

Korea's Economy 2010

Korea's Economic Prospects and Challenges

Korea's Economic Stability and Resilience in Time of Crisis

The Republic of Korea and the North Pacific Economy: After the Great Panic of 2008

Housing Policy, Mortgage Markets, and Housing Outcomes in Korea

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FINANCIAL INSTITUTIONS AND MARKETS

HOUSING POLICY, MORTGAGE MARKETS, AND HOUSING OUTCOMES IN KOREA

By Kim Kyung-Hwan and Cho Man

The Korean housing sector as of the early 1990s was characterized as an example of financial repression combined with rigid urban land use regulations.¹ Since then, the sector has gone through a major structural change in the wake of the Asian currency crisis of 1997. Among the most significant shifts, the mortgage finance system was liberalized in the late 1990s as a part of financial liberalization that included interest rate deregulation. As commercial banks were allowed to make mortgage loans, competition among lenders intensified. This has led to a rapid expansion of mortgage lending and the introduction of various mortgage products. Furthermore, developers emerged as key players in the residential construction market, relying on project financing for land acquisition and other early-stage expenses.

Although the housing finance system went through such major changes, no fundamental changes were brought to the housing supply system that would have made it more responsive to market signals. As the economy recovered from the 1997 crisis, housing prices bounced back starting in 2000 and developed into a housing price boom from 2002 until 2007. The housing boom, which was modest compared with what happened in many advanced economies, can be explained by a combination of a surge in housing demand prompted by low interest rates and an expansion of mortgage lending on the one hand, and sluggish supply on the other hand.

The latest house price hike was most marked in Seoul, especially in its submarkets southeast of the Han River, the most popular residential areas but where the supply of housing is very inelastic. The rapid

house price appreciation was countered by various policy interventions aimed at stabilizing housing prices by suppressing demand through taxation and other counter-speculative measures regulating new supply and redevelopment in Seoul. As a result, new housing supply in Seoul and in the Seoul capital region (SCR) has fallen substantially since 2003, with the exception of 2007. The housing price boom ended in 2007, and then the shock wave of the U.S. subprime mortgage debacle spilled out to other parts of the world in 2008. The Korean economy took a downturn, and housing prices started falling around July 2008. The drop in house prices was much smaller than had been feared, however, and it lasted only eight months before turning around. By fall 2009, the Korean government reintroduced measures to contain demand for fear of another house price run-up.

This paper aims to trace the major changes that took place in the Korean housing market and the housing finance system during the past decade, and also to offer an evaluation of government interventions on housing outcomes. We focus our attention on the role of the expansion of mortgage lending on the housing market as it interacted with inelastic supply responses to demand shocks. The paper draws lessons and policy implications from the Korean experience.

The rest of this paper consists of the following sections: evolution and current state of housing policy and housing outcomes in Korea (the next section), developments in mortgage markets and policy issues, and lessons for other countries along with concluding remarks (the final section).

1. Bertrand Renaud, "Compounding Financial Repression with Rigid Urban Regulations: Lessons of the Korean Housing Market," *Review of Urban and Regional Studies* 1, no. 1 (1989): 1–22; Richard K. Green, Stephen Malpezzi, and Kerry Vandell, "Urban Regulations and the Price of Land and Housing in Korea," *Journal of Housing Economics* 3, no. 4 (1993): 330–56.

Evolution and the Current State of Housing Policy and Housing Outcomes

Brief Review of Housing Policy

Throughout the periods of rapid economic growth and urbanization, the Korean government has been heavily involved in the housing sector. Government interventions pursued two main policy goals: solving the problem of chronic shortages of housing, especially in Seoul and other large cities; and stabilizing housing prices by increasing supplies while suppressing speculation.

The 1989–92 drive to build two million new dwelling units was a major milestone as it led to a 30 percent increase in housing stock between 1988 and 1992. Thanks to the massive increases in new supply, housing prices did start declining in 1991 and remained stable throughout the mid-1990s. Although this ambitious government campaign helped resolve the housing shortage within a short time period, it also showed that housing supply was a political parameter under government control rather than a response of housing producers and the factor markets to changes in demand conditions.

