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Architectural Design and the Value of Housing in Riga, Latvia

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Architectural design has generally not been included in estimations of hedonic pricing models and the reason is no doubt the difficulty in capturing it in a usable measurement variable. It is usually too idiosyncratic and heterogeneous to "sum up" easily and introduce as an explanatory variable. However, in some housing markets, architectural design consists of a limited number of standardized "prototypes", which can then be used as explanatory variables in hedonic estimations. Such is the case for Riga, Latvia, where almost the entire housing stock fits into about a score of fairly standardized architectural design types. This paper is an empirical analysis of the Riga housing market, which only became a "market" in a meaningful sense after the collapse of the Soviet regime in Latvia. The paper analyzes a set of about 3500 transactions, all from recent years. We estimate the elasticity of housing value with respect to size of housing units and some other physical features, and the value of the different architectural designs, controlling for location. This is one of the first hedonic or microeconomic analyses of housing values in any post-Soviet transitional economy.

Keywords

architecture; Hedonic models; transitional economies; Riga; pricing

Introduction

Hedonic modeling of housing values has made great strides in recent year. Curiously, one issue that has attracted relatively little attention in the hedonic analytic literature is the role of architectural design in housing value. It seems a commonplace idea that architectural design must affect the value of residential and commercial property (see, for example, Building Magazine (2001)), yet there have been few empirical attempts to quantify the effects of this. Among the few exceptions are Asabere et al. (1989), who found that buildings with older architectural design sold at a premium in the range of 14%-21%, and Moorhouse et al. (1994), who found that older heritage architectural design raised property among row houses in Boston's South End (within a hedonic pricing model), while units on entire blocks with the same design tended to sell at a price discount. Butler et al. (1999) demonstrated that preservation of historic architectural design had economic value, using data for St. Petersburg, Russia.

There has been some research on the value of architecture in commercial real estate. Both Hough and Krantz (1983) and Vandell and Lane (1989) find price premiums for commercial buildings with "good" architecture. There also exists a considerable literature on "New Urbanism" (Song and Knapp, 2003; Tu and Eppli, 1999), which focus in part on architecture as part of neighborhood design and the impact of this design on real estate values.

One reason, and probably the main one, for the small number of empirical analyses of the economic value of architectural design in housing value is the difficulty in measuring it. Architectural design is in many cases idiosyncratic, making it difficult to assess its role using data sets of real estate prices and transactions. It is difficult to “sum up” design features, other than for specific physical features commonly used in hedonic models (number of bathrooms, floor space, number of closets, size of kitchen, etc.).

In this paper, we evaluate the role of architectural design for housing values in Riga, Latvia. The Riga data have the advantage of assigning residential housing units to a limited number of architectural design prototypes. These are fairly standardized designs found among the housing units of Riga, and we have a number of observations for each design prototype sufficient to perform statistical inference. All together, there are about a score of standardized architectural designs to be found in the Riga market.[1]

[1] Three of these will be excluded from the analysis below because of the very small number of observations

The housing market for Riga is of interest for other reasons, besides the possibility of assessing the value of different architectural designs there. In recent years, increasing attention has focused on housing markets in transitional post-communist economies. This is an intriguing area for research because, in most cases, housing markets did not really exist there until the collapse of the Soviet regimes. Previous to that, housing units were allotted via non-price systems, or at least without market-clearing prices.

Among the important papers on the new housing markets in transitional economies have been Lowe and Tsenkova (2003) and Lux (2003). Within this literature, very few have attempted hedonic or microeconomic transaction analysis, no doubt because of difficulties in obtaining usable data sets. Many of the papers have dealt with the creation and development of housing finance institutions for post-communist economies.

This paper is organized as follows. In the next section we review the institutional background to the Riga housing market. After that, architectural designs commonly found in Riga are surveyed and described. We then describe the data set and discuss some summary statistics. This is followed by estimation of hedonic equations, where the architectural design constitutes a set of explanatory variables. The role of architectural design in housing value is discussed.

The Riga Housing Market

Riga was first established a little over 800 years ago, in 1201. For centuries it was mainly a city for “Baltic Germans”, ethnic Germans who entered the area originally as Crusader knights, merchants, and missionaries, and allied with the Hanseatic League. (See "Riga Timeline" diagram below.)

