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April 2014

HOUSING MARKET—TECHNICAL NOTE

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TECHNICAL NOTE

FEBRUARY 2013

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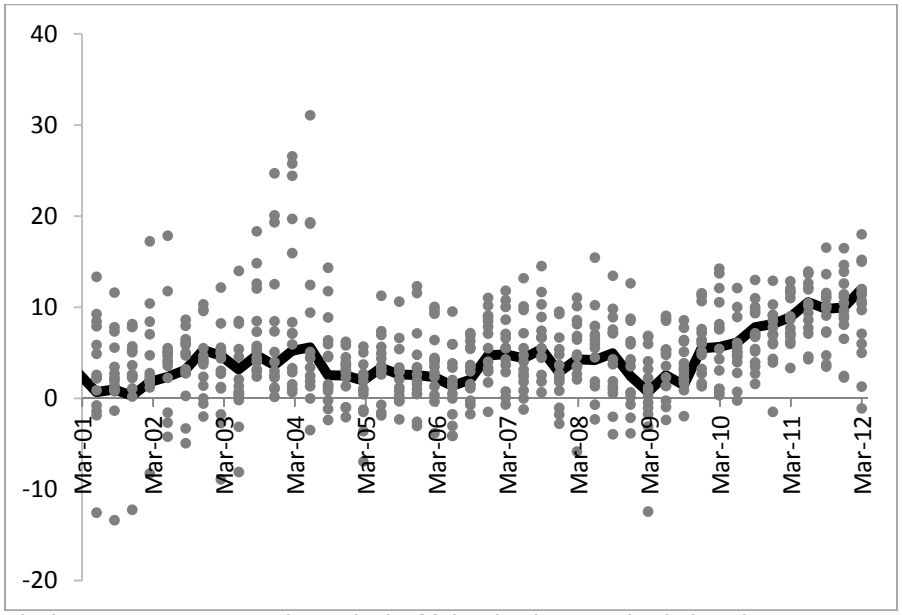
MONETARY AND CAPITAL MARKETS DEPARTMENT

Contents **Page**

I. INTRODUCTION

1. **The note presents an analysis of price developments in the Malaysian housing market and of its sustainability.**[1] The evolution of house prices is of particular interest for policy makers, but assessing the sustainability of house price levels is a daunting task. In some countries, policy makers have preferred to abstain from any intervention, direct or indirect, in the housing market. Such choices were guided by the difficulty in assessing ex-ante the presence of house price "bubbles"—prolonged rapid growth in prices followed by a sudden crash. Malaysia has been maintaining a house price index for quite a long time, allowing for a relatively long-term study of house price dynamics. Nonetheless, a thorough analysis of the housing market in Malaysia is somewhat challenging in view of limited availability of timely micro-data such as households' income and assets. Given these general difficulties, the conclusions of this note should be taken with appropriate caution. The results presented, rather than representing the fruit of an exhaustive analysis, should be used as a warning of possible risks for financial stability, and as a guidance to the areas where further study (and data collection) could be useful.

Figure 1. House Prices Growth in Malaysia, 2001–2012



The solid line is the year-on-year growth rate in the Malaysian house price index; the scatter represents the growth in regional indexes. Quarterly observations, in percentage. Source: BNM.

[1] Prepared by Roberto Piazza (IMF) in the context of the 2013 Malaysia FSAP (http://www.imf.org/external/pubs/ft/scr/2013/cr1352.pdf)

The note highlights two main aspects of the recent evolution of housing market:

- The high growth in housing prices over the past two years cannot be easily attributed to the factors that, historically, have explained developments in house prices. With reference to the statistical model constructed in the note, the growth rate in house prices displays a structural break in 2010.

- In particular, the behavior of residential loans does not seem to contribute to the recent dynamics of house prices.

2. **The growth rate in house prices has increased significantly since 2010, with substantial regional variation.** From 2001 through 2009 house price growth was relatively stable, fluctuating around an average annual growth rate of 3 percent (Figure 1). Since 2010 the growth rate has increased, reaching 12 percent at the beginning of 2011. In contrast, average inflation has changed only marginally, from an annual (end of period) average of 2.7 percent for the years 2007–2009 to an average 2.6 percent for 2010–2011. There is much regional variation in house price growth which ranges, at the beginning 2012, from 18 percent in Kuala Lumpur to -1.1 percent in Perlis. Scarcity of available land, improvements in local infrastructure and differences in employment opportunities are all factors that could contribute to explain the regional variation in house prices growth.

