THE HOUSING MARKET IN COLOMBIA:
Socioeconomic and Financial Determinants

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(Summary)

This document provides an overview of the housing system in Colombia and explores its socioeconomic and financial determinants.   Our recommendations aim at improving basic data collection regarding the construction sector, household socioeconomic conditions, and mortgage markets.   We also estimate a simultaneous econometric model for the housing market in Colombia covering quarterly-data over the period 1991-2004.   On the demand side, we found that area of approved-licenses is highly elastic to households' disposable income, prices of new-housing, and real interest rates charged in mortgage credits.   On the supply side, we found a high input-cost elasticity and a moderate response to wealth effects. These results proved to be robust to different proxies and diverse estimation procedures.

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I. Introduction

Mortgage markets currently present two interesting analytical features. At the international level, there is a house-price boom covering United States (including New York, San Francisco, Seattle), Australia (Sydney), Great Britain (London), and Spain (Madrid and Barcelona), among others.[1]

This trend, now extending over 1995-2004, invites us to re-think about:

1) Households' consumption/savings function;

2) Housing as a preferred asset when compared to financial savings or equity;

3) The role of central banks regarding "asset inflation", particularly under Inflation Targeting regimes.

The second feature relates to Colombia, where there is also a construction recovery cycle (2003-2004), after a big macroeconomic contraction of -4,3% in 1999, which involved a foreign exchange and mortgage crises, lasting over the period 1998-2001. This recovery, however, is of a weak nature as it is not yet based on mortgage credit. The ratio of mortgage credit/GDP is currently as low as 5%, down from a historical peak of 12% during the mid-1990s.

The main thrust of the housing recovery in Colombia stems from capital inflows, as a result of arbitrage in favor of Latin-American markets with respect to US-markets, and significant increases in remittances from Colombian's living abroad.[2] We estimate that the combined effect of these two forces have increased disposable income in as much as 1% of GDP over 2003-2004 and help in explaining why the annual average real-rate of growth of the construction sector (about 12%) triples that of the economy (close to 4%). If capital flows were to reversed, due to additional increases in the US-market interest rate differential, the construction recovery in Colombia could be in jeopardy.

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[1] See IMF (2003), Merrill Lynch (2004), The Economist (2004b).
[2] See Banco de la República (2004a).

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In section II we will establish some international comparisons between mortgages regimes and discuss some features of the Colombian system, characterized by low mortgage-credit deepening and a system of real-interest rate ceiling. These ceilings were ordered by the Constitutional Court, as a result of the social unrest caused by the flex-nominal system that prevailed over the 1993-1998 period. Section III focuses on the features of the Colombian housing and mortgage system. In section IV we develop and estimate a simultaneous econometric model for housing in Colombia over the period 1991-2004 (using quarterly data). Section V provides some concluding remarks.

II. Mortgage Systems: An International Comparison

A. House-Prices Cycles in Some Developed Economies

House prices behave differently across and within countries, depending on economic cycles, capital markets, local regulations dealing with land-availability and environmental requirements. Take the case of Japan, where house prices declined 19% in real terms nation-wide and 32% in Tokyo over the period 1995-2002 (see Table 1). In spite of such decline, a regular apartment of 100 mts^2 in Tokyo still cost about US$850,000 in 2002, while the average cost in the rest of Japan was close to US$300,000.[3]

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[3] See Collyns and Senhadji (2003) regarding housing-prices cycles in Asia..

In the US-Economy, on the contrary, there has been a pronounced upward house-price cycle, particularly over the years 1995-2002. The average nation-wide house-price increase was close to 27% in real terms and 47% real in the case of New York.[4] The typical 100 mts[2] N.Y.-apartment cost almost one-million dollars, not much above that of Tokyo after its price-collapsed.[5] More recently, the American house-price inflation quickened during 2004, while the Federal Reserve Bank (FED) has been increasing the Federal Funds Rate (FFR) at a "measured pace" from 1% to 2% during the second term of 2004. It is hard to judge at this stage how appropriate has been this pace of FFR-increases in taming core-inflation and house-price inflation, while market expectations are for the FFR to reach 3,5-4% by end-2005.

In Great Britain and London house-price gains have been more pronounced (surpassing 100% in real terms over 1995-2002) and the average house-price do not differ much from those of US or N.Y., respectively. The Bank of England has now increased in five occasions its reference rate during 2003-2004, reaching 4,75% in August 2004. This rapid reaction from the Bank of England aims at containing un-desired accelerations of the general price-level and in the house-price market, with good-prospects in attaining a gentle "pricking of the asset-bubble."[6]

The case of house-price inflation in Spain requires especial attention. House-valorization reached 60% in real terms over 1995-2002 and has continued in the case of Madrid over 2003-2004.[7] This situation is likely to exacerbate as the Central Bank of Spain has delegated in the European Central Bank (ECB) the conduct of monetary policy. The ECB has maintained the repo-rate at 2%, as core-inflation seems to be under-control in the EU, but this general policy is of little help in containing asset-price inflation in Spain. Nevertheless, it might be appropriate for Germany, where house-prices continued to fall in real terms during 2004. Furthermore, we will see that it is not only real interest rates close to zero that fuel house-prices in Spain, but the whole mortgage system with minimum down-payments and long-amortization horizons.

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[4] The Economist (2003a p.6)
[5] IMF (2003) p.17
[6] Merrill Lynch (2004); The Economist (2004d).
[7] See Tsatsaronis and Zhu (2004 p.67); The Economist (2004d).

The typical apartment of 100 mts^2 in Madrid, however, still costs about half of its reference in New York, London, or Tokyo, where land-scarcity and tough-regulations play an important role in house-price formation. Interestingly, transaction costs differ significantly, with no particular rule: New York and Madrid run high at 12% of commercial value, while London and Tokyo's seem moderate at 4 or 5% (see Table 1).

Table 1: House-Prices in Selected Countries-Cities
(1995- 2002)

	Real Variation (Percentage)	Value of 100Mts/Sqr. Two-Bed-Room (Thousands US$) *	Transaction Costs (% Price)
United States	**27**	**204**	
New York	47	925	12
Great Britain	**89**	**185**	
London	136	950	4
Spain	**58**	**147**	
Madrid	63	425	12
Japan	**-19**	**301**	
Tokio	-32	850	5
Colombia	**-37**	**50**	
Bogota	-39	72	4

* Dic. 2002

Source: Central Banks, The Economist (2003) and our computations.

Colombia experienced house-price real contraction of about 37% in the main cities and of 39% in Bogotá during 1995-2002, as a result of the 1998-2001 crisis mentioned before. As a result of such crisis, the typical apartment of 100 mts.^{2} cost only US$72,000 in Bogotá and about US$50,000 in the main cities by end-2002.

This short survey shows that real house-price cycles fluctuated between 50-150% in countries experiencing house-booms during 1995-2004, while those experiencing house-price real contractions have hovered around 20-40%. The boom cycle has now lasted between 4-6 years in US and UK, with some positive signals of a "soft-landing" due to proper actions taken by their central banks. Japan and Colombia are now on a recovery phase, after experiencing drastic and rapid house-price contractions lasting 2-4 years. Spain and Australia, however, are cases that need close monitoring as no proper cooling-

signals have been given by their respective Central Banks and a bust-risk is still hanging-out there.

B. Mortgage Systems

Economic theory of housing demand gives crucial importance to having credit access and the ways in which these resources are provided or rationed.[8] Hence, it is relevant to understand the different "mortgage systems" and their international practices.

