θ_1 and θ_2, while the intercept θ_{0i}, together with the error-correction speed of adjustment parameter ϕ_i and the short-run adjustment coefficients δ_{11i} and δ_{21i} vary across countries. The speed of adjustment parameter ϕ_i is expected to be negative, which would indicate tendency of house prices to return to the long-run equilibrium level. Our main objective is to extract the error-correction term (1) from the PMG estimations, which would indicate temporary deviations of house prices from their fundamental value.

IV. ESTIMATION RESULTS

Table 2 presents estimation results from the PMG model. The first column displays results for the total sample, using real GDP, remittances, and foreign inflows as fundamental determinants of house prices. Estimation results suggest that all three determinants are significant drivers of house prices. The speed of adjustment coefficient is negative and significant, indicating adjustment to the long-run equilibrium in response to the shocks. The half-life of the adjustment is less than three quarters, implying a rather speedy correction to the long-run equilibrium.

Table 2: PMG Estimation Results

	Total Sample	Baltic Countries + Kazakhstan + Russia + Uzbekistan	Other
Long-run coefficients			
Real GDP	0.2736*	3.2526***	1.3461***
	[2.15]	[17.80]	[4.69]
Remittances	0.2283***		0.2685**
	[5.31]		[2.87]
Foreign inflows	0.1106*	0.1408***	
	[2.37]	[4.51]	
Short-run coefficients			
Change in real GDP	0.042	1.1776**	0.401
	[0.22]	[3.12]	[0.98]
Change in remittances	0.0796**		0.048
	[3.17]		[1.94]
Change in foreign inflows	0.4122**	0.350	
	[3.00]	[1.65]	
Speed of adjustment	−0.2509**	−0.3489*	−0.2365*
	[−2.58]	[−2.41]	[−1.99]
Statistics			
Hausman test (p-value)	0.66	0.32	0.23
Log-likelihood	259.6072	261.9037	88.3917
Number of obs.	174	181	78

Notes: t statistics are in parentheses. *, **, and *** denote significance at 10 percent, 5 percent, and 1 percent levels, respectively.

As discussed before, the degree of exposure to different types of external inflows varies across the FSU countries. For instance, foreign financial flows have played a relatively more prominent role in the Baltic countries, whereas remittances have been a crucial component of disposable income in Armenia and Tajikistan. To disentangle the effects of different types of foreign inflows on house prices, we classify the countries into two groups: (i) the Baltic countries, Kazakhstan, Russia, and Ukraine; and (ii) the rest of the world. Columns two and three present estimation results for these two groups of countries. The estimation results suggest that foreign inflows play significant role in the first group of countries, while remittances are an important determinant in the second group of countries. The speed of the adjustment coefficient is negative and significant, confirming adjustment to the long-run equilibrium.

We check the robustness of our results using two complementary estimations (see Table 3). First, as shown in Figure 1, house prices were relatively stable pre-2005 and started picking up afterwards. To test the sensitivity of our results to different samples, we reestimate the model for the post-2005 period. Estimation results reported in the first column of Table 3 suggest that all three determinants also are significant for this shorter subsample. Second, we check to which extent the two largest oil revenue–dependent countries drive our main results. For this reason, we reestimate the model after excluding Kazakhstan and Russia from the sample. The estimation results, reported in column two of the table, suggest that the main finding remains unchanged, confirming the robustness of our results.

Table 3: Sensitivity Analysis

	After 2005	Excluding Kazakhstan and Russia
Long-run coefficients		
Real GDP	1.0829***	0.4610***
	[5.74]	[3.46]
Remittances	0.1059*	0.1654***
	[2.56]	[6.02]
Foreign inflows	0.1586**	0.3175***
	[3.13]	[9.70]
Short-run coefficients		
Change in real GDP	0.223	0.187
	[1.07]	[0.95]
Change in remittances	0.0602*	0.0779*
	[2.24]	[2.51]
Change in foreign inflows	0.3621**	0.4718**
	[2.58]	[2.93]
Speed of adjustment	−0.2834**	−0.3569**
	[−2.96]	[−3.29]
Statistics		
Hausman test (p-value)	0.36	0.67
Log-likelihood	210.9943	243.4509
Number of obs.	141	162

Notes: t statistics are in parentheses. *, **, and *** denote significance at 10 percent, 5 percent and 1 percent levels, respectively.

In the next step, we use the estimation results for our baseline specification (column 1 in Table 1) to analyze the deviation of house prices from fundamentals in certain periods of time. In particular, we focus on three periods: the precrisis period (first quarter of 2005), the peak of house prices (various quarters of 2007 or 2008, depending on the country), and the postcrisis period (third quarter of 2009). Figure 5 plots deviations from fundamentals for these periods for each country. It shows that the extent of deviation from fundamentals varies greatly across countries. The average deviation in the precrisis period is -12 percent. This means that house prices were below the level suggested by fundamentals in that period and their run up in 2007–08 was most likely a result of upward correction. In the meantime, the average deviation during the peak (14 percent) is lower than the average deviation in the postcrisis period (23 percent). This implies that the fundamental determinants of house prices have deteriorated even more rapidly than the decline in house prices in the aftermath of the crisis. In a nutshell, it indicates that house prices still have some room for a downward adjustment, despite their relatively low current levels.

