

Real estate indicators in Hong Kong SAR

Kelvin Fan and Wensheng Peng¹

Abstract

This paper provides an overview of available real estate indicators in Hong Kong SAR that may be used for monitoring the vulnerabilities of the banking sector and the economy to fluctuations in property prices. These include mainly two types of statistics: property prices and banks' exposure to property-related lending. The paper also reviews the nexus between property prices, the macroeconomy and the banking sector in Hong Kong SAR, drawing on studies carried out at the research department of the Hong Kong Monetary Authority in recent years.

This paper was prepared for the BIS/IMF Conference on Real Estate Indicators and Financial Stability, 27-28 October 2003. The views expressed are solely the authors' and not necessarily those of the HKMA.

I. Introduction

International experience suggests that movements in real estate prices have important implications for macroeconomic and financial stability. In Hong Kong SAR,² the relationship between the property market and the wider economy is of particular significance for a number of reasons. First, the property market plays an important role in the Hong Kong economy. Housing is the most important form of savings for many households. In the banking sector, about half of domestic credit currently comprises mortgage loans for the purchase of private residential properties and loans for building and construction and property development. Changes in property prices and rents influence consumer price inflation, and affect Hong Kong's competitiveness as a service-based economy. Land sales and stamp duties on property transactions have also been a significant source of government revenue.

Secondly, property prices tend to be more volatile in Hong Kong than elsewhere, with a number of large swings in the past two decades. In particular, prices of various types of premises have dropped by around 60% since the collapse of the bubble triggered by the Asian financial crisis. This has resulted in significantly negative wealth and balance-sheet effects on private consumption and investment. Weak domestic demand explains why overall economic growth has been sluggish despite the strong performance of exports of goods and service in recent years. The falls in property prices have also contributed to consumer price deflation via a direct channel through declines in rentals and an indirect channel through weak demand.

Thirdly, under the Currency Board arrangements, interest rates in Hong Kong are largely determined by those in the United States and the risk premium that is required by investors for holding Hong Kong dollar (HKD) assets. Thus, monetary policy cannot be used to guard against movements in asset prices and, more generally, for macroeconomic stabilisation purposes. Regulatory policies are therefore of particular importance in maintaining financial stability. Indeed, while the difficult macroeconomic environment, including the collapse of property prices, has affected banks' profitability, the banking sector remains generally healthy. As is explained below, prudential measures by the regulatory authorities and risk controls by banks have helped limit the exposure of the banking sector to the property market, and hence its vulnerability to fluctuations in property prices.

¹ Corresponding author: Wensheng Peng, Hong Kong Monetary Authority, 55 Floor, Two International Finance Centre, 8 Finance Street, Central, Hong Kong, tel: (852)2878 1282, fax: (852)2878 1897, email: Wensheng_Peng@hkma.gov.hk.

² Henceforth, referred to as Hong Kong.

This paper provides an overview of the various real estate indicators in Hong Kong that may be used in monitoring the vulnerabilities of the macroeconomy and in particular the banking sector to property price changes. Section II discusses two main types of real estate indicators: property prices and measures of the exposure of banks to the property sector. Section III reviews the nexus between property prices, the macroeconomy and the banking sector in Hong Kong, drawing mainly on analyses conducted by the Research Department of the HKMA in recent years. These studies help shed light on the usefulness of the various indicators for monitoring the impact of property price changes. The final section offers some concluding remarks.

II. Real estate indicators

Statistics about property prices and banks' exposures to property lending are useful indicators for monitoring the health of the banking sector. The *Encouraged Set of Financial Soundness Indicators* proposed by the IMF includes real estate prices, and the ratios of residential real estate loans and commercial real estate loans to total loans (IMF, 2003). These indicators can serve as early warning signals of emerging asset quality problems, as the impact of property price shocks generally occurs with a lag and the size of the impact depends on banks' exposure to the real estate market. This section reviews the available indicators in Hong Kong.

a. Property price indicators

Property market statistics in Hong Kong are mainly compiled by the Rating and Valuation Department (R&VD). The R&VD publishes a comprehensive set of price, rental, and transaction statistics for various types of private residential and non-residential premises in its *Property Market Statistics* on a monthly basis. There are two main types of price statistics: average prices and price indices. The compilation methods of these two types of statistics and their respective merits as an aggregate indicator of property price movements are discussed below.

Average prices

Average prices for various types of private properties (for residential, retail, office and factory uses) are expressed in terms of price per square metre of floor area. They are computed based on the actual transaction prices reviewed by the R&VD for stamp duty purposes. Transactions that involve a mix of property types and properties that have not yet been assessed for rateable values are excluded from the calculation. Residential properties sold subject to existing tenancies³, primary sales of residential properties,⁴ residential properties sold under government-subsidised schemes,⁵ and transactions involving government-owned quarters are also excluded.

Average prices are the most straightforward and simplest indicators of the central tendency of property prices of the entire population. However, this method suffers from sampling problems in that the sample of properties differs over time. In particular, average prices in a given month depend in part on the special characteristics, such as quality and location, of the premises sold during the period, which may not be representative of the overall stock. Therefore, changes in average prices between two periods may be due to change in these characteristics and may not represent the price change in the underlying population.

³ This refers to a transaction that involves a transfer of ownership of the property together with an existing rental contract of the property at the same time from the seller to the buyer. As such, the transaction price may be affected by the terms of the rental contract and may differ from that of other normal transactions.

⁴ Real estate developers usually provide a variety of payment terms for buyers to choose. The selling prices of these primary transactions may be affected by the differences in payment terms.

⁵ Include Private Sector Participation, Home Ownership, Buy or Rent Option, Mortgage Subsidy, Sandwich Class Housing, Urban Improvement, Flat-for-Sale and the Tenants Purchase Schemes.

Price indices

The price indices are designed to measure changes in prices with quality kept constant. They are derived based on the same set of transaction data for computing the average prices, but using a more sophisticated statistical procedure. The compilation of the indices involves the following steps. First, component indices for different classes of residential properties or different grades of non-residential estates are derived.⁶ The indices measure price changes by reference to the factor of sales price divided by the rateable value of a subject property rather than by reference to price per square metre as in the calculation of average prices. The rateable value of a property is an annual rental value assessed by the R&VD as the basis for charging rates.⁷ In assessing the rateable value of a property, reference is made to open market rents for similar properties in the locality, with adjustments to reflect differences in size, location, facilities, standards of finish, and management. Therefore, by utilising the rateable values in compiling the price indices, allowance is made not only for floor area but also other qualitative differences between properties. A technical note on how the rateable value can be used to adjust the transaction prices for quality differences is provided in the Appendix.

Secondly, a composite index (I) for a certain type of premises such as residential properties is calculated as a weighted average of the component indices, so that:

$$I = \sum I_i w_i$$

where I_i and W_i are the component index and weight for property class or grade i respectively. The weights for residential premises are based on the proportions of the numbers of transactions of the components in the current and previous 11 months, while those for non-residential premises are based on the proportions of the total floor area of the components in respect of the current and previous 11 months.⁸ The use of 12-month rolling transaction data for determining the weights helps smooth out the volatility due to short-term fluctuations.

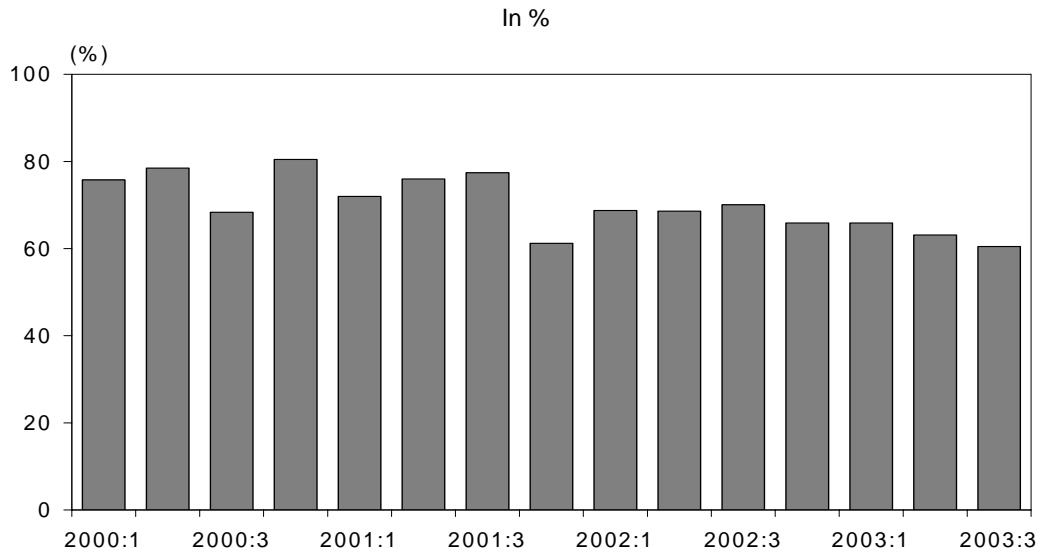
It should be noted that like average price statistics, the residential price indices do not include transactions of primary sales. However, transaction prices in the secondary market should be able to reflect the market trend owing to a relatively high liquidity in this segment. In recent years, the secondary market accounted for about two-thirds of the total transactions of residential premises (Chart 1). Nevertheless, the indices may be affected by outliers when the number of transactions in a particular class/grade of properties is small. In particular, the number of transactions of a certain grade of non-residential properties for a certain period may not be sufficient to represent the market prices in the whole grade. Finally, to what extent the price indices represent the underlying trends of the entire population depends importantly on whether the rateable values are able to capture all quality differences between properties.

⁶ Private residential properties are classified into classes A to E, with saleable area of less than 40 m², 40-69.9 m², 70-99.9 m², 100-159.9 m², and 160 m² or above, respectively. Private office premises are divided into grades A to C, with grade A offices having the best quality in terms of, for example, finishes, layout flexibility, size of floor plates, management services, and parking facilities.

⁷ Rates are one of indirect taxes levied on properties, which are charged at a percentage of the rateable value. The rateable values are reviewed annually so as to reflect up-to-date information.

⁸ In calculating the weights, numbers of transactions are used for residential properties rather than the total floor area as for non-residential properties. This is because the variety, in terms of floor area, of residential properties is relatively small compared with that of the non-residential properties.

Chart 1
Share of secondary market transactions in total transactions of residential properties



Source: R&VD.

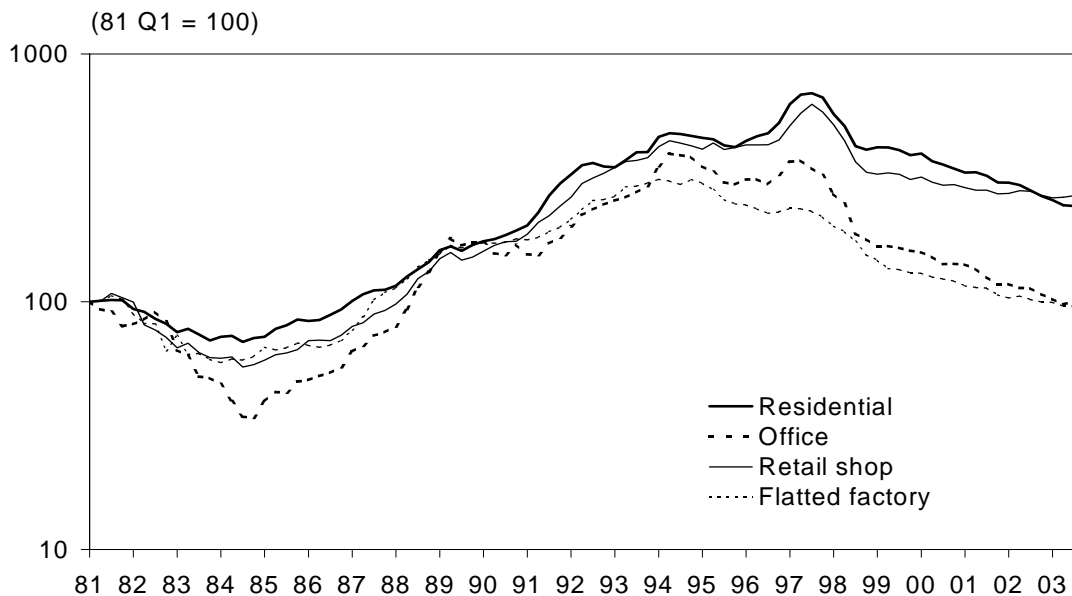
Recent developments in property prices

Chart 2 plots the price indicators discussed above over the past two decades. Panel A compares the levels of the price indices for various types of private properties including residential, office, retail shops and flatted factories. Panel B depicts the growth rates of these indices. Panel C compares the residential property price index with some average price indicators. A number of observations are worth noting.

Chart 2
Developments in property prices

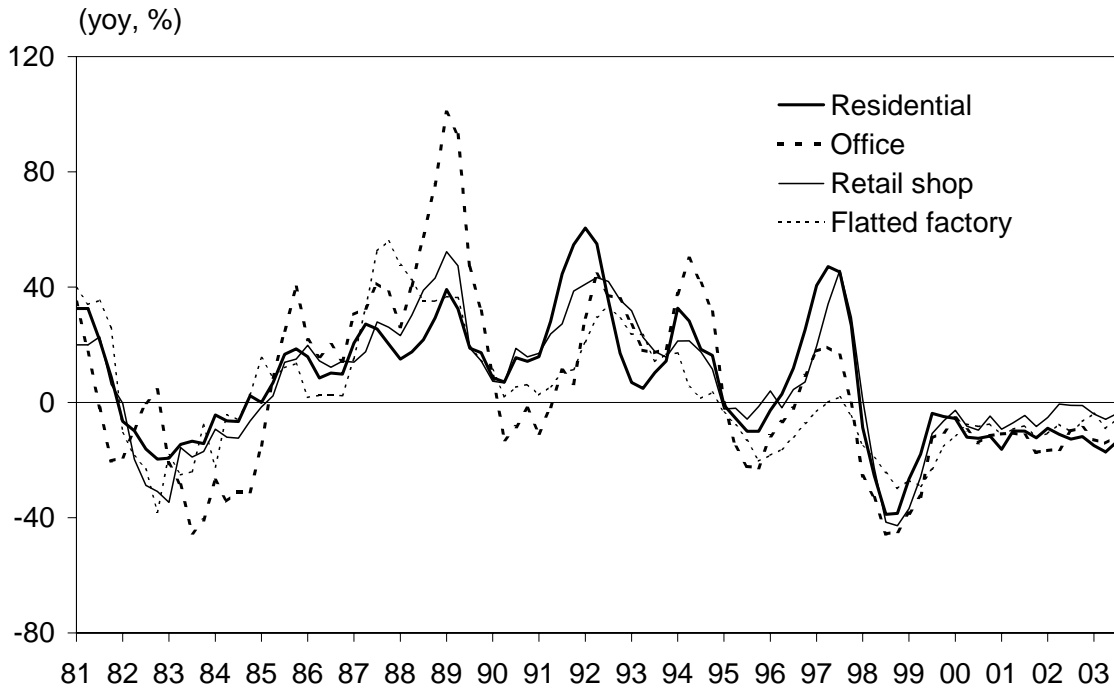
A. Property price indices

1981 Q1 = 100 (semi-logarithmic scale)



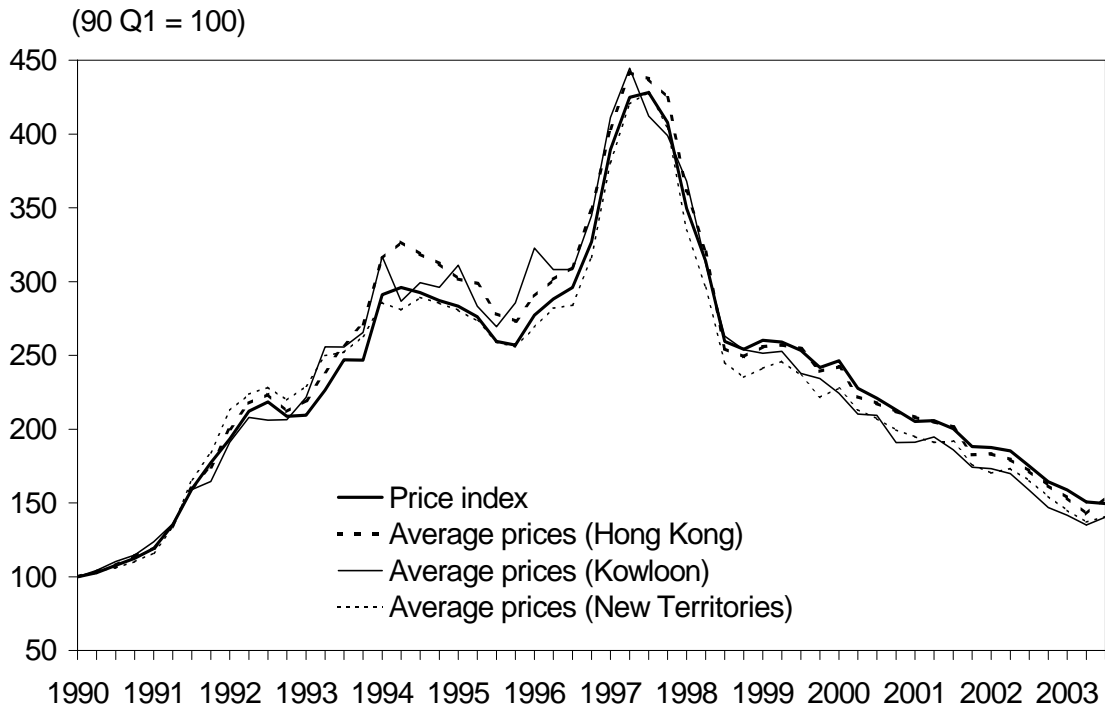
B. Growth in property price indices

Annual percentage changes



C. Price index and average prices for class B residential property

1990 Q1 = 100



Source: R&VD.

First, the price indices for all types of private (residential and non-residential) premises have declined sharply in recent years. The price indices for residential, retail and office properties were generally rising from the mid-1980s up to the onset of the Asian financial crisis in 1997, with a notable correction in 1994-95.⁹ Since the burst of the bubble in 1997, prices of retail shops, residential and office properties have dropped by more than 55%, 60% and 70% respectively.

Secondly, the price index for flatted factories reached a peak much earlier than the other price indices and started to fall from the early 1990s.¹⁰ This reflected a decline in demand for factories due to the relocation of Hong Kong's manufacturing sector to the Mainland of China.

Thirdly, because the levels of these indices are dominated by pronounced trend-wise increases, they obscure several episodes of sharp price fluctuations, as indicated by the growth rates of the indices. In particular, the residential price index has undergone recurrent fluctuations, reaching peaks of four-quarter growth rates of 25%-60% in 1991-92, 1994, and 1997 and troughs with declines of 10% in 1995, 39% in 1998, and 17% in 2003.

Finally, indicators of average prices have had broadly the same trends as the price indices. During Q1/1990-Q3/2003 the price index for the class B residential properties recorded an average year-on-year growth rate of 6%, compared with annual increases of 5%-6% in average prices for the same class in the three broad districts.

The large swings in property prices raise questions as to what drives property prices, and whether speculative activities lead to bubbles. There are indicators supporting the argument that a property bubble developed and burst in the 1990s.¹¹ One is the Affordability Index of Home Purchasers, which is compiled by the R&VD on a quarterly basis. The index measures the effect of changing prices, mortgage rates and household incomes on the ability of purchasers to afford a mortgage. It is derived by dividing a typical monthly mortgage repayment by the median household income.¹² A rise in the index represents deterioration in affordability. Having increased significantly during the boom period, the index declined sharply in the past five years (Chart 3). It has dropped by more than 70% since the second quarter of 1997, as the declines in property prices and mortgage rates outweighed the fall in median household income. The ratio of property prices to GDP shows a similar pattern, but with a smaller decline, as it does not reflect the effect of lower mortgage rates.

Another indicator is the so-called buy-rental gap, which compares the cost of purchasing and maintaining a flat to the cost of renting it. A simple measure of this is compiled by the Research Department of the HKMA, as the difference between an estimated effective funding cost and rental yield.¹³ The buy-rental gap widened considerably in the 1990s, reaching a peak in early 1998, reflecting mainly the rise in prices which drove down rental yields (Chart 4). Thus, it was increasingly more expensive to buy than to rent a property. The widening and persistence of the positive gap was probably supported by expectations of future capital gains. The gap fell in recent years due to the decline in interest rates as well as the increase in rental yield. The latter was owing to a sharper drop in prices than in rentals. The gap has declined to negative territory since the second quarter of 2001

⁹ The declines between mid-1994 and late 1995 were mainly due to the implementation of a package of anti-speculative measures by the government as well as increases in interest rates.

¹⁰ Flatted factories refer to premises designed for general manufacturing processes and normally intended for sale or letting by the developers. They exclude factory premises that are primarily purpose-built for specialised manufacturing processes and usually for occupation by a single operator.

¹¹ It is difficult to estimate the fair values of property prices. Peng (2002) presents two different empirical models of property prices that combine fundamental variables with the concept of speculative bubbles. Both approaches indicate a significant bubble component in property prices in the earlier part of the 1990s.

¹² The mortgage repayment is estimated assuming a 20-year mortgage on 70% of the purchase price for a 50m² flat. The purchase price is estimated by applying the average price for a class B residential unit. The median household income is deseasonalised.

¹³ Specifically, the buy-rental gap is calculated as:

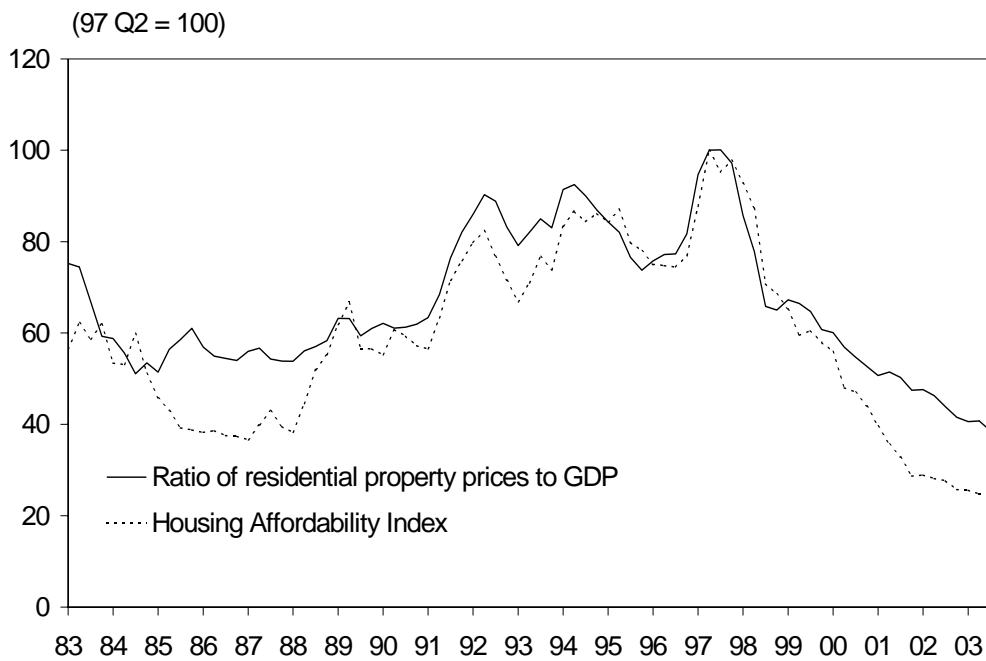
$$[((1 - \text{downpayment ratio}) \times \text{mortgage rate}) + (\text{downpayment ratio} \times \text{1-month time deposit rate})] - \text{rental yield}.$$

The terms in the square bracket represent the effective funding rate. To derive the latter, the downpayment ratio is taken as 30%, and the mortgage rate is a weighted average for new loans approved. The 1-month time deposit rate is used to represent opportunity cost of foregone interest earnings on downpayments. Rental yield refers to the average of yields on residential premises in classes A and B.

and stayed around -3.5% in recent quarters. The widened negative gap suggests incentives for households to purchase rather than rent flats, subject to expectations of future capital gains/losses.

Chart 3
Housing affordability

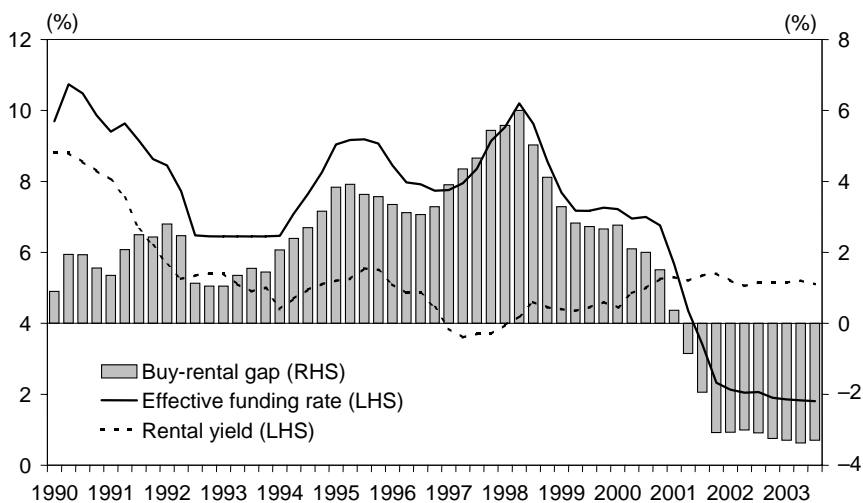
1997 Q2 = 100



Sources: R&VD; HKMA Research Department staff estimates.

Chart 4
Buy-rental gap

In per cent



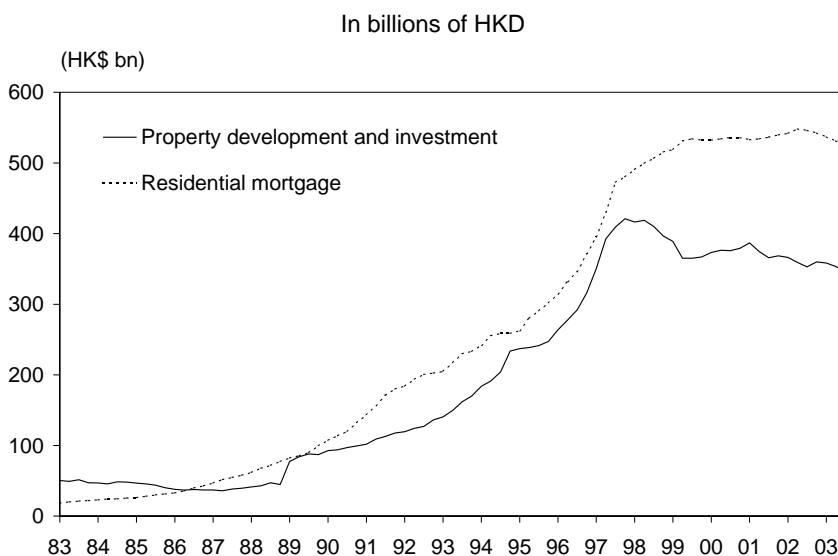
Source: HKMA Research Department staff estimates.

b. Indicators of property lending exposure

In Hong Kong, the banking sector's exposure to the property market is mainly related to residential mortgage lending and loans for construction, property development and investment. The HKMA collects statistical information about these loans through a regular statutory return. The statistics are published on a quarterly basis by the HKMA in its statistical bulletin.

Property-related loans have increased significantly over the past two decades. Both residential mortgage loans and loans for property development and investment grew rapidly between 1990 and 1997, by an average annual rate of 227%.¹⁴ Subsequently, residential mortgage loans increased at a much slower rate in 1998-2002, while loans for property development and investment dropped considerably (Chart 5).

Chart 5
Outstanding amount of property lending



Source: HKMA.

The share of property-related lending - including both residential mortgage loans and loans for property development and investment - in total loans for use in Hong Kong also increased over the past two decades from around 30% in the mid-1980s to over 50% in 2003 (Chart 6).¹⁵ The rise in recent years was mainly attributable to an increase in the share of residential mortgage lending by banks, while the share of loans for property development and investment was generally stable. It should be noted that the actual exposure is likely to be higher than is suggested by these statistics, which do not include other consumer and corporate loans extended against property collateral. Data on the latter are not available, but anecdotal evidence indicates that they are significant.