From the time of the medieval German colonial conquest until World War I, Latvia was generally not an independent state, although parts of it often enjoyed autonomous government. After World War I it was granted independence, along with the other two main Baltic peoples, the Lithuanians and the Estonians. From the end of the war and until the collapse of the Soviet regime, Latvia was a Soviet “Republic” within the Soviet Union, with a communist regime.

Riga currently has approximately 800,000 people, out of Latvia’s 2.3 million. There are just over a million people in the “Riga region”, which includes some satellite cities. Ethnic Russians are the largest ethnic group in the Riga region, while ethnic Latvians are the next largest group. The World Fact Book of the CIA estimates per capita GDP in Latvia at just over $10,000,

and total GDP at about $24 billion.

From the end of World War II and until 1991, there was essentially no housing market at all operating in Latvia.[2] Under the socialist housing system in Latvia, there were four types of tenure: state housing, municipal housing, private housing, and co-operative housing, which was based on both private as well as public investments. In 1989, 77% of dwellings belonged to the state and local governments, 19% to private owners, and 4% to housing co-operatives (Marana et al., 2004).

Beginning in 1991, a program of privatization of housing was implemented. The subsequent privatization took several forms. A "Law on Denationalizing Buildings" in the Republic of Latvia was passed in October, 1991, restoring surviving property nationalized in 1940 to its original owners or their heirs. In other cases, compensation for previous owners took the form of allotments of vouchers, the amounts of which were supposedly based upon the appraisals of property value carried out before June 1940.

By 1998, about 48,000 units had been privatized in Riga in this way. State housing allowances no longer exist and municipal subsidies are very limited and small. Private-sector rental units have been introduced less quickly, and most rental units are still non-privatized (Marana et al., 2004; Central Bureau of Statistics, 2003). State housing allowances no longer exist and municipal subsidies are very limited and small. Private-sector rental units have been introduced less quickly, and most rental units are still non-privatized (Central Bureau of Statistics, 2003). (In the analysis below, only purchased units are considered.)

By 2000, ten thousand residential buildings containing seventy-eight thousand apartments were denationalised. Fourteen thousand people had their properties returned to them, only about 75% of these being residents of Latvia (Central Bureau of Statistics, 2001).

Private-sector housing finance arrangements were almost non-existent when privatization began in Latvia, and grew very slowly until the end of 1990s when the market started accelerating. Initially there was a lot of cash purchasing for land and housing units. This has also served as an impediment to real estate developers and contractors. In 1993, there were only 5,909 mortgage loans contracted in Latvia, although this grew to 18,748 by 1999 (Latvian Mortgage Bank, 1999). In the first nine months of year 2004 the total mortgage loans contracted in Latvia already amounted to

[2] For background on housing institutional arrangements in communist countries before the collapse of the Soviet Union, see Sillince (1990), Telgarsky and Struyk (1990), and Turner et al. (1992).

813.5 million lats (or 1162 m EUR), which means the number of loans outstanding currently is more than 80,000 (Nordea Bank, 2004).

Over 20 banking institutions make mortgage loans, but three institutions make the bulk of these. Loans can be denominated either in domestic or foreign currency units. Figure 1 below depicts the dynamics of Latvia's private mortgage market. Loan terms have been extended to 25 years. Home mortgages outstanding were only 40.7 million LVL (about 65 million EUR) in 1999 but reached 487 million LVL (about 755 m EUR) at the end of 2003 and 813.5 million LVL (about 1162 million EUR) in October 2004. Due to the rapid credit expansion, housing loans as a percentage of the GDP increased from 0.96% in 1999 to 11.57% in the first nine months of year 2004. However, this number is still considerably lower than in the EU.

Figure 1a: Dynamics in housing loans & interest rates in Latvia

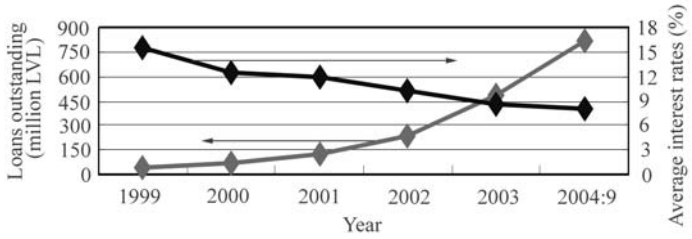
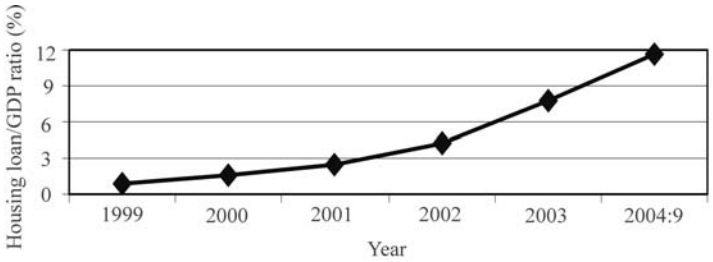