As the housing shortage was perceived to be under control, government instituted a number of policy changes in the mid-1990s: lifting price controls on new apartments in phases starting in 1995; deregulating the housing finance market by inviting new mortgage lenders while privatizing the Korea Housing Bank, the government-owned monopolistic housing finance institution, in 1997; and relaxing regulations on the conversion of agricultural land near the outer edge of built-up urban areas in 1994. Nevertheless, the supply-side reform was fragmented and piecemeal.

The Asian currency crisis that broke out in late 1997 caused a near collapse of housing prices in 1998. As

interest rates ramped up rapidly, the costs of borrowing rose quickly, resulting in large numbers of bankruptcies of debt-ridden construction companies. Facing this unprecedented crisis, the Korean government tried to boost the housing sector to facilitate a speedy recovery. Many regulations that for years had been taken for granted were suddenly modified or removed altogether: the partial relaxation of regulations preserving greenbelts and the abolition of the price controls on new apartments being examples. Unlike the recent financial crisis in the United States, however, the real estate sector in Korea was a victim, rather than a cause, of the crisis in the 1990s, and the real estate sector was in fact used as a catalyst of a speedy recovery.²

One important feature of Korean housing policy was its heavy bias toward owner-occupied housing. On the rental side, the public rental housing stock is very small. *Chonse* accounted for 21 percent of all households in Korea and 32 percent in Seoul as of 2005; *chonse* is a unique private rental arrangement in which the tenant pays a large up-front deposit that is fully refunded at the end of the lease.³ During the lease period, the tenant does not pay monthly rent.⁴ Except for the program of supplying some 200,000 rental dwellings to the lowest income group as a component of the drive to build two million units, there was in the past no systematic policy effort to promote rental housing. This changed dramatically during the Roh Moo-hyun government, which introduced a 10-year plan to build one million rental housing units. The Lee Myung-bak government modified the program by reducing the rental housing portion and increasing affordable homes for owner occupation.

Finally, the lack of transparency in the housing market has been a problem. The Roh government made an important contribution to improving the situation by establishing a system that mandated that actual transaction prices be reported and recorded in title documents.

2. See Kyung-Hwan Kim, “Could a Real Estate Bubble Cause an Economic Crisis in Korea?” in *Asia’s Financial Crisis and the Role of Real Estate*, ed. K. Mera and B. Renaud (Armonk, N.Y.: M. E. Sharpe, 2000) for a discussion of the behavior of housing markets and government responses during the Asian crisis.

3. The ratio between the *chonse* deposit and the asset price varies across housing types and locations. In the case of condominiums, the current figure is 54 percent for the nation and 40 percent in Seoul.

4. See Brent W. Ambrose and Sunwoong Kim, “Modeling the Korean *Chonse* Lease Contract,” *Real Estate Economics* 31, no. 1 (2003): 53–74.

Trends in Housing Quantity and Quality

There have been dramatic improvements in both the quantity and the quality of housing during the past two decades. To illustrate, the housing supply ratio—the ratio between the number of housing units and the number of households—increased countrywide from 72 percent (58 percent in Seoul) in 1990 to 109.9 percent (93.8 percent in Seoul) in 2008. Per capita consumption of housing space jumped from 13.8 square meters to 22.8 square meters between 1990 and 2005. In 1990, only 34 percent of housing units in Korea had a shower or bathroom facility, and 51 percent of total units had a water-borne toilet (94 percent in Seoul had such facilities); both indicators increased to percentages in the mid-90s by 2005. Such a remarkable achievement is attributable to the massive increases in the supply of modern apartments.

The level of new housing construction exceeded a half million units a year until it dwindled in the aftermath of the 1997 Asian currency crisis. Housing construction recovered its precrisis level by 2001, but then significantly dropped in 2004 and has remained low since then. The shortfall in new supply has been marked in

Seoul and in the SCR. The trend in new housing supply reflects the impact of government policy to stabilize housing prices during the latest price run-up.