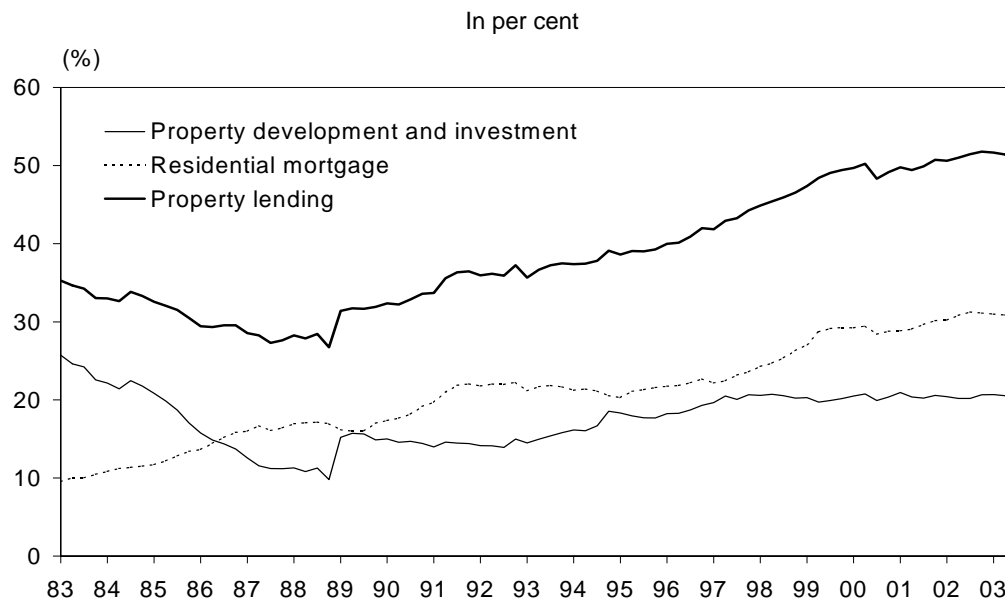
In order to contain the risks associated with excessive concentration or expansion of bank lending to the property market, a number of prudential measures have been adopted by the HKMA and the banking industry over the years. These include a guideline issued by the HKMA in 1994 to banks to maintain their ratio of property lending to loans for use in Hong Kong at about the industry average of 40%. The guideline was well observed in the aggregate during the boom period. It was withdrawn in 1998, as the property market was no longer overheated and banks were much more restrained in their

¹⁴ A reclassification of loans was implemented in 1989, which explained the sharp rise in loans for property development and investment in that year. Specifically, from 1989 loans are classified according to the usage rather than the main business of the borrower as in the past.

¹⁵ Loans for use in Hong Kong are those for financing economic activity in Hong Kong, but do not include those for financing import and export trades.

property lending. The increase in the ratio in recent years mainly reflected a contraction in lending to other sectors as a result of the economic slowdown.

Chart 6
Share of property lending in total loans for use in Hong Kong



Source: HKMA.

In view of the increasing importance of residential mortgage lending in banks' loan portfolios, the HKMA also started to conduct a monthly survey on residential mortgage loans from December 1992. This is in addition to the collection of data on outstanding amounts of residential mortgage loans through the statutory return on a quarterly basis. Following rounds of enhancement, the monthly survey now collects key indicators on banks' mortgage business including value and number of new loans approved during the month, amount of outstanding loans, asset quality of mortgage loans, and interest rate spread against the best lending rate of new loans. These more frequent and more detailed statistics are useful for monitoring and assessing banks' exposure to property market developments.

Reflecting the sharp decline in property prices in recent years, there has been an increase in the phenomenon of negative equity.¹⁶ The HKMA has conducted a survey to obtain information on banks' residential mortgage loans in negative equity since the third quarter of 2001. The information collected includes the number of mortgage loans in negative equity, their total outstanding value, the loan-to-value ratio breakdown, and the breakdown of interest rate spread against the best lending rate. The number of residential mortgage loans in negative equity rose substantially to over 20% of the total mortgage borrowers by the end of the second quarter of 2003, with the loan-to-value ratio averaging 127% (Chart 7). At the end of the next quarter, aggregate outstanding loans amounted to HK\$ 155 billion or 29% of total residential mortgage loans. The unsecured portion of these loans was estimated at about HK\$ 33 billion or around 6% of the total.¹⁷ Nevertheless, the three-month delinquency ratio of mortgage loans in negative equity declined to 2.2%, from 2.9% in the third quarter of 2002.

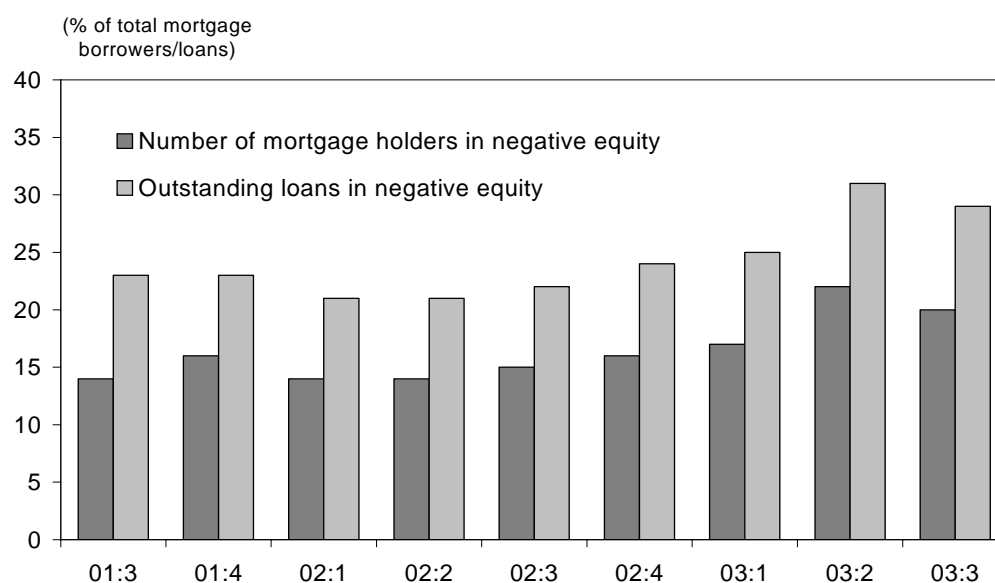
¹⁶ A loan is regarded as in negative equity if its outstanding loan amount exceeds the market value of the mortgaged property.

¹⁷ These figures relate only to the residential mortgage loans provided by authorised institutions on the basis of first mortgages, which do not reflect the situation of mortgage loans associated with government-funded co-financing schemes and private sector co-financing schemes.

Chart 7

Residential mortgage loans in negative equity

As a percentage of total mortgage borrowers/loans



Source: HKMA.

III. Property, the macroeconomy and banking performance

Fluctuations in property prices may affect the banking sector via its direct exposure to the property market and indirect effects due to the associated changes in overall economic conditions. The sharp declines in property prices in the past five years have contributed importantly to the weak economy and persistent deflation. Banks' profits have declined significantly from the pre-1997 levels, reflecting in part an increased provision for loan losses. Nevertheless, the banking sector as a whole remains healthy, with a relatively high capital ratio which averaged 15.6% at end-September 2003. This section provides a brief summary of the effects of property price declines on the economy and particularly the banking sector, based on a number of studies by HKMA Research Department staff in the past few years.

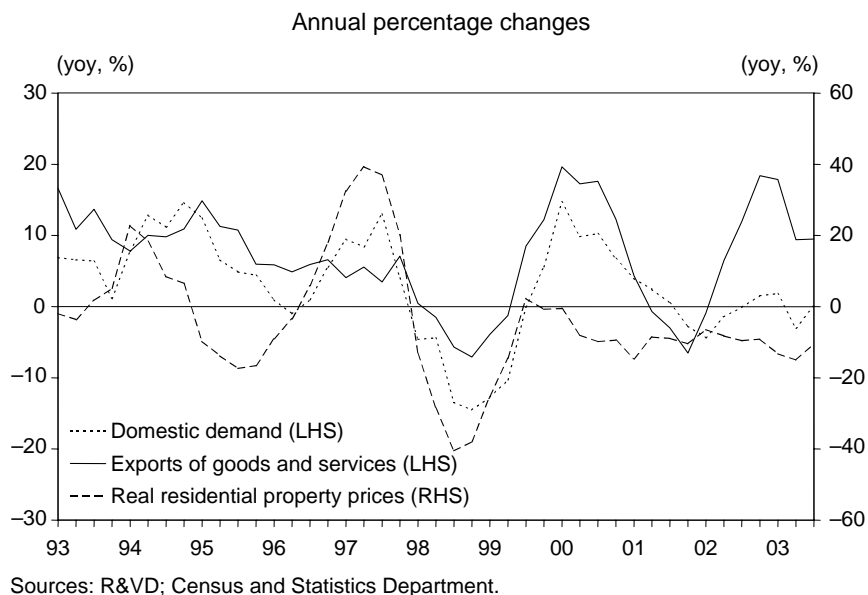
a. Property prices and the macroeconomy

The economy is affected by fluctuations in property prices through a variety of channels. Changes in property prices can influence private consumption and investment through wealth and balance-sheet effects. The phenomenon of negative equity may have reinforced the wealth or balance-sheet effects on consumption, as households with negative equity are more likely to have responded to price declines by increasing savings to strengthen their balance sheets. Property price fluctuations also affect consumer price inflation via a direct channel through declines in rentals and an indirect channel through weak aggregate demand.

Peng et al (2001) review the various linkages between the property market and the macroeconomy in Hong Kong. In particular, the study uses a multi-equation structural model to assess the impact of property price declines on economic growth. The results suggest that declines in property prices have reduced growth by affecting private investment and, to a lesser extent, consumption spending. This has been an important reason for the weakness in domestic demand notwithstanding strong increases in the exports of goods and services in recent years (Chart 8). However, any estimate of the effects should be interpreted with caution for a number of reasons. First, there are interactions between the property sector and the rest of the economy. In particular, while weak property prices may depress growth, weakening in economic activity reduces the demand for property and therefore prices.

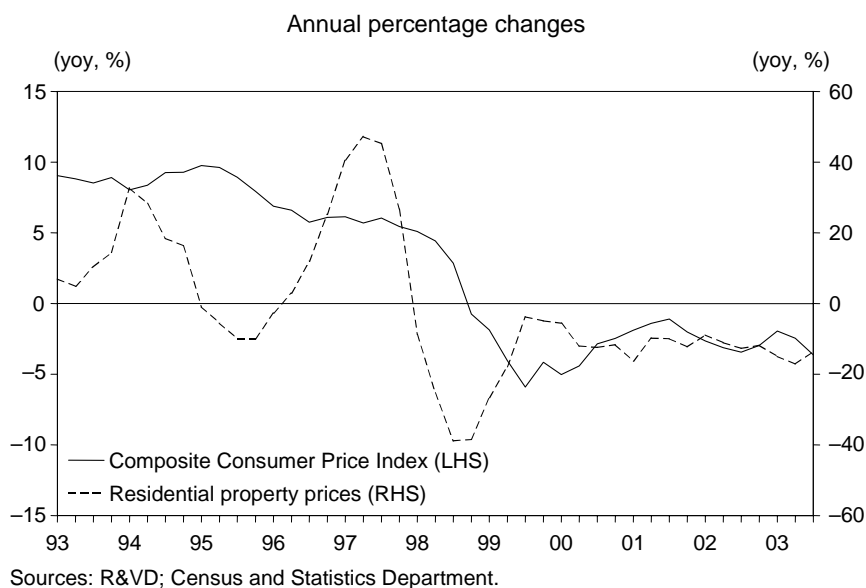
Secondly, property prices and other parts of the domestic economy are subject to common shocks such as changes in external demand, a factor particularly important for Hong Kong.

Chart 8
Property prices and the macroeconomy



On an accounting basis, declines in property rentals have contributed about half of the total decline in the consumer price index (CPI) since 1998. Considering the interaction between the property market and the rest of the economy, the exact size of the contribution may be above or below this number. However, it is fair to say that property price falls have played an important role in consumer price deflation in Hong Kong (Chart 9). Ha et al (2002) estimate a model of inflation for Hong Kong, and find that domestic prices are influenced by property prices, reflecting the lagged effect of rentals which are stickier due to lease contracts, as well as weak aggregate demand.

Chart 9
Property prices and consumer prices



b. Property prices and bank lending

The widespread practice of using property as collateral for consumer and business loans in Hong Kong points to the importance of balance-sheet and credit effects. There can be significant feedback and magnification effects through the function of the financial intermediaries. In boom periods with rising asset prices, as the net worth of households and corporations increases, so do banks' balance sheet positions and lending capacity, which may foster a credit boom and which reinforces the rise in asset prices and magnifies the effects on private spending. Conversely, under generalised asset price deflation, the negative effects on households' and banks' balance sheets can become self-reinforcing, creating a credit crunch and worsening the contractionary effects triggered by the original drop in asset prices.

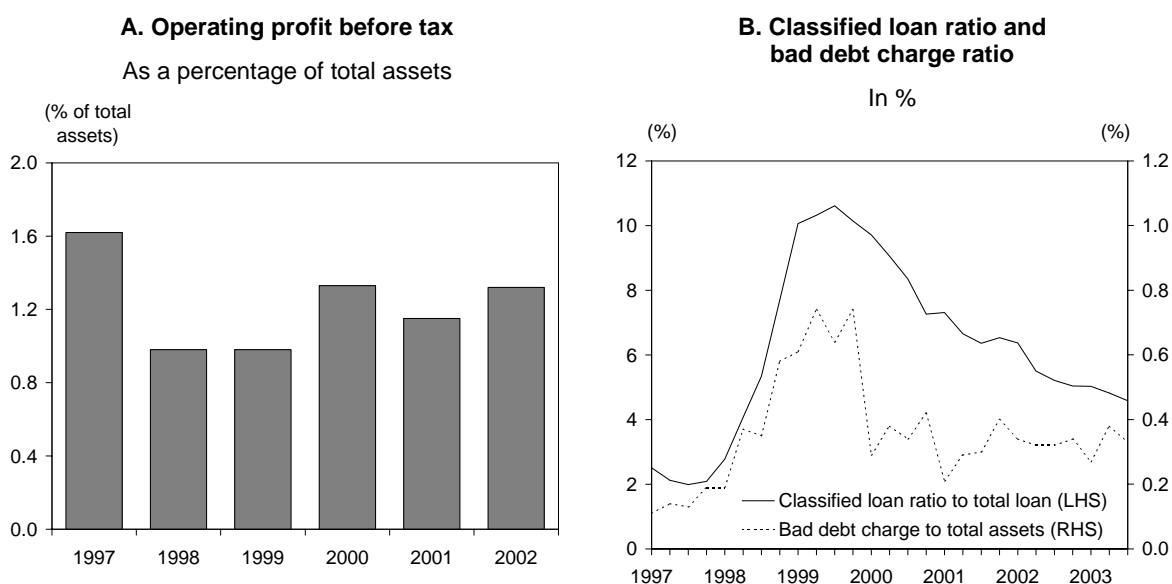
Gerlach and Peng (2002) study the nexus between output, property price and bank lending in Hong Kong. They find that bank lending appears to be mainly demand-driven and that the direction of influence goes from property price to bank credit. This implies that financial intermediaries did not play an "accelerator" role in the run-up of the property prices during the boom periods. Part of the reason would be related to the prudential regulation and risk control by banks in granting loans, which limited the responses of credit to property price changes. In particular, the study finds that the maximum loan-to-value ratio of 70%, which was adopted by the banking industry voluntarily in 1991 and later incorporated in the HKMA's guidelines on property lending, helped limit credit expansion in the bubble period.

c. Property prices and bank profitability

Banks' balance sheets and profitability have been affected by the downturn in the economy and the property market. Retail banks in Hong Kong experienced a considerable decline in profitability following the Asian financial crisis (Chart 10A). Profitability recovered somewhat in 2000-02, but remained below its pre-crisis level. The decline in profitability was associated with a deterioration in asset quality. Specifically, the ratio of classified loans to total loans of retail banks rose substantially from around 2% in 1997 to over 10% in 1999 before falling gradually to 4.5% at the end of September 2003 (Chart 10B).

Chart 10

Retail banks' profitability and asset quality

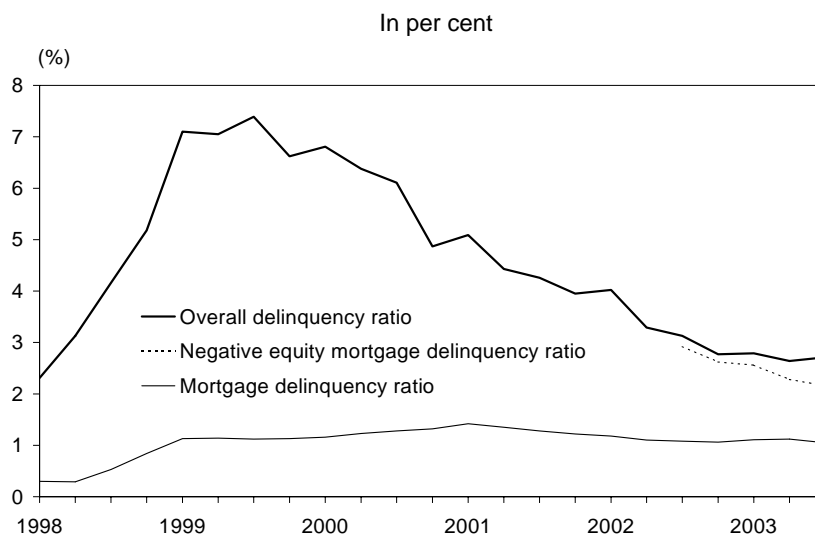


Source: HKMA.

The mortgage delinquency ratio (defined as mortgage loans overdue for more than three months relative to total mortgage loans) rose substantially from 0.3% in mid-1998 to over 1.4% in 2001 before falling gradually to below 1% in November 2003 (Chart 11). On the other hand, the ratio of rescheduled loans has been rising since the data for September 2001 were first released by the

HKMA. The continued rise in the rescheduled loan ratio suggests that banks were accommodative in restructuring mortgage loans for borrowers in financial difficulty, thereby taking the pressure off mortgage delinquencies. While the mortgage delinquency ratio has increased substantially in recent years, it remained low compared with the overall ratio of loans overdue for more than three months.

Chart 11
Delinquency ratios



Source: HKMA.

There have been a number of studies on the determinants of bank profitability in Hong Kong, using both aggregate and bank-level data. Shu (2002) finds that declines in residential property prices, reduced economic growth, and persistent consumer price deflation have had significant impacts on banks' asset quality. A study by Jiang et al (2003) suggests that the deterioration in banking institutions' profitability in recent years was mainly attributable to the adverse macroeconomic environment in Hong Kong, particularly the persistent deflation in general prices, which was in part due to declines in property prices as discussed above. Gerlach et al (2003), using confidential supervisory bank-level data, find that banking performance is affected by macroeconomic developments with the net interest margin of smaller banks being more exposed to changes in economic conditions. The collapse of the property "bubble" has also put banks under distress due to the generally large exposure to property-related lending. However, and perhaps surprisingly, the asset quality of property-related loans is found to be *less* sensitive to changes in economic conditions including property prices than that of other types of bank lending. This is in line with the stylised fact that mortgage lending is less risky than most other bank loans.

IV. Conclusions

This paper provides an overview of the real estate indicators that may be useful for monitoring the vulnerability of the banking sector in Hong Kong to fluctuations in property prices. Two types of indicators are reviewed: property prices and statistics of banks' exposure to property-related lending. These statistics are published on a regular basis by the R&VD and the HKMA respectively. In view of the increasing importance of residential mortgage lending in banks' loan portfolios, the HKMA has conducted a monthly survey on residential mortgage loans to obtain higher frequency and more detailed information, which is now also published.

The sharp declines in property prices have had a significant impact on the economy and the banking sector. Banks' asset quality and profitability fell considerably in the wake of the Asian financial crisis. These indicators have rebounded in more recent years, but remained below their pre-crisis levels. Nevertheless, the banking sector as a whole has remained in a healthy position, as evidenced by the strong capital position and high asset quality and profitability relative to banks in other economies in the region.

Appendix: The use of rateable value for adjusting quality differences between properties

This appendix illustrates how rateable values can be utilised to adjust transaction prices for differences in quality characteristics between properties.

The rateable value is an estimate of the annual rental value of a property at a reference date, assuming that the property is then vacant and to let. It is the basis on which rates, one of Hong Kong's indirect taxes on properties, are charged. In assessing the rateable value, reference is made to other open market rents agreed at or around the date of assessment, for similar properties in the locality, with adjustments to reflect any differences in size, location, facilities, standards of finish and management. The rateable value is reviewed annually by R&VD so as to reflect more up-to-date rental values of the properties.

Consider that the sale price of a property is determined by the average market price and a number of quality factors such as size, location, age, management services and facilities, etc. Algebraically, the sale price (P) of a specific property can be expressed as:

$$P = \bar{P} + \bar{P}X_1 + \bar{P}X_2 + \bar{P}X_3 + \dots + \bar{P}X_k = \bar{P}(1 + X_1 + X_2 + X_3 + \dots + X_k) \quad (1)$$

where \bar{P} is the central tendency of the property prices in the entire population (it can be viewed as the market price of a "typical" property in the population). X_i ($i = 1, 2, 3, \dots, k$) are the quality factors, which measure the deviation of the sale price of the specific property from the market price of the "typical" property due to quality differences. For example, if, other things being equal, the size of the specific property is smaller than that of the "typical" property, then the value of the quality factor for size will be negative.

Assume that the assessment of rateable value of a property is based on the same set of quality factors as in the determination of sale price, and the influence of individual quality factors on sale price and rateable value are the same.¹⁸ Given these assumptions, the rateable value (R) of the specific property can be expressed as:

$$R = \bar{R}(1 + X_1 + X_2 + X_3 + \dots + X_k) \quad (2)$$

where \bar{R} is the central tendency of the rateable values in the entire population. Thus, the factor of sale price divided by rateable value is:

$$\frac{P}{R} = \frac{\bar{P}(1 + X_1 + X_2 + X_3 + \dots + X_k)}{\bar{R}(1 + X_1 + X_2 + X_3 + \dots + X_k)} = \frac{\bar{P}}{\bar{R}} \quad (3)$$

By keeping the rateable values (and hence \bar{R}) unchanged in consecutive periods, changes in the factor of P/R represent changes in \bar{P} , that is, the central tendency of the property prices in the entire market.

¹⁸ In reality, the degrees of influences on price and rent (rateable value) for some quality factors may not be the same. For example, the age of a property usually has a greater influence on price than rent in Hong Kong.

References

Gerlach, Stefan and Wensheng Peng (2002): "Bank lending and property prices in Hong Kong", *HKMA Quarterly Bulletin*, August.

Gerlach, Stefan, Wensheng Peng and Chang Shu (2003): "Macroeconomic conditions and banking performance in Hong Kong: a panel data study", BIS Autumn Central Bank Economists' Meeting on 9-10 October 2003.

Ha, Jiming, Cynthia Leung and Chang Shu (2002): "A small macroeconomic model of Hong Kong", *HKMA Research Memorandum*, June 2002.

International Monetary Fund (2003): "Financial soundness indicators - background paper", Monetary and Financial Systems and Statistics Departments, IMF, May.

Jiang, Guorong, Nancy Tang, Eve Law and Angela Sze (2003): "Determinants of bank profitability in Hong Kong", *HKMA Research Memorandum*, September.

Peng, Wensheng (2002): "What drives property prices in Hong Kong", *HKMA Quarterly Bulletin*, August.

Peng, Wensheng, Lillian Cheung and Cynthia Leung (2001): "The property market and the macro-economy", *HKMA Quarterly Bulletin*, May.

Shu, Chang (2002): "The impact of macroeconomic environment on the asset quality of Hong Kong's banking sector", *HKMA Research Memorandum*, December.

Real estate price index: a model for the Philippines

Estrella V Domingo and Reynaldo F Fulleros¹

1. Introduction

Real estate price index (REPI) is a valuable tool for countries in assessing and valuing real properties. Valuations of real properties are used for different purposes - acquisition and disposal, mortgages, taxation, land and property management, among others. Most countries however do not have an established system of real estate prices. In fact, there is no international standard practice for real estate pricing at present.

The Philippines is in need of a real estate price index, given the shortcomings of the existing zonal valuation system of the government and the impact this has on government revenue, financial stability, land allocation and use, policies, and legislation. The present property values are found to be grossly undervalued because of the lesser understanding of valuation practices and market trends in the property industry.

The National Statistical Coordination Board (NSCB), the agency mandated to coordinate statistical matters in the country and to develop statistical frameworks and indicators, took on the task of exploring approaches to come up with a real estate price index system model for the Philippines. The general objective of the exploratory study is to help address the bigger problems of real estate valuation in the country. Specifically, the study aims to develop an appropriate REPI system. The price index should provide a consistent measure of price developments over time. It should be able to serve the needs of different users - government, banks, real estate developers/sellers, etc. In developing the appropriate price index, the study took a number of factors into consideration, such as, existing real property market conditions, availability of data, and applicability of the methodology to the country. The real estate price index system as suggested will be an evolving model since this will undergo changes or refinements as work on the index progresses.

This paper presents the steps taken to determine the methodology for compiling the real estate price index in the Philippines, required data, proposed methodology, and future activities to institutionalise the system.

2. Conditions of real property valuation in the Philippines

The initial step was to conduct a review of the present conditions of the real property industry and real estate valuation in the Philippines.

Land and property administration in the Philippines faces a critical problem of an inefficient and inequitable property market that constrains economic development, reduces opportunities for the poor, and discourages sustainable management of resources.²

One of the main causes of the problem is an inefficient, outdated zonal valuation system. According to a 2002 World Bank Study, such a system led to the gross under-valuation of real estate properties

¹ Assistant Secretary General and Statistical Coordination Officer II of the National Statistical Coordination Board (NSCB), of the Philippines, respectively. The authors wish to acknowledge the contributions of Ms Marisol Ginez and Mr Darwin Balneg.

² Inter-Agency Coordinating Committee (IACC) of the Philippine Australian Land Administration and Management Project, "Land Administration and Management Report", February 2000.

greatly affecting government revenue and land allocation.³ While the system itself is not wrong the implementation of the process is not perfect. The inefficiency of the process is prevalent in the provinces/municipalities.

The property market is characterised by multiple systems of valuation imposed by different government agencies. Depending on the purpose, this system resulted in two or three different pricings for the same property. These varying approaches can be traced to the multiple legislations/policies that support different purposes of land/property administration.

Real property prices in the Philippines (just like other countries) are very diverse owing to factors such as location, type, and features of the property. On an aggregate level, the mix of real estate transactions by type has a bearing on the total price. Other factors, such as, urban development, the entry of foreign investors in the property market, lower interest rates, and emergence of new housing and mortgage practices also contributed to the differences in prices.

The present state of property valuation can be attributed to outdated legislations and practices. Contributing to this sad state of real property valuation in the country is the lack of trained appraisers, and lesser understanding and appreciation on the part of local government officials on the proper pricing of real estate properties in their localities.

The property market in the Philippines is poorly informed on property movements.⁴ There is lack of statistics/data needed for property administration and management which is a key factor in improving the property market.

All of these point to the need to establish a comprehensive property administration database and reliable REPI system to (1) serve as guide to those concerned agencies, and (2) bring about a fair efficient and effective valuation system that is comparable internationally.

3. Conceptual framework

The study also looked into the scope and coverage of real estate as applied in the Philippines. It took into account the existing market conditions to determine the structure of real estate properties/transactions which can serve as framework for the REPI.

3.1 Scope and coverage

Real estate in the Philippines encompasses: (1) the land and/or buildings or other improvements permanently attached or annexed to land, including the rights and interests thereon; (2) rural, sub-urban and urban land areas, and the development thereof, such as residential, commercial, industrial, institutional, agricultural, forest land, aqua-cultural or combinations of such rights and interests; (3) resorts, land reclamation, building or housing projects, either for individual or condominium ownership, memorial parks, recreational, townhouses, clubhouses, and other similar nature.⁵ Given the extensive coverage of real estate, the study focused only on the most common types of agricultural, residential, and commercial properties.

³ "Real property taxation in the Philippines", a report written by Milwida Guevara, and contained in *Land taxation in practice: selected case studies*, March 2002, as case study no 8, compiled and edited by Richard M Bird and Enid Slack of World Bank.

⁴ Property movements is a general term used to refer to any of the following: real property reclassification eg agricultural to residential; transfer of ownership eg from government to private individuals, donations, and developments/improvements to a property.

⁵ The definition of real estate was taken from the Rules and Regulation Governing Real Estate Practice in the Philippines of the Department of Trade and Industry, defined under its Ministry Order no 39 - Rules and Regulations Governing the Licensing and Supervision of Real Estate Salesmen, Brokers, Appraisers and Consultants, and Realty Service Organisations.

3.2 Present classification/structure of market

Real estate transactions in the country take the following four forms: (1) sales; (2) rental/lease; (3) donations; and (4) mortgages. These transactions apply to the different types of real estate properties as classified under government laws, rules and implementing guidelines, statistical data collection, policy uses, financing institutions, and classifications as followed by private assessors.

Valuation of real estate distinguishes between the value of the land and the value of the improvements. The latter refers to dwelling units, buildings and structures, and other structures. Land is classified by the Department of Environment and Natural Resources (DENR) according to land use as follows: (1) forest land; (2) agricultural land; (3) built-up land; and (4) other lands.

The Bureau of Internal Revenue (BIR) applies a market-based classification. The general classification adopted is as follows: (1) agricultural; (2) residential; (3) commercial; (4) industrial; (5) general purpose; (6) government land; and (7) area for priority development. Agricultural lands - are principally devoted to planting/raising of all types of crops/livestock and poultry, fishpond, and other agricultural uses including timberlands and forest land. Residential properties on the other hand, include land or buildings principally used for habitation. They are classified into residential regular and residential condominium. Similarly, commercial properties are classified into commercial regular and commercial condominiums. Industrial properties include factories, warehouses, and other structures used for manufacturing and industrial uses. General purpose land refers to rawland, underdeveloped and undeveloped areas which have potential for development into residential, commercial, industrial, institutional, etc and must not be less than 5,000 square metres. On the other hand, government lands include those owned/held by the government. And lastly, area for priority development include those areas utilised for socialised housing certified by the Housing and Land Use Regulatory Board (HLURB), Presidential Commission on Urban Poor (PCUP); and, National Housing Authority (NHA).