Figure 1b: Housing loans as percentage of the GDP for Latvia, 1999-2004



Riga Timeline:

Riga established as German colonial city in 1201.

⇩

Until 15th century, part of Hanseatic League

⇩

Protestant Reformation Dominates Latvia, from 1522

⇩

Until World War I under various foreign rules: Polish, German, Danish, Swedish, and Russian

⇩

Latvia and other Baltic states became Independent – 1918

⇩

In WWII Latvia conquered by Soviet Union, Germany, then again Soviet Union

⇩

1945-1991, Latvia as Soviet Republic

⇩

Since 1991, independent Latvia

⇩

2004, Latvia Joins EU

Standard Architectural Designs in Riga

Residential buildings in Riga can be roughly divided into a small number of main groups. The first consists of building constructed in the period until the World War II. These houses are built mainly from bricks or wood and each of them has a unique design. About 7.7% of Riga inhabitants live in houses that were built in the pre-industrialization period of the Soviet Union. Most other Riga inhabitants today live in apartment houses that were built after World War II. These are large housing estates, mostly constructed in the period from 1961 to 1990. They are mainly buildings with standardized architectural designs, often utilizing large concrete panels as the construction material.

The quality of the construction is often poor, both for building exteriors and unit interiors. Uneven floors and staircases with steps of different heights are common. Building facades are not only aesthetically displeasing but also cause a lot of energy losses in the cold Baltic environment (Berglund, 2002). After the 1990s few apartment houses were built; it is estimated that only about 2.3% on Riga inhabitants live in the newly-built structures (Tursons, 2004). (In the regressions below, such new construction is identified with a separate dummy variable.)

The various standard types of architectural designs that are currently found in Riga are summarized in Table 1. As can be seen, the flat sizes are rather small by Western standards, with the average living space for all types of dwellings only 48.86 m^2 in 1998, ranging from 32 m^2 in dwellings with one room to 92 m^2 in dwellings with four or more rooms (Tursons, 2004). The majority of apartments in Riga (67%) have one or two rooms, 25% have three room apartments, and only 7% have four or more rooms.[3]

Table 1: Description of architectural design prototypes for Riga

Design type	Descriptors	Material	Period	Rooms / flat areas	Characteristics
S103	Special project	Bricks and panels	Early 1970s to 1990s	1 room 34 m^2 2 room 51 m^2 3 room 66 m^2	5, 7, and 8 storied buildings; Separated rooms, a loggia
S104	Special project	Bricks or panels	Early 1970s to 1990s	1 room 42 m^2 2 room 57 m^2 3 room 69 m^2	5 storied buildings and higher; Separated rooms, a loggia
S119	Special project	Panels	Early 1980s to 1990s	1 room 42 m^2 2 room 55 m^2 3 room 62 m^2 4 room 84 m2	Mainly 9 storied buildings With a loggia
S467	Special project	Panels	Early 1980s to 1990s	1 room 42 m2 2 room 55 m^2 3 room 62 m^2 4 room 84 m^2	9 storied buildings With a loggia
S602	Special project	Panels	Mid 1970s to 1980s	1 room 35 m^2 1.5 room 49 m^2 2 room 41 m^2 3 room 63 m^2 4 room 73 m^2 5 room 78 m^2	6 or 9 storied buildings; Very small kitchens; With a balcony or a loggia
Brezhnev	Early block housing	Bricks	Brezhnev period	2 room 45 m^2 3 room 58 m^2	5 storied buildings; With a balcony
Dormitory type					
Khruschev	Early block housing	Bricks	Khruschev period	1 room 29 m^2 2 room 41 m^2	2- to 5-storied buildings; Nondetached toilet and bathroom; Kitchen of 6m^2
Lithuanian	“Lithuanian” block building	Panels	Starting from 1960s	1 room 27 m^2 2 room 48 m^2 3 room 53-62 m^2	5-storied buildings
Small family	Very small family block building	Panels		1 room 36 m^2 2 room 36 m^2	5-, 9- or 12-storied buildings; Nondetached toilet and bathroom; With a loggia
Prewar	Prewar buildings	Wood or bricks			Practically each building is unique; Includes both prestigious houses with ceiling height 3-4 m as well as modest housing without central heating

[3] A "room" here is any unit room other than kitchen, bath, balcony, or stairwell.

