BANK LENDING AND PROPERTY PRICES IN HONG KONG

International experience suggests that swings in property prices have often led to financial fragility and banking crises. The banking sector tends to play an accelerator role when property prices rise by supplying credit, but it also tends to suffer from the disruptive impact of the subsequent decline. In Hong Kong the banking sector remains generally sound despite the collapse in property prices since 1998.

Our estimates suggest the existence of a stable long-run relationship between lending, property prices and GDP, and that the direction of influence goes from property prices to bank credit rather than the other way around. In other words, bank lending appears to be mainly demand-driven. This implies that financial intermediaries did not propagate the run-up of property prices in the years before the Asian financial crisis, although they may have played an "enabling" role.

The empirical results also suggest that prudential measures, including the limit on loan-to-value ratio imposed in the early 1990s, limited the responses of credit to property price changes. Thus, while monetary policy cannot be used to guard against excessive asset price fluctuations under the Linked Exchange Rate system, prudential regulation and effective risk controls by banks have limited the exposure and vulnerability of the banking sector to property price swings.

I. Introduction

The experiences of Hong Kong in the 1980s and 1990s offer a useful case study of the nexus between bank lending, property prices and economic activity. As documented further below, property prices in real terms in Hong Kong underwent extraordinarily large swings (measured over four quarters) by as much as ±50%. The growth of bank lending in real terms also fluctuated, although in a less pronounced fashion. Associated with these movements, there were considerable gyrations in inflation and economic activity. In particular, the recent period of declining property prices has coincided with more than three years of deflation and increases in the unemployment rate that in recent months reached its highest level since the early 1970s.

Of course, Hong Kong is not the only economy that has undergone pronounced swings in property prices. However, the experience of Hong Kong is of particular interest for several reasons. First, there were at least three episodes of annual rates of price increases of over 20% and two episodes of sharp declines of a similar magnitude in real property prices in the past two decades. By contrast, the boom and bust cycles experienced by other economies are arguably best seen as a single episode of large price increase followed by price falls.[1] Thus, the price swings in Hong Kong have been as dramatic as those in elsewhere in terms of size but more dramatic in terms of the frequency with which they have occurred.

Secondly, Hong Kong has employed a Currency Board arrangement since October 1983. Interest

1 Girouard and Blondal (2001) provides a good summary of property price developments in the OECD economies in the past two decades.

rates are therefore determined by US monetary policy and any risk premium required by investors to hold Hong Kong dollar assets. As a consequence, monetary policy cannot be used to guard against asset price swings. Regulatory policy, however, can and was used more extensively to limit the impact of property price booms on the banking sector and the economy.

Thirdly, despite the collapse in property prices, the banking sector remains sound.[2] In contrast, international experience suggests that movements in property prices have often led to financial fragility and played an important role in triggering banking crises (IMF 2000). In particular, financial deregulation and growing competition have induced banks in some countries to become increasingly engaged in mortgage financing. As a result, the banking sector in some cases played an "accelerator" role in the run-up of the property prices, but also suffered from the disruptive impact of the subsequent price decline.[3]

This paper studies the relationship between property prices, bank lending and macroeconomic fluctuations in Hong Kong in the period of 1982-2001. Since residential property prices have a crucial impact on households' consumption behaviour, the analysis focuses on residential, rather than commercial property prices.[4] Moreover, it uses data on total lending for use in Hong Kong, rather than mortgage credit. These measures of lending are correlated and thus are likely to contain the same information. However, since the property market responds to movements in the broader economy, which in turn may be driven by the availability of credit, it seems appropriate to concentrate on overall domestic lending.[5]

The key question to be addressed concerns the interaction between bank lending and property prices. It is commonly observed that there are strong and positive co-movements between these variables in asset prices booms (Hoffman 2001). However, there are two possible and complementary explanations for this observation. First, it may be that large increases in bank lending, which historically have been associated with episodes of financial deregulation, trigger property price booms. Later, as prices adjust to more appropriate levels, a contraction of bank lending reinforces the speed and magnitude of the downturn. If this "supply of credit" interpretation is correct, the potential disruptive impact of property price fluctuations on the balance sheets of banks would be of a particular concern. Thus, policy makers should carefully monitor movements in bank lending and should not hesitate to step on the brakes if credit expansion is deemed to be too rapid.