The National Statistics Office (NSO) in the Census of Population and Housing (CPH) provides a highly disaggregated categorisation of dwelling units (residential units) as follows: (1) by type of buildings: single house, duplex, apartment, accessoria, condominium, row house, etc; (2) improvised ("barong-barong"); (3) other housing units/natural shelter, boat, hotel, lodging house, dormitory, etc; (4) institutional units (hospital, convent, school dormitory); and (5) other collective living quarters (military camp, etc). Categorisations are also available by location or by type of use ie, commercial, industrial, and agricultural.

Other types of market segmentation that can affect pricing of properties are location, life of the asset, features of the property, social factor, and type of business in the case of commercial units. Location can be regional, provincial, city, municipality, or urban or rural. Tenurial status (ownership/operator) is also applied to group properties but for purposes other than valuation.

Properties in the Philippines are transferred through - transfer in compliance of the law (Agrarian Reform Act), donations, direct transfer from seller to buyer or through an intermediary/broker, and succession.

3.3 Proposed composition of the real estate price index

In coming up with the index the structure in Table 1 is suggested as preliminary. It took into consideration the features of existing classifications, availability of data, and market requirements.

Table 1

Real estate structure: Philippines

| Classification | Category | Sub-category | Remarks |
|-----------------|--|---|---|
| A. Agricultural | By type of crop/type of farm A.1. Temporary crops A.2. Permanent crops A.3. Livestock A.4. Poultry A.5. Other farms By location (regional, provincial, city, municipality) | By size By age By cost | For sales and rent prices of land only |
| B. Forest | By type of forest land (plantation forest, public and private forest land) By location (regional, provincial, city, municipality) | By size By age By cost | Covers only rent of economic/production forest ¹ |
| C. Residential | By type of project C.1. Residential regular C.2. Residential condominium By location (regional, provincial, city, municipality) | By cost By size By type of structure By number of floors By age By social category (high-end, mid-income, low-cost socialised) | Sales, mortgage and rent prices of land and improvements |
| D. Commercial | By type of project D.1. Commercial regular D.2. Commercial condominium By location (regional, provincial, city, municipality) | By size By type of structure By number of floors By age By cost | Rental and sales prices of land and improvements |
| E. Industrial | By type of project (warehouse, factory building, bank) By location (regional, provincial, city, municipality) | By type of structure By size By age By cost | Initially include only areas within Special Economic Zone |

¹ Economic/production forest includes residual dipterocarp forest, rangelands for grazing, mangrove areas for fishpond, areas under industrial forest plantation, multiple-use zone, and buffer zones for special land uses.

4. Assessment of data

A basic consideration in determining the method is to know which data are available. Thus, an assessment of available data on property valuations was undertaken. Based on the initial property composition described in Part III, the results of the assessment show that the following government agencies can be tapped to provide the data requirement for the index.

4.1 National Statistics Office (NSO)

The NSO conducts the CPH once every 10 years. It has two components; Census of Population and Census of Housing. The 2000 CPH was the 11th population census and fifth housing census of the Philippines. The past four housing censuses covered the years 1960, 1970, 1980, and 1990. The census is designed to take an inventory of the total population and housing units in the country and to collect information on their characteristics. Specifically, the Census of Housing, a subset of the CPH, provides information on the stock of housing units, geographical location, structural characteristics,

and available facilities. With some improvements, the CPH can provide the structure of housing units by type, and by location that form the basis for the weights.

The **Family Income and Expenditure Survey** (FIES) is another survey that collects data on housing characteristics and expenditures of households on rent, and repairs and maintenance for the house. It is a triennial survey.

One element in the **consumer price index** (CPI) is rent. The rent data are collected monthly and are available at the national, regional, and provincial levels. The NSO also processes the building permits, which are administrative forms required to apply for permit to construct/repair buildings and structures.

4.2 Land Registration Administration (LRA) and Register of Deeds

The LRA through the Register of Deeds maintains records of all property titles in the Philippines. All property transfers, including mortgages, have to be registered with the Register of Deeds every time a transaction takes place. The forms that accompany property transfers carry information on the values, history, characteristics like size, location, boundaries, etc, of the property, which can be used as basis for the index. While compliance to this regulation is almost total, these forms are not processed and tabulated at present for reporting purposes because of lack of resources. There is an ongoing World Bank Project that is addressing the processing problems of the LRA forms. The issue here is confidentiality of data.

4.3 Records of provincial/city/municipality assessors

The local real estate assessors also keep their own records of property declaration forms for purposes of taxation in their respective localities. These forms are filled only when the property is first registered and assessed by the new owner, which are updated when there are reported improvements to the property. The property values are assessed upon registration and are only reassessed every time there are improvements to the property or when a change in ownership of property occurs.

The assessors do a validation check of the property declaration occasionally to determine whether the correct taxes are being collected. However, most of these assessors lack the needed training for property valuation as well as fuller understanding of existing property market conditions.

4.4 Bureau of Internal Revenue (BIR)

The BIR is authorised to determine, for internal revenue purposes, the fair market value of real properties by zones/areas, in consultation with competent appraisers from both the public and private sectors. In determining the market value of the property it requires that the value of the land asset be separated from the value of improvements. As mentioned in Part III there are seven major classes of properties followed by the BIR.

Measuring the fair market value under the system is based on records of most recent actual sales/transfers/exchanges of properties appearing in administrative documents filed with the BIR and LRA; private records of banks, realtors, appraisers, etc in the locality; and records of provincial/city/municipal assessors. However, the BIR zonal valuation system has its limitations. These limitations are as follows:

1. valuations are performed at different periods with no uniform year of conduct by municipality;
2. there is high probability of undervaluation due to political intervention;
3. there are no professional qualifications or standards for local assessors; and
4. the valuation is used for tax purposes only which does not address issues on market distortion.

The zonal valuation system can benefit from the availability of the REPI because it can give signals of wrong values in the system. Based on the results, while the values can be understated the trends were proven to be consistent with available prices. The new zonal values which benefited from the recent improvements showed higher property values.

4.5 Other data sources

The Housing and Land Use Regulatory Board (HLURB) gathers land use plans of municipalities, which include information on plans for commercial centres, markets, schools, hospitals to be built in the area. These can also be used to provide more disaggregated information about land property characteristics. However these data still need to be processed to come up with a series on stock of land.

Other land information like Geographic Information System (GIS) data produced by the National Mapping and Resource Information Authority (NAMRIA) can also be used as reference, however, disaggregation of data may not give the required classification.

The Land Management Bureau (LMB) of the DENR takes charge of all government properties (land, buildings, and structures) including the rental of government buildings and maintains records of these. The DENR also monitors forest lands through the timber licensing agreements, which can be used to provide rental values for forest lands.

The Philippine Exports Zone Authority (PEZA) administers most industrial areas and keeps records of these properties. It determines and approves rentals in industrial estate.

4.6 Data problems

- Given the results of the preliminary assessment, data required for the compilation of the REPI can come from both survey and administrative-base data. However, all the available data, specifically the administrative-base data are unprocessed and need to be organised and cleaned. Some require further processing to make them useful for the REPI. But the potential of the administrative-base data is good if the compliance and implementation of these systems are strengthened, properly monitored, and improved. There is a need to revise/restructure some of the outdated forms used to make these administrative-base data more efficient and useful.
- Surveys, on the other hand, require certain improvements to include additional information to meet the requirements of the REPI.
- The surveys and administrative-base data can be improved to complement each other. The two datasets can be used to cross-check the information collected.
- The problem of representation of the results was not adequately tackled in this report because the experimental study estimates were done on an aggregate level.

5. Proposed real estate price index methodology

While the development of an appropriate model for the REPI is still a work in progress, the following preliminary approach is proposed, which will continue to be improved as more data become available and as the NSCB Staff gain more experience on real estate price indexing. The proposed methodology benefited from the results of the exploratory study on various approaches, extensive data assessment and previous experiences on land valuation.

5.1 General strategy

- The work will be done in stages. For a start, two cities will be selected as pilot areas to test the applicability of the approach, which can be replicated later in other areas once the method has been approved for adoption.
- Maximise the use of available administrative and survey data for the compilation of the REPI. Processing of administrative data will be undertaken if necessary.
- Consult with experts on the methodology and have the results validated by public officials/local assessors and private groups to ensure institutionalisation of the model.

- Undertake high-level advocacy/coordination to assure full cooperation of concerned agencies. Relatedly, institutional support has to be established to facilitate work on REPI.
- NSCB will assume the task of compiling the REPI to avoid biases in the estimates and to ensure acceptability and sustainability of the index.
- Enhance capability of compilers and users of the REPI to address the inadequacies of existing property valuation systems.
- Link with ongoing efforts to improve the land administration system to facilitate work on the REPI.

5.2 Data sources

Data will come from the following administrative and survey data:

- 2000 CPH and Census of Agriculture from NSO for stock of dwelling units and housing characteristics;
- BIR zonal values tables, records of the tax declarations, reports on capital gains (sale of assets);
- LRA records on actual sales/transfers/exchanges and mortgages of real estate properties;
- CPI and FIES for prices of rent and housing expenditures on house repairs and maintenance;
- Provincial/city/municipal assessors records and data on local properties;
- NSO building permits;
- DENR statistics on rent of economic/production forest;
- LMB for records on government properties and rent;
- Private records of banks, realtors and appraisers;
- HLURB licenses to sell and land use plans by municipalities;⁶ and
- PEZA for data on industrial properties.

5.3 Methodology

5.3.1 Assumptions

- that the composition/structure (property mix) of stock of real properties remains constant over a certain period of time, say five years;
- that the unit values derived from the LRA/BIR actual sales/transfer/exchanges of properties reports are representative of the sub-category where they belong; and
- that the records of stock of properties with the local assessors offices are adequate for REPI purposes.

5.3.2 Estimation

a. Stock of real estate properties

To estimate the stock of real estate properties, the following data will be collected, cleaned, and processed.

⁶ Licenses to sell can provide information on the appraised values of properties, while information from land use plans can provide data on weights to be used in aggregating the REPI.

- Residential properties - NSO's 2000 CPH, records of provincial/city/municipal assessors, LRA records.
- Industrial properties - PEZA, Bases Conversion Development Authority, Clark Development Corporation, Subic Bay Metropolitan Authority records.
- Commercial properties - HLURB, records of provincial/city/municipal assessors.
- Agricultural land - BIR, records of provincial/city/municipal assessors.
- Other purposes - BIR, records of provincial/city/municipal assessors, and LMB.

These records are more than adequate for the REPI, except the possible under-valuation of the properties registered, which can be validated with private records of banks, realtors, appraisers, etc.

For purposes of valuing the stock of properties, the zonal valuation will initially be used, but this will be updated for inflation based on CPI rent.⁷

b. Prices

- Two levels of real estate price indices will be constructed - (1) the sales prices index, and (2) the rental prices index. Both indices will be built based on the composition set in Part III of this report.
- Initially two approaches have been identified based on available data. Prices will be estimated for each sub-category identified in Table 1. If further breakdowns in composition are required, these will be incorporated in the estimation.
- For sub-categories where actual sales/transactions data from the LRA and local assessors records are available, prices will be derived directly by dividing the actual sales or rental prices by the number of units transacted/total area transacted.
- In cases where there are no transactions that occurred in certain areas, prices or trends in prices nearby/adjoining areas can be adopted/applied.
- Rental prices, on the other hand, will use actual rental prices from the CPI. For certain commercial buildings, benchmark rental prices can be established initially based on local government records. Succeeding annual rents will be estimated using trends of rental prices of similar government buildings, which are being managed by LMB. PEZA will provide rental prices of properties located in industrial zones. Rental prices of agricultural and forest lands can be obtained from the Department of Agriculture (DA) and DENR.
- Where current sales prices data are sometimes not available for certain areas, these can be estimated through the simple hedonic - based price method using variables, such as trends of CPI rental prices, derived rental prices of commercial/industrial properties or prices of construction materials plus prices of labour. These can be validated against available real estate prices of private assessors, realtors, and banking institutions.

c. Index

Price estimated for each sub-category will be aggregated using the Laspeyres index method with 2000 as base year.

For illustration, consider five asset types (*k*) categorised into asset type 1, 2, ..., 5 (agricultural, forest, residential, commercial, and industrial). Each category is broken down into subcategories (*j*) (eg temporary crops, permanent crops, livestock etc under category (1) agricultural; public plantation forest and private plantation forest under category (2) forest; and, so on). These subcategories consist of different types of assets (*i*) (eg palay, corn, etc under temporary crops; citrus, banana, coconut etc under permanent crops etc). These subtypes of assets (*i*) have different prices in different locations

⁷ Initial exercises showed a high correlation between trends of zonal values and CPI rent.

and for different types of ownership, and size (eg palay 1, 2, 3, ..., n ; corn 1, 2, 3, ..., n etc). Thus, the REPI is generally constructed using four levels of asset categorisation.

For a four (4) - level of asset categorisation, the following steps are applied:

Step 1

Compute price relatives (PR) for each of the asset types at the most detailed level. For asset types $i = 1, 2, \dots, n$ of a subgroup, this is given by:

$$PR_{\text{asset type } i} = (\text{current price}_{\text{asset type } i} / 2000 \text{ price}_{\text{asset type } i}) \times 100$$

Take for example, assets under type A of the Residential sub-category. Price relatives of asset types 1 and 2 are computed as:

$$PR_{\text{asset type 1}} = (\text{current price}_{\text{asset type 1}} / 2000 \text{ price}_{\text{asset type 1}}) \times 100$$

$$PR_{\text{asset type 2}} = (\text{current price}_{\text{asset type 2}} / 2000 \text{ price}_{\text{asset type 2}}) \times 100$$

Step 2

The price index for the third level of asset category is the weighted average of the price relatives belonging to that group, that is, for asset types $i = 1, 2, \dots, n$ under the asset sub-category, the index given by:

$$\text{Index}_{\text{sub-category } i} = \sum (PR_{\text{asset type } i} \times W_{\text{asset type } i}) / \sum W \text{ all asset types under sub - category } i.$$

The weight (W) used is the base year values of the asset types and is computed as the product of the base year price and its corresponding quantity in the base year such that,

$$W_{\text{asset type } i} = 2000 \text{ Price}_{\text{asset type } i} \times 2000 \text{ Quantity}_{\text{asset type } i}$$

Continuing the example in Step 1, for n assets under type A of the Residential sub-category we have,

$$\begin{aligned} \text{Index}_{\text{Residential type A}} &= \sum (PR_{\text{asset type } i} \times W_{\text{asset type } i}) / \sum W \text{ all asset types under subcategory A} \\ &= [(PR_{\text{asset type 1}} \times W_{\text{asset type 1}}) + (PR_{\text{asset type 2}} \times W_{\text{asset type 2}}) \\ &\quad + \dots + (PR_{\text{asset type } n} \times W_{\text{asset type } n})] / W_{\text{asset type 1}} + W_{\text{asset type 2}} + \dots + W_{\text{asset type } n} \end{aligned}$$

Step 3

The aggregate index for the second level category is the weighted average of the indices for the different asset types in Step 2. The method is done as in Step 2 with the weights as the sum of the weights belonging to the second level category. For asset types under the second level category j , $j = 1, 2, \dots, m$, the index is given by:

$$\text{Index}_{\text{sub-category } j} = \sum (\text{Index}_{\text{type } j} \times W_{\text{type } j}) / \sum W \text{ all asset types under sub - category } j$$

To get the aggregate index for Residential Assets,

$$\begin{aligned} \text{Index}_{\text{Residential}} &= \sum (\text{Index}_{\text{asset type } j} \times W_{\text{type } j}) / \sum W \text{ all asset types} \\ &= [(\text{Index}_{\text{type A}} \times W_{\text{type A}}) + (\text{Index}_{\text{type B}} \times W_{\text{type B}}) + \dots + (\text{Index}_{\text{type } m} \times W_{\text{type } m})] / \\ &\quad [W_{\text{type A}} + W_{\text{type B}} + \dots + W_{\text{type } m}] \end{aligned}$$

Step 4

The aggregate index for real estate is calculated as in Step 3 using weights corresponding to the different second level asset categories. For asset types without sub-categories, the index is automatically the index resulting in Steps 1 and 2. Thus the Real Estate Index for $k = 1, 2, \dots, l$ asset categories is given by:

$$\text{Index}_{\text{Real Estate}} = \frac{\sum (\text{Index}_k \times W_k)}{\sum W_k}$$

The Real Estate Index with base year 2000 is given by:

$$\begin{aligned} \text{Index}_{\text{Real Estate}} = & [(\text{Index}_{\text{Agricultural}} \times \text{Weight}_{\text{Agricultural}}) + (\text{Index}_{\text{Forest}} \times \text{Weight}_{\text{Forest}}) + \\ & (\text{Index}_{\text{Residential}} \times \text{Weight}_{\text{Residential}}) + (\text{Index}_{\text{Commercial}} \times \text{Weight}_{\text{Commercial}}) + \\ & (\text{Index}_{\text{Industrial}} \times \text{Weight}_{\text{Industrial}}) + (\text{Index}_{\text{Others}} \times \text{Weight}_{\text{Others}})] / \\ & [(W_{\text{Agricultural}} + W_{\text{Forest}} + W_{\text{Residential}} + W_{\text{Commercial}} + W_{\text{Industrial}} + W_{\text{Others}})] \end{aligned}$$

6. Future directions

Draw up a project proposal and work program for the development and institutionalisation of the REPI model in the Philippines that will include the following activities:

Preparatory activities

- Identify the pilot cities for the estimation of REPI.
- Set up the institutional framework for the REPI. This will include the creation of an inter-agency committee/technical working groups to facilitate the work on the REPI.
- Advocate the uses of the REPI for taxation, legislation, policy formulation, and land and property management.

Data preparation and improvement

- Collect, clean, process, and organise data for the index.
- Address problems on data for both the administrative base and survey data. This will involve changing/improving some of the forms and compliance mechanisms.

Estimation

- Develop the composition (property basket) for the REPI.
- Develop and improve the methodology for the REPI.
- Present the initial results and methodology for the REPI to the NSCB Executive Board for approval and endorsement to the Department of Finance and the National Economic Development Authority (NEDA). The same should likewise be presented to the different stakeholders for comments and feedbacks.

Computerisation

- Computerise compilation and dissemination of REPI.

Documentation

- Document the REPI model for replication.
- Develop an institutionalisation plan for REPI.

Capability building

- Attend training on all aspects of land and property valuation to equip the compilers with the necessary skills needed to do property pricing.

The Absa¹ residential property market database for South Africa - key data trends and implications

Christo Luüs²

1. Introduction

For most working people in South Africa (and probably in most developed countries worldwide), their house and retirement provision account for the bulk of the wealth they have accumulated throughout their working lives. The considerable extent of homeownership among South Africa's working population means that changes in residential property prices may be of particular interest and concern because of the wealth effects that could emanate from fluctuations in property values.

The aim of this paper is to give an overview of the compilation and use of the most comprehensive database on the South African residential property market. This overview is preceded by some background information on the demography, income, and other developmental issues pertaining to the country's provinces (Section 2). Key housing stock and other residential property market indicators will also be given, together with a brief overview of the operation of the mortgage finance market in South Africa (Section 3). Thereafter, a short historical overview of the development of the Absa residential property market (ARPM) database will be provided, as well as the scope of indicators being covered by the information (Section 4). Some analysis pertaining to house and land prices and size trends over time follows (Section 5). Then an attempt is made to reconcile residential property market indicators with other key macroeconomic trends, and a look is taken at the house price levels in South Africa relative to market conditions in a selection of other countries (Section 6). The paper concludes with a synopsis of some key structural issues impacting on the property market in South Africa (Section 7).

2. Demographic, developmental, housing stock and other key characteristics for South Africa

2.1 General overview: South African provinces

The Republic of South Africa covers an area of 1.2 million km² - nearly twice the size of the state of Texas in the United States. Since 1994, the country comprises nine provinces, four of which have coastlines. South Africa has eleven official languages. The home language of 55% of the population is isiZulu, isiXhosa, or Afrikaans. The *lingua franca* in most urban areas is English.

There are significant disparities in terms of human development in South Africa; not only between provinces, but also between population groups. The two smallest provinces, Gauteng and KwaZulu-Natal, account for around 40% of the country's population. Gauteng and the Western Cape generate around 56% of South African GDP. Some 55% of the population live in urban areas. Gauteng is the most urbanised province, with 96% of its people living in cities. At the other extreme, only 13% of the population of the Limpopo Province live in urban areas.

¹ Absa Group Limited: One of the "big four" banking and financial services groups operating in South Africa. In March 2003, the Group reported total assets of R269bn (\$50bn at a PPP exchange rate of ZAR5,40) and earnings of R3bn (\$0,6bn). It had 33,000 employees; a network of 3,300 ATMs; and some 680 branches throughout South Africa. Foreign branches or subsidiaries operate from countries in Africa, Asia and Europe.

² Chief Economist: Absa Group Limited. Paper presented at the IMF/BIS *Conference on Real Estate Indicators and Financial Stability* held from 27 to 28 October 2003 in Washington DC, USA. The views expressed in this article are those of the author and do not necessarily reflect those of Absa Group Limited.

2.2 Key indicators

Table 1 contains some key indicators pertaining to the demography, income and production of South Africa's provinces in 2002.

Table 1
Selected demographic and other indicators for South Africa's provinces

| Province | Population (million) | Population growth (% pa) | Urbanised (%) | Annual household income (\$) | GGP (\$ bn) | GGP (% of total) | GGP per capita (\$) |
|---------------------|----------------------|--------------------------|---------------|------------------------------|--------------|------------------|---------------------|
| KwaZulu-Natal | 9.6 | 1.4 | 46.1 | 11,812 | 25.3 | 13.0 | 2,634 |
| Gauteng | 8.7 | 1.7 | 95.8 | 20,613 | 71.4 | 36.8 | 8,197 |
| Eastern Cape | 6.9 | 1.1 | 36.5 | 8,473 | 13.2 | 6.8 | 1,919 |
| Limpopo | 5.5 | 1.4 | 13.1 | 7,965 | 8.7 | 4.5 | 1,562 |
| Western Cape | 4.5 | 1.4 | 89.0 | 18,563 | 33.7 | 17.4 | 7,543 |
| North West | 3.8 | 1.3 | 38.2 | 8,885 | 12.9 | 6.7 | 3,418 |
| Mpumalanga | 3.3 | 1.7 | 41.7 | 10,002 | 15.6 | 8.1 | 4,811 |
| Free State | 2.9 | 1.0 | 71.7 | 8,404 | 9.5 | 4.9 | 3,242 |
| Northern Cape | 0.9 | 1.0 | 71.8 | 12,228 | 3.6 | 1.8 | 3,889 |
| <i>South Africa</i> | <i>46.1</i> | <i>1.4</i> | <i>55.4</i> | <i>13,011</i> | <i>194.0</i> | <i>100.0</i> | <i>4,207</i> |

GGP = gross geographic product. All figures are 2002 estimates US\$ amounts were calculated by applying a PPP exchange rate of R5.15 (calculation according to UBS AG, Zurich).

Sources: Stats SA; Global Insight.

South Africa's high unemployment rate, estimated at around 30% of the economically active population, clearly implies that income will be skewed, and that a significant portion of households are not able to afford even meagre housing facilities.

In fact, more than 40% of dwellings can be classified as "informal housing", whereas a further significant percentage of the "formal" housing market would presumably also be of rather poor quality.

The residential property market in South Africa comprises approximately seven million formal dwellings. There is no firm data, but the value of the residential property market in 2002 was estimated at roughly R750bn³ (\$146bn at a PPP exchange rate of ZAR5.15 to the USD).

The government has succeeded in building nearly 1.5 million low-cost housing units during the period 1994 to 2003. This has provided some support to the construction sector, which suffered from surplus capacity during the late 1980s and early 1990s.

The higher end of the market (houses $\geq 80\text{m}^2$) has also experienced a significant increase in activity during the past two to three years, with the number of newly built houses having increased by 24% in 2002 compared with 2001, and the number of townhouse and flat units (apartments) by 47% (see Table 2 and the table in Appendix A).

³ It is estimated that around 1.5 million homes can be classified in terms of the ARPM classification, with an average price of R358,721 in 2003. Another three million properties could probably be classified under "affordable" housing, with an average price of R71,811 in 2002 (see also Section 6.1).

Table 2
Housing in South Africa

| | 1995 | | 1999 | |
|--------------------------|-----------|------------|------------|------------|
| | Number | % of total | Number | % of total |
| Urban housing | 5,089,000 | 56.0 | 6,503,000 | 60.4 |
| Formal ¹ | 3,626,000 | 39.9 | 3,824,000 | 35.5 |
| Informal ² | 443,000 | 4.9 | 1,074,000 | 10.0 |
| Traditional ³ | 39,000 | 0.4 | 62,000 | 0.6 |
| Other ⁴ | 981,000 | 10.8 | 1,543,000 | 14.3 |
| Rural housing | 3,991,000 | 44.0 | 4,268,000 | 39.6 |
| Formal | 1,890,000 | 20.8 | 2,352,000 | 21.8 |
| Informal | 233,000 | 2.6 | 255,000 | 2.4 |
| Traditional | 1,302,000 | 14.3 | 1,111,000 | 10.3 |
| Other | 566,000 | 6.2 | 550,000 | 5.1 |
| Total housing | 9,080,000 | 100.0 | 10,771,000 | 100.0 |
| Formal | 5,516,000 | 60.7 | 6,176,000 | 57.3 |
| Informal | 676,000 | 7.4 | 1,329,000 | 12.3 |
| Traditional | 1,341,000 | 14.8 | 1,173,000 | 10.9 |
| Other | 1,547,000 | 17.0 | 2,093,000 | 19.4 |

¹ A house, flat, townhouse or unit in retirement village. ² Shacks. ³ Ethnic huts. ⁴ Caravans, tents, etc.

Source: South African Institute of Race Relations (SAIRR).

3. The operation of the mortgage finance market in South Africa

3.1 Home ownership in South Africa

In South Africa, property ownership rates high in the national consciousness. Many of the early battles in the country, involving the Dutch and British settlers, the Voortrekkers and the various tribes with whom they came into contact, were over land ownership. Through the 1900s, one of the biggest debates in national politics was about land tenure.

Numerous pieces of legislation regulated the ownership of land, particularly on a racial basis. One of the major tenets of apartheid was the segregation and separation of land ownership. The so-called Group Areas Act allocated separate residential areas in urban areas to the black, coloured, Indian, and white communities.

Today, home ownership for all is a major political objective and receives a lot of attention. The government has made the provision of housing a priority in its social delivery programmes and assists low-income, first-time homebuyers with a subsidy ranging between R7 800 and R23,100 (\$1,500 and \$4,400 at a PPP exchange rate).

3.2 The development of the mortgage finance market in South Africa until the mid-1980s

For extensive periods during the nineteenth and twentieth centuries, home ownership in South Africa was financed mainly through building societies.

Building societies have their origins in eighteenth century Britain. The push effects of the Agricultural Revolution and the pull effects of the Industrial Revolution encouraged a mass migration of the British population to the cities and towns. This resulted in a chronic housing shortage, which the middle class traders and craftsmen were determined to overcome through the establishment of "friendly societies".

These were non-profit-making institutions that promoted thrift among their members for the purpose of procuring houses.

The British Settlers brought this concept to southern Africa and the first building societies were established in Port Elizabeth and Durban in 1855 and 1857 respectively. The first law in Southern Africa that directly controlled these institutions, the Regulation of Building Societies Act, was passed in Natal in 1858.

The early development of the movement was slow and confined to the Eastern Cape and Natal. There was neither a desire nor a need for building societies in the interior of the subcontinent until the discovery of diamonds in Kimberley (Northern Cape) in 1870 and gold on the Witwatersrand (part of the current Gauteng province) in 1886 - events that spawned urban concentrations of the population.

Whereas the very first societies mostly terminated once their objectives were reached, permanent building societies soon became established. Some of the larger building societies even survived until the late 1980s, when changes to legislation and merger activity started to affect these institutions.

One building society, the United Building Society, established in 1889, became a financial institution of significant size. For decades, it was the biggest building society in South Africa. It built up a strong capital base over the years and, in the early 1990s, was used as the merger vehicle to create South Africa's largest banking group at the time, Amalgamated Banks of South Africa Limited (Absa). One other building society and two banks were involved in this merger.

3.3 The role of banks since the mid-1980s

Legislation pertaining to building societies was frequently changed and augmented over the years, with major acts passed in 1934 and 1965. Nonetheless, certain privileges afforded to and restrictions imposed on the building societies remained. For instance, special tax treatment meant that building societies could offer mortgage loans below market rates, which placed the commercial banks at a competitive disadvantage in this regard.

As part of a comprehensive inquiry into the monetary system and monetary policy in South Africa during 1982 to 1985 (the so-called De Kock Commission), it was recommended that the playing field between banks and building societies be levelled.

The restrictions placed on the way in which building societies could capitalise themselves were especially crucial. These restrictions meant that the societies could only exist as "mutual" institutions.

Changes to the legislation caused these restrictions to be removed, and most of the larger building societies opted for a listing on the Johannesburg Stock Exchange - a process which meant that they lost their "mutual society" status.

The listing process started in 1986 and the United Building Society became the first publicly listed building society. Members' accounts (which were held as so-called subscription shares) were converted into ordinary listed shares.

As the boundaries between building societies and banks started to fade and more of the building societies converted into banks or merged with existing banks, mortgage financing became an important component of banks' balance sheets. By the mid-1990s, there were no building societies in existence, although 11 had been in operation in 1984.