(continued)

Design type	Descriptors	Material	Period	Rooms / flat areas	Characteristics
Detached	Private single family detached	Various			
Special project	Block buildings, higher quality, in the past for party elite	Panels or bricks			Different projects; More spacious kitchens and loggias; Not-typical room planning
Stalin	Early block housing	Bricks	Stalin period	2 room 52 m^2 3 room 66 m^2	High ceilings; Spacious kitchen of 8-12 m^2
Other indicators:					
New	Recent construction		From the 1990s		
Wooden	Prewar, very small	Wood			Mostly without central heating, sometimes with common toilets for the entire floor

About 88% of Riga inhabitants live in apartment houses that are constructed from bricks and concrete, while only 12% live in houses built from wood and other materials. Almost all of the apartments (99%) are electrified, 90% have access to city water and sewage and gas, and 80% have central heating, bath and hot water.[4]

While several of the design types are named for a leader of the Soviet Union during some period of rule, they nevertheless refer to specific design types. In the same periods in which Stalin, Brezhnev, and Khrushchev were in power, multiple designs were constructed, besides design types named after the ruler at the time, and sometimes a design named for a leader was still constructed after that leader was out of power.

The first standard building types in Riga were constructed during the period of Stalin. These were relatively spacious apartments, with thick walls made from bricks. The use of bricks is important, given the Baltic climate. "Stalin type" buildings have spacious rooms and kitchen, large windows and high ceilings, all of which are lacking in the later standard building types.

The next standard apartment houses built were the so-called "Brezhnev" and "Khruschev" types. These were also constructed from bricks but contained apartments that were considerably smaller. They were built to provide rapid shelter for the masses of immigrants flowing into the country in the years of rapid industrialization. "Khrushchev style" buildings often do not have separate bath and toilet (but rather these are combined), or a separate living room, which makes these less attractive than Stalin- or Brezhnev-type living units.

[4] Ibid.

Later standard apartment buildings were constructed mostly from "panels," i.e. large concrete blocks, which allowed building construction to be completed in a shorter period of time. Various types of "panel buildings" were built from the 1960s to the 1990s. These large-scale panel buildings amount to approximately 40% of the housing stock in Riga today (Marana and Tsenkova, 2002).

One of the most widespread large-scale panel housing architectural styles is the "Lithuanian" multi-unit structure. There are two types of Lithuanian structures: the old ones have a balcony and the new ones have a loggia. In general these units are regarded as higher quality than other panel units (Marana and Tsenkova, 2002).

Another architectural design consists of small apartments known as "Small-Family" projects. The Small-Family series includes both 5-storied and 9-storied buildings with one-room apartments. The apartments are spartan, the bathroom and toilet are not separated, and in general these are considered to be low-prestige projects.

Architectural designs series 467 and 602 belong to the group of panel buildings. These are mainly 9-storied buildings, where the apartments themselves are more spacious, and where the staircases and the common areas are more spacious and convenient than in the Lithuanian series houses. Series 467 differs from series 602 in the exterior building facade, which looks newer and may be decorated with colored tiles or other design flairs. Series 467 apartments have a loggia while series 602 apartments have a balcony.

The newest and more prestigious standard apartment buildings are series 119, series 103, series 104, and "special projects". Of these, series 103 and 104 and some of the special projects use bricks, at least in part, as a construction material and so have fewer problems with thermo-isolation. The newer series are also more spacious than the earlier panel-houses and may have better architectural planning, separated rooms, more loggias, etc.[5]

Following the collapse of Soviet rule, there was no immediate increase in construction quality. The quality of standard apartment buildings has varied since then with the property ownership type. For example, Lithuanian series cooperative buildings usually have higher construction quality and better