Table 2 illustrates some basic characteristics of selected "mortgage systems". For example, in the US-economy there exist long amortization schemes (25-30 years), which have helped in developing private capital markets and deepening of the public debt market. Mortgage-back securities (MBS) represent an important reference in determining the T-bills' "yield-curve" and vice versa. Given the fact that about two-thirds of the mortgage system is denominated in fixed-nominal interest rates, a reduction-trend in the Federal Funds Rate (FFR) usually sets a complex process of mortgage refinancing at lower rates.

The FFR experienced significant reductions over the period 2000-2003 and triggered one of the longest episodes of mortgage refinancing.[9] Some households chose to cash-out mortgage refinancing and increased their consumption levels, helping in shortening the recession period. Other households chose to deleverage their net financial positions by paying down more-expensive and non-tax-deductible consumer debt. Overall, the household financial obligations ratio remained rather stable at 18% over the period 2002-2004.[10]

A second mark of the US-mortgage system stems from the generous amount of financing, where credits usually represent about 70-100% of the house-market value.[11] Furthermore, there is some concern about the recent increase in the relative size of mortgage credits

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[8] See Muellbauer and Murphy (1997).

[9] It has been estimated that credit refinancing in the US-economy increased aggregated demand in about 0.3% of GDP per-annum, representing US$150-200 per-month for the typical household. See Brady et.al. (2000) and Greenspan (2004a).

[10] Greenspan (2004b).

[11] Case (2000), p.132.

being approved by cuasi-public banks, such as Fannie Mae/Freddy Mac. This policy has helped in maintaining the current boom in house-financing at a moment in which there is some evidence of a housing-price bubble during 2000-2004. Similar policies have resulted in mortgages-crises, as recession make evident households' over-indebtedness, including the cases of UK during 1992-1994 and Colombia during 1998-2001.[12]

Table 2: Mortgage Systems: Main Characteristics (2000-2002)

	Average Amortization Schedule	Credit / House Market-Value	Real Interest Rate	Tax Breaks	Interest Rate Setting
	Years		%	Direct / Indirect	
US	25 - 30	70 - 100	3 - 5	Yes / Yes	Fixed in Nominal Terms
UK	22 - 23	90 - 100	4 - 6	Yes / No *	Variable in Nominal Terms
Spain	18 - 20	80 - 90	0 - 3	Yes / Yes **	Variable in Nominal Terms
Colombia	10 a 12	Máx. 70	8 - 13	Yes / Yes	Fixed in Real Terms

* Recently Changed   ** Up to 7% of VAT-Rate

Source: Official Housing Data, Central Banks, The Economist (2003), and our computations.

In the US-economy mortgage real interest rates have been hovering around 3-5% during 2000-2004. So the risk of a boom-bust cycle in the US-economy is more closely related to house-price volatility than to interest rate volatility.[13] In fact, a mistake in attempting to "prick the bubble" might set a house-price collapse that would leave households with a high loan-to-value ratio (= Mortgage Credit / House Value) and financial entities could then experience a significant increase in their Non-Performing-Loans (NPL) portfolio.[14]

A third characteristic of the US-system is that tax-breaks are not limited to especial treatments in direct/indirect taxes. Cuasi-public banks pass onto mortgage creditors a benefit that has been estimated between 25-50 basic points. This benefit represents an additional tax-brake close to 8-10% of the current market interest rates.

The US-mortgage system has turned into a benchmark worldwide. UK, for instance, has been studying ways in which some of this refinancing process could be replicated in order to further empower monetary policy by moving from a flex-interest rate system into a

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[12] See Urrutia (2000) and Clavijo (2004).
[13] See Caplin et.al. (1997) and Shostak (2004).
[14] A boom-bust cycle is certainly a risk facing Australia now a days, see Merrill Lynch (2004).

fixed-interest rate system. However, not a defined answer has been yet provided and currently the UK-system presents real interest rates (4-6%) which are slightly above those of the US-system and with higher volatility.[15]

It has been mentioned that one additional reason for the UK not joining the European Central Bank (ECB) had to do with uncertainty surrounding the impact of ECB policies over the UK-mortgage system.[16] It is clear that the Bank of England needs to monitor-closely the particular situation of the UK-mortgage market, where land-scarcity and strict environmental regulations threat inflation behavior during "asset booms".

The mortgage system in Spain has also been dominated by a flexible interest rate setting. Spain, however, has fully adopted ECB-rulings, which has maintained a rather neutral monetary policy stance. Currently, this arrangement implies mortgage interest rates close to zero in real terms for Spain. Such monetary policy certainly represents a coordination challenge at a moment in which there are strong signals of a house-price bubble in the main cities of Spain.[17] Furthermore, unification of monetary and exchange rate policies have not yet produce growth-convergence in the EU. The ECB faces serious difficulties in setting appropriate macroeconomic policies as cumulative growth differentials have increased, for instance, between Spain-France with respect to Italy-Germany during 1998-2004.

Colombia adopted, since the 1998-1999 financial crises, a peculiar fixed-real interest rate mortgage system. Although such a system allows for pre-payments at no additional cost, the lack of sufficient competition among mortgage banks and high delinquency rates, hovering around 20-25% during 2000-2003, have maintained lending real interest rates at rather high levels of 8-13% annually (see Table 2). Furthermore, since 1999 Constitutional Court rulings ordered the Central Bank of Colombia to establish permanent ceilings for real mortgage lending rates, seeking to provide long-term house-financing at the lowest "market-rate". Although such ceilings have not been binding yet, due to the lax monetary policy adopted during 1999-2004, this economic "activism" of the Constitutional Court

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[15] Muellbauer y Murphy (1997).
[16] The Economist (2003a).
[17] See Tsatsaronis and Zhu (2004).

could certainly prove counterproductive for the housing markets in the near future, when credit dynamics is expected to recover.[18]

Table 3 illustrates the expected macroeconomic effects of having a fixed mortgage interest rate system vs. a flexible system. As previously discussed, under a fixed system a downtrend in market interest rates sets-in a refinancing process that usually boosts aggregate demand with a more lasting effect than under a flexible system. Under a flexible system responses are more rapidly absorb by the economy, but they show less resilience and more volatility.

Table 3. Fixed Vs. Flexible Interest Rates

Impact on:	Fixed	Flexible
Aggregate Demand	Stable	Volatile
Financial System	Mis-matches	Matches
Cuasi-Public Banks	Desireable	Optional
Types of	Fannie/Freddy	Securitization Inst.
Down-payments	Low	High

Source: Our own conception

On the other hand, a flexible system helps avoiding the problem of asset/liabilities mismatches. In Chile and Colombia mortgage interest rates have been traditionally indexed to CPIs (UF and UPAC-UVR units of account, respectively), both on the asset and liability sides, so that inflation volatility would no affect the balance sheet performance. As inflation was reduced from annual levels of 30-32% down to 3-6% over the 1990-2000s, credit markets in Chile and Colombia have undergone a re-nominalization process (Fuentes, et.al. 2003).

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[18] For more details on economic Constitutional Court rulings see Clavijo (2001).

Fixed rate mortgage systems have been accompanied by the development of cuasi-public banks that carry-out the securitizations of long-term mortgages, as has been the case of Fannie-May/Freddie-Mack in the US-economy. In developing economies there seems to be a larger scope for private sector-developments regarding securitization markets.