Currently, banks are by far the most important providers of mortgage finance for housing loans in South Africa. By June 2003, mortgage loans comprised 32% of the total loans and advances on the banks' balance sheets, and amounted to R289bn (\$52bn).

4. The Absa residential property market database

Currently, there are two well-known sources of systematic residential property market data in South Africa. The deeds office - where all ownership and changes in ownership of fixed property need to be registered⁴; and the Absa residential property market (ARPM) database, a brief discussion of which follows.

4.1 A short history of the ARPM database

As mentioned before, the United Building Society (UBS), which existed for more than a hundred years before merging with three other financial institutions, became a significant player in the mortgage finance market in South Africa, attaining a market share of well over a third of all residential property mortgage loans in the 1980s. With the formation of the Absa Group, this institution retained its leading role in the mortgage finance market, although inroads have been made by other banks (see Table 3).

Table 3

Market shares for loans and advances by South Africa's major banks¹

| | Absa | Nedcor | Standard Bank | FirstRand | Other | Total | Total (R mln) |
|-----------------------------|---------|---------|---------------|-----------------|---------|-------|---------------|
| Mortgage advances | 31 | 24 | 21 | 16 | 8 | 32 | 288,583 |
| Overdrafts and loans | 17 | 7 | 37 | 30 ² | 9 | 28 | 251,386 |
| Credit Cards | 25 | 22 | 25 | 22 | 6 | 2 | 15,235 |
| Instalment sales and leases | 24 | 13 | 22 | 29 | 12 | 12 | 111,622 |
| Other loans and advances | 21 | 27 | 18 | 16 | 18 | 26 | 228,637 |
| Total | 24 | 18 | 25 | 22 | 11 | 100 | |
| Total (R million) | 211,989 | 164,889 | 223,531 | 193,524 | 101,530 | | 895,463 |

¹ With the exception of total figures in rand, in per cent of total. As at end March, 2003. ² No figure available - own estimate.

Source: South African Reserve Bank (DI900 tables).

The UBS house price database came into being at around 1981. At the time, it was decided to destroy old records of home loan applications that were kept at branches. Fresh records were sampled at all major branches throughout the country and captured onto a mainframe database. Between 1981 and 1984, a bigger sample of records was obtained from the branches and added to the database. From 1985, all loan application records were captured electronically and added to the database. Since the late 1980s, the data have been captured directly onto the mainframe system.

4.2 The ARPM database: Capturing, processing and variables

Currently, data are being captured directly by property valuers onto the mainframe mortgage loan database. This is done on site using a mobile device called a Q10TEC. From the mortgage loan

⁴ Data from the deeds office suffer from two important deficiencies: (i) Data only become available after a lag of some six months; and (ii) no area size variables for properties are available, which may make comparisons between periods difficult, since it is not possible to ascertain the extent of a shifting of weights from smaller to larger properties or *vice versa*.

database, data warehouse tables are populated via an Oracle staging process. This process is performed weekly and monthly. (See Appendix B for a flowchart of the process).

By the end of August 2003, the ARPM database consisted of nearly 700,000 individual properties. Data are available in monthly time series format for both new (building loans) and existing properties. These categories are subdivided into small (80m² to 140m²), medium (141m² to 220m²), and large (221m² to 400m²) properties. For each of these categories, the following variables can be obtained on a branch/regional basis:

- Building area
- Building value
- Land area
- Land value
- Contract price (for new properties)
- Purchase price
- Value of improvements (such as fencing, patios, swimming pools)
- Sample size

In addition, data are also available for luxury homes (properties with a value in excess of R1,500,000 in constant 2002 prices) and for affordable houses (between 40m² and 80m² in size and R100,000 in value). In all, there are more than 2,000 time series of the aforementioned variables.

From the data warehouse tables, time series are generated by SAS (*Statistical Analysis System*) programs for the variables indicated above. In an attempt to ensure that data are as “clean” as possible, certain filters are applied to rid the data of outliers. Often such outliers are caused by the incorrect capturing of values. The following are the most important filters that will determine whether or not a record is included:

- Building area < 95% of land area
- 0m² ≤ land area ≤ 2,000m²
- Purchase price ≤ R1,500,000 (in 2002 rand terms; this amount is adjusted backward and forward in time by the CPI)
- 40m² ≤ building area ≤ 400m²

To avoid problems arising from the data samples for certain time series being too thin, data in the public domain are only available on a regional basis and not on a branch basis. All time series are also smoothed by an X11 seasonal adjustment process in SAS. The SAS program writes all time series data into delimited text files that can be imported into spreadsheets.

5. Historical trends of key residential property market indicators in South Africa

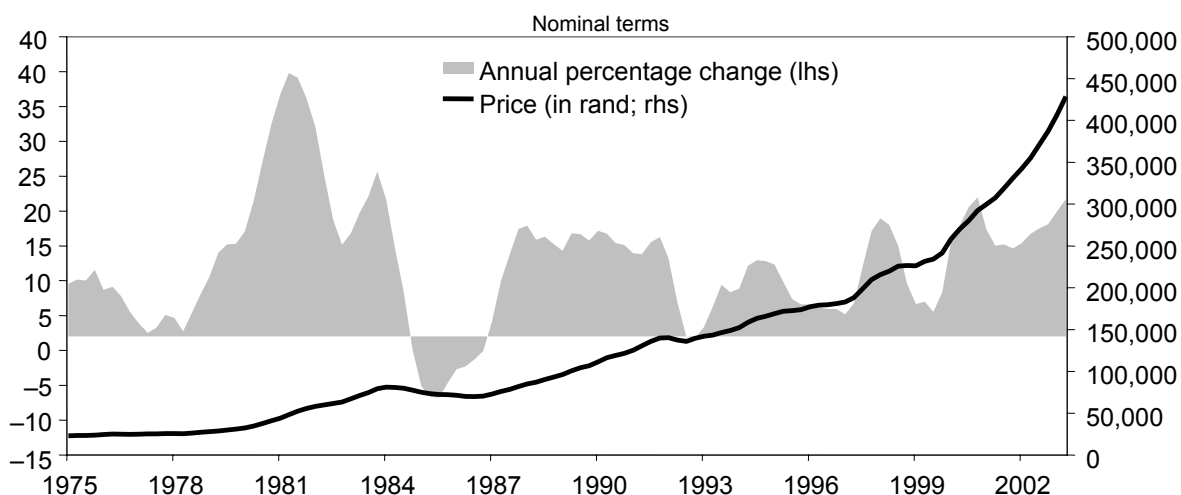
5.1 Nominal and real price trends

South African house prices have increased from an average level of R23,200 in 1975 to R358,700 in 2002, representing an average annual increase of 11% (Graph 1). However, this must be seen against the background of an average annual inflation rate of 11,5% over this period. Indeed, an analysis of real house prices (Graph 2), reveals some interesting aspects of the economic and socio-political conditions that prevailed in South Africa between the late 1970s and the late 1990s.

The 1970s brought wars in the Middle East, which sent oil prices soaring and presented the world with inflationary problems. In South Africa, the 1976 Soweto student uprising had a material impact on confidence and adversely affected economic performance. From the third quarter of 1976 to the fourth quarter of 1979, house prices declined by a total of 22.4% in real terms.

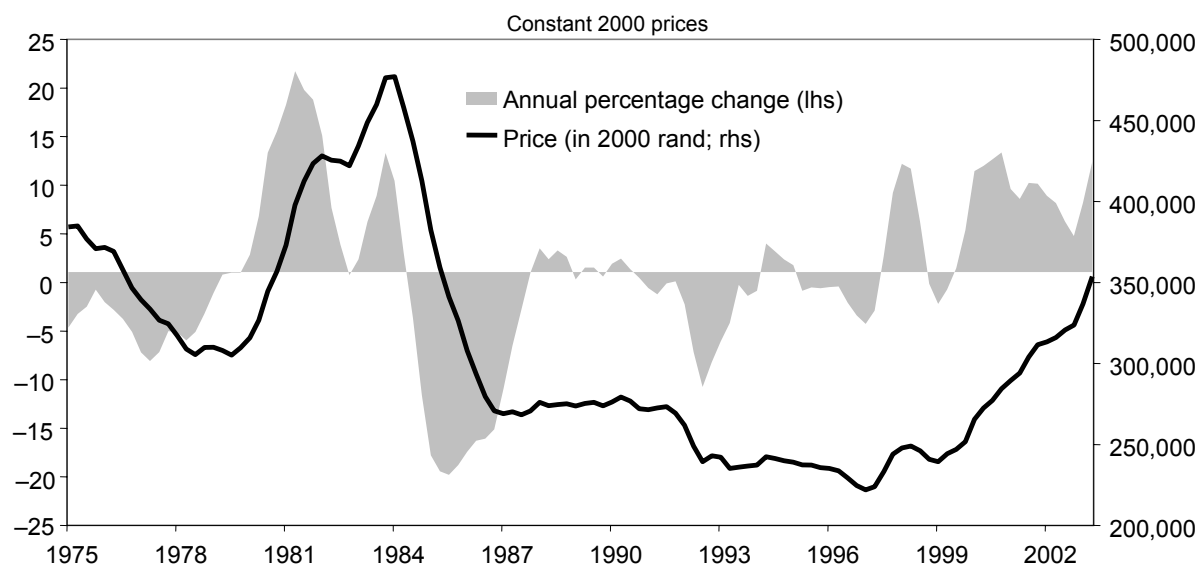
The early 1980s saw a massive loss of confidence in the dollar and concerns about spiralling inflation in most of the developed world. Consequently the gold price boomed, reaching a high of \$676 on average during September 1981, which had huge positive spin-off effects for the South African economy. At that stage, income from gold exports constituted nearly 50% of total South African export revenue. Rising incomes and a reduction in tax rates considerably boosted households' net wealth position. Improved liquidity conditions even facilitated a reduction in mortgage lending rates.

Graph 1
Average house prices in South Africa



However, the good times were about to end when the gold price pulled back and interest rates started to increase. The property market held up quite well during 1981 through to 1983, peaking in the first quarter of 1984. But severe pressure on the balance of payments, which sent mortgage rates soaring, together with increasing political pressure from both domestic and foreign sources, caused the property market bubble to burst. During the period from mid-1984 until the end of 1987, house prices declined by no less than 42% in real terms.

Graph 2
Average house prices in South Africa



From the end of 1986 through to the end of 1991, house prices simply kept pace with inflation. In 1992/93, confidence suffered a setback owing to uncertainty about the political future of the country. With the advent of the new democratic order in April 1994, confidence was restored and house prices recovered somewhat. However, an ongoing exodus of skilled managers and professionals during much of the 1990s served to keep the property market under pressure.

Only in 1998 did the market start to recover on the back of lower inflation and interest rates, higher economic growth, and a much improved fiscal situation. Unfortunately, contagion effects from the Asian crisis caused a massive fall in the value of the rand, which once again caused interest rates to soar by some seven percentage points during 1998.

By late 1999, the situation had more or less stabilised, and the house price boom resumed. By mid-2003, house prices had nearly doubled in nominal terms from their early 1998 values.

5.2 Provincial price trends

Considering the disparities in development, income and urbanisation between South Africa's provinces, it is not surprising to also find significant differences in average house prices between the regions.

It is to be expected that house prices in the poorer provinces, such as Limpopo, Mpumalanga, KwaZulu-Natal and the Free State, may be below the national average. The dwindling importance of gold mining activity has affected employment and general economic activity in provinces such as the Free State and NorthWest, although the escalation of international platinum prices has possibly more than offset the low gold-price effect in the latter province.

A province such as the Western Cape has benefited from tourism as well as from foreign buyer interest owing to the weaker rand.

Table 4
House prices in South Africa

| | Small (80m ² to 140m ²) | | Medium (140m ² to 220m ²) | | Large (220m ² to 400m ²) | | All (80m ² to 400m ²) | |
|---------------|---|----------------------------------|---|----------------------------------|--|----------------------------------|---|----------------------------------|
| | 2002 ZAR | Avg annual %ch: '92-'02 | 2002 ZAR | Avg annual %ch: '92-'02 | 2002 ZAR | Avg annual %ch: '92-'02 | 2002 ZAR | Avg annual %ch: '92-'02 |
| Eastern Cape | 188,700 | 7.8 | 261,418 | 8.4 | 404,570 | 8.9 | 281,237 | 8.9 |
| Free State | 169,805 | 7.3 | 233,117 | 8.3 | 346,138 | 9.5 | 266,224 | 9.5 |
| Gauteng | 249,029 | 8.4 | 345,075 | 9.3 | 546,112 | 9.7 | 397,304 | 10.8 |
| KwaZulu-Natal | 178,165 | 5.1 | 274,083 | 6.4 | 453,218 | 7.6 | 290,919 | 7.5 |
| Mpumalanga | 193,686 | 9.0 | 243,965 | 8.9 | 368,195 | 9.5 | 267,064 | 9.2 |
| Northern Cape | 170,487 | 10.6 | 210,877 | 8.6 | 346,143 | 9.9 | 236,656 | 9.8 |
| Limpopo | 184,956 | 8.8 | 241,331 | 7.4 | 358,669 | 8.9 | 259,494 | 8.9 |
| North West | 232,826 | 10.5 | 286,096 | 10.5 | 379,145 | 10.7 | 308,160 | 10.6 |
| Western Cape | 279,199 | 10.0 | 396,456 | 10.0 | 610,799 | 10.2 | 390,560 | 11.1 |
| South Africa | 247,468 | 8.9 | 329,623 | 9.1 | 509,092 | 9.6 | 358,904 | 10.2 |

In more localised developments, illegal cross-border inflows of foreign citizens, especially from Zimbabwe and Mozambique, have resulted in an escalation of squatting in and around cities and

caused downward pressure on formal property prices in some areas, notably certain suburbs of cities in Gauteng, Limpopo, Mpumalanga and KwaZulu-Natal.

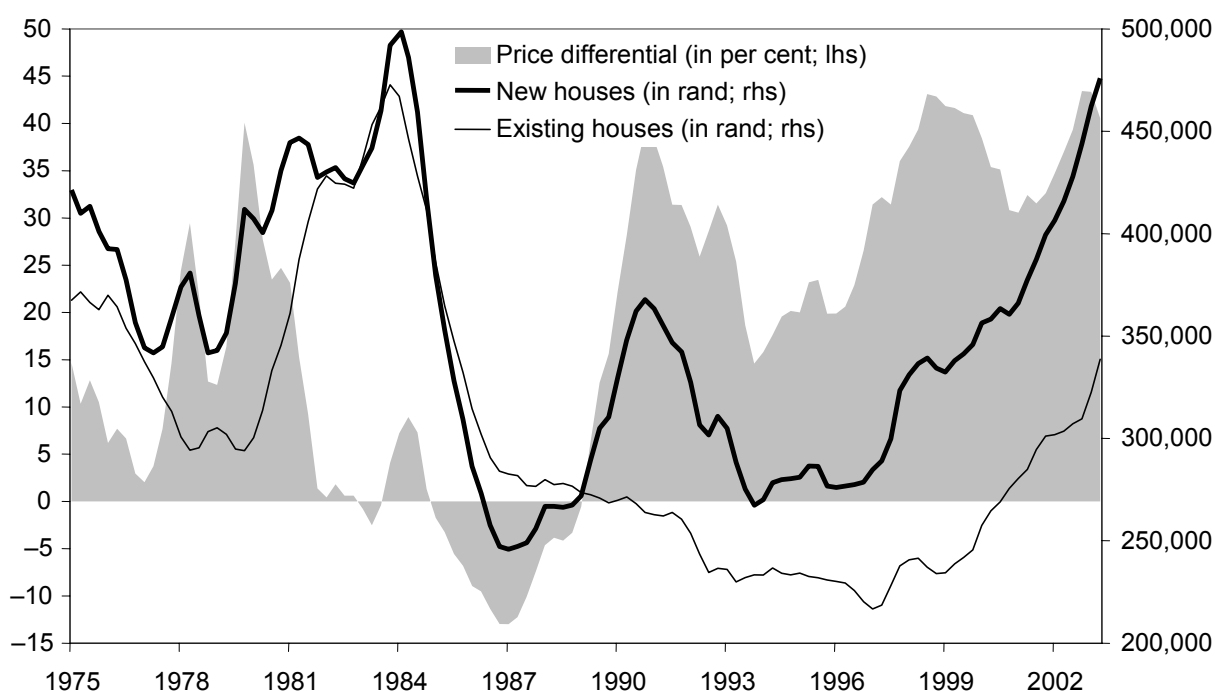
The rising numbers of informal settlements have also been aided by pressures on the agricultural sector and the consequent migration of former farmworkers to urban areas. Table 4 gives an overview of the movement of house prices in recent years in South Africa's provinces.

5.3 Building costs and land values

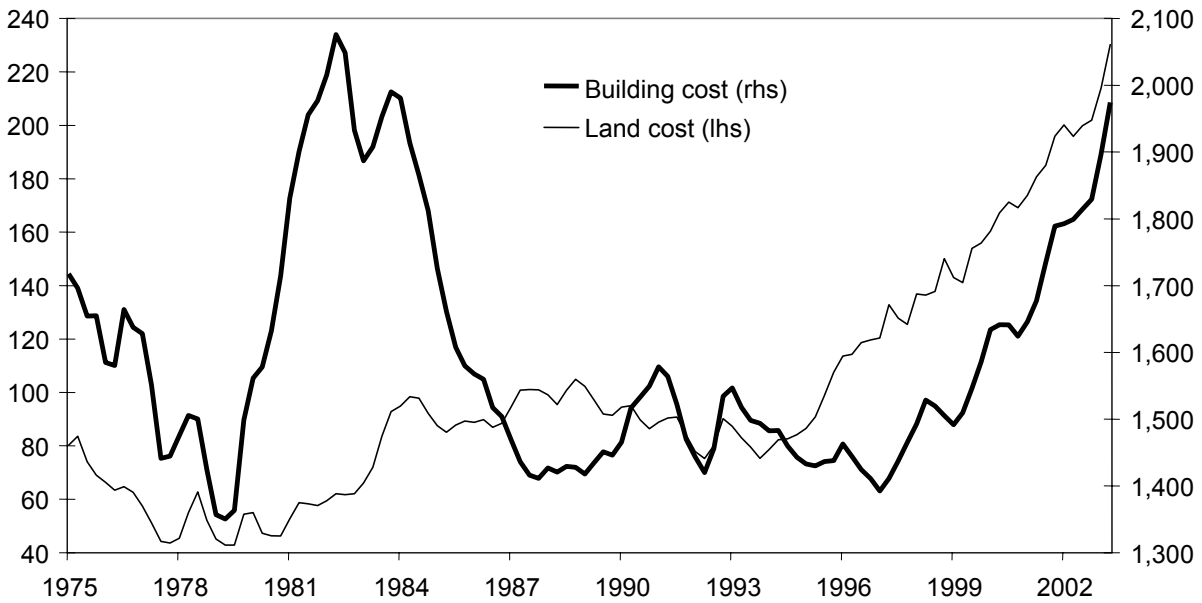
Graph 3 reflects the real price difference between new and existing houses of similar size. During the house price bubble of the early 1980s, new and existing houses cost roughly the same, but lacklustre market conditions and persistently high inflation rates during the late 1980s and early 1990s caused the price differential to become significantly positive. More buoyant market conditions have done little to reduce this differential, which has averaged between 30% and nearly 50% since 1996.

Graph 4, which depicts the building costs as well as the land costs associated with building a new house, shows that a major reason for the persistent price differential is to be found in the dramatic escalation in real land price values since 1994. The rise in land values in turn reflects the expansion of urban areas in South Africa. The development of security villages in suburban areas owing to rampant crime has contributed to the move to smaller but more expensive building plots.

Graph 3
New vs existing house prices in South Africa



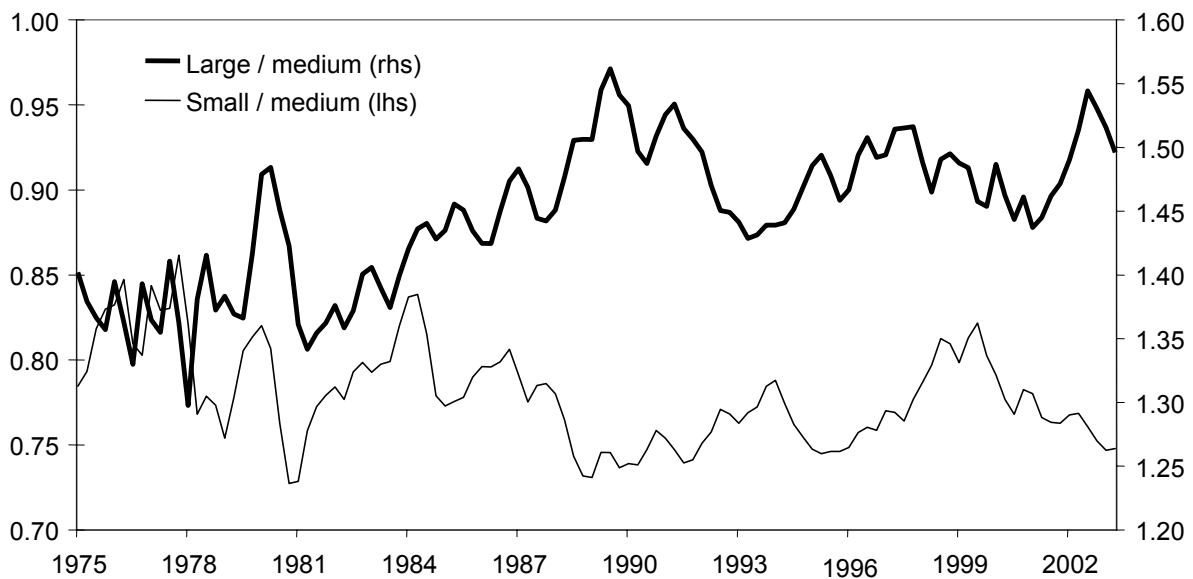
Graph 4
**Building cost and land value
of new houses**



5.4. Size trends

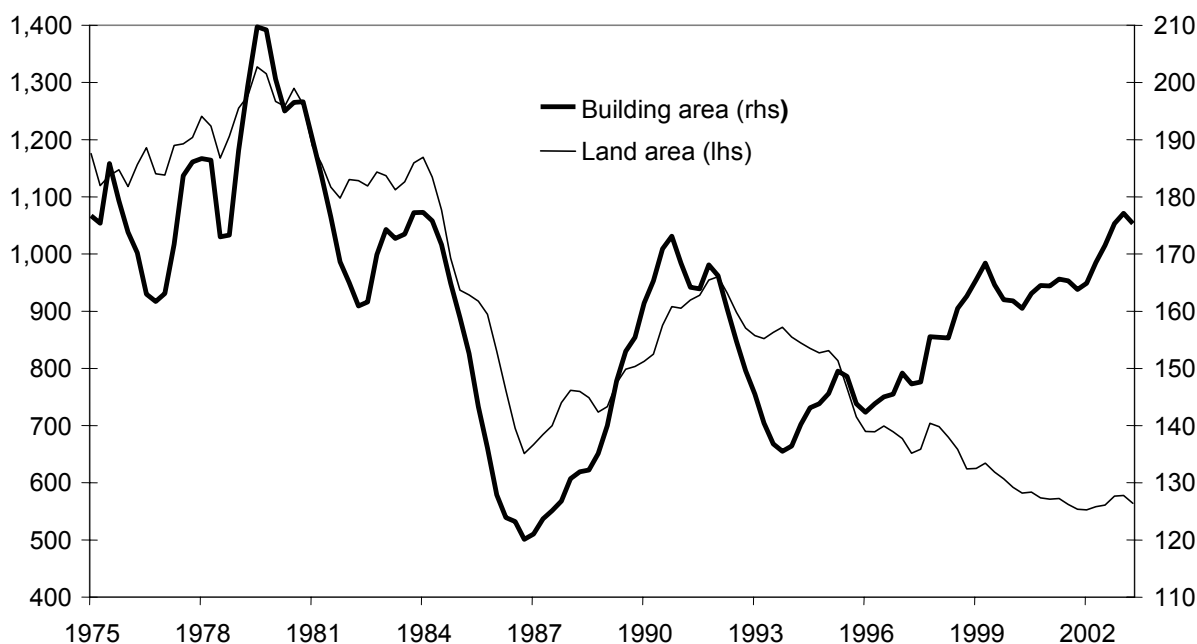
Graph 5 shows the rather interesting relationship between large and small to medium-sized house prices. A comparison of this graph with Graph 1 reveals that, during periods in which nominal house prices increased sharply, the prices of houses in the large category increased more than those of medium-sized homes. The converse tended to be the case with the ratio between the small and medium-sized house prices. “Downscaling” seems to have been prevalent in periods when the property market was under pressure.

Graph 5
Average house prices in South Africa
Large and small vs medium houses



Graph 6 depicts the trends with regard to house sizes and land areas on which new houses are built. Considering the sharp escalation in land values depicted in Graph 4, it is not surprising to find that the plot sizes on which new houses are built have been shrinking over time. The average plot size in 1979 was more than 1,200m². This declined sharply after the bursting of the property market bubble. It was only some 640m² in 1987. Average plot sizes increased again to nearly 930m² in 1991, but have since been decreasing again. They averaged only around 550m² during 2002.

Graph 6
Size trends of new houses in South Africa
 In square metres



During most of the 1970s, 1980s and first half of the 1990s, building areas followed land areas quite closely. However, they seem to have been trending in the opposite direction since the mid-1990s.

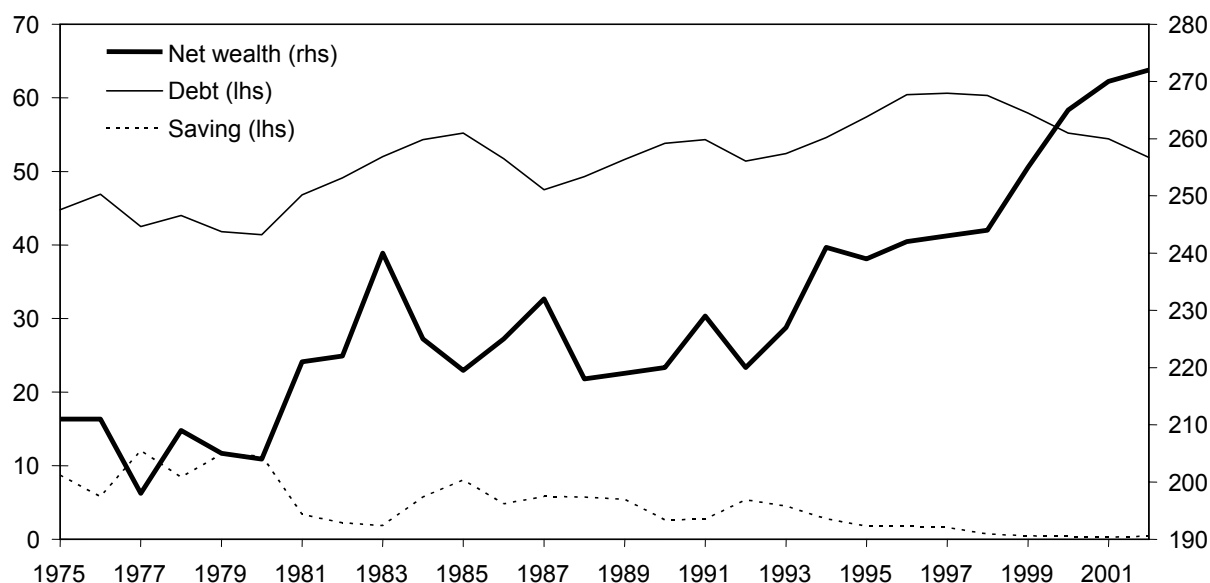
6. Some uses of house price time series data in South Africa

Apart from the obvious reason for interest in house price data, namely as a comparative measure when buying or selling a house, the public, analysts and regulators may also have other uses for time series data on residential property. These could include approximations of national wealth levels; analysing the investment potential of residential properties; evaluating the likelihood of property price bubbles; using property prices as indicators (leading or otherwise) of general economic activity; as an input in the compilation cost of living tables; and as an “early warning” developmental indicator, for instance to point out relative strains that could emerge in regional infrastructural development requirements. The first three of these aspects will be briefly highlighted.

6.1 Analysing household wealth, debt, income and savings levels

South African households have been notorious for their inability to save. According to Reserve Bank figures, household saving as a ratio of household disposable income declined to only 0.2% in 2001, rising marginally to 0.4% in 2002. These figures compare unfavourably with savings ratios of above 10% recorded in the late 1970s (see Graph 7).

Graph 7
Household debt, saving and net wealth



Source: South African Reserve Bank.

Fortunately, increases in net wealth levels (which may be somewhat underestimated)⁵ and a slight decrease in household indebtedness since the late 1990s, have ameliorated some of the negative consequences for households' balance sheets, which might otherwise have accompanied this deterioration in their savings levels.

6.2 Analysing the merits of residential property for investment purposes

Property, cash, bonds and equity can be considered the basic pillars of any well-diversified portfolio. However, a problem with direct property investment is that different properties are seldom comparable in terms of value, whereas the location and developments in the immediate vicinity of a specific property can influence its value significantly.

Nevertheless, many investors feel more comfortable with owning a tangible fixed asset, rather than "paper assets" and the gearing that may be achieved with a property investment can also be attractive to some investors.