[5] Most of the different design styles were constructed contemporaneously. There are however some differences in the mean age of units from the different designs. This means that the design variables are not completely free of construction age differences, and these age differences may have some effect. We try to reduce the effect of age in the design variables by introducing separate dummies for "new", renovated" and pre-war housing construction units. Unfortunately our data set did not contain construction date.

thermo-isolation than units constructed by the State, no doubt affecting housing value.[6]

The Data Set

The data set for Riga housing consists of about 3500 purchase/sales transactions that took place in the period between 1997 and 2003. These data were obtained from Hansabanka, which is the largest mortgage lender in Latvia, with a market share of about one fourth of the total. The data were collected by the bank as part of its mortgage lending operations, where the prices are the appraised values assigned by the bank's professional appraisers to the units, based largely (but not entirely) on samples of market purchase prices. Prices are in US dollars, which has become the conventional way to express housing transaction prices in Latvia. (Over the past year or so, there has been a switch towards quoting prices in Euro.) To the database obtained from Hansabanka were added data from another information set, obtained from the Institute of Geodesy and Geoinformation in Latvia. This latter set includes the precise number of floors, the building materials, and the precise *X*-*Y* coordinates of the apartment houses in Riga, which enables the description of the living stock in Riga in a more precise manner.

Most of the transactions are secondary market sales of residential housing units by their previous owners. A very small number of transactions are for newly-constructed housing, reflecting the fact that in the first years of independence few apartment houses were constructed. Because of capital market problems and limitations on loan sizes, the data may be biased somewhat, due to the undercounting of highest-quality, highest-price housing units in the market. These last transactions are often conducted without mortgage lending, and so would not be in our data set. Similarly, the database may also exclude some lowest-price housing, which can often be purchased without the need for taking out a bank loan at all.

The characteristics of the sample are summarized in Table 2. As can be seen, Riga housing is quite small and cheap by the standards of Western Europe and North America. Mean unit price in the sample was only about $24,600 and the mean size was 59 m^2, with about two and half rooms. (As noted above, “rooms” are all unit rooms not counting baths, kitchen, common stairwell, and any porch or balcony.) Most of the sample units were in apartment buildings with a mean total size of 6.4 floors.

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[6] The architectural floor plans for the various design types are shown at http://www.realty.lv/eng/market/plans/, http://www.nams24.lv/;jsessionid=87jy482f21?_p=4&menu__id=22

Table 2: Summary statistics for Riga residential housing sample (*N*=3501)

Variable		Mean	S.D.
Price of housing units (US$)		24,621	19,149
ln (housing value)		9.8711	0.60042
Area (m^2)		59.1268	23.32635
Number of rooms (not counting bath and kitchen)		2.4751	0.97260
Floor of building		3.8512	2.38084
Number of floors in whole building		6.3779	2.68230
Riga neighborhoods	**Proportion within sample (%)**	**Mean of housing unit value in category ($)**	**S.D. of housing unit value in category ($)**
Agenskalns	4.1	19,141	13,220
Bolderaja	1.9	12,990	5,966
Brasa	0.8	23,135	18,412
Breksi	0.1	19,575	4,269
Centrs	18.0	40,260	30,059
Ciekurkalns	0.5	24,900	13,672
Darzciems	0.5	30,228	7,572
Ilguciems	1.4	26,006	7,259
Imanta	7.6	19,683	9,371
Jaunciems	0.0	26,000	
Jugla	4.5	17,761	10,842
Krasta	0.6	29,645	6,320
Kengaragas	7.2	16,394	9,804
Mangali	0.2	27,875	12,124
Maskavas	0.5	22,047	12,346
Mezaparks	0.5	65,664	33,039
Mezciems	3.2	22,270	10,161
Pardaugava	4.3	17,428	13,234
Plavnieki	8.7	20,675	10,657
Purvciems	15.3	21,465	12,394
Sampeteris	0.8	27,122	14,572
Sarkandaugava	2.7	20,192	11,735
Skirotava	0.0	8,500	
Teika	3.0	26,266	16,118
Vecmilgravis	2.3	16,611	9,209
Vecriga	0.8	63,706	34,920
Ziepniekkalns	6.9	21,802	12,321
Zolitude	3.5	24,602	10,272
Housing architectural design:			
S103 model type	4.1	21847	12,206
S104	2.1	27,076	12,558
S119	8.2	25,441	11,175
S467	3.3	23,224	9,397
S602	16.7	20,229	9,309
Brezhnev	0.8	25,441	6,023
Dormitory type	0.2	16,567	14,290
Khruschev	10.6	17,841	10,943
Lithuanian	17.4	17,479	8,111
Small family	2.7	12,399	4,901
Prewar	17.7	37,425	31,207
Detached	0.1	25,250	14,751