There no longer exists an overall housing shortage in Korea, as the number of houses exceeds that of households in the country as a whole. Instead, the problem is the mismatch between demand and supply in local markets. The combination of a reasonably steady flow of new construction and a continuous decline in the supply of new housing in Seoul and the SCR has led to a sporadic price hike in the submarkets with inadequate supply and to a large glut of unsold houses in locations with insufficient demand (see *Table 1*).

House Price Trends and Government Responses

The inflation-adjusted rate of change in housing prices and *chonsei* deposits during the past two decades is illustrated by *Figure 1*. After the precipitous fall in 1998, housing prices bounced back starting in 1999 and began to rise significantly in late 2001, helped by the record-low interest rate and rapid expansion of consumer credit. Nonetheless, the rate of house price appreciation at the national level was moderate

Table 1: Trends in New Construction and Unsold Houses in Korea, 1995–2009

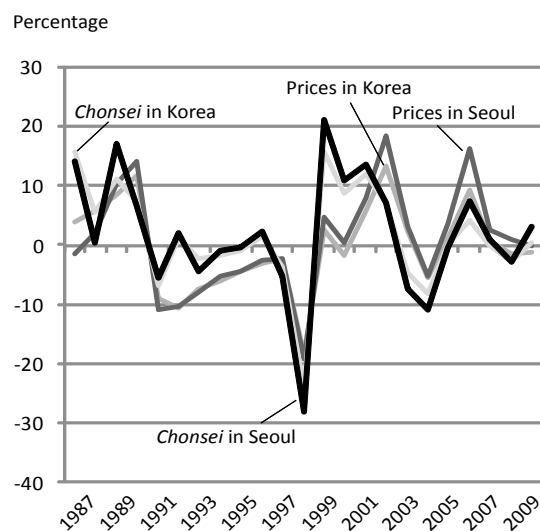
Location	New housing construction (by year)								
	1995–98	1999–2002	2003	2004	2005	2006	2007	2008	2009
Korea	528,414	508,650	585,382	463,800	463,641	469,503	555,792	371,285	381,787
Seoul	76,965	108,688	115,755	58,122	51,797	39,694	62,842	48,417	36,090
Incheon	23,157	34,820	29,392	22,440	17,588	15,876	41,571	33,632	59,519
Gyeonggi	129,398	146,263	152,142	125,157	128,516	116,488	198,138	115,531	159,549
SCR ¹	229,519	289,771	297,289	205,719	197,901	172,058	302,551	197,580	255,158
Location	Stock of unsold houses (year end)								
	1995–98	1999–2002	2003	2004	2005	2006	2007	2008	2009
Korea	113,380	46,464	38,261	69,133	57,215	73,772	112,254	165,599	123,297
Seoul	1,927	1,914	735	612	574	529	454	2,486	1,803
Incheon	4,197	957	467	1,770	1,196	426	527	1,647	4,539
Gyeonggi	18,511	10,002	6,168	13,076	10,472	3,769	13,643	22,795	19,325
SCR ¹	24,635	12,873	7,370	15,458	12,242	4,724	14,624	26,928	25,667

Source: Ministry of Land, Transport and Maritime Affairs, Seoul.

¹ SCR = Seoul capital region (Seoul, Incheon, and Gyeonggi Province).

compared with that of many advanced economies.⁵ The price hike was geographically concentrated in Seoul, especially in the condominiums located in the three districts in southeast Seoul (known as the Gangnam area; see *Figure 2*). The steady rise in employment and population in that area, which is well known for the quality of its public schools and amenities, and the very sluggish increase in housing stock over the years are believed to be the underlying causes of the rapid run-up in house prices there.

Figure 1: Real Rates of Change in Housing Prices and Chonseil Deposits in Korea and in Seoul, 1987–2009



Source: Authors' computations with the use of data from Kookmin Bank.

Despite the localized nature of the house price run-up, the government went back to its arsenal of traditional weapons to suppress speculators. The efforts to stabilize house prices were strengthened further as the then new government headed by the late president, Roh Moo-hyun, took office in early 2003. The government waged an all-out campaign to contain rising house prices with a barrage of policy packages. Between 2003 and 2007 about three dozen policy packages were introduced, extending to taxation, regulations, and mortgage financing. For example, the compre-

hensive real estate tax on expensive condominiums was introduced in 2005, and the capital gains tax was raised, in particular, for owners of two or more houses. The government also introduced various regulations covering housing development, including a series of new restrictions on redevelopment as well as reinstitution of the price controls on new apartments that had been lifted in 1999.