There is an on-going debate about pros/cons of each system, where the common trend is that nobody seems to be totally satisfied with their existing institutional arrangement. UK recently analyzed possibilities of deepening their fixed rate component, but not a defined strategy has been yet adopted, while in the US-system there have been raising concerns about cashing-out house valorizations that could prove only temporary, as previously discussed.[19]

C. <u>Ownership Rates</u>

Let us defined households' ownership rate as the ratio of household owners to the number of properties. This indicator is usually drawn from household surveys. In the case of the US-economy such rate has continued to increase from 66% in the mid-1990s up to 68% in the early 2000s (see Table 4). A similar trend has been observed in UK and Spain; actually they have reached higher levels of ownership rates at 70-80%, although the average in the EU is lower at 61%. In Germany households living under rent-arrangements represent about 40% of the population and something of the sort occurs in Nordic-countries. So not necessarily all developed economies exhibit high ownership rates as it is usually thought of. Nevertheless, most of households' wealth is represented in housing. In the case of the US-economy between a third and a half of the net wealth is in housing.[20] In consequence, a change in house-prices alters more significantly wealth-perceptions than changes in stocks' valuations.[21]

The World Bank reports that "secure ownership tenancy" is quite high in developing economies (at 90-100%),[22] which seems odd when contrasted with informality, lack of

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[19] See Brady et.al. (2000).
[20] IMF (2003 p.14).
[21] See Case (2000); Greenspan (2004c); The Economist (2004a).
[22] World Bank (2002), p.177.

ownership titles, and difficulties in carrying-out the rule of law.[23] One would expect that ownership rates in developing economies would be much lower than in developed economies.

Table 4: Property Rates and Mortgage Market Conditions

	Owners / Households (Percentage)		Mortgage Loans / GDP (Percentage)		Real Annual Return (Percentage)
	1990s	2000s	1990s	2000s	1995 - 2002
US	66	68	na.	58	7
UK	67	70	na.	55	10
EU	nd.	61	na.	33	na.
Spain	nd.	83	na.	54	21
Colombia	60	58	11	5	0,5
Chile	63	66	7	12	na.

Source: Official Housing Data, Central Banks, The Economist (2003), IADB (2004), and our computations.

However, official statistics indicate that this is not the case. For instance, in Chile and Colombia ownership rates are in the range 58-66%, not too distant from the 60-70% above reported for developed countries.[24] These ownership rates in Latin America, nevertheless, are surprisingly high when considering that Mortgage Credit/GDP ratios are very low and currently stand at 5-12%.

So a key question is in place: How could developing economies, with low savings rate, achieved "ownership rates" like those of a developed world, without even leveraged their mortgage markets? The answer is that a big fraction of those household properties in Latin America really represent low-quality and informal-housing developments, in many cases being the result of land-invasions, self-constructed properties, which lack basic sewages or utilities. In fact, it has been estimated that nearly 50% of the population in Latin America live in un-healthy properties that yet they claim to own.[25] In the early 1990s, about 60% of

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[23] See World Bank (1994); Szalachman (2000); De Soto (2000); Clavijo (2001, 2004); Kalmanovitz (2003).
[24] See Szalachman (2000) and IADB (2004).
[25] UNDP (2003).

the population of Mexico City, 38% of Lima, and 26% of Bogotá lived in self-constructed properties, usually associated with distant and unstable geographical settlements.[26]

III. The Housing Sector in Colombia

A. Macroeconomic Impact

The relative importance of the construction sector in the Colombian economy is summarized in Table 5, where it can readily be seen that housing and civil works have represented about 5-7% of GDP in the last decades. More recently and as a result of the housing-crisis of 1998-1999, construction sector's share of GDP has declined to 5,2%, in spite of the 2002-2004 recovery (representing sectorial real growth rates of 6-9% per-year). The housing sector, in particular, only represents about 3% of GDP, which is about half of the shared usually observed in many developed economies.

The creation of jobs through the housing sector stands at 5-6% of the total employment and has great potential in absorbing low-trained labor force. This sector exhibits a low-level wage structure and yet a very flexible labor market.

Colombia reported an ownership rate of 58% in 1998, including about 6% of households that were servicing their mortgage credits. Such ownership rate was lower than the 66% observed back in the 1980s or the 60% reported during the 1990s.[27] Furthermore, behind this relatively high ownership rate of the late 1990s stand other housing statistics that indicate that ownership does not necessarily translates into well being for the majority of Colombians. For instance, note that with a ratio of Mortgage Credit/GDP standing only at 5% nowadays (see graph 1) one should be suspicious about the quality of the housing, which actually comes from informal construction process, as mentioned before.

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[26]   See Gilbert (2001) and IADB (2004).
[27]   See Szalachman (2000) and DANE (2003).

Table 5: Construction and Housing Sector Statistics for Colombia

	1980s	1990s	2000s
Construction			
Construction * / GDP	7,0	5,9	5,2
Buildings ** / GDP	na.	3,8	3,0
Employment / Total	6,7	6,3	5,4
Social Hous. / Total Licenses	na.	na.	29,0
Housing			
Ownsership Rates	66,0	59,8	58,0
Average Area (Sqr. Mts)	45,0	60,0	70,0
Quantitative Deficit	na.	22,3	15,4
Qualitative Deficit	na.	4,2	13,3
Over-Crowd Rate	na.	14,8	17,4
Mortgages			
Mortgage Credit / GDP	8,0	11,0	5,0
Mortgage Credit / Total	20,0	28,0	26,0
Real Interest Rate	7	13,5	11

* Construction = Buildings + Civil Works
** Buildings = Housing + Comercial Constructions

Source: DANE, BR, ICAVI (2002), CONPES (2004), Szalachman (2000),
         and own computations.

In fact, the quantitative housing shortage in Colombia was around 22% in the 1990s, which was actually low for Latin American standards.[28] When considering as well the qualitative housing shortage of around 26,5% and the over-crowd rate of nearly 15%, one comes to the conclusion that about 45% of the population lives in un-healthy housing (see Table 5). Interestingly enough, this figure is not much different from the figure reported by expert urbanists who have indicated that the "effective" shortage of adequate housing in Bogotá was close to 41% in 1995.[29]
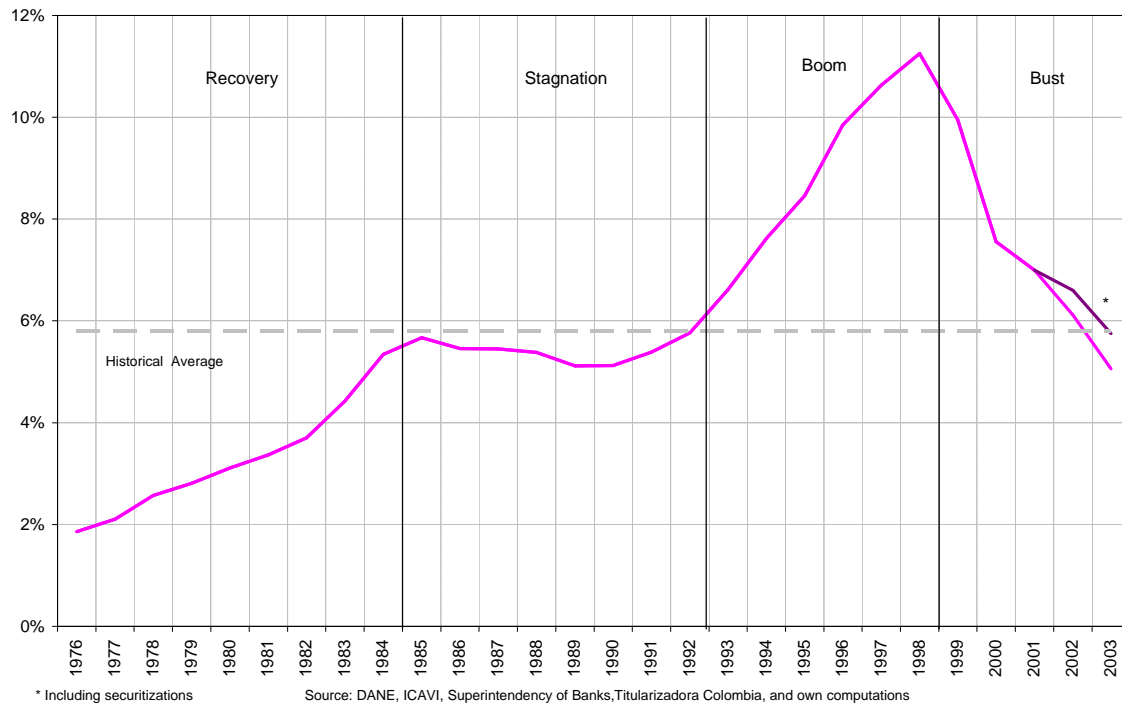
More recent figures indicate that the quantitative housing deficit hovers around 11-15%, while the qualitative deficit is around 13-20%, depending on the source being CONPES or the World Bank. If we consider as well the up-dated over-crowd rate of 17%, we conclude

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[28] Szalachman (2000).
[29] See Gilbert (2001), p. 15.

that Colombia had an "effective" housing deficit in the range of 41-52% at the end of the 1990s.