3. **The recent sharp rise in house prices, together with the relatively high household indebtedness, is a potential source of concern for financial stability.** The household debt-to-GDP ratio, while relatively stable in recent years, reached 74 percent at the end of 2011, an historical peak. The increase in the level of household debt could, to a certain extent, be attributed to growing affluence and income growth, and to financial deepening occurring as the country grows. Nonetheless, against the background of increased debt levels, sharp rises in house prices that are not supported by fundamentals can be a source of risk for financial stability. A sharp fall in prices would, in fact, weaken the value of the real estate assets that, explicitly or implicitly, operate as collateral in mortgage and other lending contracts. If this shock were to be accompanied by a recessionary environment with rising unemployment, then the repayment capacity of the borrowers would be impaired, and the fall in the collateral value could then reverberate on the health of financial institutions' balance sheets. If should also be recognized that, at the aggregate level, the strong financial buffers of Malaysian households could be a mitigating factor in case of a reversion in house prices dynamics. At present, total household financial and liquid assets are 2.3 times and 1.5 times household debt, respectively. Caution should be used, however, in relying on aggregate wealth data, since they could miss important distributional variations at the micro level.

4. **The Malaysian authorities have adopted macro-prudential and fiscal measures to address the concerns about the housing market.** In November 2010 the BNM introduced a maximum 70 percent limit for LTV ratio on the third and subsequent home mortgages. Since January 2011, banks' capital risk weights have been raised to 100 percent

for mortgages with LTVs exceeding 90 percent. Moreover, since December 2011, a maximum LTV ratio of 60 percent has been set for residential property loans taken by non-individual borrowers. Previously, the federal government had also taken actions to curb the rise in house prices. In particular, in January 2010 the Real Property Gains Tax (RPGT) was set at 5 percent, after having been exempted during the period 2007–2009. This was revised in 2011 with the reintroduction of a tiered tax structure ranging between 5 and 10 percent for disposal within five years of purchase. The tax rate was further revised in the 2013 budget (announced September 2012) to 10–15 percent for disposal within five years. Finally, in January 2010 the minimum unit price for house purchases by foreigners was raised from RM 250,000 to RM 500,000.

5. **Notwithstanding the measures undertaken, house price growth remains at historical highs.** The analysis conducted indicates a structural break in 2010 in the relation between actual house prices growth and a predictor that historically has tracked well the price dynamics. At the same time, no structural break has been detected in the relation between the growth rate in residential loans and a corresponding predictor estimated from historical data.

II. The Dynamics of the Malaysian Housing Market

6. **The second half of 2010 marks a clear change in the evolution of house prices.** A visual inspection of Figure 1 shows a sharp increase in house price growth beginning around the third quarter of 2010. During the fourth quarter of the same year, the BNM started to adopt a set of macro-prudential policies.

7. **For these reasons, the note focuses on explaining the evolution of various variables of interest during the period starting with the third quarter of 2010.** In particular, the last quarter of 2012 is the last observation for which house price data are available.

8. **Specifically, two variables of interest are analyzed: the evolution of house prices and of the volume of residential loans.** Each one of these dimensions is meant to capture aspects that are relevant to policy makers. The analysis of house prices aims to establish whether the factors that historically have been related to the evolution of house prices are also able to explain the recent increase in the rate of growth of house prices. Since the answer to this question is negative, the note then moves to consider whether recent house prices dynamics can be attributable to a shift in the supply of credit for residential property.

9. **Both variables are studied using a common methodology, which entails constructing a baseline "predictor" for the variable of interest, using historical data.** The note refrains from using the word "fundamental" and uses instead the term

"predictor."[2] The methodology used is entirely econometric, and is built on a two-step procedure. First, a statistical relation is estimated between the variable of interest, i.e., the independent variable, and a small set of regressors. The regressors are chosen among the variables that economic intuition suggests to be related to the independent variable. The regressors' parameters, estimated from a sample period ending with 2010Q2, are then used to construct an out-of-sample prediction for the dependent variable, starting from the third quarter of 2010.