The second interpretation is that the co-movements of bank lending and property prices stem from episodes of economic optimism or pessimism that are reflected in property prices and, later on, in bank lending. Under this view, rapid growth of credit reflects largely the impact of rising property prices on the demand for credit. While this may suggest that such developments are less risky than credit supply-driven property price booms, it may warrant concerns by regulators if banks underestimate the risks associated with rapid lending, since near-term default risks naturally decline in an economic expansion.

To date little work appears to have been devoted to examining the pattern of causality between bank lending and property prices in Hong Kong. This paper is intended to fill the gap. To preview the results, the analysis suggests that changes in bank credit were largely driven by demand-side factors, including movements in output and property prices. On the other hand, there is

2 Peng, Cheung and Leung (2001) provides an overview of developments in the property sector in Hong Kong, and their impact on the macroeconomy and the banking sector.

3 For a discussion on the Scandinavian experience of the 1980s and early 1990s, see Drees and Pazarbasiouglu (1995).

4 In any case, prices of office and retail properties shared similar trends with those of residential properties in the past two decades.

5 We have explored the sensitivity of the results to the exact choice of data. In particular, the use of mortgage loans rather than total domestic credit gave similar results to those presented below.

no evidence of a feedback from credit growth to movements in real estate prices. At the risk of oversimplification, the results thus suggest that the direction of influence goes from property prices to bank credit, rather than the other way around. The paper goes on to explore the question of how bank credit responded to the large swings in the property price in the past two decades, and in particular whether regulatory changes have influenced the sensitivity of bank lending to property prices.

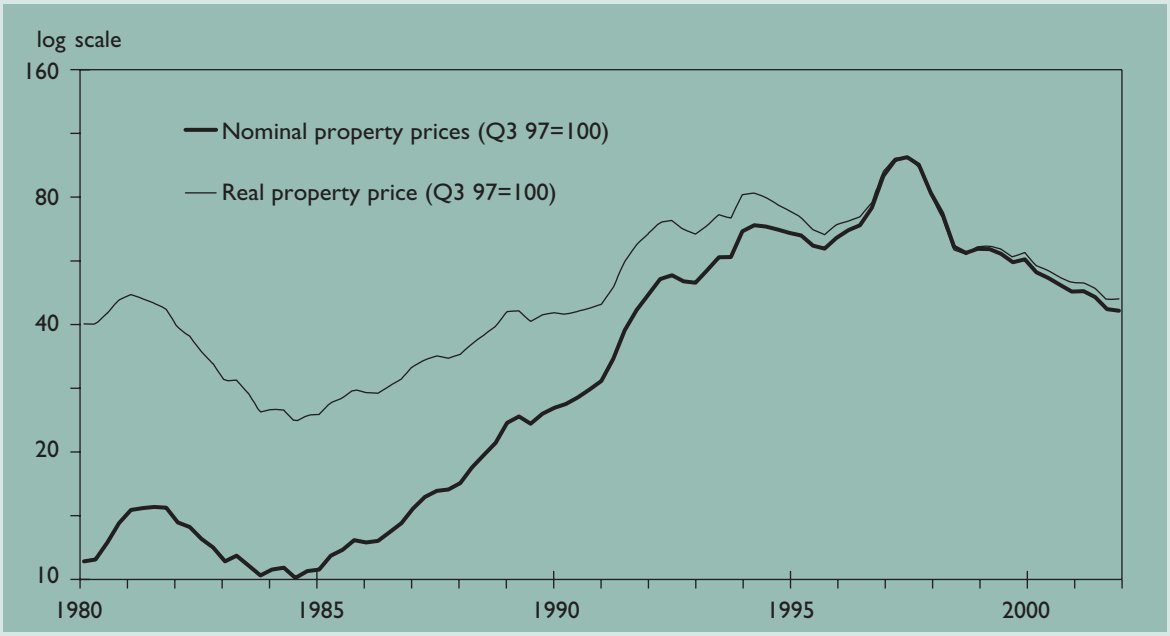
The paper is organised as follows. Section II provides some stylised facts about developments in bank credit, property prices and economic activity. It also reviews briefly developments in prudential regulation and bank lending stance in the past decades. Section III examines the long-run relationship between bank credit, property prices and economic activity, and the short-term dynamic relationships between bank credit and property prices. Section IV examines how regulatory changes may have affected the sensitivity of banking lending to property price movements. The final section offers some concluding remarks.

