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Wealth Effects in Emerging Market Economies*

Tuomas A. Peltonen† Ricardo M. Sousa‡ Isabel S. Vansteenkiste§

Abstract

We build a panel of 14 emerging economies to estimate the magnitude of housing, stock market, and money wealth effects on consumption. Using modern panel data econometric techniques and quarterly data for the period 1990:1-2008:2, we show that: (*i*) wealth effects are statistically significant and relatively large in magnitude; (*ii*) housing wealth effects tend to be smaller for Asian emerging markets while stock market wealth effects are, in general, smaller for Latin American countries; (*iii*) housing wealth effects have increased for Asian coutries in recent years; and (*iv*) consumption reacts stronger to negative than to positive shocks in housing and financial wealth.

Keywords: *wealth effects, consumption, emerging markets.*

JEL Classification: *E21, E44, D12.*

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Non-technical summary

Household consumption is affected not only by income but also by wealth, such as real estate and stock ownership. When real estate or stock prices rise, the wealth of homeowners or shareholders increases and household consumption can rise even when labour income remains constant. Such rise in consumption due to the increase in real estate prices is called housing wealth effect, whereas the rise in consumption that is due to the increase in stock market prices is called stock market wealth effect.

There is a large body of literature that studies the effect of asset price fluctuations on private consumption and authors have used different econometric techniques and databases to address the issue. More recently, interest in the topic has regained ground against the background of the current financial turmoil which has led to concerns by numerous academics, central banks and governments about the potential macroeconomic implications of a downturn in house and equity prices.

Despite the wide range of studies, most of the empirical evidence refers to advanced economies and mostly to the United States, where data is more readily available. Extending the existing literature to assess the macroeconomic impact of asset price fluctuations in emerging markets may, however, be important as these economies are becoming a key engine of growth in the world economy and may play an important role in the resolution of global imbalances. In addition, since an increasingly large number of emerging market economies is becoming financially developed (Dorrucci et al, 2008), their access to financial assets and the possibility to extract equity from them has also risen, hence, increasing the potential macroeconomic impact of domestic asset price movements.

Measuring wealth effects for emerging markets is, therefore, of major relevance, and the main goal of the current work. To the best of our knowledge, only Funke (2004) tried to address this question, which we improve and extend upon several directions. First, we look not only at the effects of money and stock market wealth but also at housing wealth effects, therefore capturing the impact of an important component of household wealth. Ignoring this may lead to omitted variable bias and, consequently, to biased estimates of the wealth effects. Second, we use data at high frequency - that is, quarterly data (for 1990:1-2008:2) - and are, therefore, able to obtain more precise estimates of the magnitude of the wealth effects on consumption. Third, we consider labour income (rather than disposable income or real GDP per capita) in our panel of countries. Finally, we build upon modern panel estimation techniques to control for endogeneity.

Using a panel of 14 emerging economies, we show that wealth effects are statistically significant and relatively large: a 10% rise in housing prices leads to an increase in private consumption of between 0.25% and 0.49%; an increase of 10% in stock prices is associated with a 0.29% to 0.35% increase in consumption; and when money wealth rises by 10%, consumption increases by 0.41% to 0.50%. Additionally, the empirical findings suggest that: (*i*) housing wealth effects tend to be smaller for Asian emerging markets while stock market wealth effects are, in general, smaller for Latin American countries; (*ii*) housing wealth effects have increased in recent years for Asian emerging economies and (*iii*) consumption reacts stronger to negative than to positive shocks in housing and financial wealth. Among Asian countries, stock market wealth effects tend to be larger in the most developed financial markets while housing wealth effects are only statistically significant in the cases of Hong Kong, Singapore and Thailand. Finally, the results suggest that consumption growth exhibits a substantial persistence and responds sluggishly to shocks. This may be an important reason for concern

- particularly, in the case of a negative downturn - taking into account that these economies have often witnessed episodes of economic, financial and currency crises. In fact, despite the small short-run elasticity of consumption to asset price changes, the empirical findings show that the long-run elasticities are quite large. As a result, the effects of a slowdown of the economic activity may be amplified by this intrinsic characteristic of consumption in emerging markets.