Apart from the prospective returns, there are clearly a number of factors that ought to be considered when any investment, particularly directly in real estate, is made:

- Risk: The volatility of the return or underlying price can easily be measured for financial assets, but there are other unquantifiable risks involved in direct property investments, such as the risk of not finding suitable tenants.

⁵ The South African Reserve Bank does not publish regular data on household wealth, presumably because figures are regarded as quite "soft". However, from time to time, mention is made of household net wealth figures. This occurred in December 2002, when Graph 7 appeared in an article (Household, debt, wealth and saving) in the SARB Quarterly Bulletin. From the net wealth figures appearing in this graph, gross household wealth can be calculated by adding debt and net wealth together (which came to an estimated R2,216bn at the end of 2002). The gross wealth will, in turn, consist of financial assets as well as tangible assets, which would also include residential property. To arrive at a very rough estimate of financial assets, the following amounts were added together (all figures from the SARB Quarterly Bulletin): individuals' deposits at banks (R175bn); unit trusts' assets at book value (R152bn); accumulated funds in pension and provident funds (R559bn); and unmatured policies relating to pension and other business at long-term insurers (R653bn). The sum of these financial assets came to R1,538bn, leaving around R680bn for tangible assets, such as vehicles, residential property and farmland.

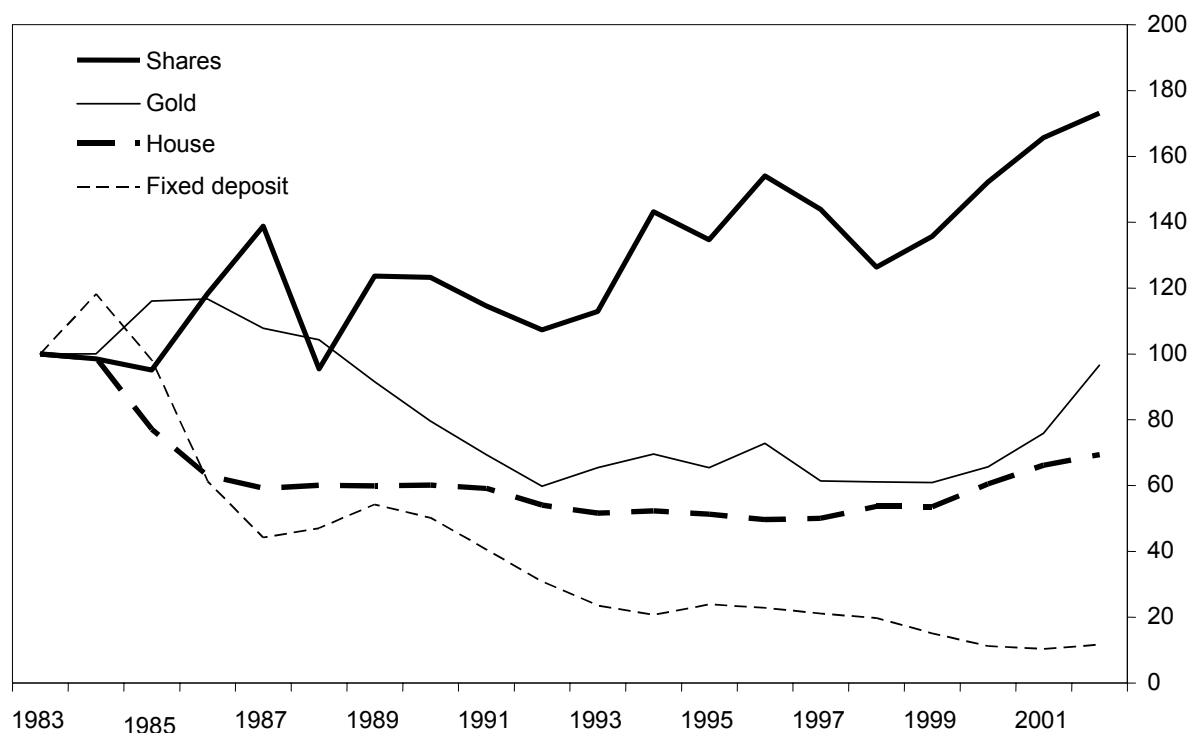
- Homogeneity: Two property investments are hardly ever directly comparable, and using national or regional price data will only approximate actual historical returns achieved on a specific investment. The same applies to investment (rental) income.
- Liquidity: How soon and with what ease can an investment be liquidated. It is well accepted that direct property investments are fairly illiquid.
- Tax implications: In South Africa, dividends are not taxed, but rental and interest income are, as are capital gains.
- Costs: These are nearly always a factor with all types investments. They can be substantial in the case of property. Such costs include transfer duties, bond registration fees and agent's commission. Maintenance and repair costs should also to be considered, but are normally deductible for tax purposes.
- Gearing: As mentioned before, this aspect could make property investments quite attractive, but sharp increases in interest rates could affect the return on the investment. In South Africa, fixed-rate mortgages are not available for terms exceeding two or three years.

Graph 8 shows the South African experience with regard to the capital growth of various asset classes over the past number of years. For ease of comparison, gross internal rates of return were calculated for all types of investments, although the above factors should evidently be considered at all times.

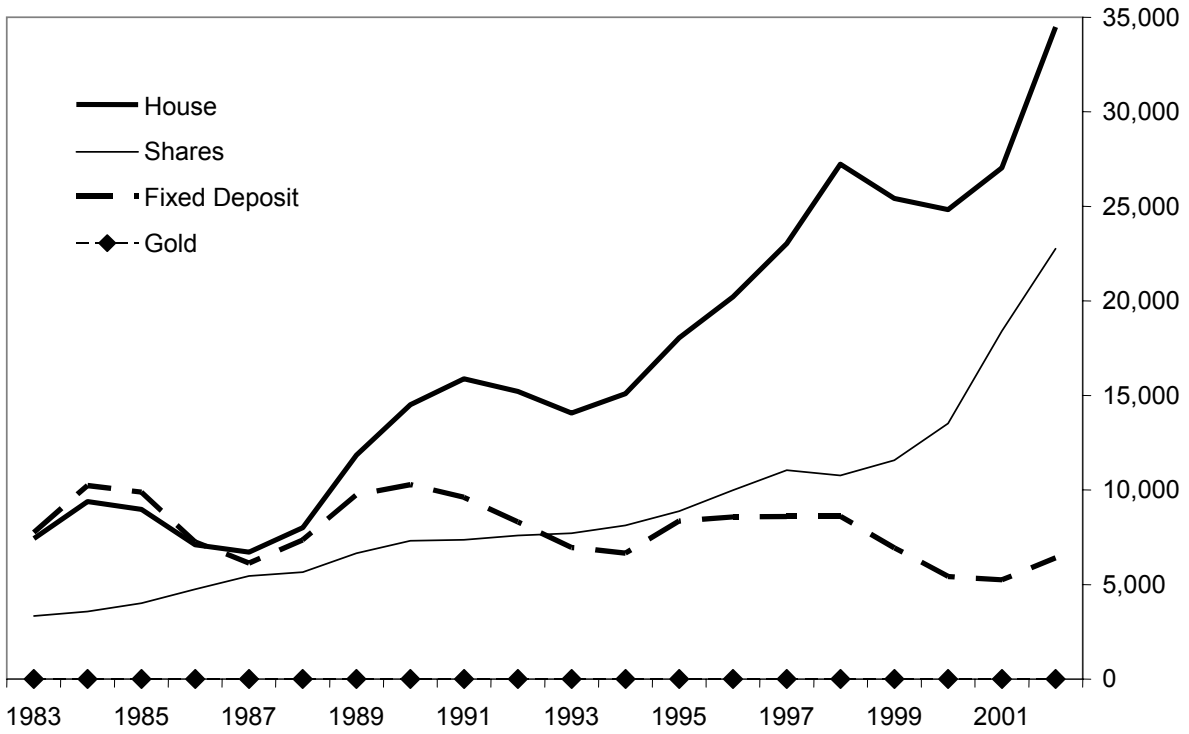
It is clear that the capital growth component of a residential property investment was not as high as the capital growth that could have been achieved on a share portfolio based on the all-share index of the JSE Securities Exchange. However, gross income (with costs and taxes not deducted - see Graph 9) still made residential property a fairly solid contender among the asset classes considered here.

Combining the data from Graphs 8 and 9 into gross internal rate of return figures (ie, no adjustments were made to allow for deductions such as maintenance costs and commissions or for taxation), shows that residential property could be regarded as the best performing asset class over 20, 15, 10 and five year periods (see Graph 10).

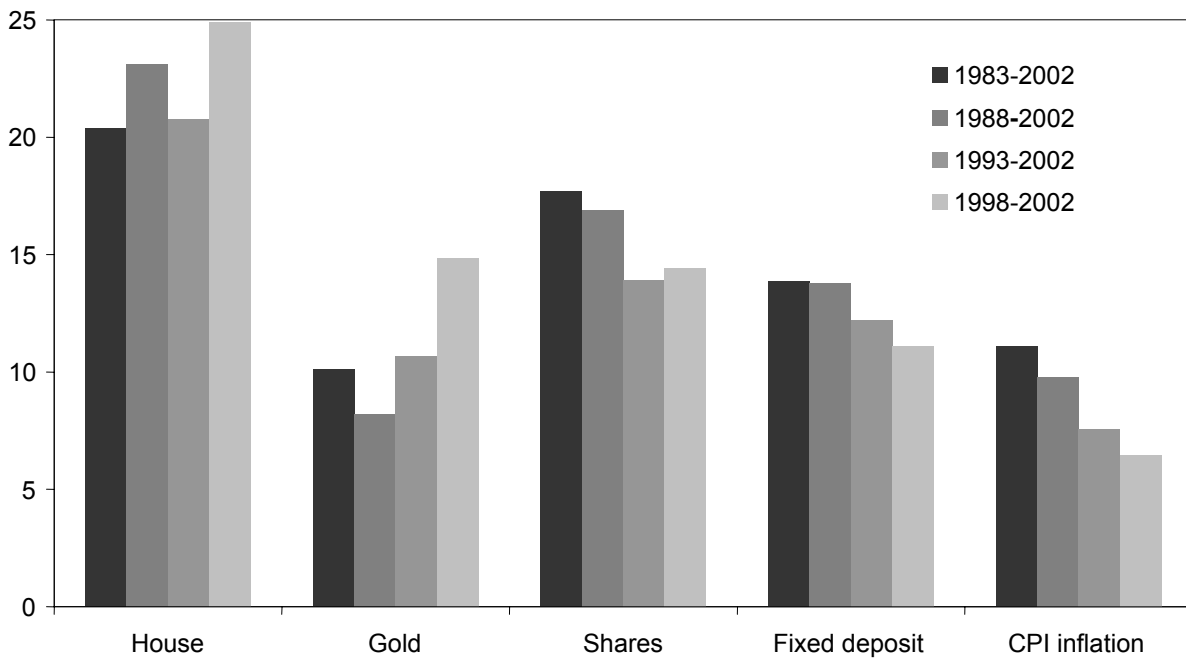
Graph 8
Real capital values



Graph 9
Nominal income per annum



Graph 10
Gross internal rates of return and inflation



6.3 Determining if there is a property price bubble: South African vs some international evidence

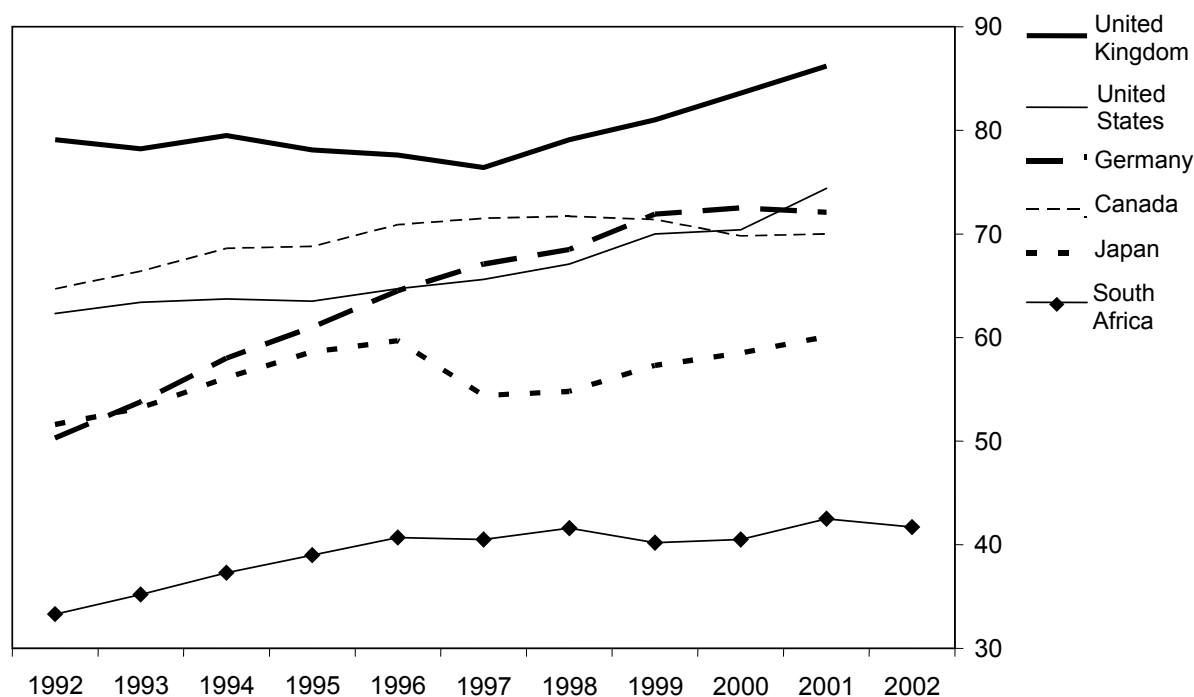
Market bubbles are usually unwelcome developments because of the macro-economic distortions that they may cause once they burst. Monetary policy is usually slow to react or may even not react at all to an impending bubble and the fall-out of a market crash may prove difficult to contain with monetary policy measures alone.

Part of the problem is that bubbles are often not detected until it is too late. The wealth effects associated with the bursting of an asset bubble - more specifically a property market bubble - may be more severe the higher the level of indebtedness in an economy.

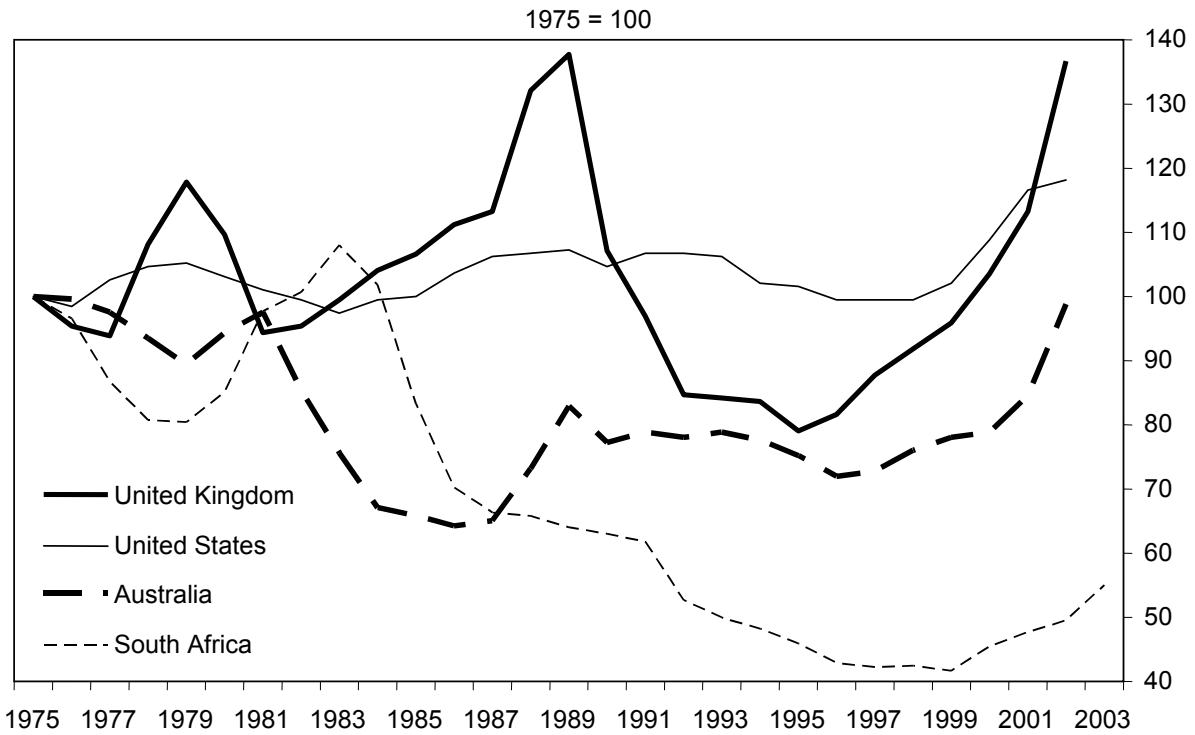
As pointed out in Section 6.1, the level of household debt to disposable income in South Africa was around 53% by mid-2003, having reached a peak of 61% in early 1998. Compared with some developed economies such as Japan, the United Kingdom and the United States, this level cannot be considered particularly high. Mortgage debt levels in many developed countries are likewise significantly higher than in South Africa. However, allowing for nominal interest rates that are some two to three times higher in South Africa than in most of these countries would bring the country's mortgage debt level roughly on a par with that of the United States (see Graph 11).

Graph 12 shows the movement of house prices in selected countries, relative to average income levels, since 1975. It is clear that, according to this measure in 2002, house prices in Australia and the United Kingdom roughly equalled their previous peaks, whereas relative house prices in the United States exceeded their previous peaks since 1975 by a considerable degree. In contrast, South African house prices relative to income levels remained far below their previous peak reached in 1983. Graph 13 indicates that, in real terms, house prices are still some 25% below their 1983 peak.

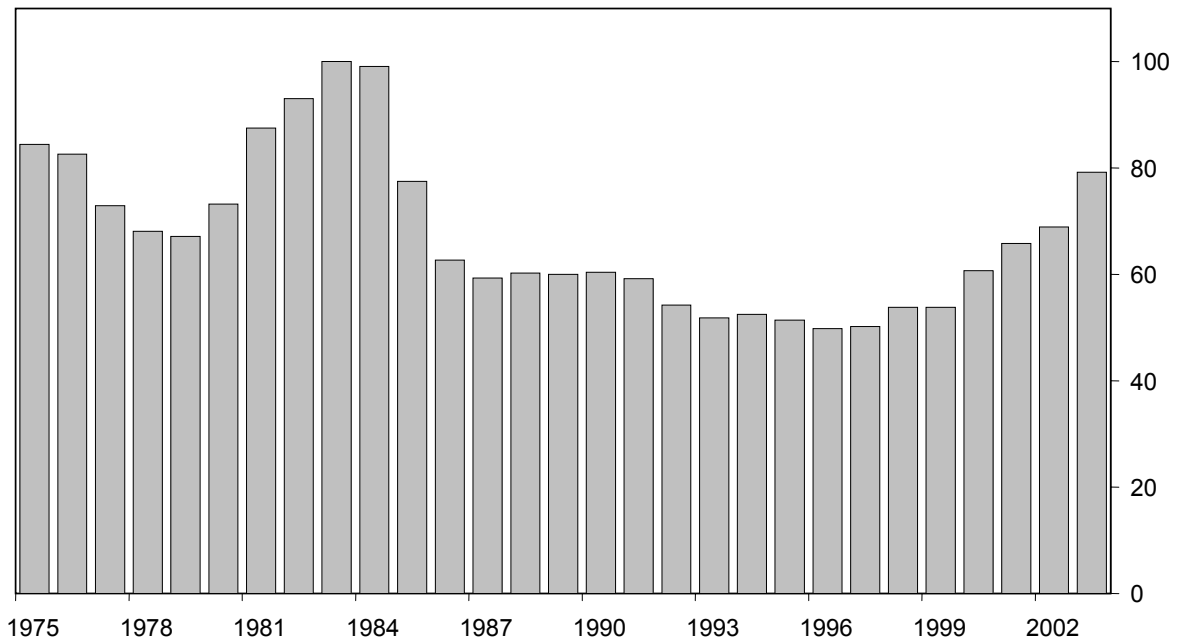
Graph 11
Mortgage debt



Graph 12
House prices to average income



Graph 13
Real house prices



7. Driving forces impacting on the residential property market in South Africa

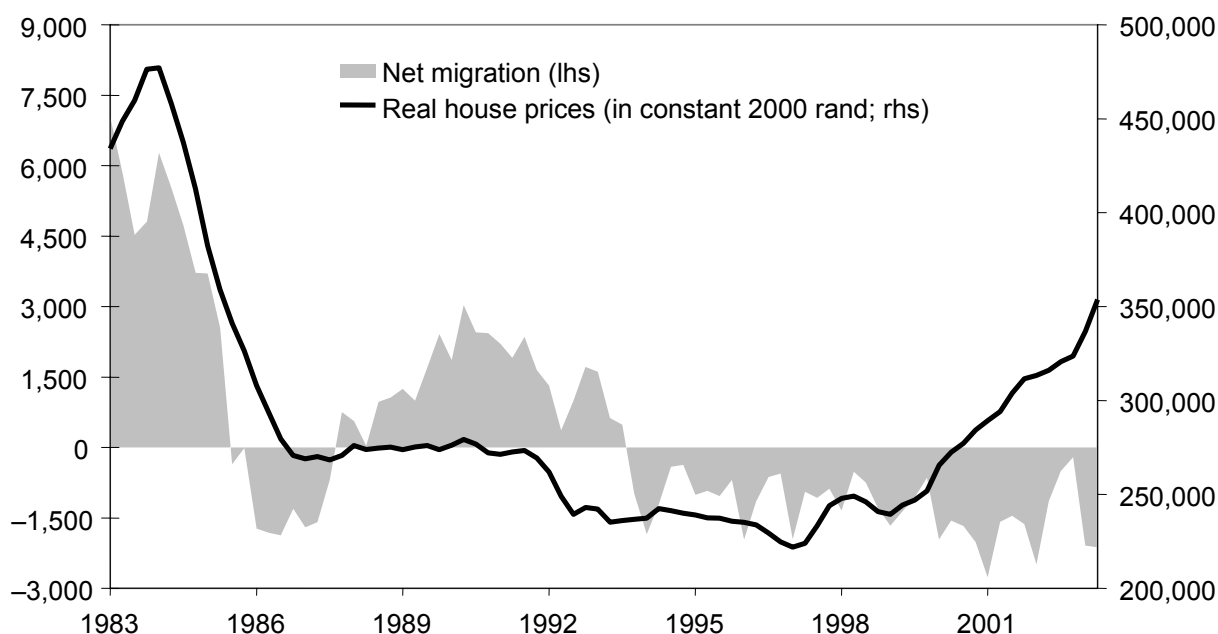
What follows is a non-exhaustive list of factors that have recently been influencing, or that are in future expected to influence, residential property market trends in South Africa.

7.1 Migration trends

According to official statistics, some 87,800 people have emigrated from South Africa during the period January 1994 to June 2003, whereas only 42,800 people immigrated to South Africa during the same period. However, unofficial estimates (obtained by, for instance, comparing the data of foreign-destination countries) put the emigration figures at two to three times this number.

This so-called brain drain was, prior to 2001, caused by the pull-effects of skills shortages in many developed economies as well as the push effects of an underperforming economy, crime and affirmative action policies in South Africa. Consequently, a relative oversupply of residential properties for most of the 1990s, resulted in declining real property prices (Graph 14).

Graph 14
Net migration and real house prices



Source: Stats South Africa.

With weaker global economic conditions and increased geo-political risks after 11 September 2001, the net migration loss from South Africa seems to have abated somewhat.

7.2 Black economic empowerment

One of the major tenets of the government's current socio-economic policy is to enable so-called "historically disadvantaged" people to participate in the mainstream economy. Thus far, significant strides have been made in changing the racial composition of the workforce at all levels and of all organs of government, including the state-owned enterprises. The creation of a "black middle class" has supported the demand for properties in previously whites-only residential areas.

In addition, negotiated private sector “industry charters” will specify targets for certain percentages to be achieved for historically disadvantaged people to be included in employee numbers, procurement contracts and ownership. Social responsibility efforts (also in terms of “community reinvestment”) and training will also receive special attention.

Since there is still an enormous shortage of black people possessing the required qualifications and skills, these objectives may be difficult to achieve in the short to medium term. However, in the longer term they are likely to further assist with the expansion of a black middle class, provided that economic growth is sufficient. If productivity and economic growth do not increase meaningfully, these socio-economic measures may prove to be only redistributive in nature.

7.3 Security issues

Crime⁶ has shown a rapidly increasing trend over the past number of years, which has seen a rapid expansion in the development of so-called “security villages” - fenced-in units containing anything from four or five to hundreds of properties with 24-hour security control. Consequently, the prices of such units - usually a small plot with a sizeable house - have also increased rapidly in some urban areas. The development of golf estates for upper-income households has also been benefiting from similar trends.

7.4 Growth, income and employment

Conceptually, disposable income and employment changes should feature high on the list of factors that could potentially impact on a county’s residential property market. In South Africa, neither of these variables have shown significant growth since the mid-1980s, mostly because of low economic growth, especially during the period from 1985 to 1993. However, household disposable income per capita has, with the exception of 1998 and 1999, increased every year since 1995, whereas formal sector employment recorded a slight increase in 2002 - the first such rise since 1990.

Regrettably, very rigid labour market conditions, brought about by the restrictive labour laws introduced over the past number of years, as well as a highly unionised and militant work force render the probability of substantial increases in employment unlikely. Therefore the process of capital intensification in the economy is expected to continue, which might not aid efforts to reduce unemployment figures.

7.5 Foreign buying of South African properties

An undervalued currency (especially during 2002), heightened global political risks, and the well-known natural beauty and desirable climate of South Africa have caused foreigners - especially from the United Kingdom and the rest of Europe - to display a growing interest in South Africa as a holiday destination.

Some, lured by the relatively low property values, have bought properties particularly in coastal regions, such as the Western Cape and KwaZulu-Natal. This had a noticeable impact on the prices of properties in some of these areas in recent years.

⁶ Rampant crime can mainly be ascribed to the following:

- A largely underqualified, understaffed, and underpaid police force;
- An inefficient criminal justice system;
- Lax border controls, which are leading to an enormous influx of poor, unemployed people from neighbouring African states, and even those further afield;
- The perceived lenient treatment of criminals and sometimes insufficient sentences for serious crimes; and
- Increased drug-trafficking and the establishment of foreign crime syndicates in South Africa.

7.6 Monetary and fiscal policies

Significant progress has been made in lowering inflation and restoring fiscal discipline over the past decade or so. The budget deficit as a percentage of GDP has averaged only 1.9% since 1998/99, whereas the debt-to-GDP ratio declined to just 41.3% in June 2003. Consequently, the cost of debt servicing has been reduced, making it possible to increase the extent of social service delivery. Also, during the past three budgets, the government announced relief for homebuyers by reducing transfer duties on properties.

However, the introduction of capital gains tax in October 2001 may still impact negatively on the residential property market. This tax also applies to all residential properties, except on the primary dwelling of a taxpayer. When a primary dwelling is sold, the first R1 million in capital gain will not be subject to capital gains tax.

Inflation rates that have been persistently higher than those of South Africa's trading partner nations necessitated a fairly restrictive monetary policy over the past number of years. Over the past decade, nominal mortgage rates, which are linked to short-term rates, have fluctuated between 13% and 24% and have at times caused substantial problems, with households finding it difficult to afford higher interest payments.

However, conditions appear to be becoming more favourable for a structurally lower inflation rate of between 3 and 6% over the next few years, after the introduction of an inflation-targeting regime for monetary policy. This could also imply an era of somewhat lower interest rates, which might lend further support to the property market.

7.7 Investment returns

South Africa did not escape the fallout from the weakness that has characterised the US and other stock markets since early 2000, even though the local stock market has not really been overvalued since the emerging market crisis of 1998. The South African bond market performed excellently, with bond yields falling from 18.3% (September 1998 average) to around 9% currently, but this bull run also seems to be losing steam. With the South African equity market's price-earnings ratio seemingly unable to improve above the recent level of 12 (compared with 18.2 reached in May 1998), investors appear to have given up hope, for now, of a strong recovery in South African shares - at least while the US market remains overvalued and the rand relatively strong.

Solid property returns - especially in view of declining interest rates - have again highlighted the value of property in portfolios, and investments in residential properties have benefited from the search for low risk-high return assets. Of course, property is unlikely to outperform other investments indefinitely, but it may do so over the next year or two.

8. Conclusion

The Absa Group's fairly comprehensive residential property database, based on around a third of properties being mortgaged in South Africa, facilitates an improved analysis of trends and cycles in the economy. In particular, it may be used to compare current prices with previous peaks, as well as with income levels.

Although residential property prices in South Africa seem to have followed the rising trend prevailing over the past number of years in most other developed markets, prices in South Africa are still below the peak reached in the early to mid-1980s.

Various factors are influencing property prices in South Africa. Some of these - notably structurally lower interest rates - could support property prices over the next few years.