II. House Prices and Bank Lending Behaviour

As a first step it is useful to review the behaviour of house prices, bank lending, real output and inflation in Hong Kong in the period under study. Chart 1 plots real and nominal residential property prices in the period 1980:4 – 2001:4. The graph shows that property prices declined sharply between 1981 and 1984, but grew rapidly thereafter until late 1997 when, following the onset of the Asian financial crisis, real estate prices started to slide. By the end of the sample period, they had declined by more than 50% in real and nominal terms.

Bank lending and output appear more stable than property prices. In real terms, domestic credit (i.e. loans for use in Hong Kong) increased sharply in the second half of the 1980s after being broadly stable in the first half (Chart 2). It subsequently remained on an upward trend, but with a slower rate of growth, and reached a peak in 1997. Bank credit declined in the wake of the Asian financial

Chart 1
Residential Property Price Indices



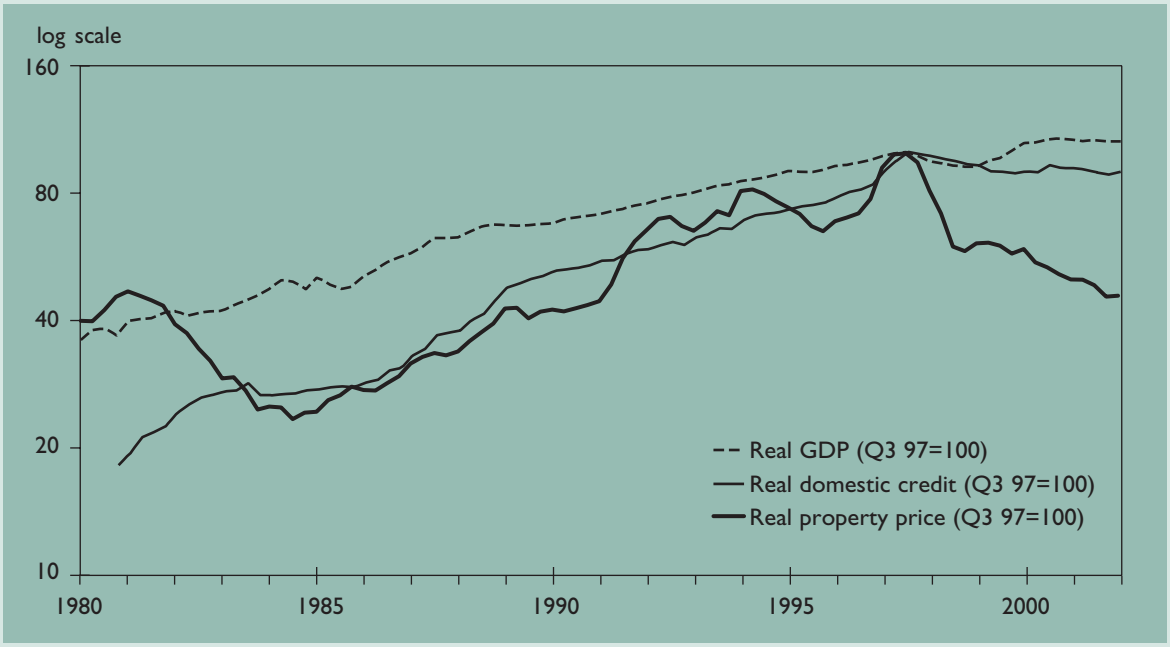
crisis, and has been relatively stable since late 1998. Real GDP followed a similar trend, with rapid growth in the latter part of the 1980s, and steady upward movement in the first part of the 1990s before a significant contraction in 1998.