1 Introduction

Household consumption is affected not only by income but also by wealth, such as real estate and stock ownership. When real estate or stock prices rise, the wealth of homeowners or shareholders increases and household consumption can rise even when labour income remains constant. Such rise in consumption due to the increase in real estate prices is called housing wealth effect, whereas the rise in consumption that is due to the increase in stock market prices is called stock market wealth effect.

There is a large body of literature that studies the effect of asset price fluctuations on private consumption and authors have used different econometric techniques (such as panel versus single equation models) and databases (like micro panel data and aggregate time series) to address the issue.[1] More recently, interest in the topic has regained ground against the background of the current financial turmoil which has led to concerns by numerous academics, central banks and governments about the potential macroeconomic implications of a downturn in house and equity prices.

Despite the wide range of studies, most of the empirical evidence refers to advanced economies and mostly to the United States, where data is more readily available. Extending the existing literature to assess the macroeconomic impact of asset price fluctuations in emerging markets may, however, be important as these economies are becoming a key engine of growth in the world economy and may play an important role in the resolution of global imbalances. In addition, since an increasingly large number of emerging market economies is becoming financially developed (Dorrucci et al, 2008), their access to financial assets and the possibility to extract equity from them has also risen, hence, increasing the potential macroeconomic impact of domestic asset price movements.

The importance of financial assets in emerging economies is *inter alia* reflected both in the rise in stock market capitalization which currently represents more than 20% of the world's stock market capitalization,[2] and as a share of its domestic size which is in many cases higher than for developed economies. For real estate assets, emerging markets have been recording an important rise in homeownership rates, which are now estimated to be around 62% for Latin America and 55% for Emerging Asian urban areas (see, for example, UN-HABITAT).

Measuring wealth effects for emerging markets is, therefore, of major relevance, and, to the best of our knowledge, only Funke (2004) has tried earlier to address this question. In this study, the author uses a panel of 16 emerging market economies and annual data for the period 1985-2000. He finds some evidence for a small, but statistically significant stock market wealth effect.

In this paper, we intend to quantify the wealth effects in emerging markets whilst improving and extending the existing literature in several directions. First, we look not only at the effects of money and stock market wealth but also at housing wealth effects, therefore capturing the impact of an important component of household wealth. Ignoring this may lead to omitted variable bias and, consequently, to biased estimates of the wealth effects. Second, we use data at high frequency - that is, quarterly data (for 1990:1-2008:2) - and are, therefore, able to obtain more precise estimates of the magnitude of the wealth effects on consumption. Third, we consider labour income (rather than disposable income or real GDP per capita)

[1] See, for example, Altissimo et al. (2005) for a review of the literature on wealth effects.

[2] The stock market capitalization of the 14 emerging market economies studied in this paper accounted for 19.2% of the world's total stock market capitalization in September 2008. Only three years ago, their share of the world stock market capitalization was 12.3%.

for our panel of countries.[3] Finally, we build upon modern estimation techniques - namely, by using a system GMM estimator developed by Blundell and Bond (1998) - to control for endogeneity.

Due to the wide coverage of our study, we face a number of data limitations. First, data on housing and equity wealth is not available on a broad basis for emerging economies. We therefore use stock market and house price indices as proxy variables for these wealth components. This is however in line with the studies that have investigated the (in)direct impact of stock market prices on aggregate consumption (Romer, 1990; Poterba and Samwick, 1995; and Ludwig and Slok, 2004) or the role played by housing prices (Miles, 1992; Miles (1995), Girouard and Blöndal (2001), Aoki et al. (2003) as well as Ludwig and Slok (2004).[4] Second, we consider a measure of aggregate consumption and hence we cannot distinguish between non-durable and durable consumption. Conventional theories look at the flow of non-durable and services consumption, since durable consumption can be thought of as a replacement and addition to the capital stock. In addition, total consumption measures include expenditures on housing services. Nevertheless, as Mehra (2001) points out, total consumption is the variable of interest when investigating the consumption-wealth channel. In particular, stock market crashes are more likely to lead to a postponement of durable consumption decisions, while the reduction of non-durable consumption might be of minor importance (Romer, 1990). Furthermore, durable consumption goods are among the major entities on which resources raised by mortgage refinancing are spent on (Brady et al., 2000).