Appendix A

New residential buildings completed

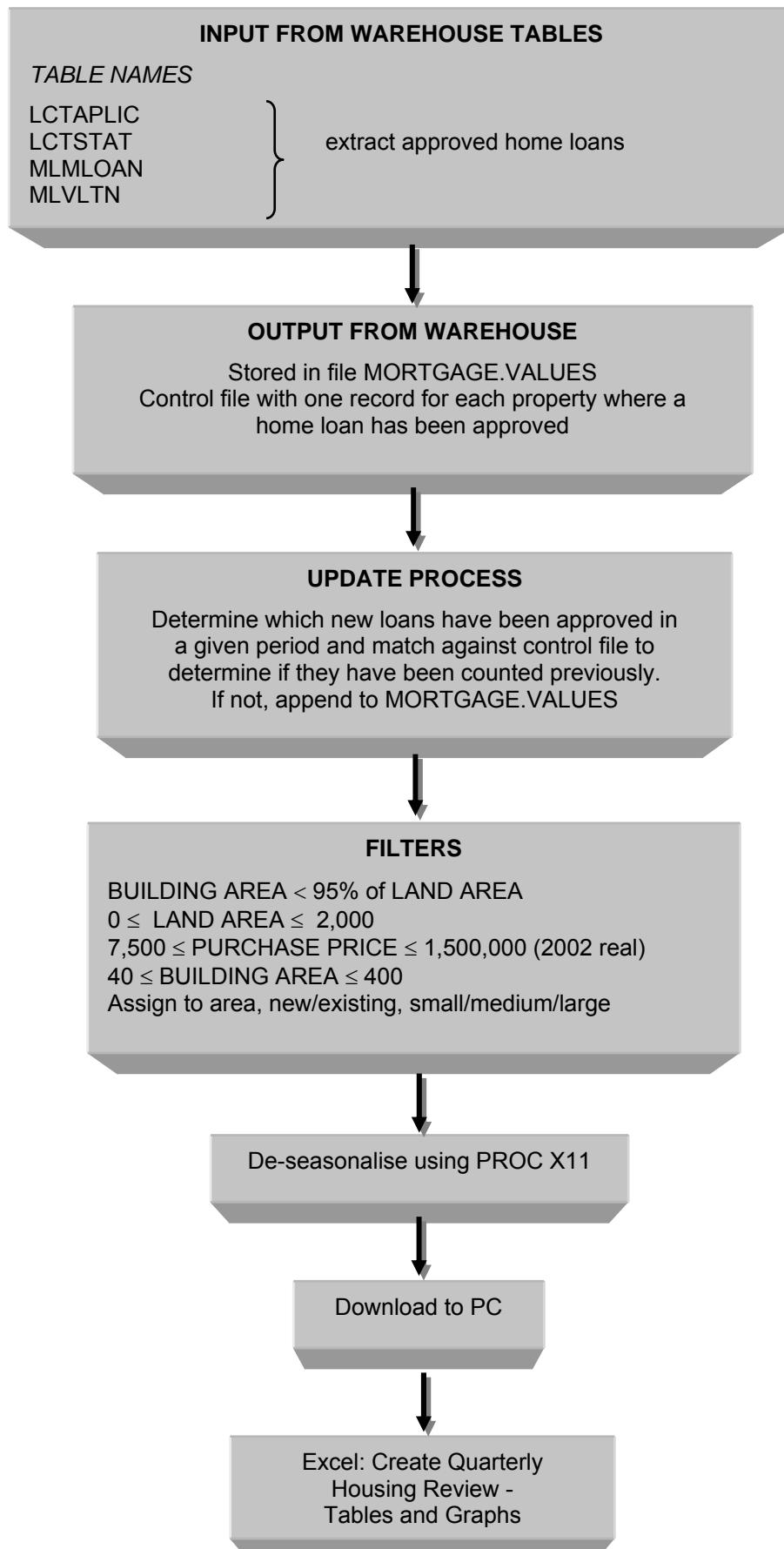
Number of units and total value in rand

| | Houses (<80m ²) | | | | | | | |
|---------------------|-----------------------------|---------------|-------------|---------------|------------------|------------------|-------------|---------------|
| | 2001 Number | 2002 | | | 2001 R'000 | 2002 | | |
| | | Number | % change | % of total | | R'000 | % change | % of total |
| Western Cape | 5,792 | 7,457 | 28.7 | 20.4 | 265,614 | 312,207 | 17.5 | 25.4 |
| Eastern Cape | 2,820 | 3,331 | 18.1 | 9.1 | 122,013 | 189,827 | 55.6 | 15.5 |
| Northern Cape | 126 | 116 | -7.9 | 0.3 | 9,076 | 5,187 | -42.8 | 0.4 |
| Free State | 2,155 | 2,896 | 34.4 | 7.9 | 49,875 | 70,689 | 41.7 | 5.8 |
| KwaZulu-Natal | 2,307 | 2,430 | 5.3 | 6.6 | 103,023 | 97,506 | -5.4 | 7.9 |
| North West | 2,510 | 1,826 | -27.3 | 5.0 | 61,630 | 35,208 | -42.9 | 2.9 |
| Gauteng | 7,986 | 16,303 | 104.1 | 44.5 | 299,744 | 455,506 | 52.0 | 37.1 |
| Mpumalanga | 3,165 | 2,010 | -36.5 | 5.5 | 64,123 | 42,295 | -34.0 | 3.4 |
| Limpopo | 426 | 231 | -45.8 | 0.6 | 22,480 | 18,944 | -15.7 | 1.5 |
| <i>South Africa</i> | <i>27,287</i> | <i>36,600</i> | <i>34.1</i> | <i>100.0</i> | <i>999,579</i> | <i>1,227,369</i> | <i>22.8</i> | <i>100.0</i> |
| | Houses (≥80m ²) | | | | | | | |
| | 2001 Number | 2002 | | | 2001 R'000 | 2002 | | |
| | | Number | % change | % of total | | R'000 | % change | % of total |
| Western Cape | 4,099 | 5,659 | 38.1 | 39.1 | 1,169,702 | 1,769,314 | 51.3 | 38.0 |
| Eastern Cape | 943 | 648 | -31.3 | 4.5 | 172,903 | 159,558 | -7.7 | 3.4 |
| Northern Cape | 165 | 60 | -63.6 | 0.4 | 36,079 | 15,146 | -58.0 | 0.3 |
| Free State | 317 | 373 | 17.7 | 2.6 | 65,145 | 74,308 | 14.1 | 1.6 |
| KwaZulu-Natal | 1,618 | 1,388 | -14.2 | 9.6 | 479,379 | 423,434 | -11.7 | 9.1 |
| North West | 577 | 803 | 39.2 | 5.6 | 144,952 | 206,809 | 42.7 | 4.4 |
| Gauteng | 3,421 | 4,939 | 44.4 | 34.2 | 1,182,440 | 1,873,542 | 58.4 | 40.2 |
| Mpumalanga | 354 | 407 | 15.0 | 2.8 | 65,074 | 94,836 | 45.7 | 2.0 |
| Limpopo | 159 | 178 | 11.9 | 1.2 | 34,743 | 43,845 | 26.2 | 0.9 |
| <i>South Africa</i> | <i>11,653</i> | <i>14,455</i> | <i>24.0</i> | <i>100.0</i> | <i>3,350,417</i> | <i>4,660,792</i> | <i>39.1</i> | <i>100.0</i> |
| | Flats and townhouses | | | | | | | |
| | 2001 Number | 2002 | | | 2001 R'000 | 2002 | | |
| | | Number | % change | % of total | | R'000 | % change | % of total |
| Western Cape | 1,860 | 2,436 | 31.0 | 23.3 | 299,930 | 411,201 | 37.1 | 21.9 |
| Eastern Cape | 244 | 364 | 49.2 | 3.5 | 31,743 | 35,511 | 11.9 | 1.9 |
| Northern Cape | 80 | 46 | -42.5 | 0.4 | 8,950 | 12,543 | 40.1 | 0.7 |
| Free State | 195 | 356 | 82.6 | 3.4 | 25,551 | 60,447 | 136.6 | 3.2 |
| KwaZulu-Natal | 780 | 741 | -5.0 | 7.1 | 149,134 | 185,063 | 24.1 | 9.8 |
| North West | 169 | 612 | 262.1 | 5.9 | 16,600 | 89,314 | 438.0 | 4.8 |
| Gauteng | 3,544 | 5,670 | 60.0 | 54.2 | 611,453 | 1,055,292 | 72.6 | 56.1 |
| Mpumalanga | 149 | 207 | 38.9 | 2.0 | 16,021 | 26,440 | 65.0 | 1.4 |
| Limpopo | 72 | 26 | -63.9 | 0.2 | 11,435 | 4,123 | -63.9 | 0.2 |
| <i>South Africa</i> | <i>7,093</i> | <i>10,458</i> | <i>47.4</i> | <i>100.0</i> | <i>1,170,817</i> | <i>1,879,934</i> | <i>60.6</i> | <i>100.0</i> |

Source: Stats South Africa.

Appendix B

ARPM Database Process Diagram



References

Du Toit, J (2001): *Provincial Characteristics of South Africa*, 2nd edition, Johannesburg: Absa Group Limited, 27 p.

Falkena, H B, L J Fourie, W J Kok (1984): *The Mechanics of the South African Financial System*, Johannesburg: Macmillan, 457 p.

Kane-Bernam, J (Managing editor): *South Africa Survey 2002/2003*, Johannesburg: South African Institute of Race Relations, 2003, 561 p.

Prinsloo, J W (2002): "Household Debt, Wealth and Saving", *Quarterly Bulletin Pretoria*: South African Reserve Bank, December, pp 63-78.

"A Boom out of Step", *The Economist*, London, 29 May 2003.

"The Monetary System and Monetary Policy in South Africa", Final Report of the Commission of Inquiry into the Monetary System and Monetary Policy in South Africa Pretoria: Government Printer, 1984, pp 57-89.

Neighbourhood Watch, <http://business.iafrica.com/markets/ipac/fortunestrategy>

Quarterly Economic Perspective, Johannesburg: Absa Group Economic Research, 3rd Quarter 2003, 24 p.

Prices and Earnings - A Comparison of Purchasing Power Around the Globe, Zurich: UBS AG, 2003, 46 p.

New quality adjusted price indexes for non-residential structures

Bruce Grimm¹

Introduction

Accurate, quality adjusted prices for non-residential structures are necessary for a good understanding of the functioning of the economy. For example, there have been poorly measured quality improvements in many types of non-residential structures, for such items as improved energy efficiency and pre-wiring for computer networks. In addition, better price estimates may shed light on the long-standing puzzle of low or declining productivity in the construction industry. For example, both real gross output and real value added per person engaged in the construction industry have declined in each of the three most recent years for which estimates are available. If price increases are overstated, measures of real output and productivity trends will be lowered.

In order to improve its estimates of non-residential structures' prices, the Bureau of Economic Analysis (BEA) has developed new quality adjusted price indexes for several types of non-residential structures. The new indexes will be incorporated into the comprehensive revision of the national income and product accounts (NIPA's) later this year. They are designed to replace the existing price index estimates, which are constructed using an indirect methodology. The new indexes are expected to be used only until the Bureau of Labour Statistics introduces Producer Price Indexes (PPIs) for non-residential structures later in the decade. The price indexes are based on hedonic regressions, and yield rates of inflation that are slightly higher than those yielded by corresponding matched-model price index estimates based on the same source data. Also, relative to the existing price indexes, the new price indexes will slightly increase estimated rates of inflation for non-residential structures, beginning with 1998. BEA will use the new price indexes to deflate related structure types within private non-residential structures and Federal and state and local government gross investment in structures.

BEA's existing methodology is indirect; for the overwhelming portion of non-residential structures, the detailed price indexes are based on a summary price index that is an unweighted average of the Census Bureau's price index for single-family houses under construction and a three quarter moving average of the Turner Construction Company's building cost index. The use of this methodology means that movements in estimated prices of non-residential structures are often similar to those for residential structures. Further, a previous BEA internal study of the quality of the Turner index found that it was a judgmentally-constructed index and that its documentation did not make available sufficient data to evaluate its statistical consistency and reliability. Thus, the existing methodology lacks credibility and offers no assurance that it is able to accurately portray movements in prices of non-residential structures.

The estimation of non-residential structures prices

1. Earlier work on quality adjusted prices

Two approaches are generally used to estimate non-residential structures' prices. The first approach holds quality constant by pricing and repricing sample structures that are designed to be typical of structures of a given type. The second approach uses hedonic estimates that value quality

¹ The views expressed are those of the author and do not necessarily reflect those of the Bureau of Economic Analysis. Bruce Grimm, Bureau of Economic Analysis, 1441 L Street NW, Washington, DC 20230; voice: (292) 606 9623; e-mail: Bruce.Grimm@bea.gov.

characteristics, so that the effects of changing quality can be separated from price changes. The first use of hedonic indexes for construction prices was by the Census Bureau in 1968, and was for single-family housing. A revision of the methodology for price indexes for construction was done by a joint BEA-Census Bureau group in 1974 (Bureau of Economic Analysis (1974)). Since then, with the exception of the introduction of the single-family housing price index into the calculation of price indexes for non-residential buildings, little has changed in BEA's methodology for non-residential structures prices.

As part of a search for an improved methodology, Edwin Coleman of BEA produced an unpublished study of the quality of 32 private sector construction cost indexes (Coleman (1988)). He found that most of the indexes contained "...one or more... conceptual or statistical problems...". He also found that the various indexes tracked reasonably closely to the corresponding NIPA price indexes for non-residential structures. He laid out criteria for evaluating the quality of the indexes and, using these criteria, he produced standardised descriptions of each of the indexes as well as additional descriptions specific to the various indexes. He found several indexes to be somewhat more successful than the others. Among these was the Turner Construction Company's cost index, but he found that there was insufficient information to fully evaluate it. This was also the case for the Engineering News Record building and construction cost indexes that were used for Census' monthly real construction estimates. The R S Means Company's construction cost index made enough data available, but had some significant limitations, including changes in methodology over time.

A former BEA chief statistician, Frank de Leeuw, completed a study of construction prices in 1991 and produced two related discussion papers. The first paper used hedonic regressions with Census data and log-log specifications to estimate price indexes for multifamily housing for 1978-89, and found increases in prices that were at about the same rate as those for Census' single-family house prices (de Leeuw (1991a)). The paper also analysed the "components" approach used by Statistics Canada for non-residential and multifamily housing buildings. This approach specified the components of several prototype buildings and surveyed contractors to determine what they would charge for the prototypes at the time of the survey. The paper also described cyclical fluctuations in output prices relative to input prices in the Canadian construction sector.

The second paper reported on a set of hedonics-based price indexes for 1986-90 that were estimated using F W Dodge Company data for six types of non-residential buildings (de Leeuw (1991b)). It noted that only a very limited set of quality characteristics were available for use as explanatory variables in hedonic regressions. Nevertheless, it found substantial differences in the trend rates of inflation for the six types of structures, and that their central tendency was similar to the published NIPA price index for non-residential structures. It concluded that the hedonic approach did not yield significantly improved results, and that a data set with additional quality characteristics would be needed if improved hedonics-based indexes were to be constructed.

Several other preliminary studies, at both BEA and at the Census Bureau, evaluated the feasibility of developing price methodologies, both using the hedonic and the model building approaches. The studies were not continued because of a lack of resources; in particular, the necessary private information sources were too costly for either agency to afford.

The Bureau of Labour Statistics is working with a private contractor to develop PPIs for four types of non-residential structures; warehouses, light industrial/factory buildings, office buildings, and schools. The methodology will be broadly similar in approach to the model price work that has been done in Canada. Specifications for typical versions of the structures are being developed, with some geographical disaggregation to account for differing characteristics that arise due to different climates in different parts of the country. A private source will provide estimates of the costs of materials used in construction, and sampled contractors will provide monthly updates on margins. Additional PPIs for component assemblies for non-residential structures are being developed. The PPIs are scheduled for initial publication later in this decade. Because BEA's new indexes are designed to link up with the corresponding PPIs, the linked indexes should allow BEA to prepare an unbroken set of estimates beginning with 1998.

2. Source data

The data used to support the new price estimates are taken from annual publications by the R S Means Company, *Square Foot Costs*, and cover the period 1 January 1997-1 January 2003. Although these data are proprietary, they have withstood the market test of being commercially profitable over a long period of time. R S Means has sold its data for many years to firms in the construction business - architects, builders, and others - who use it to put together bids on construction projects. Because the Means annual cost estimates are revised in the fall of each year, the estimates are based on costs observed late in the previous year and projected forward to 1 January of the succeeding year. These costs are gathered by Means from a large number of contractors, building supply firms, and the like.

Means publishes the costs at several levels of detail. At the most detailed level, the costs for specific sub-assemblies or components are calculated as the sum of the costs of labour, materials, any equipment needed, and overhead and profit. At a more aggregate level, Means publishes estimates of the square foot costs for sample structures, both residential and non-residential. The sample non-residential structures are priced for six combinations of wall and support frame type, and for nine sizes (in square feet). Additional information is supplied for one specimen structure of each type that describes about 34 quality characteristics, such as electrical service, types of roof, and wall finish. These quality characteristics change gradually to reflect changes in typical buildings in the Means surveys. For example, between the mid-1990s and 2003, the type of roof changed for their sample two to three storey college dormitory, and the electrical service was upgraded. The percent shares of each of 11 construction characteristic categories, under which the characteristics are grouped also change from year to year. For example, the share of the exterior closure category for the specimen dormitory went from 12.9% of the total in the mid-1990s to 14.8% in 2003. Site work, such as earthwork, roads, and landscaping are not included in the estimates, but architects' fees, interest costs, and taxes incurred as part of the building process are included.

At a still more aggregate level, Means estimates "city cost indexes" for 30 major US cities. Nine sample structures are costed out; one storey factory, two to four storey office building, retail store, two to three storey town hall, two to three storey high school, four to eight storey hospital, parking garage, one to three storey apartment, and two to three storey motel. In order to simplify the computational process, the inputs to the nine buildings are simplified and aggregated by Means, using 66 commonly used construction materials, labour hours for 21 building construction trades, the latest negotiated labour wage rates for the same construction trades, and related equipment rental costs for six types of construction equipment.

The 30 city cost indexes are aggregated into a national average cost index. As such, this Means index is probably not capable of picking up cyclical fluctuations other than those associated with materials inputs and labour costs. Also, the index amounts to a chained Paasche index; this is likely to understate inflation. Because the index is based on actual costs of construction, it is in principle able to pick up changes in productivity. However, as may be seen in Chart 1, the Means 30-city national average price index has had broad movements in 1960-2002 similar to those of the existing NIPA price index. Year-to-year fluctuations in the two indexes also exhibit generally similar patterns, but although the Means index is about equally volatile until 1970, it is somewhat less volatile thereafter (Chart 2).

Because of the limitations of the Means 30-city national average index, the Means square foot cost estimates for the sample buildings of various specifications and types offer superior information for estimating non-residential structures prices. The blowup factors used in the calculation of the sample buildings' total costs appear to be fixed from year to year, and thus do not allow for changing profit margins.² A limitation of the quality adjustment process occurs because the quality characteristics of the individual sample buildings tend to changeover time at a finer level of detail than that of the reported characteristics; these will not be observed at all. For example, a substitution of a more energy efficient, more costly insulation material would not be noted and would show up as a price increase. Despite these limitations, detailed price estimates based on the Means square-foot-cost data allow much more direct estimation of the prices of individual non-residential structures types than does the

² Some sort of cyclical corrections - perhaps along the lines of those suggested by Frank de Leeuw - might be tried, but such work is beyond the scope of this study.

present methodology. The direct estimates allow greater differentiation of prices among various types of non-residential structures than can be obtained from the existing, indirect summary price methodology.

3. Methodology

The hedonic price indexes underlying BEA's new non-residential structures price indexes are "regression" price indexes. That is, ordinary least squares regressions are used to explain costs per square foot for various types of structures as functions of the number of square feet, a number of quality characteristic dummy variables, and time dummy variables that indicate the year each observation is from. The price index estimates are derived directly from the constant term and the estimated parameters of the time dummy variables.

As a check on the hedonic estimates, matched model price indexes were also calculated, using selected observations from the same data set for which more detailed characteristics information is available. Because the matched model indexes for each type of structure are based on just two observations per year rather than the 108 observations per year used for estimating the hedonic indexes, the hedonic estimates are more robust. Generally, the matched model indexes yield similar patterns of increase, with slightly lower average rates of inflation.³ The matched model indexes are briefly described in the appendix.

Some hedonic studies of structures' prices have used structures' total costs as the dependent variables. However, examination of the Means data found that there is a non-linear relationship between structure cost per square foot and size in square feet. Experimentation using the Means data also indicated that, for given structure type and year, the logs of these two variables have a nearly linear relationship, and limited Box-Cox testing confirmed the superiority of the log-log functional relationship. Hence, the dependent variables in the regressions are the logs of the cost per square foot and the first explanatory variables are the logs of the buildings' sizes in square feet. The quality characteristic dummy variables have values of one when the characteristic is present and zero otherwise, and are entered into the equation linearly. The time dummy variables have values of one in the indicated years and zero otherwise and are also entered into the equations linearly. Thus, the functional form of the estimated hedonic equations is:

$$\log(\$/\text{sq ft}) = c + a_0 \times \log(\text{sq ft}) + \sum_i (a_i \times \text{characteristic}_i) + \sum_t (b_t \times \text{time dummy}_t),$$

where i is the set of quality characteristics, t is the set of time periods, c is the estimated constant term and the constant term and the a_0 , a_i , and b_t parameters are estimated coefficients.

One additional quality characteristic used in some equations is the presence or absence of basements. The cost per square foot for basements is a linear function of the number of square feet. Because the log of the cost per square foot is the functional form used for the dependent variable in the regression equations, there is a non-linear relationship between the dependent variable and the costs of basements. Also, the costs per square foot for basements have generally increased somewhat more slowly than other costs per square foot over the sample period. In order to evaluate whether this linear relationship results in distorted estimates in what is otherwise a log-log equation specification, three equations were estimated for each type of structure; an equation that combined observations on structures with and without basements and included a dummy variable for the presence or absence of basements, and two equations that each contained only the observations for structures with or without basements.

With regression-type hedonic price indexes, there is a danger that parameter instability might affect the estimated coefficients of the time dummy variables. Concerns about the sensitivity of the estimates to parameter instability led to the estimation of regressions for adjacent pairs of years for each type of structure, separately for structures with and without basements; this was done to evaluate the effects of any parameter instability. The full data set contains 648 observations for each structure type - both with and without basements - and the individual pairwise regressions are each based on

³ The similarity of hedonic and matched model price estimates, made using the same or similar data, has been found elsewhere. See, eg, Aizcorbe et al (2000) and Landefeld and Grimm (2000).

216 observations. (Half of the observations are available for the regressions for structures with, and without, basements.) The results of pairwise regressions yielded price index estimates nearly identical to those yielded by equations estimated over the full, 1997-2003 sample period, and they are not described here in detail.

The types of structures for which hedonic regressions were estimated included one storey warehouses, one and three storey factories, and three height ranges for office buildings - two to four storeys, five to 10 storeys, and 11-20 storeys. Exploratory work indicated that estimated parameters of equations for structures with different numbers of storeys were sometimes statistically significantly different for differing heights. As a result, separate sets of regressions were estimated for the two heights for factories, and for the three height ranges for office buildings. In addition, hedonic regressions were estimated for four types of schools; elementary, junior high, senior high, and vocational.

Reflecting the lower rates of increase for basement costs than for other structures' prices, the estimates of average rates of price increase for structures without basements were somewhat greater than those for structures with basements. Alternative estimates of rates of inflation, based on the regressions for structures both with and without basements, found average rates of price increase that were between the rates for structures with, or without basements.

The estimates for the regressions combining structures with and without basements tend to weight the two variants roughly equally. In contrast, general observation suggests that some types of structures were more or less likely to have basements (eg, unlikely for one storey warehouses, highly likely for 11-20 storey office buildings). Similarly, the relative importance of construction of different heights of buildings varies (eg, more square feet of one storey factories than three storey factories).

As a result, the price indexes presented here are weighted averages of the separate indexes for structures of each type with, and without, basements, and where applicable, of different heights or type of school. Eight intermediate summary price indexes were constructed by weighting together the separate indexes for structures of each type with and without basements. Next, summary indexes were constructed for factories and for office buildings by weighting together the intermediate indexes for the various heights. In both stages, the weights were based on subjective judgment about the prevalence of the value of construction in each height category. Similarly, the indexes for the various types of schools were weighted together using Census Bureau estimates of numbers of students of appropriate ages, and assuming that vocational school students are one fifth of the number of students of high school age. The two sets of weights are listed in the appendix.

There were some departures from this general methodology. The estimated rates of inflation for all four types of structures were implausibly low for 1997-98 and surprisingly high for 1999. As a result, the Means 30-city national average price index was used as an interpolator between 1 January 1997 and 1 January 1999 estimates for each type and height of structure. In addition, specification changes of sample structures, combined with apparent quality changes at an unpublished finer level of detail, led to a drop in the prices of two to four storey office buildings, between 2000 and 2001. As a result, a price index for two storey medical office buildings was constructed and used for the estimate of price increase from 2000 to 2001 for two to four storey office buildings. Specification changes, and apparent unpublished quality changes, for 11-20 storey office buildings from 2000 to 2001, led to the substitution of the estimates for price increases for five to 10 storey office buildings for the price increase for the taller buildings from 2000 to 2001.

The estimates

1. Equations

As discussed above, all of the regression equations make the log of the price per square foot a function of the log of the number of square feet. Because the dummy variables for quality characteristics - which were for exterior wall type and interior support type, two or three of the dummy variables are not used in order to avoid singular moment matrices. Likewise, it is necessary to omit one year dummy, for 1997. Thus, the equations presented here contain three to five quality characteristic dummy variables and five year dummy variables.

Table 1 summarises the estimated equations used to construct the price indexes. In all the equations, the constant term and the coefficient of the log of number of square feet are highly significant, with p-values less than 0.01. Likewise, the coefficients of the year dummy variables are all significant, with p-values less than 0.01. The time period for all of the regressions is 1997-2003.

The summary statistics for equations for warehouses, factories, and office buildings both with and without basements are very similar to those for the corresponding equations shown in Table 1. The principal differences are that the combined equations had F-test statistics roughly double those for the equations in Table 1. The pairwise regressions also yielded estimates for price increases that were quite similar to those derived from the Table 1 equations. Alternative price index estimates, made using the pairwise regressions, found that for nearly all years, for all six structures types, the estimated rates of price change are within 0.1 percentage point of indexes estimated using the Table 1 equations, and for most estimates, the rates are within 0.01 percentage point. Based on this, it appears unlikely that the effects of year-to-year parameter instability on price estimates are

Table 1
Summary measures for the hedonic regressions used to construct price indexes

| Structure type | Number of characteristics | Number with p-values < 0.01 | R ² | F-test statistic |
|--------------------------|---------------------------|-----------------------------|----------------|------------------|
| Warehouses: | | | | |
| with basement | 4 | 4 | .979 | 1451 |
| without basement | 4 | 4 | .979 | 1468 |
| Factories: | | | | |
| 1-storey: | | | | |
| with basement | 5 | 4 | .991 | 3364 |
| without basement | 5 | 4 | .992 | 3336 |
| 3-storey: | | | | |
| with basement | 3 | 3 | .990 | 3309 |
| without basement | 3 | 3 | .981 | 3296 |
| Office buildings: | | | | |
| 2-4 storey: | | | | |
| with basement | 5 | 4 | .982 | 1633 |
| without basement | 5 | 4 | .983 | 1727 |
| 5-10 storey: | | | | |
| with basement | 3 | 3 | .972 | 1232 |
| without basement | 3 | 3 | .972 | 1239 |
| 11-20 storey: | | | | |
| with basement | 3 | 3 | .953 | 725 |
| without basement | 3 | 3 | .953 | 729 |
| Schools: | | | | |
| Elementary: | | | | |
| with basement | 3 | 3 | .997 | 13070 |
| without basement | 3 | 3 | .997 | 11824 |
| Junior high: | | | | |
| with basement | 4 | 4 | .996 | 8132 |
| without basement | 4 | 4 | .996 | 7644 |
| Senior high: | | | | |
| with basement | 3 | 3 | .992 | 4686 |
| without basement | 3 | 3 | .993 | 8835 |
| Vocational: | | | | |
| with basement | 4 | 4 | .991 | 3519 |
| without basement | 4 | 4 | .989 | 2919 |

2. Price indexes

The four price indexes derived from the hedonic regressions - in percent change form for the years 1998-2003 - are shown in Table 2. In addition, the table shows percent changes in the existing NIPA price index. (Because the new price indexes are for changes from 1 January of a given year to 1 January of the following year, the changes in the existing NIPA price index are calculated by averaging fourth and first quarter level values and then calculating percent changes.)

Table 2
Percent changes in the price indexes

| Year | Existing NIPA index | Hedonic indexes | | | |
|----------------|---------------------|-----------------|-------------|------------------|-------------|
| | | Warehouses | Factories | Office buildings | Schools |
| 1998 | 3.71 | 4.19 | 3.74 | 4.54 | 3.74 |
| 1999 | 3.96 | 5.08 | 4.55 | 5.49 | 4.47 |
| 2000 | 4.22 | 4.00 | 3.60 | 4.31 | 3.71 |
| 2001 | 4.45 | 3.64 | 3.89 | 4.11 | 4.50 |
| 2002 | 3.07 | 3.97 | 4.05 | 1.97 | 2.92 |
| 2003 | 1.33 | 2.52 | 4.53 | 3.17 | 3.79 |
| Average | 3.45 | 3.90 | 4.03 | 3.92 | 3.85 |

As may be seen in Chart 3, the differences in average changes between the existing NIPA price index and the hedonic indexes are partially due to a slowing of inflation in the existing NIPA index in 2002 and 2003 that is not matched fully by the hedonic indexes. As may be seen in Chart 4, the year-to-year rates of inflation for the various indexes show considerable variation. The rough similarities in pattern for the four hedonic indexes in 1998-2000 is due to the use of the Means 30-city national average price index as the interpolator between those years.