Figure 5: Deviation of House Prices from Their Fundamental Value
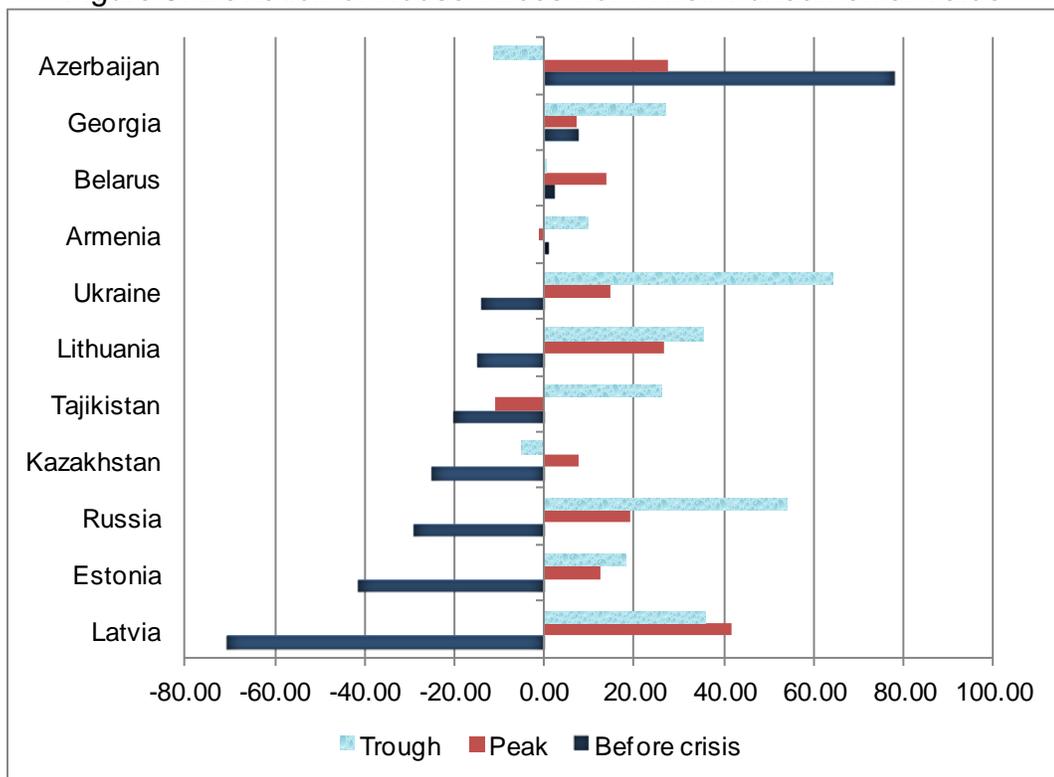
V.   CONCLUSIONS AND POLICY RECOMMENDATIONS

Our estimation results suggest that real GDP, remittances, and foreign inflows have been significant drivers of house prices in the FSU countries. The inclusion of external inflows as determinants of house prices makes our analysis different from previous studies, which have mostly focused on domestic factors. We find that house prices tend to adjust to the long-run equilibrium in response to the shocks, and that the correction to the long-run equilibrium seems to be rather speedy (the half-life of the adjustment is less than three quarters). Our

results also suggest that the average misalignment of house prices in the FSU countries was in the range of 14–23 percent in the aftermath of the global financial crisis.

House price linkages to real and financial sectors highlight the importance of the subject for policymakers.[8] Our results imply that house prices are highly vulnerable to the significant drops in remittances and foreign inflows and economic contractions that we have observed during the global financial crisis. Therefore, policy makers and regulators in the FSU countries need to monitor housing price developments and their determinants closely and try to factor in these into their macro and risk-management frameworks. In order to strengthen banks' balance sheets and prepare them better for possible shocks, regulators should promote more prudent risk management practices by banks. This can be done by setting lower loan-to-value ratios for mortgage loans. Also, in order to stem excessive foreign inflows in boom periods regulators should consider introducing limits on foreign borrowing by banks.

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[8] Research has found that there is a strong link between house price declines and banking crises and economic downturns. See, for example, Reinhart and Rogoff (2009).

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Appendix 1. Factors of House Prices Determinants

Factors	Effect on House Prices	Comment	Sources
Real disposable income	Positive	Proxy for the wealth of households, making housing more affordable to population	Abelson and others (2005); Hofman (2005); Klyuev (2008); Tsatsaronis and Zhu (2004); and others
Real GDP growth	Positive		Ahearne and others (2005)
Real per capita GDP	Positive		Almeida and others (2006); Egert and Mihaljek (2007); and Iossifov and others (2008)
Inflation	Positive	Proxy for the alternative investments and capital gains from housing	Abelson and others (2005); Ahearne and others (2005); Iossifov and others (2008); Tsatsaronis and Zhu (2004)
Real interest rate	Negative	Cost of credit	Abelson and others (2005); Hofman (2005); Egert and Mihaljek (2007); Hunt and Badia (2005); Meen (2002); Schnure (2005)
Unemployment	Negative	Suppresses demand for housing	Abelson and others (2005); Egert and Mihaljek (2007); Iossifov and others (2008); Klyuev (2008); Schnure (2005)
Population growth	Positive	Increases demand	Ahearne and others (2005); Egert and Mihaljek (2007); Fitzpatrick and McQuinn (2004); Terrones and Otrok (2004)
Availability of credit	Positive	Increases pool of potential buyers	Collyns and Senhadji (2002); Fitzpatrick and McQuinn (2004); Tsatsaronis and Zhu (2004)
Housing stock	Negative	Decreased demand	Abelson and others (2005); Fitzpatrick and McQuinn (2004); Meen (2002)
Current account	Negative	Current account deficit widens before the peak and narrows with decline in prices	Ahearne and others (2005)