In addition, the government set a limit on the loan-to-value (LTV) ratio and debt-to-income (DTI) ratio to discourage home purchases via leverage in those hot markets. A limit on LTV was first introduced in September 2002; it was set at 60 percent for mortgages on houses located in Seoul, Incheon, and selected cities in Gyeonggi Province, and it was then expanded to the whole country in October 2002. It was lowered to 40 percent in July 2005 for condominiums located in hot markets and valued at 600 million *won* and above. The current Lee Myung-bak government returned the LTV limit to 60 percent in November 2008, but later lowered it to 50 percent beginning in September 2009. A DTI limit of 40 percent was first introduced in August 2005 for speculative transactions, and then the limitation was extended to condominiums located in hot markets and valued at 600 million *won* and above. The DTI limit was lifted in 2008 but reinstituted in September 2009 at 50–60 percent to apply to mortgages exceeding 50 million *won* on condominiums located in the Seoul capital region. The LTV and DTI regulations are considered one of the most effective measures for cooling off demand and the resulting hike in house prices.

The housing price boom ended in 2007, and then the shock wave of the U.S. subprime mortgage debacle turned into a financial crisis and spilled over to other parts of the world in 2008. Consequently, the Korean economy took a downturn, and housing prices started falling in about July 2008. The drop in house prices was much smaller than initially feared, however, and it lasted for only eight months before turning around. In fact, the government reintroduced measures to contain demand for fear of another house price run-up by the fall of 2009.

5. Bertrand Renaud and Kyung-Hwan Kim, "Global House Price Boom and Its Aftermath," *Housing Finance International* 22 (December 2007): 3–15.

Housing Finance System and Policy Challenges

Changes in the Housing Finance System

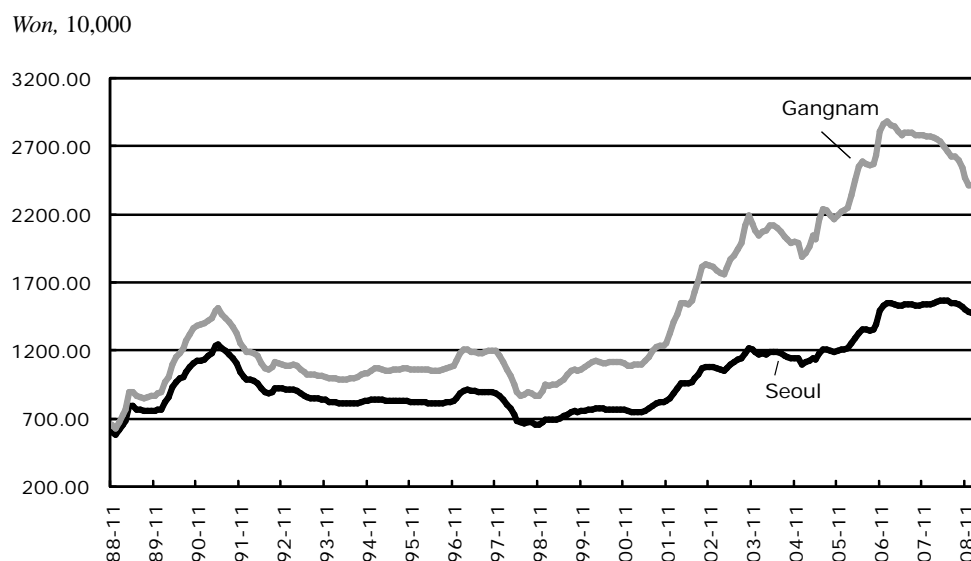
The Asian financial crisis brought a sea change to the real estate finance system in Korea. First and foremost, residential mortgage lending was liberalized, resulting in a sharp increase in lending volume. As shown in **Table 2**, the ratio of mortgage debt outstanding to gross domestic product increased from about 10 percent before the crisis to 36 percent,⁶ a level similar to levels in Japan and France. Also the secondary mortgage market was introduced in 1999, and it paved the way for wholesale funding through the issuance of mortgage-backed securities (MBS). Furthermore, the housing finance system has been transformed from one dominated by narrowly based special-circuit institutions to a market-based system, with the share of commercial banks and other private-sector lenders exceeding 90 percent in recent years.