Using a panel of 14 emerging economies, we show that wealth effects are statistically significant and relatively large: a 10% rise in housing prices leads to an increase in private consumption of between 0.25% and 0.49%; an increase of 10% in stock prices is associated with a 0.29% to 0.35% increase in consumption; and when money wealth rises by 10%, consumption increases by 0.41% to 0.50%. Additionally, the empirical findings suggest that: (*i*) housing wealth effects tend to be smaller for Asian emerging markets while stock market wealth effects are, in general, smaller for Latin American countries; (*ii*) housing wealth effects have increased for Asian countries in recent years; and (*iii*) consumption reacts stronger to negative than to positive shocks in housing and financial wealth. Among Asian countries, stock market wealth effects tend to be larger in the most developed financial markets while housing wealth effects are only statistically significant in the cases of Hong Kong, Singapore and Thailand. Finally, the results suggest that consumption growth exhibits a substantial persistence and responds sluggishly to shocks. This may be an important reason for concern - particularly, in the case of a negative downturn - taking into account that these economies have often witnessed episodes of economic, financial and currency crises. In fact, despite the small short-run elasticity of consumption to asset price changes, the empirical findings show that the long-run elasticity is quite large. As a result, the effects of a slowdown of the economic activity may be amplified by this intrinsic characteristic of consumption in emerging markets.

The rest of the paper is organized as follows. Section 2 reviews the existing literature of wealth effects on consumption. Section 3 presents the estimation methodology. Section 4 describes the data. Section 5 discusses the results. Finally, Section 6 concludes with the main

[3] In the empirical application, labour income is approximated with wage or salary income.

[4] The reader should note that parts of the equity and housing wealth is owned by non-residents. This implies that parts of domestic asset price changes are not reflected in changes in domestic consumption. The paper acknowledges this caveat, but focuses on the domestic consumption effects of wealth changes caused by asset price changes.

findings and policy implications.

2 A Brief Review of the Existing Literature

An extensive empirical literature has tried to estimate the magnitude of the wealth effects on consumption. For the United States, commonly cited estimates of the marginal propensity to consume out of wealth are typically in the range of 4 to 7 cents increased consumer spending from a dollar increase in aggregate wealth (see, for example, Davis and Palumbo, 2001; Gale and Sabelhaus, 1999; Kiley, 2000). Mankiw and Zeldes (1991) show that the consumption of stockholders is more volatile and more strongly correlated with stock market returns than for non-stockholders. Ludvigson and Steindel (1999) also identify a wealth effect on consumption but show that the effect is unstable over time.

Other studies find modest wealth effects. Cochrane (1994), Mayer and Simons (1994), Brayton and Tinsley (1996), Campbell et al. (1997), Desnoyers (2001), and Lettau and Ludvigson (2001) show that the overall impact on consumption is small and mainly transitory. Poterba and Samwick (1995) suggest that, although patterns of stocks' property have changed, they did not have a significant impact on the relation between stock price fluctuations and private consumption. Caporale and Williams (1997) suggest a small marginal propensity to consume out of wealth, but emphasize that the processes of financial liberalization/deregulation have strengthened wealth effects. Otoo (1999) shows that the correlation between stock prices and the consumer confidence level (either for stockholders or non-stockholders) does not change with the property of stocks, that is, consumers use stocks mainly as a leading indicator of real economic activity. Poterba (2000) points out that the concentrated nature of wealth, the desire to leave bequests, and precautionary motives in the consumer's behavior are important determinants of the modest wealth effects. Starr-McCluer (2002) suggests that concerns relative to trend inversions in stock prices can lead stockholders not to spend realized gains.

At the international level, the evidence is also quite diverse. In Japan, Mutoh et al. (1993) and Ogawa (1992), Horioka (1996) and Ogawa et al. (1996) suggest estimates for the marginal propensity to consume out of wealth of around between 0.01 and 0.04, varying, considerably, with the definitions of wealth and income. In France, Bonner and Dubois (1995) and Grunspan and Sicsic (1997) do not find evidence of a wealth effect. In Italy, Rossi and Visco (1995) present evidence of a marginal propensity to consume wealth that ranges between 0.03 and 0.035. In Australia, McKibbin and Richards (1988), Tan and Voss (2003) and Bertaut (2002) estimate the marginal propensity to consume out of wealth to be between 0.02 and 0.05. In Canada, Macklem (1994), Boone et al. (2001) and Pichette (2000) suggest the existence of a wealth effect of the order of 0.03 to 0.08. For the UK, Fernandez-Corugedo et al. (2003) quantify the marginal propensity to consume out of wealth at 0.05.