Since the level of housing prices is dominated by a pronounced trend-wise increase, Chart 2 hides some interesting short-term fluctuations. To explore the frequency, size and persistence of these fluctuations, Chart 3 plots the changes in real property prices over four quarters. It shows that there have been several episodes of sharp price fluctuations. In particular, property prices in Hong Kong have undergone recurrent fluctuations since 1990, reaching peaks of four-quarter growth rate of 20-40% in 1991-92, 1994 and 1997, and troughs with price declines of 20% in 1995 and 50% in 1998 respectively. Compared with growth in real domestic credit, changes in real property prices were of much larger magnitude, although the directions of movements were similar.

As noted above, bank credit grew rapidly in the second half of the 1980s. In particular, there was strong demand for mortgage finance, resulting in an increased exposure of the banking sector to the property market.[6] To contain the risks associated with excessive concentration or expansion of bank lending for property purchases and development, a number of prudential measures were adopted over the years. First, a maximum loan-to-value ratio of 70% was adopted by the banking industry on a voluntary basis in the latter part of 1991, and was later endorsed by the Hong Kong Monetary Authority (HKMA) and incorporated in its guideline on property lending in 1994.[7] This serves to limit the risks faced by banks from fluctuations in property prices and thus helps to ensure the stability of the banking system in times of market volatility.

Chart 2

Property Price, Domestic Credit and GDP



6 For example, mortgage loans increased from slightly above 10% of GDP in the mid-1980s to about 30% in the early 1990s.

7 Lending institutions usually employ a professional surveyor to value the property. The valuation is based on both quantitative and qualitative factors (such as size, age, location and facilities etc.) of the property, and on recent transaction prices of similar properties. The maximum loan will be calculated based on the lower of the purchase price and the valuation amount. During boom periods, the valuation amount was usually smaller than the purchase price.

Secondly, the HKMA issued a guideline in 1994 to advise banks to keep their ratio of property lending to loans for use in Hong Kong at about the industry average of 40%.[8] The guideline was well observed in the aggregate during the booming period. The guideline was withdrawn in July 1998, as the property market was no longer overheated and banks were much more restrained in their property lending. The increase in the ratio in recent years, to about 50% at present, mainly reflected a contraction in lending to other sectors as a result of the economic slowdown.

Thirdly, banks are advised not to place undue reliance on the value of collateral when granting loans. They should take into account the ability of the borrower to service the debt, and therefore should apply prudent limits for the maximum amount of loan repayments in relation to the income of the borrower. For residential mortgage loans, a 50% debt service-to-income ratio is generally adopted by banks.