Graph 1: Mortgage Credit as a Percentage of GDP in Colombia
1976 - 2003

* Including securitizations   Source: DANE, ICAVI, Superintendency of Banks,Titularizadora Colombia, and own computations

It is then clear that in spite of the national efforts for combating illegal urban settlements, lead especially by the City of Bogotá, programs to extend the coverage of Basic Needs are still badly needed.[30] Prospects for habilitating property titles for the poor are rather grim due to structural problems related to the illegality of these settlements (to begin with).[31]

When considering Social Housing Programs (VIS), analysts have focused more on budgetary procedures than in assuring that focalization on the poor takes place. In fact, there has not been enough monitoring of these programs after the subsidy allocation has

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[30] See Secretaria de Hacienda de Bogotá (2004, p.41) and UNDP (2003).
[31] See De Soto (2000, p.46-62) and Gilbert (2001, p.30).

taken place.[32]   It is crucial to revamp statistical data-bases and scoring procedures to have a proper assessment of the impact of the VIS-programs, which currently represent less than a third of the new housing.

The official balance regarding housing shortages is alarming. It has been estimated that social-housing (VIS) deficit stands at 1,2 million units and for regular housing stands at 1,7 million units, for a total shortage close to three million units (in a country of about 9 million households). The demand for housing seems to grow at the population vegetative rate of 2% per-annum, indicating additional annual needs of 170,000 units (about 100,000 for social and 70,000 regular housing). Hence, governmental housing programs of about 100,000 units per-year would only satisfied the vegetative growth of social-VIS-needs (DNP, 2003 p.107). As for regular housing demand, it is required that private sector maintains the current dynamic over the following years, which would very hard to accomplish under the current mortgage credit conditions. Note that even under this optimist scenario (i.e. enough budgetary allocations for social-VIS and dynamic private sector attending regular markets), the possibility of correcting historical imbalances in over-crowd indicators and un-healthy housing looks very challenging.

In short, our call is for organizing in Colombia a surveillance program focused on housing issues, where a key element is developing a comprehensive data-base with a macro-impact module (dealing with GDP-labor multipliers) and a micro-impact module (dealing with quality, budgetary, and social issues). The deputy office for housing in Colombia has recently launched a similar program that could well-be the platform of a more ambitious surveillance program, where key players should include DANE, DNP, and several private institutions. This is the only way in which Colombia could have a proper "road housing map", where the lead should be taken by private real-state developments, including massive leasing and rental projects, as currently occur in Germany and Spain with the so-called "inmobiliarias".[33]

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[32]   See CONPES (2004).
[33]   The benchmark for such a monitoring program can be found in The Office of the Vice-Primer Minister of England. See, for example, http://www.odpm.gov.uk.

B. Real-State Cycle

In graph 2 we show the ratio of the new house-price index for Bogotá with respect to the general CPI of Colombia over the period 1984 – 2003. We have identified five cycles in the relative price of new housing in Bogotá. The period 1984-1991 depicts a slow upward trend, which reached the historical average (100) after increasing about 25% during the years 1987-1991. This is a recovery period after the financial crisis of the years 1982-1984 and the coffee boom of the years 1986-1988.

Graph 2: Relative Price of New Housing in Bogotá
[Average Value 1984-2003 (NHI / CPI) = 100]
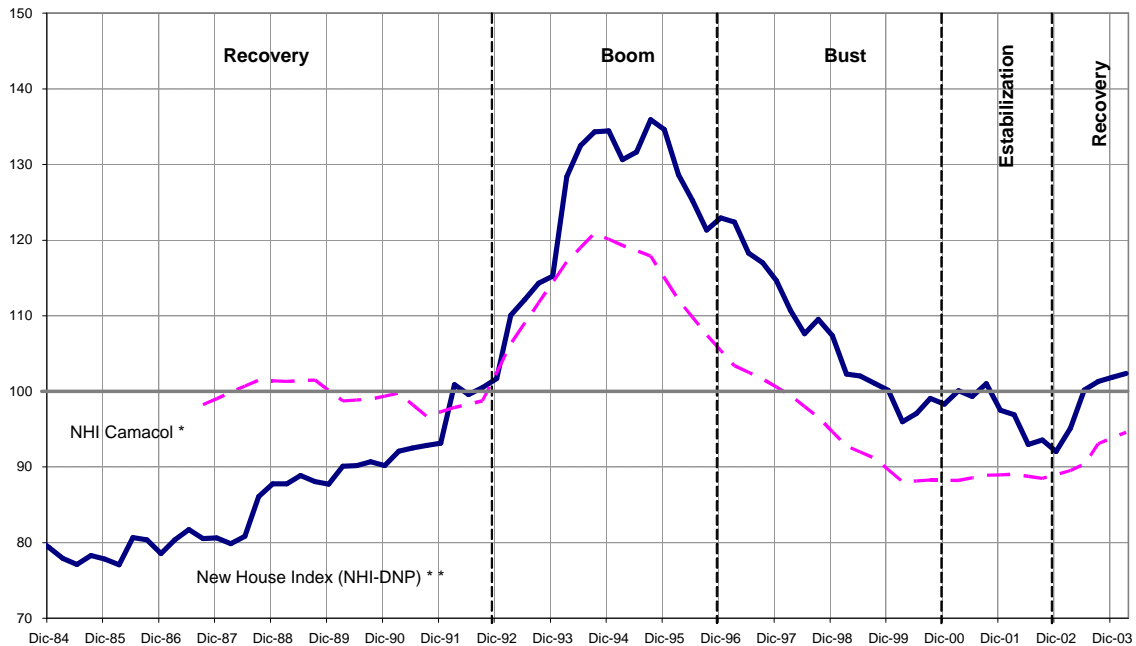
Sources: * Camacol;   ** 1984-1993, Carrasquilla, et.al. (1994) and 1994-2003, DNP; Re-scaled to Historical Average = 100.