(continued)

Riga neighborhoods	Proportion within sample (%)	Mean of housing unit value in category ($)	S.D. of housing unit value in category ($)
Special project	8.7	23,392	15,989
Stalin	5.7	28,938	18,391
Other construction indicators:			
New Construction	1.9	59,986	29,262
Percent built from wood	2.18	20,358	19,012
Percent built from wood and concrete	0.46	19,129	12,238
Other factors:			
Unit sold new before completion of finishing	1.22	59,304	30,850
Percent that have not been renovated immediately before sale	66.98	20,389	13,462
Percent that have undergone renovation immediately before sale	31.8	32,243	24,428

There is considerable variation in sample mean unit values across neighborhoods and also in standard deviations. As can be seen, the Mezaparks area is the most expensive, with mean unit price at about $65,700, and Vecriga with mean value about $63,700, followed by Centrs, which is the city center and contains the central business district, in a distant third place, with mean value about $40,300. Mezaparks housing consists largely of new apartments or special project apartments, and the district contains a number of amenities. It mainly consists of detached houses built in the pre-war period, and these have traditionally been inhabited by the wealthiest part of the population. Very few standard-type buildings have been constructed in the area.

Veciga is the tourist center, with many pre-war historic and heritage architecture, and it is also the financial center. It has been included in the UNESCO World Heritage List since 1997. The apartments in this district are better quality and more spacious than in other parts of the city, which helps to explain the higher prices there.

The "Center" is the downtown of the city, the traditional shopping and business center. Most, though not all, of the housing stock here is pre-war. The apartments tend be larger and more luxurious; the floor area of apartments in pre-war buildings is about 20%-25% larger on average than in the standard type buildings. In the Center, proximity to workplaces and recreation facilities also contributes to the price premiums.

Mean values for all other neighborhoods were between 15 and 30 thousand dollars, except for Skirotava, which had a low value of $8500. Because

Skirotava and Jaunciems have so few observations, they are excluded from the regression results that follow. Generally the lowest average housing values in our sample are observed in the Bolderaja, Vecmilgravis, and Kengarags districts. Both Bolderaja and Vecmilgravis are located relatively far from the city center, at the estuary of the Daugava into the sea. While the location is attractive due to proximity to the sea, apparently the quality of standard apartment houses together with a high crime rate has produced relatively low prices. This is also true of Vecmilgravis, a green district not far away from the seaside but rather far from the city center. Similarly Kengarags is relatively far away from the center and is reputed to have a high crime rate.

A recent household survey of Rigans asked about the areas in which respondents would like to purchase an apartment (Hietanen, 2004). It revealed similar results to the ones expected from average housing values across the respective districts. Among the most preferred areas were Mezaparks, Imanta, Purvciems, and Old Riga. The lowest status was Kengarags, followed by Bolderaja, Plavnieki, and Zolitude.

The Architectural and Other Explanatory Factors in the Riga Housing Market

Table 3 shows the estimation of two slightly different versions of hedonic pricing equations for Riga housing, using our sample described above. In the first equation, several housing variables are introduced in quadratic form, and in the second they are "logged". The price elasticity with respect to floor space is about 1.0, so in the second version of the equation the dependent variable used is log of price per square meter. The price elasticity of the number of rooms, holding floor space constant, is –0.8%. With respect to the floor in the building, the price elasticity is about 1.7%.

There is also a transactions time trend, with prices rising about 2% a month, other things held constant. Because the Rigan housing market has been changing so dramatically, the time variable contributes a significant amount to the explanatory powers of the equation. In regressions not shown, we ran estimates without any time variable.[7] The adjusted *R*-square dropped from about 0.84 to about 0.57 (for the version with logged explanatory variables). In the future, as the market matures and stabilizes, "time" will be a less important factor in explaining Riga housing prices. In any case, the architectural design variables remain significant even when the time variable

[7] When dummies are used for individual years, the goodness of fit improves somewhat, as would be expected.

is suppressed.