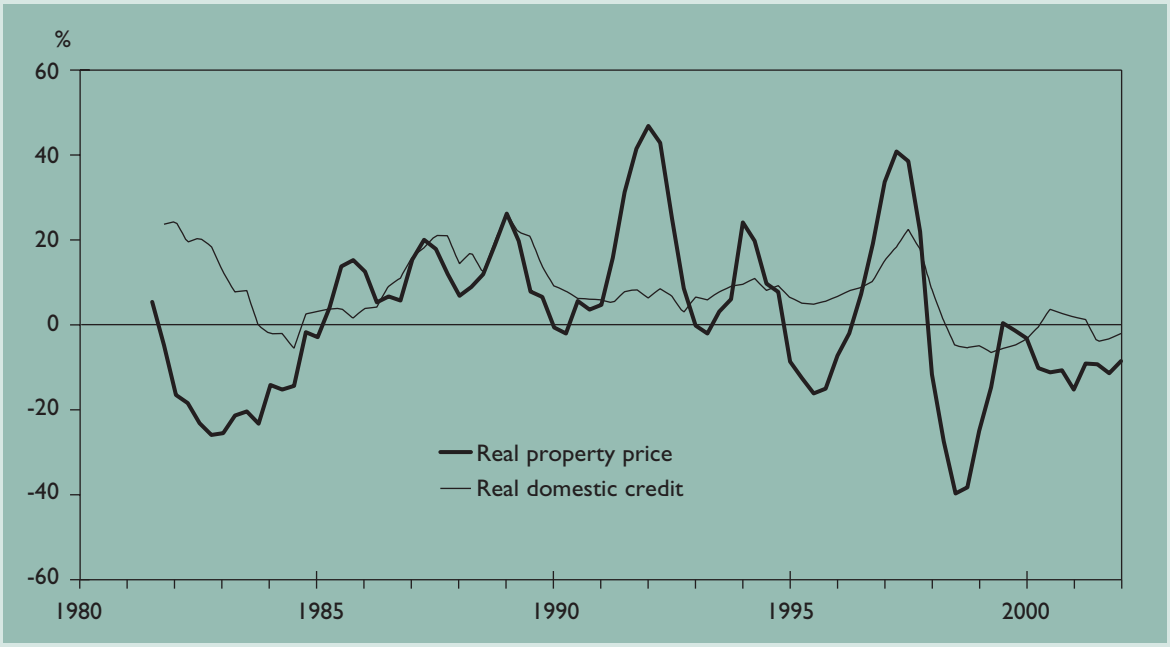
Finally, there were signs that banks' lending stance became tighter in the first part of the 1990s, following strong growth of bank credit in the preceding period. Specifically, the lending spreads – as measured by the difference between the best lending rate (BLR) or mortgage rate and the 3-month inter-bank interest rate – increased around 1991 (Chart 4). They recorded a couple of downward spikes due to temporary increases in the inter-bank interest rate in the wake of the Asian financial crisis.[9]

III. Long-run Equilibrium and Short-run Dynamic Relationships

This section turns to the econometric work on the empirical relationships between lending, property prices and GDP. Specifically, co-integration tests are applied to identify the possible long-run relationships between the logarithms of these variables. Under this approach, the long-run relationship can be represented by a so-called co-integration (CI) vector. Quarterly data that

Chart 3

Annual Growth in Property Price and Domestic Credit



8 Property-related lending includes residential mortgages, and loans for property development and investment.

9 In more recent years, the mortgage lending spread dropped significantly, reflecting increased competition in the mortgage market.

span the period 1982:1-2001:4 are used. Standard augmented Dickey-Fuller (Dickey and Fuller (1981)) unit root test statistics suggest that lending, GDP, and property prices are integrated of order one over the sample period. Table 1 reports the final estimates of the CI vector and the feedback parameter for bank lending[10].

The result that the parameter on real GDP is close to -1 implies that real bank loans and real income grew proportionally over time. By contrast, real property prices and real GDP appear to be weakly exogenous. The feedback parameter (α) for real bank lending is substantial (-0.13) and highly significant (t=3.9). The long-run elasticity of real bank lending with respect to real property prices is about 0.35, implying that a 10% increase in property prices is associated with a 3.5% increase in real bank lending in the long run. Overall, these results suggest that there was a well-defined long-run relationship between property prices, bank loans and GDP, and that the deviations from the equilibrium tended to be offset over time through movements in bank lending.

Table 1

Long-run Relationship (1982:1 - 2001:4)

	CI vector β	Loading coefficient α
Real bank lending	1.00	-0.13
		(0.03)
Real GDP	-1.00	0.00
Real property price	-0.36	0.00

Note: Number in bracket is standard error for α.