Box 1. When are House Prices Disconnected from "Fundamentals"?

The relationship between house prices and 'fundamentals' is a difficult issue to specify, both theoretically and empirically. The reasons are various. First of all, any definition of a "fundamental" is always model-specific. The simplest asset pricing model would define, for instance, the "fundamental" price of a house as the present discounted value of all future rents that an investor receives (or avoids paying) from the ownership of a house.

Moving a step further, one could also consider that in a hypothetical country where individuals often migrate inter-regionally in search for better jobs, the value attached by an investor to the purchase of a house depends upon how liquid the housing market is. If the market is not liquid, then a house owner who is offered a more profitable job in another region would either have to turn down the job offer, or would have to accept the risk of having to sell (or renting) the house at short notice at a low price. In any case, the value of house to a potential buyer is reduced. Liquidity must then be added to the list of "fundamentals" that influence house prices.

Another version of the pricing model could consider that, if house buyers are credit constrained, house prices might be *lower* than the present discounted value of rents. In other words, the extent to which credit constraints are present and binding would also constitute a "fundamental" determinant of house prices. A final, and somewhat more subtle, example is given by the case when moral hazard is present in the market for residential lending. Moral hazard can arise, for instance, because the government provides guarantees, implicit or explicit, to the mortgage market or simply to the banking sector. When guarantees are present, the price of houses can be *higher* than in the case where there is no guarantee. Is it possible to say that, in this case, the price is higher than its "fundamental"?

The answer is both straightforward and somewhat trivial: it depends on how one defines the "fundamental". For instance, if the fundamental is *defined* as the present discounted value of rents, then the price under moral hazard is higher than the fundamental. But it is also possible to take an alternative view, where the presence of implicit government guarantees is a "fundamental" determinant of house prices – indeed government guarantees are, in the example, truly determinants of equilibrium prices. Under this interpretation, a proxy for the pervasiveness of government guarantees should also be considered as a "fundamental" variable explaining house prices, together with the present discounted value of rents, a measure of liquidity for the housing market, and the tightness of borrowing. The discussion above leads us to conclusions:

1. The definition of "fundamental" is always model-specific.
2. Even within the framework of a given model, there is no unique way to define a "fundamental".

Observationally, a certain level of house prices may differ from what would be predicted using a certain definition of "fundamental". However, the same level of prices might be perfectly explained when the definition of "fundamental" is expanded to include one or more of the model's variables.

For the reasons given above, the use of the word "fundamental" is often confusing. In particular, it is important

[2] The word "fundamental" can be confusing and can give rise to misinterpretations. A full discussion on this point, which is also useful for shedding light on the conceptual framework that should be used in the interpretation of the results derived here, is contained in Box 1.

Box 1. When are House Prices Disconnected from "Fundamentals"? (Concluded)

to emphasize that if a certain observed level of prices is not explained by (a certain definition of) the "fundamental", this does not mean that there is something "wrong" with the observed price level. Ideally, by selecting the right model and, within it, the right set of variables, one should always be able to define the "fundamental" so that it coincides with the observed prices.

Hence, to avoid confusion, this note does not use the word "fundamental". Instead, consistently also with the econometric nature of the analysis conducted, the expression "predictor" is used.

A. House Prices

10. **This section constructs a baseline predictor for the growth rate in house prices, and compares it (out-of-sample) to the actual change in prices since 2010Q3.** The goal of the analysis is to verify whether the variables that, historically, have explained well the dynamics of house prices can also account for the recent sharp rise in house prices growth since the second half of 2010.

Construction of the predictor for house prices growth

11. **Choice of the sample period and data frequency.** Malaysia maintains a quarterly time series for the house prices index, tracing back to the 1990s. The choice of the sample period, however, is here restricted to begin with 2000Q1 (hence, annual growth rates start with 2001Q1). The main reason for this choice is to focus just on the period which followed the Asian financial crisis, which represented a point of structural change for the evolution of the Malaysian macroeconomic aggregates, and for a large set of internal regulations, first and foremost on the banking and financial sector.