The second part of the cycle is given by the boom years of 1992–1995, where house-prices in Bogotá increased by 35% in real terms, leveraged by a tax-amnesty given to repatriated resources and strong monetary expansions. The third part of the cycle is the bust that occurred in 1996–2000, prompted by the political crises of the years 1996–1997 and the Asian crises of 1998-2000. The initial slow-down implied a fall of about 11% in real terms and the crisis brought about and additional fall of 17%, taking the index back to the initial

levels of 100. The last episode shows and additional fall of the index to 90 during 2001-2002 and slight recovery during 2003-2004, back to the historical average of 100.[34]

In short, during the boom/bust cycle the prices of new houses in Bogotá experienced a value-loss of 39% in real terms during 1996-2002. The magnitude of this price-collapsed is high by international standards, where boom/bust cycles usually range from 10-20 value-losses. In other mayor cities of Colombia, price fluctuations were also significant, but of a lesser magnitude than in Bogotá.[35]

C. Housing-Financial Returns

Housing-financial returns depend crucially on house-price fluctuations, which in turn impact the cost of renting. Lease-fees are determined by:

1. The economic cycle, which alters the ratio of Lease-fee/Home-value in ranges that have fluctuated between 0,7% - 1,2% per-month in Colombia in the last two decades;

2. The structure of tax-brakes related mortgage credit vs. lease-payments; and

3. The difference between housing-financial returns against other portfolio, where liquidity plays a key role.

Table 6 shows the financial return obtained from renting a house in Bogotá over the period 1995-2002, after paying maintenance and property taxes.[36] When considering the value-loss of about 37% that occurred during that period (see graph 2), one comes to the conclusion that the net financial return of owning a house was close to zero in real terms during the period 1995-2002. This result is quite poor when contrasted with the 7% annual-

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[34] More details in Banco de la República (2003 p. 41).
[35] House-value losses were about 34% in Medellín, 35% in Cali, and 32% in Barranquilla. The weighted average real value-loss in the main cities has been estimated at 37% during 1996-2002, using weights of 50% for Bogotá, 20% for Medellín, 20% for Cali, and 10% for Barranquilla. Housing-price series were constructed in our branching offices and are available upon request.
[36] We followed the standard methodology where: House-Financial Return = [Monthly Lease-Fee – Maintenance Costs – Property Taxes] + House Valorizations, as explained in Muellbauer and Murphy (1997, p. 1702-1707).

real returned observed in the US-economy, the 10% in UK, or the 21% observed in Spain over the period 1995-2002 (as seen in Table 4).[37]

Prospects for Bogotá have improved recently (Fedesarrollo, 2004), as lease-fees are now close to 0.9% monthly of the house-market value. House valorizations are up about 10% in real terms per-annum during 2002-2004. As a result, housing-financial returns are now between 5,5-9,1% in real terms per-year (see Table 6).

Table 6: Housing-Financial Returns in Bogotá 1990-2003

Year	Lease-Fee (1)	Maintainance Costs (2)	Property Taxes (3)	Subtotal (4) = (1) - (2) - (3)	Valorizations		Returns	
					3 Yr. Averg. (5)	1 Yr. Averg. (6)	3 Yr. Averg. (4) + (5)	1 Yr. Averg. (4) + (6)
1990	12,0%	1,4%	0,7%	9,9%	5,7%	3,7%	15,6%	13,5%
1991	12,0%	1,4%	0,7%	9,9%	5,9%	3,8%	15,8%	13,6%
1992	12,0%	1,4%	0,7%	9,9%	6,1%	12,4%	16,0%	22,3%
1993	12,0%	1,4%	0,7%	9,9%	10,5%	16,9%	20,4%	26,8%
1994	12,0%	1,4%	0,7%	9,9%	16,5%	23,0%	26,3%	32,9%
1995	12,0%	1,4%	0,7%	9,9%	13,5%	0,8%	23,4%	10,6%
1990-1995 Aver.				**9,9%**	**9,7%**	**10,1%**	**19,6%**	**20,0%**
1996	12,0%	1,4%	0,7%	9,9%	6,2%	-8,2%	16,1%	1,7%
1997	9,6%	1,4%	0,7%	7,5%	-2,6%	-6,7%	4,8%	0,8%
1998	8,4%	1,4%	0,7%	6,3%	-7,7%	-10,3%	-1,5%	-4,0%
1999	8,4%	1,4%	0,7%	6,3%	-8,9%	-9,2%	-2,6%	-2,9%
2000	8,4%	1,4%	0,7%	6,3%	-8,2%	-5,1%	-2,0%	1,1%
1996-2000 Aver.				**7,2%**	**-4,3%**	**-7,9%**	**3,0%**	**-0,7%**
2001	9,6%	1,4%	0,7%	7,5%	-4,2%	2,7%	3,2%	10,2%
2002	9,6%	1,4%	0,7%	7,5%	-3,9%	-7,8%	3,6%	-0,4%
2003	10,8%	1,4%	0,7%	8,7%	1,0%	8,9%	9,6%	17,6%
2001-2003 Aver.				**7,9%**	**-2,4%**	**1,3%**	**5,5%**	**9,1%**

Source: Our Computations

By end-2002, the average 100-Sqr.-Mts. apartment in Bogotá cost only US$72,000, while in other main cities could be bought for only US$50,000.[38] This represented less than a tenth of the cost of the referenced apartment in cities like New York, London, and even Tokyo (after the asset-bust). We have estimated that transactions costs in Bogotá are at the lower-end of the spectrum at 4%, while in New York they are 12% of the market-value.

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[37] See The Economist (2002b p.11; 2004c p.68).
[38] This is the aftermath cost of the Asian crisis, as related in Cardenas and Badel (2003, p.53), Tenjo and López (2003, p.171), Herrera and Perry (2003, p.153).

D. The Mortgage System in Colombia

It is regulated by Law 546 of 1999 and the main characteristics are:[39]

1. Financing horizons in the range of 5-30 years, but due to recent difficulties the effective average term has been shirking from 15 years down to 10 years;

2. Minimum Down-payments of 30% of the house market-value, which aims at avoiding the over-indebtedness observed during the credit boom of 1993-1997.

3. High real mortgage-interest rates at 9-13% per-year, which are regulated by ceiling-rates ordered by the Constitutional Court and instrumented by the Central Bank, currently at 11% for social housing and at 13,9% for the rest. This highly regulated environment has been the result of the real-state crises, which still shows high NPL-indicators (currently at 11%) and declining mortgage-credit (currently at only 5% of GDP).

Nevertheless, there have been interesting financial developments which aim at reducing financial costs and boost demand for housing-credit. Several mortgage banks have moved to offer fixed-nominal interest rates, avoiding the traditional CPI-indexation of mortgage credits. In order to cover for the peso-denomination risk, such institutions maintained in their asset-portfolio significant amounts of local CPI-linked treasury-bills. Deepening of the local public-debt market since the mid-1990s has helped in creating a medium-term "yield-curve" for the recently born Mortgage-Backed-Security (MBS) Colombian-market, which currently shows a portfolio close to 1% of GDP.

The secondary market demand for MBS could increase beginning in 2006, when tax-exemptions granted to the pension funds will expire.[40] Local treasuries represent about 30% of GDP, which exhibit a modified duration close to 3,5 years, where nearly 15% of GDP are issued at fixed nominal interest rate and the other 15% of GDP are CPI-linked (with no significant exchange-rate-indexation).[41]

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[39] See Cuellar (2002) and Clavijo (2000; 2002b).
[40] See Zea (2003, p.74).
[41] More details in Banco de la Republica (2004b).

As inflation in Colombia converges from the current 5-6% rate down to the medium-term target of 3%, announced under the Inflation-Targeting regime adopted since 2000, mortgage-credit users should reap a huge benefit by experiencing a reduction in real interest costs from 13,9% down to 8-12% in the near future. However, consolidation of this cost-reduction requires more stability in Court Rulings regarding mortgage-markets and continuous reduction in the NPLs-indicator, which has declined slowly from 22% in early-2000s down to 11% in mid-2004.

Finally, it should be said that the mortgage system in Colombia is currently subject of several tax-distortions. As previously shown in Table 2, Colombia grants generous direct/indirect tax-treatments, including full-tax deductions for interest and amortizations payments (not necessarily linked to mortgage-credits), as a result of a desperate move to bolster the construction sector in the aftermath of the 1998-1999 financial crises.[42] At the margin and in the early years of such legislation, such tax-brakes probably had a positive effect in reviving the construction sector, but they currently represent a huge tax loop-hole that should be soon corrected to cope with the precarious fiscal situation.[43] In a similar fashion, voluntary pension contributions should stop being treated as a 5-year personal-tax-free Certificate of Deposit, which is later use to access a second-round of tax-brakes when paying for a house.