To examine the short-term dynamic relationship between real bank credit, and real property price, we use a general-to-specific approach to obtain parsimonious equations for growth in real bank credit and real property price.

Other possible variables that do not enter the co-integration relationship are also considered, because they may contribute to short-term movements in lending and property prices, such as changes in the real interest rate. The parsimonious

Chart 4

Bank Lending Spreads

10 Standard Johansen (1988, 1999 and 1995) tests are applied to real property prices, real lending and real GDP. Standard trace tests can reject the null hypothesis of no CI vector (p=0.05), but cannot reject the null hypothesis of at most one CI vector (p=0.19). Initial estimates suggest that the parameter of real GDP is close to -1. The standard errors for the loading coefficients (α) indicate that real bank loans adjust to disequilibrium (as captured by derivations from the CI relationship). These restrictions are not rejected by the data. The results reported in Table 1 are the restricted parameters. Details of the test results are presented in Gerlach and Peng (2002).

equation for credit growth is as follows.

$$\Delta l_t = +\ 0.244^*\Delta l_{t-2} - 0.313 + 0.239^*\Delta y_t + 0.176^*\Delta p_t - 0.078^*CI_{t-1} + 0.357^*(\Delta r_{t-1} - \Delta r_{t-2}) \quad (1)$$

(SE) (0.083) (0.107) (0.101) (0.034) (0.026) (0.142)

$R^2 = 0.57$; Sample period: 1984:1 - 2001:4

where Δl = real credit growth
Δy = real GDP growth
Δp = real property price growth
Δr = change in real interest rate
CI = co-integration vector

All variables are of correct signs and significant, and various diagnostic tests for the residuals and parameter instability tests are passed.[11] Several observations are worth noting. First, as expected, the significant error-correction term (CI_{t-1}) suggests that excess credit reduces credit growth in the next period, entailing an adjustment over time to maintain the long-run stable relationship between real credit, housing price and GDP. Secondly, changes in the real interest rate are significant at lag 1 and 2, but have opposite signs and have roughly equal absolute values. Since the restriction that the coefficients sum to zero could not be rejected, we imposed it and re-estimated the model. This specification implies that changes in real interest rates did not have any long-run impact on credit growth.[12]

Thirdly, growth in real GDP and real property price appears to have contributed positively to credit growth. While weak exogeneity is established for the former two variables with respect to the latter in the co-integration test, those tests tell little about the contemporaneous relationship between the variables. In particular, there is a risk of simultaneity bias that could lead to inconsistent OLS estimates of equation (1). Following Davidson and Mackinnon (1989, 1993), a Hausman test is applied to explore the possible patterns of endogeneity. Instrumental variable estimates indicate that current property price changes remain significant in the equation for bank lending growth, suggesting consistent OLS estimates. In other words, movements in property prices did play a structural role in driving credit growth.

A parsimonious equation was also estimated for property price growth. While credit growth seems to have a strong contemporaneous effect on property price changes, Hausman test results suggest that it is spurious and is due to reverse causality.[13] A separate paper in this issue provides a more comprehensive study of property prices in Hong Kong. Specifically, changes in property prices are modelled as a function of a set of macroeconomic variables including real mortgage interest rate and other demand and supply factors, as well as bubble terms (Peng, 2002).

IV. Regulatory Change and Credit Growth

As noted above, in order to limit the exposure of the banking system to a potential fall in property prices, banks started to apply a maximum loan-to-value ratio voluntarily in the latter part of 1991. This was later incorporated into HKMA's guideline on property lending in 1994. One would expect this regulatory change to appear in the empirical analysis in one of the two ways. First and most obviously, one would expect increases in property prices to have led to less lending growth after 1991. To examine whether the response of credit growth to movements in property prices has changed over time, the equation of Δl is reestimated recursively. The results indicate that the coefficients on most variables including Δy are generally stable, except for some volatility in the early period of the sample. However, the coefficient on Δp seems to have declined considerably after 1991.[14]

11 Detailed results are presented in Gerlach and Peng (2002).

12 This is perhaps not surprising, considering the difficulties in disentangling the effects of interest rate changes on the demand and supply of bank credit in this type of framework.