A dominant share of mortgage loans in Korea makes use of variable interest rates that are pegged to short-

term market rates, such as the three-month certificate of deposit rate. After early 2006, both the benchmark and lending rates rose steadily until September 2008. Since then, however, the rates have declined owing to the accommodative monetary policy to combat the slowdown of the real economy caused by the global financial crisis. The spread over the benchmark rate rose from 1.39 percent in August 2008 to 2.98 percent in March 2009 owing to rising risk averseness in the overall financial system in Korea in the wake of the turmoil in the global financial markets after the bankruptcy of Lehman Brothers. But the spread has been narrowing since then.

The maximum LTV ratio, one key underwriting criterion, is capped at 60 percent for private-sector lending; it is capped at 70 percent for public-sector lending. The DTI ratios were added as another key underwriting condition in 2007, and they are currently set at 33 percent for the front-end ratio (in other words, the mortgage payment over income) and at 40 percent for the back-end ratio (the total debt service over income). In most cases, there is a penalty for early repayment of principal within five years from origination. The

Figure 2: Real Prices for Condominiums in Seoul and Gangnam, 1988–2008



Source: Neonet.

Note: 2005 prices; price is per *pyong* (1 *pyong* = 3.3 square meters).

6. This figure may underestimate the size of the housing loans because it does not include unofficial housing loans extended to the landlord by the tenant in the form of a *chonsei* deposit. The total size of this unofficial housing finance system is estimated to be about one-half of the total mortgage debt outstanding in Korea; see Man Cho and Kyung-Hwan Kim, "Three Pillars of Mortgage Credit Risk Management: A Conceptual Framework and the Korean Case," *Housing Finance International*, December 2009.

delinquency rate (payments that are more than 30 days behind) remains reasonably low to date, after a temporary surge in late 2008.

Table 2: Growth of Mortgage Debt Outstanding as a Percentage of Gross Domestic Product, 1994, 2000, and 2006

Countries	1994	2000	2006
Netherlands	46.4	74.2	111.9
Denmark	64.9	76.1	100.8
United Kingdom	54.6	56.3	83.1
Australia	33.2	55.5	82.2
United States	46.4	52.1	77.2
Ireland	22.8	31.6	70.1
Portugal	15.6	43.9	59.2
Spain	15.8	30.9	58.6
Sweden	54.8	45.7	56.7
Germany	44.1	54.1	51.3
Finland	36.2	30.7	43.8
Japan	34.4	36.6	36.1
Korea	11.0	13.0	35.7
France	20.8	21.5	32.2
Italy	6.0	10.0	18.7

Source: Kyung-Hwan Kim and Bertrand Renaud, “Global House Price Boom and Its Unwinding: An Analysis and a Commentary,” *Housing Studies* 24, no. 1 (2009): 7–24.

Policy Issues

Household debt, including home mortgages, has increased substantially in Korea during the past 10 years. Household debt jumped from 192 trillion *won* to 692 trillion *won* between 1999 and 2009, or from 35 percent to 65 percent of GDP. This rapid growth in household debt gives a reason for concern. McKinsey Global Institute pointed out the potential dan-

ger of deleveraging in the household sector.⁷ Micro analyses show, however, that the explosive increase in consumer lending in Korea during the past decade was concentrated in high-income households and that those high-income consumers used the borrowed funds predominantly for acquiring real estate.⁸ Also, the LTV ratio of outstanding mortgages is about 47 percent, and the delinquency rate is stable (*Table 3*). However, as the interest rate is likely to be raised as part of an exit strategy, this could possibly lead to a deterioration of borrowers’ debt service capacity for mortgage and other consumer debt, especially for borrowers prone to income and employment shocks.

This will require careful monitoring. The government might further tighten the LTV and DTI regulations if the volume of mortgages continues to expand and the household credit risk increases.