IV. Econometric Determinants of the Housing-Market in Colombia

The fundamental determinants of the housing market in Colombia, paradoxically, have not been explored in a systematic manner.[44] In this section we attempt to cover for this lack of

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[42] See Law 488 of 1998 and Law 633 of 2000 (Art.23), which promoted the so-called AFC-accounts, reaching a historical-cumulative value of COP$45 billion in mid-2004 (about 1% of the CDs-market).

[43] We found that the tax-brake might not actually compensated for the mortgage-credit cost, turning unattractive the acquisition of a property. It is required that asset-valorizations be positive in real terms for the tax-brake to induce a net positive yield in buying a property. A formal demonstration is available upon-request.

[44] A notorious exception is the study of Fedesarrollo (2004), where demand-supply functions were estimated. However, the sample-period was rather narrow (1997-2003), due to basic-data difficulties, and parameter estimates turned-out to be unstable.

stable estimates of demand-supply housing functions. Our estimates cover quarterly data over the 1991-2004 period.

A. The Basic Model

We follow a standard demand for housing, which can be summarized as in equation (1):

$$H^D = f(y, \textbf{\textit{m}}, D),\tag{1}$$
$$+ \quad - \quad ?$$

where H^D is the demand for housing, y is average household real income, $\textbf{\textit{m}}$ is the opportunity cost faced by the prospective buyer, and D is intended to capture other factors that could affect the demand schedule. It is also common to define $\textbf{\textit{m}}$ as:

$$\textbf{\textit{m}} = P_H * (r + \textbf{\textit{d}} - \dot{P}_H^{\;e} / P_H),\tag{2}$$

where P_H is the house-price, r is the real interest rate, $\textbf{\textit{d}}$ is the rate of depreciation (or the cost of maintaining the asset, including taxes) and $\dot{P}_H^{\;e} / P_H$ is the rate of valorization of such asset. Replacing (2) in (1) yields equation (3), which represents the (linear) function of housing demand in terms of its final price:[45]

$$H^D = g(y, P_H, r, \textbf{\textit{d}}, \dot{P}_H^{\;e} / P, D).\tag{3}$$
$$+ \quad - \quad - \quad - \quad + \quad ?$$

Muellbauer and Murphy (1997) explain how equation (1) is the result of intertemporal maximization of a consumer's utility function that chooses between two goods: housing and consumption goods. Hence, the demand for housing and consumptions goods has similar determinants, including the vector of other variables represented by D. Such a vector, in turn, refers to future-income expectations and a *proxy* for households' wealth.

The housing supply function can be modeled as in equation (4):

$$H^S = s(P_H, \overline{H}, S),\tag{4}$$
$$+ \quad - \quad ?$$

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[45] Muellbauer and Murphy (1997); Gallin (2003); Mühleisen and Kaufman (2003), among others, use an inverted demand function, as defined in (3), with the purpose of modeling price-behavior and detecting asset-bubbles.

where H^S is the quantity of housing supply, P_H its price, $\overline{H}$ is the stock of housing (which affects the construction of new houses) and S refers to all other variables that could move the supply-schedule.

This supply function can be inverted as in equation (5) to express it as a function of house-prices P_H, instead of being a function of quantities H^S, such that:

$$P_H = s(H^S, \overline{H}, S).$$

(5)

$$+ \quad - \quad ?$$

At the international level, it is quite common for analysts to concentrate on the estimations of housing-demand functions and disregard supply functions, given the difficulties of tackling the empirics of the latter function. Estimates of equation (5) usually appear in the company of simultaneous estimates of equation (3), such that price-equilibrium for the housing market can be found in the context of:

$$H^D = H^S = H.$$

(6)

Graph 3 represents equations (3), (4), and (6). Our estimates aim at finding short-term price-quantities changes when components of the demand-supply schedules change. If the demand for housing increases in the short-run from D1 to D2, one would expect the equilibrium prices to increase from E_0 to E_1. As the supply function responds in the medium-term, however, the price increase should be lower, reaching E_2. We attempted to include dynamic responses of the supply-function, but estimates turned unstable, so our following discussion will concentrate on short-term effects.[46]

B. <u>Data Base</u>[47]

The housing demand (H^D) and supply (H^S) was approached as the quantity of squared-mts of approved-licenses for new housing. In this regard our sample leaves-out transactions of used-houses and the leasing-market.[48]

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[46] We used the well-known buffer-stock model, which proved to be rather unstable. Error correction models worked better, but yet proved unsatisfactory to be worth-reporting.
[47] See Annex 1 for data actually used.

Graph 3: Housing-Market Equilibrium
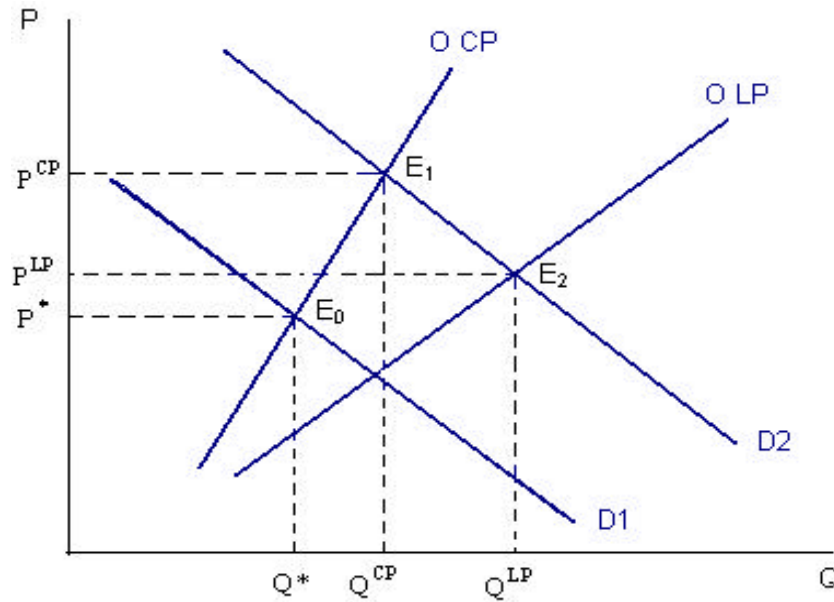
Household's disposable income (y) was taken from National Surveys. The real mortgage-credit cost (r) excludes "social housing". We assume that depreciation and maintenance costs (d) remained constant over the sample-period. Different proxies of asset-valuations changes were used, linking adaptive and semi-rationale expectations. But econometric significance of these variables was low, leading us to disregard them.[49]

In the vector of variables D, in equation (3), we included the rate of unemployment as a proxy of income volatility (*Unempl*) which turned out-to-be systematically significant. Wealth effect on households was better capture through a stock-exchange index than through financial-asset changes.[50]

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[48] This implies that we will not be able to capture the substitution effect between new and used housing. Furthermore, such price-data relates only to Bogotá. We found, however, that Bogotá's new-house-price index is a leading indicator for the rest of the main cities.

[49] Expected returns on house-valuations were obtained through an AR(1) process of the variable $\left(\dfrac{P_{+4} - P}{P}\right)$, and we included them in (3). Our semi-rationale expectations model followed Muellbauer and Murphy (1997), but none of these estimates proved significant.

[50] In fact, the traditional financial deepening indicators (like M3/GDP) were insignificant.

As for the housing supply function (equations 4 and 5), we used several proxies for capturing house-stock effects $(\overline{H})$, but no satisfactory results were obtained. We even constructed a historical stock of "available squared-mts" without gaining much statistical significance.