The studies mentioned above are based on the life cycle model and the permanent income hypothesis, as they suggest that consumers distribute increases in anticipated wealth over time and that the marginal propensity to consume out of wealth should be the same no matter what asset categories are considered.

A companion literature has, however, argued that shocks to different forms of wealth (such as equity versus housing wealth) can elicit varying consumption responses. There is, in fact, a number of reasons for why the responsiveness of consumers to financial asset shocks and housing asset shocks can be different: liquidity reasons (Pissarides, 1978), utility derived from

the property right of an asset as housing services or bequest motives (Poterba, 2000; Bajari et al., 2005), different distributions of assets across income groups,[5] expected permanency of changes of different categories of assets, mismeasurement of wealth[6] and 'psychological factors' (Shefrin and Thaler, 1988). Each of these motives suggests a distinction between the impact of financial wealth and housing wealth on consumption (Case et al., 2005).

At this level, the empirical findings are not yet conclusive, namely, in what concerns the significance of housing wealth effect. Elliott (1980), Levin (1998) and Mehra (2001) find essentially that the wealth effect is independent of the category of asset considered. Thaler (1990), Sheiner (1995), and Hoynes and McFadden (1997) investigate the correlation between individual savings rates and changes in house prices and find a weak relation. Slacalek (2006) shows that housing wealth effects are smaller than financial wealth effects for most countries, with the notable exceptions of the US and the UK. In contrast, Case (1992), Kent and Lowe (1998), Skinner (1999), Case et al. (2005), and Dvornak and Kohler (2003) find evidence of a considerable housing wealth effect on consumption. Carroll et al. (2006) exploit the sluggishness of consumption growth to distinguish between short-run and long-run wealth effects, and find that housing wealth effects are substantially larger than for stock market wealth.

Despite the wide evidence on wealth effects for developed countries, little attention has been given to emerging markets, a gap that we try to address in the present work. To the best of our knowledge, the closest to our paper is - as mentioned in section 1 - Funke (2004), who uses an annual panel of 16 emerging economies for the period 1985-2000. By means of feasible generalized least squares (FGLS), the author estimates a panel equation which includes log changes in real GDP per capita, log changes in real money wealth per capita and log real equity returns as explanatory variables for changes in real consumption per capita. Based on this model, the author finds a small, but statistically significant stock market wealth effect: a 10% decline (increase) in stock prices is associated with a 0.2-0.4% decrease (increase) in private consumption over a 3-year period.

3 Estimation Methodology

The empirical model for the estimation of wealth effects on consumption can be summarized as follows[7]:

$$\log C_{i,t} = \beta_0 \log C_{i,t-1} + \beta_1 \log Y_{i,t} + \beta_2 \log W_{i,t} + \log \mathbf{X}'_{ji,t}\boldsymbol{\beta}_j + v_i + \varepsilon_{i,t} \qquad i = 1, ..., N \qquad t = 1, ..., T_i \tag{1}$$

where $C_{i,t}$ stands for the consumption of country i at time t, $Y_{i,t}$ represents labour income, $W_{i,t}$ is the asset wealth, $X_{ji,t}$ is a vector of j strictly exogenous covariates, the βs are parameters to estimate, v_i are country-specific effects, and, $\varepsilon_{i,t}$ is the error term. The inclusion of a lag of consumption in (1) is aimed at capturing the presence of habit formation and simultaneously tests the permanent income hypotheses. Empirically, it also captures the high degree of

[5] Housing wealth tends to be held by consumers in all income classes. On the other hand, stock market wealth is, in many countries, concentrated in the high-income groups which are often thought to have a lower propensity to consume out of both income and wealth.

[6] This may be especially so for houses, which are less homogenous and less frequently traded than shares. Also many consumers may not be aware of the exact value of their indirect share holdings. For example, Sousa (2003) shows that directly held stock market wealth effects are significantly different from indirectly held stock holdings.