Conclusions

The new estimates of prices for non-residential structures introduce directly applicable quality adjustments by using hedonic estimates. Even though the new price indexes do not result in substantial changes in estimates of inflation in structures prices, they will make a significant improvement in the quality of the estimates of non-residential structures prices. The last major overhaul of the methodology for construction prices occurred in 1974 (BEA (1974)), and generally lowered estimates of inflation for the period ending in 1973. Because the lower inflation estimates led to higher trend rates of increase in real non-residential structures investment, they helped to reduce the puzzle of low or declining productivity in the US construction industry. In contrast, the new estimates of non-residential structures prices presented here slightly raise the estimated rate of inflation, and this exacerbates the puzzle of low or declining productivity in the construction industry.

Chart 1
Non-residential construction price indexes
 (1996 = 100)

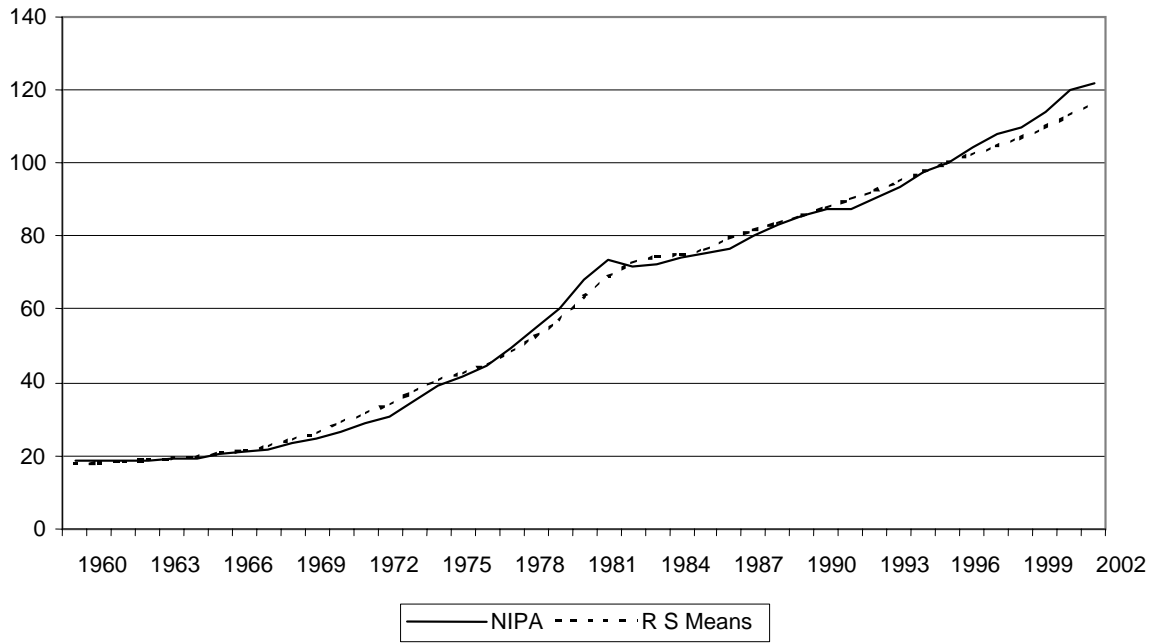


Chart 2
Non-residential construction price indexes
 (Percent change)

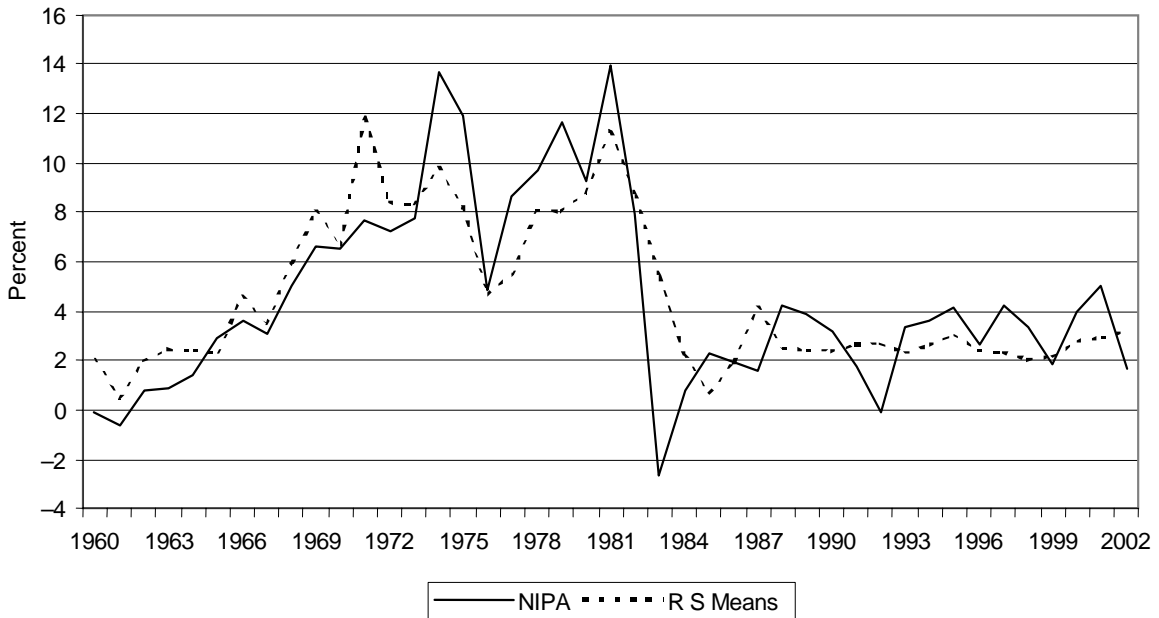


Chart 3
Price indexes for some non-residential structures
 (1 January 1997 = 100)

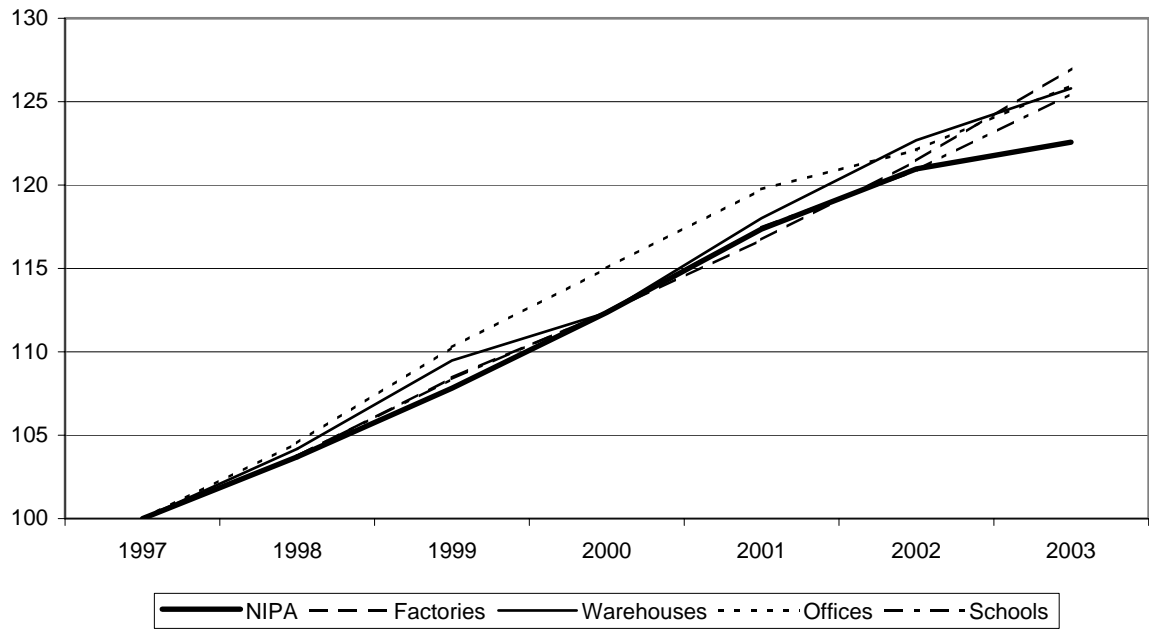
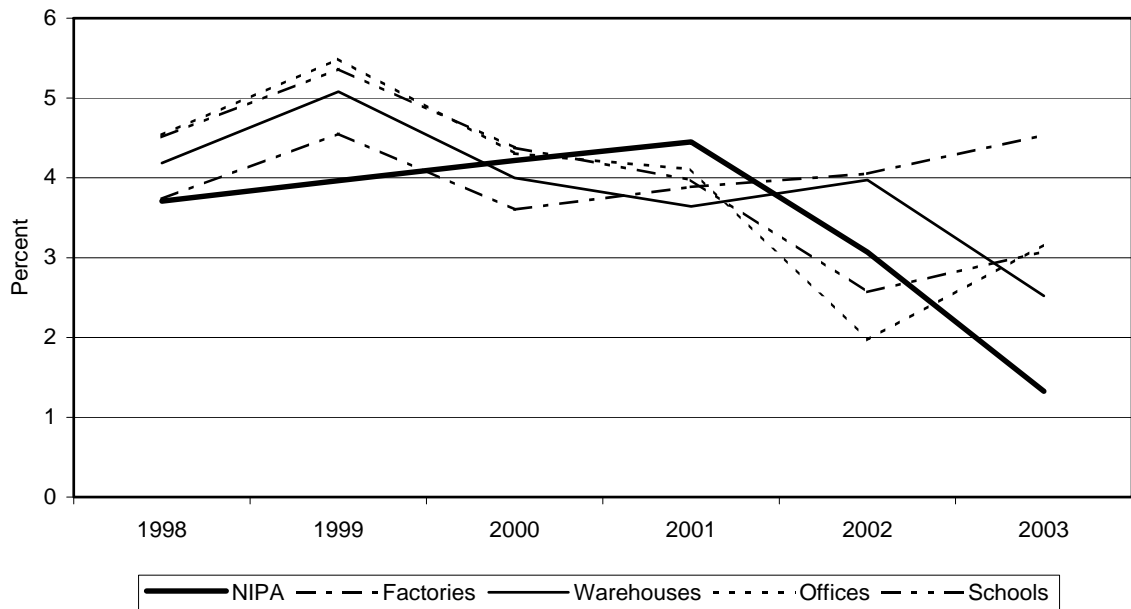


Chart 4
Price indexes for some non-residential structures
 (Percent change)



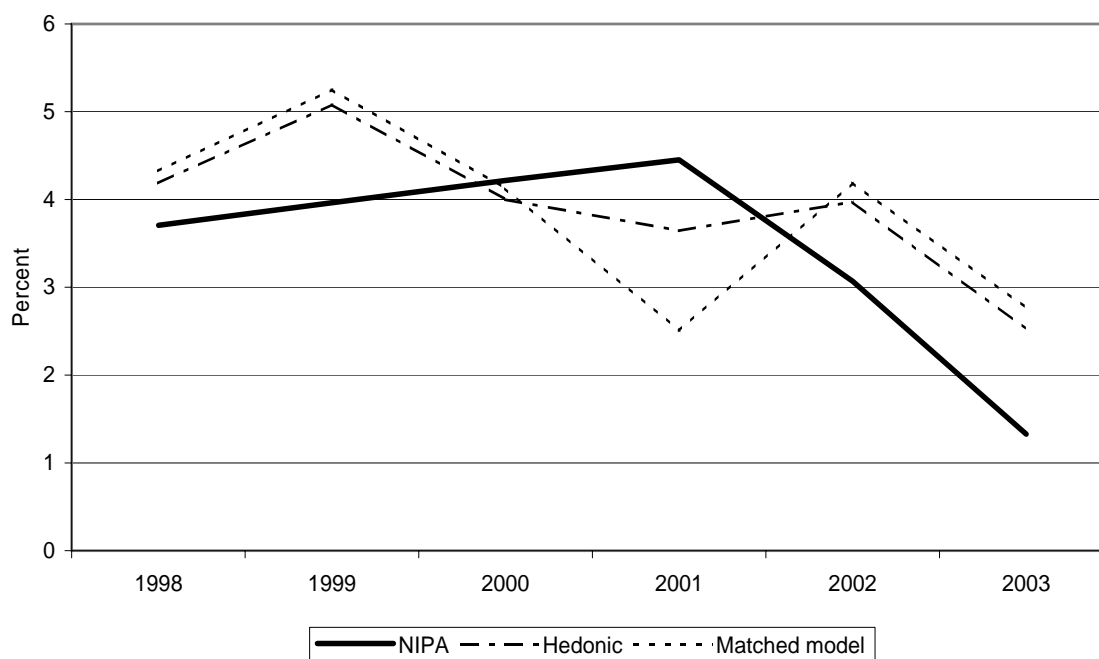
Appendix

1. Alternative estimates

Average rates of increase - from 1 January 1997 to 1 January 2003 - of the various quality adjusted price indexes are shown in Table A1. These include the separate hedonic indexes for each type and height of structure with and without basements (these are the detailed price index estimates underlying the estimates presented in Table 2), the hedonic indexes calculated using the regressions that include structures both with and without basements, and matched model indexes corresponding to the hedonic estimates.

The hedonic price indexes increase more rapidly than the matched model price indexes for all four types of non-residential structures, and within types, for each height class except for one-storey factories. Price indexes for structures with basements increase more slowly than those without, and indexes for structures, including those both with and without basements, increase at intermediate rates. Both hedonic and matched model price indexes exhibit similar year-to-year increases, but they are not in lock step; Chart A1 illustrates this for warehouse prices.

Chart A1
Price indexes for warehouses
(Percent change)



2. Weights

The judgmental weights used to aggregate components indexes for structures with and without basements - within heights, where applicable - are shown in the first column of Table A2. The judgmental weights used to aggregate different heights (or types of schools) within structure types are shown in the second column.

Table A1
**Average rates of increase for
non-residential structures prices**
1 January 1997-1 January 2003

| Structure type | Hedonic estimates | Matched model estimates ¹ |
|---------------------------|-------------------|--------------------------------------|
| Warehouses | 3.90 | 3.86 |
| with basement | 3.63 | 3.57 |
| without basement | 3.99 | 3.95 |
| with and without basement | 3.81 | 3.86 |
| Factories | 4.03 | 4.00 |
| 1-storey: | | |
| with basement | 3.48 | 3.60 |
| without basement | 4.03 | 4.12 |
| with and without basement | 3.79 | 3.90 |
| 3-storey: | | |
| with basement | 4.21 | 3.97 |
| without basement | 4.40 | 4.14 |
| with and without basement | 4.31 | 4.10 |
| Office buildings | 3.92 | 3.50 |
| 2-4 storey: | | |
| with basement | 3.95 | 3.43 |
| without basement | 4.09 | 3.52 |
| with and without basement | 4.02 | 3.44 |
| 5-10 storey: | | |
| with basement | 3.97 | 3.71 |
| without basement | 4.03 | 3.75 |
| with and without basement | 4.00 | 3.72 |
| 11-20 storey: | | |
| with basement | 3.70 | 3.42 |
| without basement | 3.74 | 3.49 |
| with and without basement | 3.68 | 3.42 |
| Schools | 3.97 | 3.77 |
| Elementary: | | |
| with basement | 3.57 | 3.43 |
| without basement | 3.88 | 3.71 |
| with and without basement | 3.72 | 3.65 |
| Junior high: | | |
| with basement | 4.05 | 3.83 |
| without basement | 4.19 | 4.10 |
| with and without basement | 4.12 | 4.05 |
| Senior high: | | |
| with basement | 3.67 | 3.42 |
| without basement | 3.78 | 3.73 |
| with and without basement | 3.75 | 3.67 |
| Vocational: | | |
| with basement | 3.32 | 3.23 |
| without basement | 3.52 | 3.46 |
| with and without basement | 3.45 | 3.41 |

¹ Matched model indexes for structures with and without basements are weighted sums of the separate matched model indexes for structures with and without basements; weights are from Table A2.

Table A2

Weights within type for basements and height

| Structure type | Weight within type for basements | Weight within type for height, or school type |
|--------------------------|---|--|
| Warehouses: | --- | 1.00 |
| with basement | .25 | --- |
| without basement | .75 | --- |
| Factories: | | |
| 1-storey: | --- | .67 |
| with basement | .25 | --- |
| without basement | .75 | --- |
| 3-storey: | --- | .33 |
| with basement | .25 | --- |
| without basement | .75 | --- |
| Office buildings: | | |
| 2-4 storey: | --- | .60 |
| with basement | .80 | --- |
| without basement | .20 | --- |
| 5-10 storey: | --- | .20 |
| with basement | .90 | --- |
| without basement | .10 | --- |
| 11-20 storey: | --- | .20 |
| with basement | .95 | --- |
| without basement | .05 | --- |
| Schools: | | |
| Elementary: | --- | .54 |
| with basement | .20 | --- |
| without basement | .80 | --- |
| Junior high: | --- | .19 |
| with basement | .20 | --- |
| without basement | .80 | --- |
| Senior high: | --- | .215 |
| with basement | .20 | --- |
| without basement | .80 | --- |
| Vocational: | --- | .055 |
| with basement | .20 | --- |
| without basement | .80 | --- |

References

Aizcorbe, Ana, Carol Corrado and Mark Doms (2000): "Constructing price and quantity indexes for high technology goods", paper presented at the National Bureau of Economic Research Summer Institute 2000 session on Price, Output, and Productivity Measurement, Cambridge, Massachusetts, 31 July.

Bureau of Economic Analysis (1974): "Revised deflators for new construction", *Survey of Current Business*, 54, August, pp 15-27.

Coleman, Edwin J (1988): "An empirical framework for assessing the quality of private non-residential construction price/cost indexes", manuscript.

de Leeuw, Frank (1991a): "New price indexes for construction", BEA, discussion paper, no 50, Bureau of Economic Analysis, June.

——— (1991b): "Price indexes based on the Dodge major projects file", BEA, discussion paper, no 51, Bureau of Economic Analysis, June.

Landefeld, J Steven and Bruce Grimm (2000): "A note on the impact of hedonics and computers on real GDP", *Survey of Current Business*, 80, December, pp 17-22.

Means, R S: *Square Foot Costs*, R S Means Company, Kingston, Massachusetts, annual publication.

Real estate prices and CNB monetary policy

Ivan Matalík, Michaela Skolkova and Jan Syrovatka

I. Introduction

Real estate prices are among the fundamental indicators for the development of asset prices. The growing importance of asset prices for central banks' monetary policy is the consequence of the ongoing liberalisation of the economic environment and the ensuing globalisation of the world economy. The central banks of advanced countries continue to focus primarily on their main objective, price stability. Nevertheless, the changing global economic environment has been responsible for a certain shift in the perception of a central bank's fundamental role towards that of securing financial stability.

The changing global economic environment has also affected the impact on the central banks' monetary policy in the developing European countries, including the Czech Republic. The high degree of liberalisation of the financial markets not only means that the effects of global economic changes are swiftly passed on to the national economy, but is also responsible for a wide variety of financial innovations. These innovations result in an ever-expanding range of assets, the gradual erosion of differences between the financial and non-financial sector and the rising importance of asset prices in monetary policy in the transforming countries.

In the case of the Czech Republic, the question of asset prices in the Czech National Bank's monetary policy has been examined chiefly in the last two years. This is based on the desire to preserve macroeconomic and financial stability, particularly following experiences with the instability of the banking system in the second half of the 1990s. With regard to the Czech Republic's entry into the European Union in 2004, attention is currently paid to the sharp rise in real estate prices. This is the background to this study on the subject of real estate prices and CNB monetary policy. The next two sections focus on the general definition of assets and the significance of asset prices for the central bank's monetary policy. The three subsequent sections look at the situation in the Czech Republic, primarily with regard to the definition of assets, monitoring real estate prices and the importance of real estate prices in the CNB's monetary policy. The resulting analysis chiefly reflects the authors' practical experience of monetary policy and monetary analyses during the economic transformation of the Czech Republic.

II. General definition of assets

Using a theoretical definition, an asset may be defined as an item with a market, ie, exchangeable value, which forms part of the wealth or property of its owner. A distinction is made between financial and non-financial, or real, assets.

Financial assets are assets in the form of cash, bank deposits and securities which bring their owners a return in the form of interest on the deposits and bonds or dividends from shares. Financial assets also include a foreign exchange rate as the price of a specific asset - currency. *Non-financial assets* include production factors (land, buildings, machines, vehicles, mineral deposits) and immaterial assets (eg patents or trademarks). When examining asset prices, central banks typically focus primarily on financial assets and non-financial assets in the form of real estate and land.

Financial and non-financial assets are present in all areas of a society's economic activity. They constitute a common ingredient of the portfolios of practically all economic sectors. A fundamental factor that determines the prices of specific assets is supply and demand. The classic market axiom applies: when demand is greater than supply an asset's price rises and vice versa. This is closely linked to the degree of a given market's development, ie, whether the market is advanced and effective and has sufficient liquidity.

The economic cycle also influences asset price developments. Different assets develop differently within the economic cycle. The largest difference can be seen in the development of share and bond

prices. During a recession, share prices fall as a result of falling profits. Bond prices, however, rise in response to the fall in interest rates. During a depression, shares continue to have a low, and bonds a high, market value. During the recovery phase, share prices rise together with rising profits, while bond prices begin to fall. In times of boom, share prices are high due to high profits and bond prices continue to fall. From the long-term standpoint, share prices essentially copy the development of economic activity; in fact, from a shorter perspective they generally anticipate the development of the real economy by several months.

Expectations also influence prices. According to the theory of expectation, long-term rates represent the mean of future anticipated short-term rates, including risk premium. This means that share prices can be interpreted as prices reflecting the current value of anticipated future company revenues and real estate prices on the basis of expected future rents. Changes in short-term interest rates thus affect long-term rates and asset prices in relation to how monetary policy will affect expected future short-term rates, returns and rents. Expectations also form part of the effective market hypothesis¹ (the school of rational expectations as part of new classical theory), according to which all accessible data on asset prices that are relevant for the formation of expectations are immediately reflected in market prices. In addition to existing experience, this data also includes various prognoses of economic development and the opinions of central bankers regarding the development of basic macroeconomic indicators.

No less important a factor in price forming is speculation, the result of which is the creation of so-called price bubbles. Bubbles can indicate the future fall in asset prices and thereby reduce real economic activity. According to monetary theory,² a bubble may arise, but will only grow into a real financial crisis if the public loses confidence in the banking sector. This theory does not acknowledge the relation between bubbles and the economic cycle. Adherents of the financial instability approach³ (a post-Keynesian concept), on the other hand, regard asset price bubbles as the result of irrational behaviour on the part of investors and acknowledge the relation between price bubbles and the economic cycle. The view prevails that in the event of price bubbles the central bank should play a positive role in moderating the unfavourable impacts on the real economy. This view is shared by both monetarists and proponents of the financial instability theory⁴ (ie post-Keynesians) as well as the adherents of asymmetrical information⁵ (ie, institutionalists).

Asset prices are also influenced by other factors, which are chiefly present in the new market economies. These contribute to the uncertainty over the true level of asset prices and thus to uncertainty concerning the future response of asset prices to monetary policy. Among them are restricted access to information, weak and uncompetitive markets and volatile macroeconomic indicators.

As is clear from the above survey, asset prices are determined by a variety of diverse factors whose weight changes over time. This means that in order to assess the price development of assets it is necessary to know both the specific type of asset and the structure of factors that applies to the relevant asset at any given time.

Some work has been done in constructing an aggregate asset price index.⁶ Its **reliability factor** depends on the one hand on the concept of its construction and on the other on the quality of the data used. In essence, there exist two fundamental criteria for the selection of assets in the index. The first is the sufficient ratio of the relevant asset to the wealth of the private sector, which guarantees the proper representative character of the affluence of the whole of society. The second criterion is sufficiently high liquidity on the publicly organised markets.

¹ Some of the more important authors in this field are Fama, Miller, Modigliani and Sharpe.

² See Friedman and Schwartz (1963).

³ See Minsky (1975).

⁴ See Minsky (1986).

⁵ See Mishkin (1991).

⁶ Borio et al (1994).

In the technical sense of the word, the construction of the relevant asset price index is quite problematic. The assets market contains a wide variety of heterogeneous products. And it is precisely the differences between assets that have a powerful impact on the overall value of the aggregate index and its **reliability factor**. Nevertheless, in general we can say that despite these limitations, asset prices represent a major source of information for the central bank's monetary policy decision-making.

III. Asset prices and monetary policy

A. The importance of asset prices for the central bank's monetary policy

The importance of asset prices for monetary policy rises in correlation with the development of the financial markets. Information from the financial markets can be used in timing specific monetary policy measures. This means that asset prices can suggest whether the measures will be effective. Opinions differ on whether the central bank should respond to asset price changes. One line of thinking is that the central bank should include asset prices in the overall target price index. Others believe that asset prices are only relevant for monetary policy if they affect the forecast for future inflation, or if they threaten the stability of the financial system. The optimal monetary policy reaction to changes in asset prices thus depends on their importance in the transmission mechanism and on those factors that influence them.⁷

If fundamental factors are responsible for a change in asset prices then this is justified. An increase in productivity leads to increased company profits and higher share prices. On the other hand, experience tells us that improvements in fundamental factors almost always result in a higher dynamic for asset prices than would correspond to those factors. Nevertheless, price movements on the assets market generally influence inflation expectations and expectations of future economic growth. This is due to the fact that asset prices are strongly influenced by expectations of future returns, which themselves are dependent on expectations of future economic activity, inflation and monetary policy. The use of asset prices as a sufficiently reliable indicator thus depends to a large extent on whether the relevant expectations are determined by fundamental economic factors.

Taking account of asset prices for monetary policy in general has its adherents and opponents. The argument for the inclusion of asset prices in the monetary policy planning concept is based chiefly on their forward-looking character, which corresponds to current monetary policy approaches based on medium to long-term outlooks. It's frequently emphasised that financial assets very easily monitored, only revised in exceptional cases, and stand out for their statistical reliability. Those who argue against their inclusion in monetary policy claim that there is no reason to expect the repetition of previously-monitored links between asset price developments and monetary policy objectives. The reason is the strong dependence on expectations. If the price volatility of one type of asset can successfully be reduced, this volatility may switch to other assets.⁸ The inclusion of speculative price fluctuations on the assets market between the mediating objectives of monetary policy may make it less transparent for the public. Monetary policy responses to price fluctuations on the assets market thus do not necessarily lead to their stability. On the contrary, future prices may have a tendency to greater volatility. This applies particularly in cases where a monetary policy measure does not fall within previous monetary policy experience and is considered surprising.

The degree to which asset prices can act as sound leading indicators depends to a significant extent on whether the expectations on which they are based reflect fundamental economic factors.⁹ The

⁷ Several studies exist on the impact of monetary policy on asset prices; most of them however focus on the ability to influence financial market interest rates. The Swedish Central Bank, which examined the impact of all instruments used by the central bank on the stock market, including inflation reports and the governor's speeches, concluded that it actually does influence share price levels and market volatility (the question is whether this is desirable). In Japan, a relation was proved between share and land prices on the one hand and real economic indicators on the other. Share and land prices are therefore important indicators.

⁸ See Dornbusch's "Overshooting model".

⁹ Information effectiveness has been addressed by, for example, Le Roy, Kupiec, Borio, Kennedy and Andersen.

assessment of the significance of asset prices in the context of monetary policy represents a relatively new subject, one which in certain respects objectively meets with inappropriate methodological approaches and opinions. Nevertheless, it is a matter of importance for the majority of central banks. The reason is the fact that the development of asset prices and monetary policy register definite mutual links, which it is useful to take into account when considering the various approaches in monetary policy.

B. The impact of monetary policy on asset prices

Monetary policy may influence asset prices in a variety of ways. One of these is the so-called rational approach,¹⁰ which consists of the setting of short-term rates by the central bank. This then influences asset prices in the economy through the rates. A second method is the monetary approach,¹¹ which is essentially based on the volume of disposable financial resources for the purchase of assets. It proceeds from the fact that there are only two basic ways in which people can dispose of their money. Either they can spend it on buying goods and services, which ultimately increases economic activity, or they can save it through purchasing financial assets.

The development of asset prices is also connected to a number of macroeconomic variables that stand at the hub of monetary policy. For example the relation between *financial assets and the money supply*. If the money supply exceeds demand for money a certain surplus will probably be spent on the acquisition of assets, asset prices will rise, and vice-versa. The reasons why asset prices are relevant for the demand for money are clear. Higher aggregate asset prices are logically linked to the higher value of financial transactions and real assets. A rise in asset prices also increases the overall wealth of a society, which can positively affect demand for money.¹²

Other such links include the relation between *asset prices and credits and the offer of and demand for savings*. The relation between credit and asset prices is many-sided; economic subjects may use credit directly for the purchase of real and financial assets. A direct result of a rise in prices is therefore an increase in the credits issued by financial institutions. The expansion in the assets side of the balance sheet (credits) appears on the liabilities side (money supply). Of particular significance in the relation between asset price development and demand for savings is the link between the development of the offer of savings in the economy and the overall demand of economic sectors for financial resources. If the offer of savings in the economy as a whole exceeds demand for financial resources, a certain surfeit will be spent on existing assets, whose prices will thus tend to rise. Alternatively, if the offer of savings is lower than demand for financing in the economy as a whole, existing assets will be sold and their price will instead tend to fall.