Vector S incorporated and index of construction input-cost, financial opportunity cost, and some measurement of quality changes (an attempt to tackle the "hedonic-price" problem). The variables used were, in order, the Camacol construction-index cost, the CDs-Real interest rate, and non-linear time-variables.

C. Estimation and Results

Table 7 illustrates the initial non-simultaneous estimation results for housing demand and supply functions, for 1991-I / 2004-I (quarterly data). The approved licenses for new housing in Colombia are highly elastic to price changes (-1,23) in Bogotá (city that actually leads the market-price) and the negative signal indicates that we are dealing (as expected) with a normal-good.

Such housing-demand function is also highly elastic to real (lagged) household-disposable income (1,36) and sensible to volatility of such incomes (as capture by the open-unemployment rate). The magnitude-signals of these elasticities are consistent with traditional estimates for the US-economy.[51]

The demand for housing is relatively elastic to mortgage credit-costs, showing an elasticity of -0,36, similar to interest-rate elasticities found in traditional money-demand functions. This gives empirical support to our claim that an overly-regulated housing sector regarding interest rates, as the ceilings imposed by court rulings, will hamper housing-developments. One should expect that as NPL-indicators reduce over-time, mortgage interest-rate should diminish. This will cause a natural increase in the demand for housing. Put differently, additional provision of housing can not be pursued through administrative controls over the

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[51]   See Arcelus and Meltzer (1973).

mortgage-rates. We also found moderate support for wealth-effects on housing-demand. Increases in stock-exchange valuations of 10% tend to be associated with increases of 3% in the demand for housing.

Regarding the housing supply-function, Table 7 reports a price-elasticity close to unit (1,09), similar in absolute value to our estimate through the demand function. Input costs, in turn, are highly correlated with supply-price increases, although statistical significance is weak in this case. Finally, the financial opportunity cost plays a minor role in the supply functions (-0,08), although it is consistently significant in statistical terms.

In order to correct our estimations from possible simultaneity-bias and to better characterized each side of the demand-supply market, we also estimated this system through a Full-Information Maximum-Likelihood method (FIML).[52] Under this scenario prices-quantities are estimated in a simultaneous market and they are efficient under normality of estimated errors. We proceeded to invert the supply-function, as in equation (5), and to obtain FIML-estimates of our demand-supply housing system.[53]

Table 8 reports our estimates under FIML, which basically confirm our previous results: income-price elasticities are high and they have the expected signs. Furthermore, such elasticities increased (in absolute terms) reaching 1,5 for income, -1.8 for price, and -1.4 for income volatility (capture through unemployment). However, the impact of real interest rates on mortgages decreased in absolute terms (from -0,36 down to -0,28), but the role of mortgage credit, nevertheless, remained quite relevant. Note also how the elasticity of input-costs on the supply-function remained high (2.28), which lead-us to think the possibility of oligopolistic behavior, which needs to be further study at a micro-level.

Finally, it is worth to highlight that housing-prices follow a cyclical behavior, as captured by the quadratic-time component reported in Table 8. This factor could also be related to

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[52] See Greene (2000) and Wooldridge (2000).
[53] Several colleagues commented to us that an alternative might have been to use a set of instrumental variables; however, we found that our FIML-approach, under normality of errors, fulfilled our expectations, having serious data-base restrictions.

quality improvements in housing-supply, which affect in a non-linear manner house-prices.[54]

Table 7: Housing Demand and Supply Functions for Colombia

Method: OLS

Period: 1991:I-2004:I Quarterly

Demand Equation

Dependent Variable: Log (Squarte Mts. Of Approved New Licences)*

	Coeficient	Stand. Error	Prob.
Constant	20,370	2,523	0,000
log (House Price)	-1,232	0,418	0,005
log (Real Income (-1))	1,365	0,606	0,029
log (Unemployment)	-1,132	0,208	0,000
log (Real Mortgage Interest Rate)	-0,364	0,119	0,004
log (Stocks Exch.-Index)	0,298	0,085	0,001
Observations	53		
R^2	0,688		
Durbin-Watson	2,065		
Prob Ljung Box (order 2)	0,908		

Housing-Supply Equation

Dependent Variable: Log (Squarte Mts. Of Approved New Licences)*

	Coeficient	Stand. Error	Prob.
Constant	13,326	5,139	0,013
log (House Price)	1,092	0,270	0,000
log (Housing Cost-Index)	-1,068	1,218	0,385
Real Interest Rate	-0,078	0,013	0,000
Observations	53		
R^2	0,550		
Durbin-Watson	1,446		
Prob Ljung Box (order 2)	0,041		

* Includes a dummy for 1999:IV, which improved estimation results.

Source: Own Computations.

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[54] This is the case of the US-economy, as reported by Mühleisen and Kaufman (2003), and there is also some evidence in the case of Colombia, as mentioned by Fedesarrollo (2004).

Table 8: Simultaneous Housing Demand-Supply Function Estimates

Method: Full-Information Maximum Likelyhood (FIML)

Period: 1991:I-2004:I Quarterly

Observaciones incluidas: 53

Endogenous Variables: log(Sqr. Mts. Of approved licences) and log(New House-Prices)

Demand Equation

Dependent Variable: Log (Squarte Mts. Of Approved New Licences)*

	Coeficient	Stand. Error	Prob.
Constant	23,561	2,911	0,000
log (House Price)	-1,787	0,502	0,000
log (Real Income (-1))	1,486	0,557	0,008
log (Unemployment)	-1,420	0,245	0,000
log (Real Mortgage Interest Rate)	-0,283	0,114	0,013
log (Stocks Exch.-Index)	0,378	0,119	0,001
R^2	0,623		
Durbin-Watson	1,956		
Residuals Normality-Test *	0,117		0,943

Supply Equation

Variable dependiente: Log (New House-Price)

	Coeficient	Stand. Error	Prob.
Constant	-9,761	1,775	0,000
log (House Price)	0,273	0,057	0,000
log (Housing Cost-Index)	2,282	0,305	0,000
Real Interest Rate	0,015	0,005	0,005
t	0,035	0,008	0,000
t^2	-0,001	0,000	0,000
R^2	0,796		
Durbin-Watson	1,658		
Residuals Normality-Test *	0,031		0,985
Log Likelihood	101,201		
Determinant residual covariance	0,000		

* Jarque-Bera Normallity-Test

Source: Own computations

V. Concluding Remarks

We have provided an international overview of housing systems and place Colombia's mortgage system in that context, including an analysis of socioeconomic and financial determinants. Our survey showed that real house-price cycles fluctuated between 50-150% in countries experiencing house-booms during 1995-2004, while those experiencing house-price real contractions have hovered around 20-40%. The boom cycle has now lasted between 4-6 years in US and UK, with some positive signals of a "soft-landing" due to proper actions taken by their central banks. Japan and Colombia are now on a recovery phase, after experiencing drastic and rapid house-price contractions lasting 2-4 years. Spain and Australia, however, are cases that need close monitoring as no proper cooling-signals have been given by their respective Central Banks and a bust-risk is still hanging-out there.

In the particular case of Colombia our recommendations aim at improving basic data collection regarding the construction sector, household socioeconomic conditions, and mortgage markets. The construction sector in the Colombian economy represents about 5-7% of GDP, but more recently the construction sector's share of GDP has declined to 5,2%, in spite of the 2002-2004 recovery. The housing sector, in particular, only represents about 3% of GDP, which is about half of the shared usually observed in many developed economies.

Our econometric estimates of the demand for housing in Colombia indicate that the area of approved-licenses is highly elastic to households' disposable income, prices of new-housing, and real interest rates charged in mortgage credits. On the supply side, we found a high input-cost elasticity and a moderate response to wealth effects. Our estimates under FIML confirm our results: income-price elasticities are high and they have the expected signs.