12. **Choice of the regressors.** First of all, house prices can be expected to be positively related to the CPI, in particular to the CPI component that includes rents, i.e., the "dividend" from owning a house, and energy prices, since construction costs are heavily influenced by the cost of energy products. Second, house prices should be positively related to current and future real income. Third, house prices should be negatively related to the lending rate. To capture the three dimensions listed above, the following four variables are chosen:

- The CPI component measuring the evolution of rents, power and utilities prices (CPIRP). Source: Bank Negara Malaysia.
- Real GDP (RGDP) and the consumer sentiment index (SENT) as a proxy for current income and future expectations on income growth. Source: Bank Negara Malaysia.
- The base lending rate (BLR), which is the reference rate used by banks to price loans. Source: Bank Negara Malaysia.

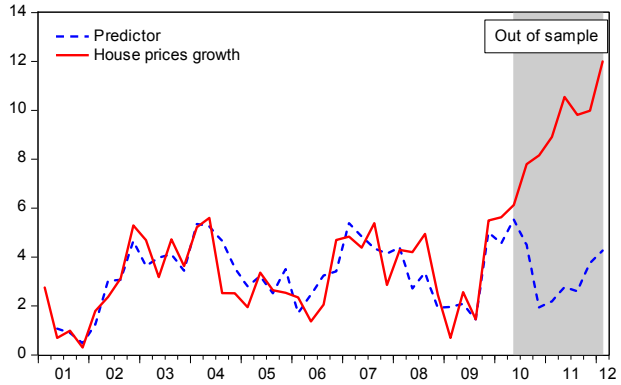
- To reduce the influence of seasonal factors, the regression is performed on percentage annual changes for both the independent variable (house prices) and for the regressors in 1–2. For the BLR, which is already in percentage terms, the annual difference is used. Moreover, to account for a delayed response in investor's expectations, an appropriate lagged structure is employed.

Figure 2. Predictor of House Prices Growth

Dependent Variable: House prices growth
Method: Least Squares
Sample (adjusted): 2001Q2 2010Q2
Included observations: 37 after adjustments

Variable	Coeff.	Std. Error	t-Stat	Prob
Constant	-1.20	1.00	-1.20	0.24
RGDP(-1)	0.58	0.09	6.71	0.00
CPIRP(-2)	1.30	0.54	1.43	0.02
BLR	-1.79	0.52	-3.41	0.00
SENT	0.05	0.01	6.35	0.00

R-squared	0.71	AIC-corrected	4.73
Adjusted R-squared	0.68	Schwarz criterion	3.02
S.E. of regression	0.92	Durbin-Watson stat.	1.96



Results and conclusions

13. **The predictor derived from the regression provides a good in-sample fit.** The estimated coefficients are reported in Figure 2. The corresponding "predictor" explains as much as 71 percent of total in-sample variation in house prices growth. The Adjusted R-squared is also high. All regressors' coefficients are of the expected sign. The Durbin Watson statistic is almost 2, ruling out the presence of residual autocorrelation. Moreover, an Engel-Granger test for cointegration strongly rejects (p-values below 0.0 percent) the null hypothesis that house prices growth and the predictor are not cointegrated.

14. **Starting with the second half of 2010, the relation between house price growth and the estimated predictor breaks down.** After 2010Q2, house price growth permanently exceeds predictions. This conclusion can be seen by inspecting the right hand side panel in Figure 2. A more formal analysis confirms the visual impression. If the regression equation is re-estimated for the entire sample period, the R-squared drops to 38 percent, but introducing the lagged value of house prices growth raises the R-squared to 81 percent, and this new variable is significant at a 1 percent level. Almost identical results hold if, instead of lagged values, the next quarter's growth rate in house prices is used. Strikingly, the lagged house price growth is highly insignificant if added to the baseline regression with sample ending in 2010Q2. In a nutshell, until 2010Q2 the variability of house prices is well explained by the regressors presented in Figure 2, and the introduction of the lagged values of the independent adds no explanatory power. For the period beginning in 2010Q2, by contrast, once the effects of the regressors used to construct the baseline predictor are removed, the current growth in

house prices is statistically well explained by the growth in the past prices, or by the expected growth in future prices.

Alternative specifications for the econometric model have also been explored.