[7] The more recent literature, such as Campbell and Mankiw (1989), estimate the model in first differences.

persistence of consumption, as noted in Carroll et al. (2008). It is also in line with the findings of Flavin (1981), Campbell and Mankiw (1989) and Lettau and Ludvigson (2001), who show that consumption growth is somewhat predictable by its lag.

When model (1) is estimated using ordinary least squares (OLS), substantial complications arise. In fact, in both the fixed and random effects settings, the lagged dependent variable is correlated with the error term, even if we assume that the disturbances are not themselves autocorrelated. Moreover, the estimation of the dynamic panel defined above suffers from the Nickell (1981) bias, which disappears only if T tends to infinity.

Arellano and Bond (1991) developed a generalized method of moments (GMM) estimator that solves the problems referred above, allowing one to eliminate country specific effects or any time invariant country specific variable. Additionally, it also solves the endogeneity issue that may be due to the correlation of the country specific effects and the independent variables. Consequently, first differencing (1) removes v_i, and produces an equation estimable by instrumental variables:

$$\begin{aligned} \Delta \log C_{i,t} &= \beta_0 \Delta \log C_{i,t-1} + \beta_1 \Delta \log Y_{i,t} + \beta_2 \Delta \log W_{i,t} + \boldsymbol{\Delta} \log \mathbf{X}'_{ji,t} \boldsymbol{\beta}_j + \Delta \varepsilon_{i,t} \quad (2) \\ \text{with } i &= 1, ..., N \quad t = 1, ..., T_i \quad j = 1, ..., K \quad (3) \end{aligned}$$

where Δ is the first difference operator, while the variables and parameters are defined as in (1). Following Holtz-Eakin et al. (1988), Arellano and Bond (1991) instrument the differenced pre-determined and endogenous variables with their available lags in levels: levels of the dependent and endogenous variables, lagged two or more periods; levels of the pre-determined variables, lagged two or more periods. The exogenous variables can be used as their own instruments.

A problem of this difference-GMM estimator is that lagged levels are weak instruments for first-differences if the series are very persistent (Blundell and Bond, 1998). According to Arellano and Bover (1995), efficiency can be increased by adding the original equation in levels to the system. If the first-differences of explanatory variables are uncorrelated with the individual effects, both lagged values of the first-differences of the explanatory variables and of the dependent variable can be used as instruments in the equation in levels. In this case, the estimation combines the set of moment conditions available for the first-differenced equations with the additional moment conditions implied for the levels equation. Blundell and Bond (1998) show that this system GMM estimator is preferable to that of Arellano and Bond (1991) and, for this reason, the current paper uses an estimation methodology based on Blundell and Bond (1998).

4 Data and Summary Statistics

The dataset consists of an unbalanced panel of 14 main emerging economies, 8 from emerging Asia (China, Hong Kong, Indonesia, Korea, Malaysia, Singapore, Taiwan, and Thailand), 4 from Latin America (Argentina, Brazil, Chile and Mexico), and 2 others (Russia and South Africa). These countries account for 45.9% of world GDP, and 97.3% of the emerging economies' GDP, measured in 2007 PPP terms.[8]

[8] The IMF (2008) classifies the Newly Industrialized Economies (Hong Kong, Korea, Singapore and Taiwan) as industrialized economies, but includes them into the aggregate of "emerging Asia". When these economies are included into the emerging economies' category, the total share of "other emerging and developing economies" of the world GDP is 47.2%, measured using 2007 PPP weights.

We use quarterly data for the period 1990:1-2008:2 (where available).[9] Housing and financial wealth are proxied by the corresponding indices. Housing price (residential property) indices are provided by CEIC data (for the emerging Asian countries), the IMF (for the Latin American countries), and Haver Analytics (for the other two economies). Stock price indices (composite indices) are obtained from the Global Financial Database. Money wealth is proxied by broad money, M_2, available from Haver Analytics.[10] With regards to the other series, real private consumption (private consumption at constant prices) are the official series from National Accounts statistics, provided by Haver Analytics, with the exception of China, Hong Kong, Indonesia, and Singapore for which the data comes from CEIC. Data on income (either salary or wage income) is obtained from CEIC (for emerging Asian countries), and from Haver Analytics (Latin American economies, Russia, and South Africa). The CPI price index is mainly from Haver Analytics, with the exception of Argentina, Brazil, and Chile, for which the data source is the IMF. Finally, population statistics are obtained from the UN World Population Statistics database. Table A in Appendix provides a detailed description of the variables and data sources used in the analysis.