Table 3: Regression of ln of Riga housing value*

Dependent variable:	Version I		Version II	
	Coefficient	*t*-stat	Coefficient	*t*-stat
Constant	7.314	178.900	4.544	109.935
Time	0.021	80.960	0.020	76.546
Number of rooms	0.114	4.907	--	--
Number of rooms squared	–0.024	-6.795	--	--
ln (Rooms)	--	--	–0.008	–0.726
Area (Floor space)	0.025	25.049	--	--
Area-squared	–5.87E-05	–12.572	--	--
Floor of unit	0.023	4.485	--	--
Floor of unit squared	–0.002	–4.212	--	--
ln (Floor)			0.017	2.500
Floors in building	0.012	4.133	--	--
ln (Floors)	--	--	0.135	7.616
Neighborhood dummies				
Agenskalns	–0.352	–15.076	–0.315	–13.083
Bolderaja	–0.752	–22.692	–0.724	–21.465
Brasa	–0.188	–3.999	–0.179	–3.773
Breksi	–0.303	–2.517	–0.265	–2.188
Ciekurkalns	–0.323	–5.289	–0.265	–4.427
Darzciems	–0.188	–3.186	–0.145	–2.367
Ilguciems	–0.238	–6.393	–0.203	–5.384
Imanta	–0.328	–14.281	–0.310	–13.304
Jaunciems	–0.412	–1.701	–0.403	–1.651
Jugla	–0.353	–14.355	–0.334	–13.447
Krasta	–0.300	–5.266	–0.264	–3.995
Kengaragš	–0.415	–18.300	–0.400	–17.100
Mangali	–0.430	–5.030	–0.361	–4.192
Maskavas	–0.442	–7.224	–0.471	–5.784
Mezaparks	–0.210	–3.298	–0.114	–1.670
Mezciems	–0.353	–12.014	–0.332	–11.140
Pardaugava	–0.398	–17.245	–0.362	–15.143
Plavnieki	–0.362	–15.381	–0.343	–14.088
Purvciems	–0.274	–14.301	–0.251	–12.568
Sampeteris	–0.272	–5.914	–0.221	–4.577
Sarkandaugava	–0.461	–16.387	–0.450	–15.771
Teika	–0.168	–6.453	–0.136	–5.104
Vecmilgravis	–0.591	–19.702	–0.573	–18.523
Vecriga	0.775	16.121	0.750	14.909
Ziepniekkalns	–0.378	–15.761	–0.357	–14.397
Zolitude	–0.361	–11.086	–0.330	–9.863
Architectural design type dummies:				
S103	0.123	5.103	0.117	4.841
S104	0.074	1.885	0.015	–0.430
S119	–0.028	–1.102	0.053	–2.104
S467	0.013	0.487	–0.042	–1.501

(continued)

Dependent variable:	Version I		Version II	
	Coefficient	*t*-stat	Coefficient	*t*-stat
S602	–0.012	–0.631	–0.054	–2.809
Brezhnev	0.187	3.975	0.193	3.997
Dormitory	0.054	0.543	0.247	2.463
Khruschev	0.052	2.957	0.059	3.325
Small family	–0.092	–3.145	–0.105	–3.601
Prewar	–0.026	–1.234	0.040	1.800
Detached	–0.363	–2.141	–0.236	–1.380
Special project	0.069	3.394	0.051	2.679
Stalin	0.117	5.160	0.165	7.051
Quality dummies				
Renovated	0.189	21.528	0.189	21.046
New construction	0.268	6.364	0.318	7.209
Construction-material dummies:				
Wood	–0.283	–9.525	–0.281	–8.876
Mixed materials	–0.261	–4.289	–0.195	–3.064
N	3609		3462	
Adjusted R^2	0.919		0.855	

* "Lithuanian" design does not appear as explanatory variable. In effect, it is the "default" value measured by the constant.

Renovated units are sold on average for almost 21% higher prices ($e^{0.189}$–1) and new units for 12% higher, respectively, all other things equal. The coefficients for the dummy variables for wood and mixed construction materials are negative and fairly large. The neighborhood location dummies roughly fit the standard monocenter urban model.[8]

What can be said about the relationship between architectural design and housing value in Riga? The values of different designs, controlling for neighborhood, floor, location, and size of the housing unit, are shown in Table 3 as part of the hedonic equation estimations. As can be seen, the design with the highest values, while other things equal, is "new construction", which has the highest value coefficient of all, followed by relatively new "dormitory structures" in the logged version, and then followed by Brezhnev units. The next highest design values are S103 and Stalin. In addition, these design styles (as seen in Table 1) are generally constructed from bricks and not panels. Bricks generally seem to be associated with higher value in Riga.[9]

The Stalin structures have relatively high ceilings and relatively large

[8] They and commuting patterns in Riga are the subject of a companion paper, “Price Gradients and Commuting in Riga, Latvia,” by Pnina O. Plaut and Egita Uzulena, mimeo.