- The main alternative specification is to expand the number of regressors to include the trend growth rate in population (POP)[3] and a more complete lag structure for the other regressors. All the regressors in the alternative model are highly significant, and the regression has a better in-sample fit (R-squared equal to 81 percent and Adjusted R-squared equal to 76 percent). However, the larger number of regressors for a relatively small sample raises concerns about the risk of overfitting. In particular, the alternative model has a worse performance than the baseline model when the corrected Akaike Information Criterion is used as a metric for model selection. Still, the out-of-sample behavior of predictors derived, respectively, from the alternative and the baseline model are almost indistinguishable, providing a robustness check to the results. In addition, the average lending rate on new loans and the growth rate of the adult population have also been used in place of, respectively, the variables BLR and POP. In both cases, the results remain substantially unchanged, but the explanatory power of the regression decreases somewhat.

- The price of steel and that of other construction materials have been added to the regression, or used in place of CPIRP, in the absence of a precise indicator of construction costs. These variables largely underperform the use of CPIRP alone.

- It was not possible to substitute the growth rate in GDP with the growth rate of wages, since the latter variable is available only since 2006, and its use would have required dropping a substantial part of the estimation sample.

15. **Of a somewhat different nature is the decision to exclude the supply of housing from the list of regressors.** This decision is based on the strong endogeneity bias that the variable could introduce. Therefore, for future investigation, the use of vector auto regression (VAR) or simultaneous equation techniques could be explored to help to minimize the impact from the endogeneity bias. Nonetheless, various measures of house supply have been

[3] Official publications report estimates of the overall population only at an annual frequency. In the alternative model, quarterly population levels were obtained using a spline interpolation of annual data. To capture only the long term component of population changes, and to avoid artificial fluctuations introduced by the interpolation, the quarterly population series were filtered using an HP procedure. The annual percentage change in the trend population (POP) is then obtained. As expected, the regression coefficient for population trend growth is positive and significant, but explains a small portion of the independent variable's total variance. The alternative model also includes as regressors the contemporaneous values of RGDP and of CIR, which have positive and significant regression coefficients.

employed in the regression (e.g., the growth rate, current and lagged, in housing units, or the ratio between the population and the number of housing units). None of these additional variables turns out to be significant.

16. **The break-down of the structural relation between house prices and the macroeconomic variables used in the econometric model is suggestive of an important shift in the dynamics of house prices, and should be further investigated.** Identifying the "missing variables" that are able to explain the rapid growth in house prices since 2010 is an important task. As the examples in Box 1 point out, sudden and unexplained increases in house prices are not necessarily a source of concern. This would be the case, for instance, if the price growth was driven by improved liquidity of the housing market. By contrast, if prices growth were related to heightened moral hazard in lending practices, then the consequences for systemic risk would be substantial. Alternative econometric models could extend the analysis in this note to study the role of the following additional explanatory variables:

- Changes in the tax treatment of real property gains.
- The role of demand for domestic real-estate due to foreigners including Malaysians residing abroad.
- The role of (endogenous) changes in the supply of houses.
- The possibility that the growth in house prices could be explained by regional dynamics. The substantial variation in house prices growth, as seen in Figure 1, might reward further investigation.
- More generally, microeconomic phenomena, whose effect is not evident in aggregate variables, could be important. The analysis of changes in the distribution of income growth, of debt and of liabilities, across different population groups would require more data collection.

B. Residential Lending

17. **This section discusses the evolution of residential lending in Malaysia, following the methodology developed in the previous section, as a contribution to the exploration of additional factors influencing the recent dynamics in house prices.** As before, the goal is to construct a predictor that explains the pattern of residential loans for the period ending the second quarter of 2010. The evolution of the predictor is then contrasted, for the period starting with the third quarter of 2010, with the actual evolution of residential loans. This analysis could potentially help shed light on the causes of the sharp rise in house price growth. In particular, a break-down, since the third quarter of 2010, in the relation between loans growth and the corresponding predictor could indicate a connection with the structural break in the evolution of house prices. A sudden and permanent increase, from the second

half of 2010, in residential loans growth over the value of the predictor could, for instance, indicate that changes in credit policies specific to mortgages might be responsible for an increased demand, and hence for higher prices, in the houses market.