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Annex : Housing Data-Base for Colombia

New National Housing (Square-Meters of Approved-Licences). Source: DANE and "Revista del Banco de la República".

House-Price Index (New Housing in Bogotá). (Base Year is December of 2003=100). Our own estimations base on the DNP-index, linked to the index computed by Carrasquilla, et.al. (1994). Deflacted by CPI.

Households Real Disposable-Income. 1990-1999 is taken from National DANE-Surveys, corresponding to 7-main cities. March-2000 on-wards refers to 13-main cities. Data is expressed in real-million-pesos of 2003. Source: DANE and own-computations.

Unemployment Rate. 7-Main Cities. Source: DANE and Banco de la República computations since 2001.

Real Interest Mortgage-Rate. 1990-1994 taken from ICAV and turned into quarterly data through geometric-interpolation; then on-wards is ICAV-monthly data. Data is deflacted by CPI-UPAC-UVR components. Source: ICAV and own-computations.

Stock-Exchange Index. Links Bogotá (IBB) and Colombia (IGBC), where 29th of june 2001 =100. Source: BVC, Asobancaria, and own-computations.

Construction Input-Cost Index. (Dec. 1989=100) Refers to all-household construction, deflacted by CPI. Source: Camacol-Cundinamarca.

Real Interest on CDs. 12-month moving average, deflacted by CPI. : promedio móvil de orden 12 de la DTF deflactada por la inflación del IPC. Source: Banco de la República.

Test of Stacionarity (KPSS)

Null Hypothesis: Series is stationary

Series	Time Trend with A Drift	eta mu / eta tao 8-Lagged	Crit. Value at 5%	Reject Ho
Log New-House Sqr. Meters	Yes	0,099	0,146	No
Log House-Price Index	No	0,174	0,463	No
Log Real Income	No	0,181	0,463	No
Log Unemployment Rate	Yes	0,105	0,146	No
Log Real Interest Mortgage-Rate	No	0,343	0,463	No
Log Stock-Exchange Index	Yes	0,131	0,146	No
Log Input-Cost Index	No	0,103	0,463	No
Real Interest CDs-Rate	No	0,157	0,463	No

Data Used in Econometric Estimates for Colombia

	New-House Licenses (Sqr. Mts)	New-House Price Index (Dec.2003 = 100)	Real Household Disposable Income	Un-employment Rate	Real Interest Mortgage-Rate	Stock Exchange Index	Construction Input-Cost Index	Real Interest CDs-Rate
Mar-90	417152	84,064	0,575	10,1	4,447	N.A.	101,001	6,557
Jun-90	464242	84,149	0,587	10,9	6,185	N.A.	99,687	6,152
Sep-90	438654	84,859	0,569	10,2	6,327	N.A.	98,362	6,018
Dic-90	314142	84,193	0,533	10,6	5,703	N.A.	94,820	5,731
Mar-91	366419	86,729	0,569	10,7	6,796	12,651	97,772	5,096
Jun-91	511355	87,321	0,571	10,7	7,472	14,457	94,770	4,747
Sep-91	527951	87,769	0,546	9,8	8,664	15,413	93,613	4,599
Dic-91	533044	88,156	0,545	9,4	11,048	32,996	92,523	5,196
Mar-92	668917	98,669	0,552	10,8	8,929	46,968	94,659	4,924
Jun-92	728481	96,909	0,549	11,2	4,289	48,649	90,800	3,234
Sep-92	806026	98,157	0,554	9,1	3,683	59,218	92,606	1,266
Dic-92	1151199	99,779	0,554	9,8	7,566	53,335	92,736	-0,289
Mar-93	602551	111,165	0,585	9,7	8,429	49,400	98,441	-0,433
Jun-93	706425	113,899	0,606	9,1	11,959	50,476	96,280	1,025
Sep-93	551779	116,888	0,708	7,8	11,803	63,960	97,905	2,346
Dic-93	994451	118,184	0,696	7,8	10,360	80,368	96,190	2,725
Mar-94	540693	136,026	0,803	10,2	9,673	115,296	98,995	2,855
Jun-94	982281	141,593	0,724	9,8	9,450	114,605	98,911	2,571
Sep-94	936718	144,094	0,724	7,6	11,383	111,972	100,385	3,387
Dic-94	1194758	144,251	0,715	8,0	15,909	95,997	99,667	5,347
Mar-95	564743	139,104	0,662	8,1	19,882	97,407	101,099	7,489
Jun-95	575410	140,430	0,682	9,0	20,299	93,362	98,573	9,660
Sep-95	619988	146,238	0,693	8,7	17,306	88,633	98,343	9,862
Dic-95	595166	144,488	0,660	9,5	18,558	81,157	97,177	9,453
Mar-96	413751	136,356	0,630	10,2	20,226	87,857	101,392	9,433
Jun-96	286449	131,745	0,690	11,4	19,964	98,428	97,308	9,340
Sep-96	436692	126,410	0,641	11,9	16,965	97,562	96,126	9,476
Dic-96	467302	128,621	0,607	11,3	14,502	94,822	95,257	8,594
Mar-97	499966	127,847	0,682	12,3	14,384	120,853	96,077	7,237
Jun-97	340409	122,314	0,679	13,3	12,940	134,873	93,651	5,665
Sep-97	655807	120,567	0,661	12,1	12,511	161,102	92,772	4,811
Dic-97	615556	117,344	0,658	12,0	12,287	159,833	93,295	4,742
Mar-98	557763	112,040	0,677	14,4	11,250	131,595	93,627	5,052
Jun-98	414735	107,855	0,657	15,9	16,282	126,232	88,446	6,488
Sep-98	381891	110,424	0,670	15,0	23,037	92,435	90,296	8,863
Dic-98	336207	107,482	0,622	15,6	26,761	119,608	91,865	11,714
Mar-99	317421	100,597	0,621	19,5	23,479	103,843	90,802	13,213
Jun-99	332774	100,258	0,585	19,9	18,057	116,360	90,907	12,854
Sep-99	270309	98,918	0,580	20,1	16,758	103,935	91,357	11,597
Dic-99	187765	97,662	0,623	18,0	16,690	113,486	93,189	9,277
Mar-00	311721	91,993	0,649	20,3	13,315	109,493	91,747	6,719
Jun-00	476068	93,492	0,649	20,4	12,902	87,156	92,230	4,953
Sep-00	345241	96,218	0,618	20,5	12,508	85,757	94,980	3,529
Dic-00	499043	95,179	0,629	19,5	12,423	80,717	100,428	2,682
Mar-01	414566	97,568	0,616	20,1	12,399	93,227	97,376	3,351
Jun-01	294653	96,548	0,605	18,1	12,276	99,118	96,263	4,047
Sep-01	289781	98,867	0,615	18,0	11,948	95,884	96,351	4,267
Dic-01	586727	94,097	0,623	16,8	12,736	96,717	97,009	4,135
Mar-02	595188	93,298	0,646	19,1	12,535	109,939	96,990	3,927
Jun-02	662760	87,977	0,635	17,9	13,016	124,378	95,974	3,582
Sep-02	678506	88,734	0,688	18,0	13,662	121,534	96,161	3,036
Dic-02	557343	86,667	0,644	15,7	13,598	155,561	96,932	2,433
Mar-03	492055	90,873	0,659	17,5	13,666	161,230	99,968	1,524
Jun-03	432481	97,715	0,619	17,0	13,428	202,813	99,523	0,795
Sep-03	611514	99,274	0,640	17,0	12,687	212,858	100,114	0,514
Dic-03	752861	100,000	0,685	14,6	13,252	226,267	102,030	0,625
Mar-04	685874	100,697	N.A.	16,9	13,606	312,784	106,941	0,938