13 See Gerlach and Peng (2002) for details.

14 Charts of the recursive estimates of the coefficients were presented in Gerlach and Peng (2002).

Secondly, the imposition of the regulatory constraint meant that banks could adopt more stringent lending criteria in order to restrain demand. One way of doing that was to increase the spread between lending rates and the interbank rates at which banks raised funds. As shown in Chart 4, the lending spread does seem to have increased around 1991. The lending spread is therefore included in the model.[15] The OLS estimates below indicate that the current lending spread is of a negative sign and significant with a p-value of 0.02. Thus an increase in the spread would reduce credit growth in real terms.

$$\Delta l_t = +\ 0.211^{*}\Delta l_{t-2} - 0.269 + 0.214^{*}\Delta y_t + 0.196^{*}\Delta p_t + 0.349^{*}(\Delta r_{t-1} - \Delta r_{t-2}) \quad (2)$$

(SE) (0.081) (0.105) (0.099) (0.034) (0.137)

$$- 0.070^{*}CI_{t-1} - 0.419^{*}\text{spread}_t$$

(0.026) (0.178)

$R^2 = 0.61$; Sample period: 1984:1 - 2001:4

Finally, a dummy variable is incorporated in the model to capture the regime shift around 1991. The dummy takes the value of zero up to the middle of 1991, and unity thereafter. The equation for Δl is re-estimated by including a term $dummy^{*}\Delta p$. What this term effectively does is to adjust the coefficient on Δp to become in line with a regime shift in banking lending in 1991. The estimates of the equation are as follows:

$$\Delta l_t = +\ 0.232^{*}\Delta l_{t-2} - 0.272 + 0.296^{*}\Delta y_t + 0.404^{*}\Delta p_t - 0.067^{*}CI_{t-1} \quad (3)$$

(SE) (0.078) (0.102) (0.097) (0.081) (0.025)

$$+ 0.467^{*}(\Delta r_{t-1} - \Delta r_{t-2}) - 0.268^{*}dummy^{*}\Delta p_t$$

(0.138) (0.088)

$R^2 = 0.63$; Sample period 1984:1 - 2001:4

It is noted that the dummy series is highly significant, and that the parameters appear more stable than before.[16] Also, various diagnostic and instability tests are passed. Moreover, a comparison of the coefficients of Δp and $dummy^{*}\Delta p$ suggests a significant drop in the response of credit growth to property price around 1991. Taking these estimates literally, a 10% increase in real property prices would lead to a rise in real bank credit by 4% in the earlier sample period, but by only 1.3% after 1991.

15 The spread of best lending rate is used, as it is probably a more appropriate variable than the mortgage spread in explaining growth in total domestic credit.

16 Specifically, recursive estimates of the coefficients are almost straight lines, as shown in Gerlach and Peng (2002).

V. Conclusion

While preliminary, there are two both interesting and important econometric results in this paper. First and foremost, credit growth appears to be mainly demand-driven. Over the long run, it evolves over time in relation to growth in real GDP and property prices. Despite this, policy can play an important role in conditioning the behaviour of credit, as is evidenced by the reduced sensitivity of credit to property prices following the regulatory change in the early 1990s.

Secondly, there is little evidence of feedback from real credit growth of banks to property prices. This follows from the finding that neither the CI relationship nor the growth rate of lending enters in the model for property prices, once the simultaneity is dealt with. This implies that the financial intermediaries did not play an "accelerator" role in the run-up of the property price in the years before the Asian financial crisis. Part of the reason would be related to the prudential regulation and risk control by banks in granting loans. As noted above, a number of prudential measures were adopted in the early part of the 1990s following strong growth in domestic credit in the preceding years. Also, banks appear to have raised the intermediation spread in the 1990s.

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