Construction of the predictor for residential loans growth

18. **Choice of the sample period and data frequency.** The BNM maintains monthly time series on the volume of approved loans by purpose. One of these series, the volume of residential loans, is the focus of this section. All the series are available as annual growth rates since January 2007. Consequently, the sample period used in the baseline regression extends from January 2007 to June 2010. The out-of-sample period begins in July 2010 and ends in May 2012, the latest date for which values for all regressors (see below) are available.

19. **Choice of the regressors.** Loans approved for the acquisition of residential property can be expected to be explained by two broad groups of indicators. First, current and expected evolution of borrowers' income. Second, general conditions in the credit market, captured by both the volume and the price of loans extended by the banking sector. In addition, to improve the fit of the baseline regression, the lagged value of the dependent variable is employed. Correspondingly, the list of proposed regressors is the following:

- The lagged value in the dependent variable, namely the volume of loans approved for the acquisition of residential property (RES(-1)). [Source: BNM].

- The Industrial Production Index (IP). This is an indicator, at a monthly frequency, of the level of economic activity, and thus a proxy for the evolution of aggregate income. [Source: BNM].

- The outstanding volumes of approved working-capital loans (WCL). It is important to notice that only a small part (about 10 percent) of working capital loans are to the construction sector, thus reducing endogeneity concerns in the relation between WCL and RES. [Source: BNM].

- The price of credit, as proxied by the overnight policy rate (OPR). [Source: BNM].

20. **To reduce the influence of seasonal factors, the regression is performed on percentage annual changes** for the independent variable, current and lagged, and for regressors 1–3. For the OPR, the annual difference is used.

Results and conclusions

21. **The predictor derived from the regression provides a good in-sample fit.** The estimated coefficients are reported in Figure 3. The corresponding "predictor" explains 74 percent of total in-sample variation in the growth rate in residential lending. The Adjusted

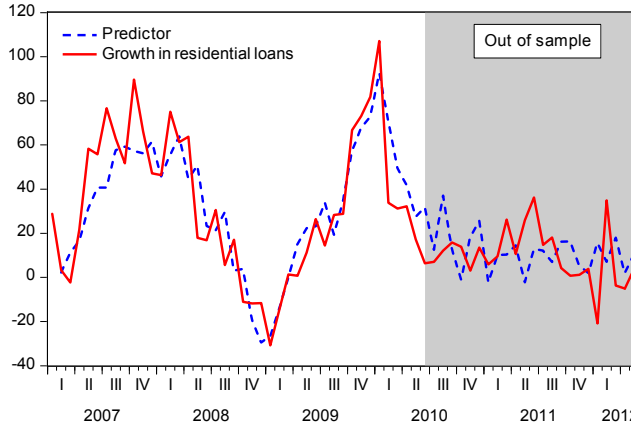
R-squared is high and all regressors' coefficients are of the expected sign. Moreover, an Engel-Granger cointegration test strongly rejects (p-value below 0.0 percent) the null hypothesis that the growth rates in residential loans and the predictor are not cointegrated. The Durbin Watson statistic is closed to 2, and autocorrelation in residuals is ruled out.

Figure 3. Predictor of Residential Loans Growth

Dependent Variable: Growth in residential loans
Method: Least Squares
Sample (adjusted): 2007M2 2010M6
Included observations: 41 after adjustments

Variable	Coeff.	Std. Error	t-Stat	Prob
Constant	0.08	0.05	1.73	0.09
RES(-1)	0.40	0.12	3.22	0.00
IP	1.50	0.51	2.95	0.00
WCL	0.26	0.10	2.69	0.01
OPR(-1)	-19.60	4.87	-4.02	0.00

R-squared	0.74	AIC-corrected	1.18
Adjusted R-squared	0.72	Schwarz criterion	-0.32
S.E. of regression	0.17	Durbin-Watson stat	1.88



22. **The growth rate of residential loans has remained moderate after the first half of 2010, and there is no sign of a break-down in its relation with the estimated predictor.** The growth in residential loans have hovered around 10 percent since the second half of 2010. Even after accounting for the real cycle (IP), the aggregate credit cycle (WCL and OT) or the price of credit (OPR), there is no sign of a structural change in the dynamics of the growth in residential credit. This conclusion is confirmed by various statistical tests. First, an Engel-Granger test strongly rejects (p-value below 0.0 percent) the null hypothesis of no cointegration between the growth rate in residential credit and the corresponding predictor even when the estimation sample is extended to the entire period (up to May 2012). A Chow test, calculated over the entire sample period, does not reject the null hypothesis of no structural break in June 2010.