Key risk parameters to watch in the mortgage lending sector include loan maturity, interest rate variability, and principal repayment schedule. Although a 15-year fixed-rate mortgage was the dominant product before the 1997 Asian currency crisis, variable-interest-rate mortgages with short maturities, usually three years, have become dominant since, imposing a high credit risk at the time of rollover of existing loans. The short-term bullet mortgages with initial interest-only payment periods carry the risk of loan rejection or of a higher risk premium, depending on market and borrower-specific conditions at the time of refinancing. Fortunately, because of inducements by the government, the average maturity of new mortgages has lengthened in recent years. The share of mortgage loans with principal amortization, rather than interest-only payments, has also increased (*Table 4*). Although the maturity has been extended, the existing stock of those short-term rollover loans would still be a systemic risk factor to watch going forward.

A more fundamental issue is that more than 90 percent of mortgage loans outstanding in Korea are still adjustable-rate mortgages (ARMs), making the

7. “Debt and Deleveraging: The Global Credit Bubble and Its Economic Consequences,” McKinsey Global Institute, January 2010.

8. See Joon-Kyung Kim, “Recent Changes in Korean Households’ Indebtedness and Debt Service Capacity,” KDI School Working paper no. 08-23 (Seoul: KDI School of Public Policy and Management, December 2008). Kim also pointed out that this skewed borrowing contributed to worsening the distribution of wealth in Korea.

Table 3: Delinquency Rate on Consumer Loans and Mortgages in Korea, All Banks, 2004–09, percentage

Type of loan	2004	2005	2006	2007	2008				2009			
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Consumer loans	1.7	1.1	0.7	0.55	0.6	0.5	0.6	0.60	0.8	0.59	0.54	0.42
Mortgages	1.8	1.1	0.6	0.43	0.5	0.4	0.4	0.47	0.6	0.43	0.41	0.33

Source: Financial Supervisory Service, Seoul.

sector vulnerable in an environment of rising interest rates. Although both public- and private-sector institutions have been trying to promote fixed-rate mortgages (FRM) with long maturities, the FRM's market share remains very small. The well-known “tilt,” or front-load, problem in FRM—that is, high initial monthly payments—and other factors such as the high price-to-income ratios operate as impediments to expanding FRM products in Korea. To deal with this policy challenge, hybrid mortgages with a reasonable cap structure (for example, a “5/1/1/ ARM” with a 5 percent lifetime cap and 1 percent maximum for the first and subsequent adjustments) as well as various affordability-enhancing mortgage products such as equity-sharing mortgages, variable-maturity mortgage, price-level-adjusted mortgages can be further explored by market participants.

Related to the above, the expansion of the mobilization of funds for mortgages from capital markets is another challenge. Currently, mortgage funding in Korea is almost all based on bank deposits, which

is a key reason for the dominance of ARM products in mortgage markets. In addition to the welfare implication of the interest rate risk that ARM borrowers are exposed to, deposit-based funding can be unstable depending on the landscape for the market for small saving. Similar to what happened to lenders in the U.S. savings-and-loan crisis in the 1980s, large lenders in Korea have recently been facing stiff competition from money market funds and other short-term investment vehicles. Therefore, securing a more stable and longer-term funding source would be important. In addition to MBSs issued by the Korea Housing Finance Corporation and large commercial banks, covered bonds (CBs) are being discussed as an alternative wholesale funding instrument. A careful study comparing CBs with MBSs in the Korean context would be warranted.

Next, collection and sharing of data on consumer credit will be critical for further advancing risk-based mortgage underwriting and capital management. Currently, data sharing is confined to small numbers of partici-

Table 4: Share of Mortgages with Long Maturity and Principal Amortization, 2004–09, trillions of won

		2004	2005	2006	2007	2008	2009
Maturity longer than 10 years	New annual issuance	50.7	57.4	71.1	71.3	61.3	N.A.
Principal amortization		53.8	63.6	N.A.	N.A.	N.A.	N.A.
Maturity longer than 10 years	Year-end outstanding balance	20.7	34.4	51.0	58.0	59.6	55.7
Principal amortization		23.2	36.3	52.4	59.2	60.9	56.9

Source: Financial Supervisory Service, Seoul.

pating institutions within the banking sector, whether they are commercial banks, savings banks, cooperative banks, or capital companies. A broader sharing of data in developing credit or mortgage scores will enhance the soundness in risk management and will reduce systemic risks in case of an economic shock.