One of the key links between the development of asset prices and the central bank's monetary policy is the relation between *asset prices and inflation*.¹³ Analysis of this relation is important in deciding whether monetary policy should respond to asset price developments or not. A theoretically positive or negative relation between the expected inflation rate and nominal asset prices depends on the correlation between inflation and returns on assets. The level of consumer prices may also be directly affected by an increase in asset prices, or indirectly through changes in household expenditure.

¹⁰ See BIS (1998).

¹¹ See Borio et al (1994).

¹² Grice and Bennett were the first to attempt to include affluence in the conventional function of demand for money. Other authors include Hall, Corker and King. M Friedman analysed the impact of share prices using a narrow definition of money and concluded that asset prices should be treated in the same way as an alternative income rate.

¹³ This has been examined, among others, by Modigliani and Cohn (1979), Gultekin (1983), Solnik (1983) and DeFina (1991).

IV. Asset prices in the Czech Republic

A. Asset prices during the Czech Republic's economic development to the present

Asset prices during the decade-long history of the Czech economy have developed in different ways at different times. Abroad, price fluctuations on the asset market can partially be explained by upturns in the economic cycle. In the case of the Czech Republic, asset price movements have been associated primarily with the economy's transition from a planned to a market-oriented economy.

In the first case, this meant the impact of the *change in ownership structure*. In the space of a few years, an enormous volume of property changed owners. This change took several forms which, from the point of view of prices (or rather the valuation of the property), had no comparison with, and in terms of their rapidity no analogy outside, the transforming economies. *Price, business and financial liberalisation were also important*. A significant proportion of prices in the economy were liberalised and barriers limiting the imports of foreign goods and preventing the free movement of capital were relaxed. The Czech Republic thus joined those economies for which a high level of openness is customary.

Another factor determining the structure and price fluctuations of the asset market was the *creation of a financial market* which at the beginning of the economic transformation was practically non-existent. Initial price relations did not reflect the real value of individual financial assets. The first significant change towards more realistic prices in this area took place in 1990 with the devaluation of the Czech currency and again during the currency turbulence of May 1997. The Czech financial market was shown to be easily vulnerable and influenced by external factors in a context of inter-connected world markets. Similarly, share prices from voucher privatisation fell sharply after their introduction on the stock market (1993-94) and even in the following years failed properly to reflect the real value of company assets. Only with the economy's subsequent restructuring at the end of the 1990s did their prices begin to reflect companies' performance in the conditions of a market economy.

B. Definition of assets in the Czech Republic

The period of economic transformation saw the creation of the following categories of financial and non-financial assets, which form the subject of analysis of the asset prices channel as part of the monetary transmission mechanism of the CNB's monetary policy. The chief financial assets¹⁴ include securities, household assets in the form of building savings and capital pension insurance. Non-financial assets include real estate, land ownership, production equipment and other immaterial assets. The detailed assets structure in the Czech Republic is evident from the following diagram.¹⁵

The development of financial and non-financial asset prices in the Czech Republic differed markedly for individual assets from the beginning of the economic transformation period. It's important to note that at the beginning of the 1990s almost none of the aforementioned financial assets existed, with the exception of some forms of life insurance. Financial assets were overwhelmingly in the form of cash or deposits and only with the development and strengthening of the liquidity of basic segments of the financial market did alternative forms of financial investment begin to emerge. This development was understandably reflected in the development of their prices. This applied primarily to the over-valuing of asset prices in the form of company shares and investment funds in the mid-1990s, which was linked to the economy's general imbalance. We may describe this situation as a transformation bubble in this asset segment.

¹⁴ In accordance with the definition of the monetary transmission mechanism in Section 5 we do not include among asset prices financial assets in the form of currency and deposits since these are examined by other transmission channels.

¹⁵ We leave to one side the fact that Czech subjects may also own assets abroad in the same or similar structure.

Figure 1

Assets in the Czech Republic**A. Financial assets**1. *Monetary assets*

- currency
- demand deposits at banks
- term deposits at banks (including building societies)
- deposits at credit unions

2. *Securities*

- a. with a given maturity
 - short-term:
 - T-bills
 - CNB bills
 - medium-term:
 - government bonds
 - municipal bonds
 - corporate bonds
 - mortgage bonds
 - (and long-term)
- b. without a given maturity
 - shares of enterprises
 - shares of investment funds
 - open-end mutual funds

3. *Private capital insurance*

- pension insurance
- life insurance

B. Nonfinancial assets

- real estates
- land
- production equipment
- other: immaterial assets (patents), art and historic objects, valuables and jewels

Certain non-financial assets, in particular real estate prices, developed similarly. At the beginning of the 1990s, real estate prices rose markedly due to the limited supply and high demand. Only with the gradual deepening of liquidity on the real estate market, chiefly as a result of the construction of new houses, flats commercial and production premises, did this asset market start to see more realistic price relations at the end of the 1990s. The deformation of the asset prices with respect to real estate also impacted on the credit market. On the one hand, they acted as unrealistic and low-liquidity collateral, on the other hand institutional conditions (the Act on Bankruptcy and Settlement) also hindered the recovery of collateral. As a result, deformations on the capital market and the real estate market were reflected in banks' worsening portfolios and the subsequent credit restrictions by banks.

An international comparison reveals that the ratio of financial assets to GDP in the Czech Republic still falls short of the figure recorded in advanced countries. The structure of financial assets also differs and reflects both the structure of the financial market and certain historical correspondences with regard to the preferences of household investments. In the Czech Republic, households continue to prefer to hold currency and invest in deposits. The following table provides a comparison of the asset price structures of different countries.¹⁶

Table 1

Structure of financial assets held by households in selected countries in per cent (2000)

| | Germany | France | United States | United Kingdom | Czech Republic |
|---|---------|--------|---------------|----------------|----------------|
| Currency and deposits | 36.2 | 30.4 | 11.1 | 22.2 | 59.6 |
| Equities | 15.6 | 24.8 | 33.1 | 17.4 | 17.7 |
| Other securities | 10.1 | 2.7 | 6.4 | 1.3 | 14.5 |
| Mutual funds | 10.5 | 9.0 | 12.9 | 5.5 | 4.7 |
| Life insurance | 13.6 | 23.3 | 7.1 | 27.5 | 2.3 |
| Pension funds | 5.2 | 1.5 | 23.8 | 22.1 | 1.2 |
| Financial assets as a percentage of GDP | 180 | 234 | 341 | 299 | 121 |

¹⁶ See OECD (2000).

At present, the CNB pays closest attention to real estate prices within the larger development of asset prices. Recently, this assets segment has recorded quite a sharp price increase, chiefly as a result of expectations associated with the rise in price of apartments and houses following entry into the EU in 2004. Interest in acquiring property has also been stimulated by the lowest ever interest rates in the Czech Republic and the consequent accessibility of mortgages to finance real estate purchases. For this reason, the following two sections address the monitoring of real estate prices in the Czech Republic and the relation between real estate prices and the CNB's monetary policy.

V. Monitoring real estate prices in the Czech Republic

A. Current situation

Since 1997, the Czech Statistical Office, together with the Ministry of Justice, has been developing a system to monitor real estate prices in the Czech Republic. This is the first attempt to gather data from the real estate sphere in the period since 1989. An important milestone was the introduction of Act no 151/1997 Coll., on Asset Evaluation, which stipulates the obligation of the tax authorities to pass on to the Ministry of Finance and the Czech Statistical Office data from tax declarations concerning prices established by real estate evaluations and prices agreed for real estate in the case of sale. The Act came into effect as of 1 January 1998.

Certain requirements are placed on the development of the real estate price monitoring system. First, it should be reliable and up-to-date and should provide information on the price level spread according to the types of real estate, their location and other determining factors, including the development of this spread in time. The system should provide global information at a macroeconomic level and should thus not duplicate the so-called price maps which are compiled by local administrative bodies for their own purposes.

The system's data comes from real estate tax declarations, which owners or sellers of real estate are obliged to provide to the tax authority within 30 days of receiving a registered purchase agreement from the Land Registry. A database for tax was established by the tax authorities for tax declarations provided in 1998, ie, the data has been collected since February 1999 (with an average gap of seven months from the sale date, or delivery of the real estate tax declaration). The tax authorities have identified the following types of real estate from the declarations in the database: buildings and halls, family houses, recreational cottages and homes, recreational and gardeners' huts, garages, wells, apartments and non-residential premises, building plots, agricultural land and forest land. These data, which are owned by the Ministry of Finance, are electronically sent to the Czech Statistical Office on a monthly basis in coded form.

The chief advantage of this resource is that it comes from real, paid (declared) prices and is therefore a comprehensive, regular and optimised data flow on price transactions on the real estate market. The only problem may be distortions caused by the possibility that the declared price is not always the same as the price actually paid. Nevertheless, in a relative comparison of prices over time and generally also in the real estate's location this objection has no weight since it can be posited that any such distortion remains, on average, constant.

The Czech Statistical Office used this database to compile the publication in 2002 of "Prices of Monitored Types of Real Estate between 1998 and 2000" (ČSÚ (2002)). The publication, which is mostly analytical in character, provides information on real estate's price dependence on a variety of determining factors. The explanatory priority variable in the publication's tables is a unitary purchase price, and from that a price index, which is a proportion of average prices from two different time periods. The explanatory variable expresses mainly location and time, followed by wear and tear and the size of the community. Only single-apartment brick family homes, apartments, multi-dwelling buildings, brick garages and building plots were selected from those on the database as they fulfilled the criteria of sufficient volume and homogeneity.

The selection of explanatory factors and of real estate types for this publication (for the years 1998-2000) is the result of extensive numerical analyses, of which the most important is probably the analysis of the seasonal character of sales. Also of interest is the analysis of the stipulation of the relative degree of average unitary price in each of the explanatory factors and the analysis of the connection between the unitary price and the size of the building plot.

The study also showed the relatively precise dependency of the unitary price on wear and tear, which makes it possible to conduct a hypothetical calculation of the price of a new family home for each price given (the Czech Republic can be divided into two localities - more expensive and cheaper). The price diffusion is greater in localities with a higher price level.

The statistical analyses were used to stipulate the maximum extent of a set of tables as one of the publication's objectives had been to find the maximum reliability factor of the current state of data, or to define the border for the reliability factor of the examined from a perspective selected in advance. This classification pointed to uneven data coverage from various regards and thus to the urgent necessity to improve the statistical system for the monitoring of real estate.

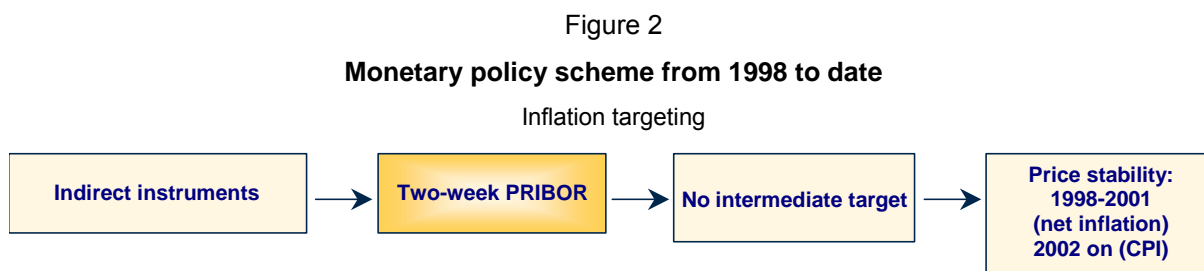
B. Proposals to improve data collection

Due to the character of the data resource (data from tax declarations owned by the Ministry of Finance) the information provided on real estate prices cannot be absolutely up-to-date. For the future, the Czech Statistical Office is considering the annual publication of "Monitored Real Estate Prices". The next publication, which comes out at the end of 2003, will cover the period 1998-2002. The Office's objective is to shift the publication's **reliability factor** to the real estate price indices; however, because the available data do not provide adequate information for the calculation of clean price indices, it will be necessary to apply more demanding statistical methods which place higher demands on sources. Nevertheless, the publication under preparation will also contain an aggregated real estate index for selected types of real estate, or for those types of real estate for which an index can reliably be constructed. For the future, the Czech Statistical Office is considering the creation of standard, long-term schedules for real estate price indices. The aforementioned character of the data resource is a further reason why real estate price indices cannot be entirely up-to-date.

VI. Real estate prices and CNB monetary policy

A. CNB monetary policy and the monetary transmission mechanism

Since 1998, the CNB's monetary policy has been based on the so-called inflation targeting regime. The changeover from so-called currency targeting, which was practised from 1990 to 1997, to inflation targeting was caused by the loss of the nominal currency policy anchor in the form of the exchange rate during the exchange rate turbulence of May 1997, subsequent rise in inflation and the associated rising inflation expectations and the necessity to increase overall transparency and consistency of the CNB's monetary policy. The monetary policy scheme from 1998 to the present is given in the following graph.



Since 1998, when the Czech Republic became the first transforming economy to introduce an inflation targeting regime, this form of monetary policy has been significantly developed. This applies above all to the target itself, which, since 2002, has been the overall consumer price index instead of "net inflation"¹⁷. Other important changes include, for example, the switch from defining targets for specific

¹⁷ Net inflation = the total consumer price index less changes in so-called regulated prices and indirect taxes (approx 20% of the price index).

years to a target in the form of a **continuous band**, the change from a conditional to an unconditional prognosis, greater transparency in the CNB's monetary policy through the publication of future inflation factors, the voting ratios of the Bank Board members etc.

An important feature of the CNB's monetary policy is the inflation prognosis, which is the result of the CNB's short- and medium-term macroeconomic prognosis. When compiling the prognosis, the CNB proceeds from a number of theoretical postulates, but also from empirical information which are the result of a permanent analysis of the monetary transmission mechanism (MTM) in the Czech Republic.

The study of the MTM in the Czech Republic is one of the basic areas of research in the CNB. For example, as part of the research from 1998,¹⁸ the following six channels were defined:

- CNB action on interest rates on the interbank deposits market (PRIBOR)
- the impact of interbank deposits market interest rates on other financial market interest rates
- the impact of financial market interest rates on the exchange rate
- the impact of the exchange rate and interest rates on aggregate demand
- the impact of interest rates on demand for money
- the relation of the money supply to inflation and GDP.

With the gradually changing character of the Czech economy, primarily through the economy's restructuring and culmination of economic transformation, changes have taken place in the way economic impulses function in the economy. The asset price channel, which since 1998 has been included in the MTM roughly under the channel describing the impact of interbank deposit interest rates on other financial market interest rates, is currently allocated a separate channel of its own. The effectiveness of the asset channel is closely linked to the level of the financial market's development. The connection between central bank measures and their impact on asset prices is, however, generally not straightforward. The transmission is highly influenced by expectations.¹⁹ At present, the MTM is most often broken down into the following five channels:

- **direct monetary transmission** - classic transmission channel via in which demand for money is influenced;
- **interest channel** - operates through official interest rates determining financial market rates; its effects are manifest in investment, substitution and income;
- **asset price channel** - affects real economic activities through asset prices such as shares, bonds, real estate, land, exchange rate etc. In this respect of chief relevance are Tobin's q effects and affluence effects. The exchange rate channel is also incorporated in the assets channel;
- **credit channel** - acts on the economy through the offers of credits and their price,²⁰ can be sub-divided into two channels: banking credit channel and **balance sheet channel**;
- **expectations and uncertainty channel** - relates primarily to the credibility of the central bank's monetary policy. A further aspect of the channel concerns the uncertainty of loan contract repayments, eg increased uncertainty at times of recession obfuscates the distinction between good and bad credit risks. The rise in uncertainty thus reduces the **reliability factor** of information on the financial markets, while negative selection and moral hazard restrict credit and thus contribute to the fall in economic activity.

The increasing significance of the asset prices channel in the MTM, which has also become a feature of CNB monetary policy over the past two years, chiefly stems from the change in the microeconomic

¹⁸ Eg Arlt et al (1998).

¹⁹ Among the major authors to have written on the role of asset prices in the MTM as part of their studies are Von Mises, Keynes, Kindleberger, Minsky, Friedman and Kuttner.

²⁰ See Bernanke and Blinder (1988), Gilchrist and Zakrajšek (1995) and Peek and Rosengren (1995).

environment. This is the process of globalisation, deregulation and financial liberalisation,²¹ which has led to changes in the perception of monetary policy in many countries, or a switch to inflation targeting, in which expectation plays a major role. Another important factor that has influenced the earmarking of a separate asset price channel in MTM is the experience of many countries which, as a result of rising asset prices and their subsequent fall, suffered major financial instability and high losses in the banking sector. The final factor contributing to the greater attention paid to asset prices as a separate channel are the fundamental characteristic features of asset prices, but in particular their information content. The aforementioned factors are the reason why the CNB's monetary policy also focuses on asset prices and within them real estate prices. This focus is the result of similar factors to those abroad, ie, the impact of globalisation, deregulation and financial liberalisation on monetary and economic development in the Czech Republic.

B. Real estate prices as a factor in CNB monetary policy

CNB monetary policy pays close attention to developments in real estate prices. Yet this asset's role in the process of monetary policy remains limited and only indicative. This is mainly due to insufficient current information on asset price developments in this segment. As has already been mentioned, data are obtained more than a year in arrears and even with an improvement in data collection the delay in publishing statistics on real estate prices will be almost one year. Monetary policy thus uses partial information from a variety of statistical surveys provided by the large real estate agencies. Currently, the CNB, in conjunction with the Czech Statistical Office, is attempting to speed up the data collection procedure and possibly to introduce current studies on the development of real estate prices in the Czech Republic.

The second reason for the purely indicative role of real estate prices in monetary policy is the specificity of real estate market developments in the Czech Republic, mainly due to the culmination of economic transformation and the Czech Republic's entry into the European Union. Real estate prices continue to narrow the gap with prices that are normal in the European Union, depending on the level of economic development of the various regions of the Czech Republic. Any increase in real estate prices over the last year (eg +20% in Prague) is recorded as significant; real estate prices in the capital are also only coming nearer to those common in the European Union. If we take into account that, at an economic level, Prague is around 130% of the EU average, this development can be considered as justified. Further price movements should however be linked chiefly with economic developments in the Czech Republic.

Real estate prices also only play an indicative role in CNB monetary policy because of the absence of any empirical evidence that real estate prices influence household consumption habits and company investment. It thus proceeds chiefly from theoretical assumptions on the impact of real estate prices on economic development.

When examining the *impact of real estate prices on household consumption*, we assume the existence of three channels. The first is the classic *affluence effect* associated with F Modigliani. In his concept of the consumption function, based on the model of the life cycle, consumer expenditure is determined by lifetime resources which form financial wealth, real and human capital. Since real estate comprises the decisive part of assets in the household portfolio, it can be assumed that with its increase in price the consumers' lifetime resources increase and with it their routine expenditure. From a macroeconomic point of view, there is an increase in aggregate demand. In the Czech Republic, the affluence effect has yet to manifest itself to any meaningful extent. Apartments and family houses are very rarely used for investment purposes. The second channel acts through the *possibility of using*

²¹ Liberalisation on the financial markets and related procedures leads to:

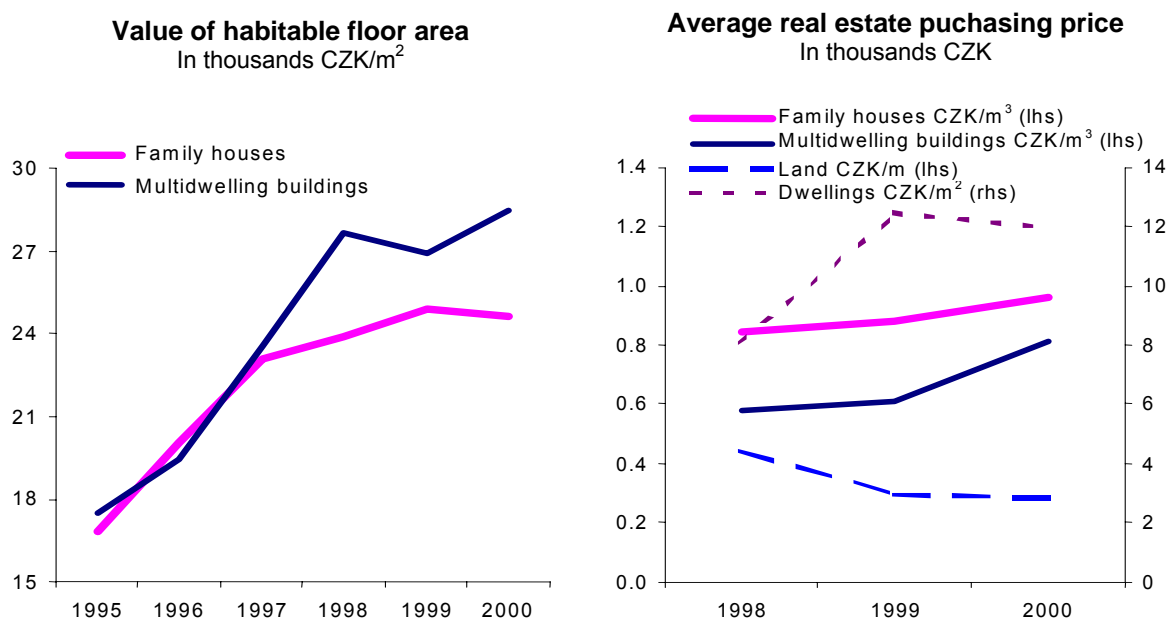
- a reduction in interest margins, to which banks react by entering into higher risk transactions (eg credit for the purchase of shares and real estate)
- a significant shift in banking credit from the public sector to the private sector
- easing access of the private non-financial sector to credit
- diversification of the assets and liabilities sides of the balance sheet of the private, non-financial sector
- a reduction in the proportion of fixed interest rates in favour of variable interest rates
- securing credit by means of collateral in the form of financial assets
- a general expansion of securities holdings at the expense of traditional forms of savings.

real estate as collateral for credit. For owners, real estate represents highly valuable collateral since credit secured on its basis is, in comparison with other types of credit (personal loans, credit cards), generally cheaper. The increase in real estate prices thus directly influences the accessibility, or potential credit capacity of a household with a direct impact on consumption. In the Czech Republic it is unlikely that a relation through collateral will become more pronounced. The third channel acts through *additional expenditure arising from the acquisition of real estate.* This applies to purchases of items long-term consumption which, while they are considered investments from the point of view of economic theory, from the standpoint of statistical monitoring they are categorised under normal consumption in the system of national accounts. Over the past few years in the Czech Republic, the rise in consumer demand has been closely connected with the process of equipping items of long-term consumption in relation to the rise in the proportion of new real estate in household ownership.

The impact of real estate price development on company investment is assessed using Tobin's q theory of investment and the credit channel theory. Under the former theory, real estate is assessed in the same way as other assets (eg shares), ie, an increase in the price of real estate - for example in the event of a relaxation of monetary policy - increases Tobin's q (the market price of real estate divided by costs for the reproduction of real estate) and thereby stimulates its new construction, or investment generally. On the other hand, the volume of investment in real estate reduces in the event of a fall in the price of real estate, ie, if there is a tightening of monetary policy. Real estate is often used as collateral when providing credit. Therefore, *changes in real estate prices, or requirements for collateral quality (on the part of commercial banks and banking supervision) may influence the volume of overall credit in the economy, particularly investment credits.* A tightening up of monetary policy (increased interest rates) can result in the fall in the values of collateral and thus to restriction on the credit supply (and vice-versa). In addition, a change in real estate prices may alter the value of a bank's and company's portfolio, or balance sheet, which in turn means a change in the position for the provision and obtaining of credit, or debt repayment.

From the Statistical Year-Book of the Czech Republic and the publication "Monitored Real Estate Prices 1998 to 2000" it is evident that real estate prices continue to rise (between 1995 and 2000 the value of unitary habitable floor area in family houses and multi-dwelling buildings rose by approximately 50%), as the following graph and table indicate.

Graph 1



Source: Czech Statistical Office.

We can expect that in the future the asset price channel in the real estate segment will function very differently due to increased competition and the introduction on the market of financial innovations.

This should particularly cover mortgage financing which is more accessible to a wider circle of clients, not only through falls in mortgage rates but also the provision of new mortgages to refinance existing mortgages and the introduction of flexible mortgage products. The development of real estate prices as part of the analysis of asset prices should thus play an increasing role in the CNB's monetary policy.

Table 2
Value of habitable floor area
In thousands CZK/m²

| Year | Family houses | Multidwelling buildings |
|------|---------------|-------------------------|
| 1995 | 16,826 | 17,528 |
| 1996 | 20,063 | 19,457 |
| 1997 | 23,109 | 23,542 |
| 1998 | 23,913 | 27,688 |
| 1999 | 24,899 | 26,902 |
| 2000 | 24,654 | 28,470 |

Source: Czech Statistical Office.

Average real estate purchasing price

| | 1998 | 1999 | 2000 |
|--|--------|--------|--------|
| Family houses CZK/m³ | | | |
| Prague | 2,914 | 3,102 | 3,069 |
| CR | 843 | 880 | 959 |
| Dwellings CZK/m³ | | | |
| Prague | 19,228 | 22,954 | 26,296 |
| CR | 8,077 | 12,453 | 11,936 |
| Multidwelling buildings CZK/m³ | | | |
| Prague | 701 | 849 | 1,206 |
| CR | 580 | 612 | 812 |
| Land CZK/m² | | | |
| Prague | 3,158 | 3,152 | 3,183 |
| CR | 444 | 296 | 285 |

Source: Czech Statistical Office.

VII. Conclusion

Real estate prices are one of the prime indicators for the development of asset prices in the Czech Republic. The development of real estate prices is reflected in the specifics of the period of transition that the Czech economy went through in the 1990s. This period is characteristic for the emergence of a transitional price bubble on the real estate market at the beginning of the 1990s, when the enormous demand for this asset without corresponding response on the part of supply led to an unfounded increase in prices. With the restructuring of the Czech economy in the second half of the 1990s and the gradual convergence of the Czech economy with the EU, the Czech real estate market gradually came to function more efficiently. The market is currently experiencing a rise in prices as a result of expectations concerning the development of real estate prices following the Czech Republic's entry into the EU and the accessibility of funds to invest in this asset.

Real estate prices have begun to take a central position in the CNB's monetary policy in the last two years, during which time monetary policy has been based on an inflation-targeting regime and has

focused more on the comprehensive study of the monetary transmission mechanism and attention to a variety of financial and non-financial indicators of monetary and economic development. Real estate prices are one of these indicators.

An analysis of the development of real estate prices as part of an analysis of the monetary transmission channel comes up against data problems. In 1997, the Czech Statistical Office, in conjunction with the Ministry of Finance, setup a system to gather information on the development of real estate prices. At present, data are available on real estate prices from 1998 to 2000. The current system represents a very solid basis from which to proceed and make it more efficient. The major challenge for the Czech Statistical Office is the acquisition of more up-to-date information and the construction of an aggregate price index for the development of real estate prices.

We expect that, once an effective data gathering system has been put in place for real estate prices in the Czech Republic, the CNB's monetary policy will be able to focus more on analysing this indicator of monetary and economic development. In line with the theoretical preconditions and results of empirical research we may expect that the development of real estate prices in the Czech Republic will likewise have a standard effect on household consumption patterns and companies' investment decisions.

References

Arlt, J, M Guba, I Matalík, V Stiller and J Syrovátka (1998): *Definice měnového transmisního mechanismu v ČR a analýza vybraných základních vazeb* (interní materiál ČNB).

Český Statistický Úřad (2002): *Ceny sledovaných druhů nemovitostí v letech 1998-2000*: www.czso.cz

Bernanke, B and A S Blinder (1988): "Credit, money and aggregate demand", *American Economic Review*.

Bank for International Settlements (1998): "The role of asset prices in the formulation of monetary policy", *BIS Conference Papers*, no 5.

Borio, C E V (1995): "The structure of credit to the non-government sector and the transmission mechanism of monetary policy: a cross-country comparison", *BIS working paper*, no 24.

Borio, C E V, N Kennedy and D S Prowse (1994): "Exploring aggregate asset price fluctuations across countries: measurement, determinants and monetary policy", *BIS Economic Papers*, no 40.

DeFina, R H (1991): "Does inflation depress the stock market?", *Business review*.

Friedman, M and A Schwartz (1963): *The monetary history of the United States*, Princetown.

Gilchrist, S G and E Zakrajšek (1995): *The importance of credit for macroeconomic activity - identification through heterogeneity*.

Gultekin, N B (1983): "Stock market returns and inflation: evidence from other countries", *Financial Analysts Journal*.

Minsky, H P (1975): *John Maynard Keynes*, New York, Columbia University Press.

——— (1982): *Can 'It' happen again?*, M E Sharpe.

——— (1986): *Stabilizing an unstable economy*, New Haven, Yale University Press.

Mishkin, F S (1991): "Asymmetric information and financial crises: a historical perspective", NBER, Inc.

Modigliani, F and R A Cohn (1979): "Inflation, rational valuation and the market", *Financial Analysts Journal*.

Organisation for Economic Co-operation and Development, Statistics (2000): www.oecd.org

Peek, J and E S Rosengren (1995): "Is bank lending important for the transmission of monetary policy?", Federal Reserve of Boston, Conference Series.

Solnik, B (1983): "The relation between stock prices and inflationary expectations: the international evidence", *Financial Analysts Journal*.