23. **An alternative model specification has been considered. In particular, two regressors were added to the baseline model.** The first is the lagged value of WCL. The second is a residual credit variable called "other loans", composed of all loans approved, excluding those for the provision of working capital, the acquisition of residential property, or for financing the construction sector. Both additional regressors turn out to be highly significant, and with the expected (positive) sign. The regression fit improves, with the R-squared and the Adjusted R-squared increasing, respectively, to 83 and 80 percent. However, the small sample size raises concerns of overfitting, and in fact the baseline model is the preferred model according to the corrected Akaike Information Criterion. Nonetheless,

regardless of which of the two models is used, the out-of-sample behavior of the predictor is largely unaffected.

24. **The econometrically stable evolution of residential loans contrasts with what is observed for the behavior of house prices.** Recent higher growth rates in house prices may not be due to changes in credit policies specific to the mortgage market. If the increases in house prices were caused by a change in credit policies specific to the residential sector, e.g. through a reduction in lending standards for mortgage loans only, then the structural break in house price growth should have been accompanied by a structural break for residential loans growth. In particular, starting with the third quarter of 2010, the actual growth rate in residential loans should have permanently shifted above the path of the respective predictor.

25. **Similarly, the analysis also suggests that the macro-prudential policies adopted did not generate a structural shift in the growth rate of residential loans or of house prices.** Specifically, if the policies had had a restrictive effect on the growth of residential credit, then their introduction in late 2010 would have marked a permanent fall in the growth of residential loans below the corresponding predictor. The apparent lack of impact of the macro-prudential policies on the volume of residential loans is not surprising, since the authorities' goal was not to change the volume of lending, but rather its composition, by reducing lending for "speculative" purposes, while favoring lending to "non-speculative" investors. With this respect, the macro-prudential policies may be considered effective since, for instance, the growth rate of individuals with multiple housing accounts has slowed to 2.3 percent in June 2012, from 14.3 percent in December 2010. At the same time, there is no evident sign that, so far, the macro-prudential policies have led to a slowdown in house prices growth.

III. CONCLUSIONS

26. **The most striking feature in the recent development of the Malaysian housing market is the high growth rates in house prices that have been recorded since 2010.** Since the third quarter of 2011, house prices experienced an annual growth rate of at least 10 percent. While remaining below those observed recently in some neighboring countries, these rates of price growth are historical highs for Malaysia.

27. **Since the second half of 2010, the growth rate in house prices has decoupled from its structural relation with the predictor constructed from historical data.** This decoupling remains unexplained, and should be further investigated. The identification of the sources of the shift in house prices dynamics is a crucial step towards: a) determining whether the high growth in house prices is based on harmful market distortions; b) if needed, correcting the distortions through appropriately targeted actions.

28. **There is no evidence supporting the hypothesis that higher growth in house prices could be due to changes in lending practices specific to the residential sector.** Changes in lending practices, for instance through reductions in lending standards for

mortgage loans, would have generated a shift in the relation between the growth in residential loans and the corresponding estimated predictor. On the contrary, the analysis proposed indicates that this relation has remained stable over time.

29. **There is no direct evidence that the macro-prudential policies adopted have changed the dynamics of house prices or of aggregate residential loans.** The growth rate in house prices has remained high even after the introduction of the macro-prudential measures, and the structural dynamics of aggregate residential loans have remained virtually unchanged. This is not surprising, since the authorities' goal was to change the composition of lending, rather than its volume. With this respect, the macro-prudential measures adopted appear to have had some effect. Moreover, one could argue that the measures encouraged a more cautious approach to lending than might otherwise have been the case, supporting financial stability by 'shutting the stable door before the horse bolted.'

30. **More research is needed: enhancements in the collection of micro-data would be particularly useful.** In particular, the collection of granular data including house ownership by income group, collateral values and refinancing facilities taken by house buyers especially for "equity withdrawal" purposes would provide extremely useful tools in the analysis of systemic risk and in the design and implementation of macro-prudential policies.