[9] And decidedly not wood. See discussion of wood below.

kitchens, both of which seem to be characteristics that buyers value. Brezhnev and S103 designs usually have balconies or loggias and Stalin designs may have also these, although these can be found in some lower-value designs as well. The Brezhnev design is one of the first standard apartment house designs associated with better construction quality, and this may be a factor in its relatively high value coefficient.

At the other (low) end of the value scale are the "detached" homes, which have the lowest design value of all, followed by "small family". For Western readers used to associating single-family structures with higher values, these findings may appear surprising. The reason is that these "single family" or "detached" units are often low-quality small shanties or shacks, with poor architectural planning. Moreover these are often surrounded by large housing estates, producing an adverse effect on their locational values. They often have no heating and may not have their own bathrooms. While the design value coefficients are computed here after controlling for unit size, nevertheless they may be picking up some (possibly nonlinear) effects of the unusually small sizes of many of these units.

The other designs have intermediate coefficient values. Most of these remaining designs are predominantly constructed out of panels (concrete blocks). While prewar housing in Riga often sells at a premium compared with other housing (see Table 2), from the regression it is clear that this is due to its location and not the architectural design itself. The value coefficient for prewar housing is close to the average for all designs city-wide. In many of these intermediate-value designs, bath facilities are generally "combined", meaning the toilet and bathtub would be in the same room. In Riga this is considered a serious drawback, again a finding that might appear somewhat strange to Western eyes. (Units with two or more baths are rare.) In some of the higher-value designs, the bath and toilet are separated into two rooms. In S104 units, among the highest of the design values for this "intermediate-value" group of designs, bathrooms are also separated.

There is also some importance to other construction indicators. Higher-value coefficients are associated with "new" or "renovated" units, other things equal. Interestingly, wood or "mixed construction materials" (partly wood) produce considerably lower values, other things equal. Wood structures have values about 28% lower than brick or panel structures. Again, this may appear strange to Western readers, often accustomed to thinking of wood as adding housing value. Wooden structures have heat and insulation problems. Moreover wooden buildings may have shared toilets with other apartments on the same floor, and may not have access to hot water, central heating and sewage system. They also may be older and

smaller units,[10] and may include shanties.

Conclusions

Architectural design should be a factor in hedonic pricing models of real estate value, both residential and commercial, but it is only rarely included. This is no doubt due to the difficulty in creating measurements and indicators of design quality that can be quantified and measured in a standardized manner, other than through specific physical features, such as number of baths or size of balconies. In this paper we are able to estimate the implicit values of architectural quality in residential housing units for Riga, Latvia because these are lumped into a relatively small number of standardized designs. While all of the designs are for housing units that might seem small and even spartan to Western readers, there are nevertheless noteworthy price differences, and these differences are independent of location.

It appears that the Brezhnev, Stalin, and S103 designs are associated with the highest design values. There are also price premiums associated with new (post-Soviet) construction and with some physical features, such as building out of bricks, having high ceilings, and having balconies or loggias. Floor plans having the bathroom and toilet separated from one another into two "rooms" seem to raise housing value. Some construction material variables also have pricing importance. Interestingly, single-family units and construction out of wood is associated with considerable price discounts, as these units are regarded as shanties at the low-quality end of the housing stock.

More generally, our analyses is one of the first microeconomic hedonic-style analyses of housing values in a transitional economy of Eastern Europe. Until the fall of communism, most of these countries did not have functional housing markets at all. Instead, housing was state allotted. After the collapse of communism there, new markets emerged and began pricing the existing housing stock. Mortgage markets began operating and property law was altered and property rights defined more clearly. The results and implications of these changes for housing pricing processes is only now beginning to be explored and understood.

[10] While size of unit is controlled in the regression with a separate variable, these construction material dummies may be picking up some residual effects of size not completely captured by the size variable.

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