As the mortgage lending sector develops, serving the underserved better becomes a key policy issue. Efforts should be made to extend financial services to those with insufficient wealth, income, or credit standing while the practice of more mature risk management and risk sharing is secured. Related to this point, development of a well-functioning mortgage insurance (MI) industry is an important next step in mortgage market development in Korea. Currently, LTV thresholds are very much constraining the demand for mortgages from potential borrowers. As shown in **Table 5**, 85 percent of borrowers are concentrated near the LTV limit (in the 50–70 percent range). In this circumstance, an expanded MI program, offered either by public or private insurers, would be an effective instrument in enabling the mortgage finance industry to better serve wealth-constrained households.

It is also imperative to develop mortgage products that cater to the preferences and repayment capabilities of the currently underserved clientele. To this end, analyses on mortgage choice and demand patterns, on efficient and stable funding methods, and on managing embedded risks will all be needed.⁹ Furthermore, a framework for sound banking supervision will also be required. A dynamic capital provisioning, tools for managing systemic risk, and other ongoing policy

reforms being discussed in the aftermath of the global financial crisis should be considered.

Concluding Remarks

During the past two decades, housing standards have improved remarkably in terms of both quantity and price. This achievement was made in an environment subjected to extensive government interventions in the housing market. In fact, Korea has various regulations and other distortive measures that cannot be found elsewhere, which are likely to have limited the scope of further improvement in the housing sector.

This paper provided an overview of the evolution of housing policy and housing outcomes during the past decade, focusing on the developments in the housing finance system. A major conclusion is that significant progress has been made on mortgage financing since the 1997 Asian crisis but that no fundamental changes have been brought to the housing supply system. This poses a serious issue, as the combination of inelastic supply and demand increases will lead to a highly volatile housing price path.¹⁰ In light of the uncertainty about future housing demand expected to emanate from changes in preferences following income growth, aging of population, and slowdown of population growth, a more flexible housing supply system that is responsive to changing demand conditions is called for. There is much room for policy reform.

Another policy implication to draw from the Korean experience is the rental housing policy, or lack thereof, until recent years. Historically, the rental sector in

Table 5: Percentages of Borrowers Falling under Various Loan-to-Value Ratio Thresholds, 2008

Areas	<10%	10–20%	20–30%	30–40%	40–50%	50–60%	60–70%
Korea	0.3	0.6	1.6	3.1	5.9	35.6	53.0
Seoul	0.3	1.0	2.3	4.3	7.2	41.4	43.4

Source: Korea Housing Finance Corporation, Seoul.

9. See Man Cho, “Managing Mortgage Credit Risk: What Went Wrong with the Subprime and Alt-A Markets?” *International Real Estate Review* 12, no. 3 (2009): 295–324.

10. See Kyung-Hwan Kim and Man Cho, “Structural Changes, House Price Dynamics and Housing Affordability in Korea,” working paper, July 2009, for a graphical analysis of this possibility.

Korea was dominated by the *chonsei* system, and government policy was skewed to the provision of owner-occupied housing. But the private rental sector has not been fully developed. The tax system penalizing the ownership of more than one house has been a constraint in attracting private capital into the small-scale rental business. Promoting home ownership is politically popular, but unsustainable homeownership could create a social problem, as was demonstrated by the U.S. subprime mortgage crisis.¹¹

Finally, it is important to maintain a sound and safe mortgage lending system as the financing sector is developed and expanded over time. To that end, the argument by Gramlich is relevant and worth considering,¹² in addition to the risk management tools discussed earlier. The implication is a proper targeting of the high-risk lending sector and a periodic monitoring thereof will help prevent a systemic shock either from the real sector or from the financial sector.

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11. Edward M. Gramlich, *Subprime Mortgages: America's Latest Boom and Bust* (Washington, D.C.: Urban Institute, 2007).

12. Ibid.