For the regression analysis, data are transformed in several ways. First, the wealth variables are deflated using the private consumption deflator, with the exception of Singapore, where the CPI index (all items) is used. Moreover, we divide real money by the population in order to express it in per capita terms. Second, income corresponds to real wage or salary provided by National Statistics authorities, except for Argentina, China, Indonesia, Malaysia, Russia, and Thailand, where nominal wages (or salaries) are deflated using the private consumption deflator. Third, data on population for all countries and real private consumption for China are annual, and, therefore, we interpolate them using a cubic conversion method. Fourth, the semi-annual nominal wage data for Hong Kong is interpolated using the same method for the period 1990:1-1998:4.

Given that emerging markets have frequently been the stage for episodes of economic, financial and/or currency crises, we create a dummy for these events and define it as follows: it takes the value of 1 if either the change (year-on-year) of real GDP, real property price, or real equity price index is more than two times the country-specific standard deviation of the variable; and 0, otherwise. In addition, one quarter before and after the peak of crisis are also marked with 1. All other periods (normal periods) are marked with 0.[11]

Figures 1 to 5 in Appendix A show the evolution in time of all series used in the regression analysis. Tables A1 to A4 also present a range of descriptive statistics. In this context, it is noteworthy to mention Table A4, which reports that the average correlation coefficient between consumption and equity prices is around 0.4 over the entire sample; for property prices, this coefficient is even higher, namely around 0.5.

Finally, we use the panel unit root tests of Levin et al. (2002), Im et al. (2003), and Maddala and Wu (1999) to assess the presence of unit roots in the data. The empirical findings show that the log differences of all key variables are stationary following the rejection

[9] For more details on the data providers, please visit the following web sites: http://www.ceicdata.com/ for CEIC data, http://www.haver.com for Haver Analytics, http://www.imf.org for the IMF, and http://www.globalfinancialdata.com for Global Financial Data.

[10] For Thailand, we use M_3 instead of M_2.

[11] Note that there is no uniform definition of currency and financial crisis in the literature (see e.g. Kaminsky et al. (1996)). Our definition of financial crisis follows a "signal approach", developed by Kaminsky and Reinhart (1996) and Kaminsky et al. (1996), where abnormal movements in the key economic and financial variables are used as indicators for financial crisis.

of the null hypothesis of a unit root (see Table A5).

5 Estimation results

We start by considering the GMM estimation of the dynamic panel defined in (2). We include the lag of consumption, the labour income (proxied by wage and salary income), the housing wealth (proxied by the property index), the financial wealth (proxied by the equity price index), and the money wealth (proxied by the per capita broad money) among the set of endogenous variables.[12] In the set of strictly exogenous variables, we include a dummy variable for economic/financial crises, and a constant. In addition, we also include a linear time trend to the specification if it is statistically significant at 10% level, following the approach adopted in Case et al. (2005). The moment conditions in the GMM model use the orthogonality conditions between the differenced errors and lagged values of the dependent variable, which assume that the original disturbances in (2) are serially uncorrelated and that the differenced error is MA(1) with a unit root. In fact, two diagnostics are computed using the Arellano and Bond (1991) GMM procedure to test for first order and second order serial correlation in the disturbances. One should reject the null hypothesis of the absence of first order serial correlation and not reject the null hypothesis of the absence of second order serial correlation. The test results confirm these assumptions.

The estimation results are summarized in Table 1.[13] Columns 1 to 4 display the point estimates using the entire sample: in Column 1, we include all components of wealth in the estimation; in Columns 2, 3 and 4, we consider only one component of wealth (respectively, housing, financial, and money wealth). Columns 5 and 6 provide a comparison between the wealth effects in Asian and Latin American countries in the period 2001:1-2006:4 (where all variables are available for both regions). Columns 7 and 8 allow us to analyze the wealth effects for Asian countries in two sub-samples: 1990:1-1999:4 and 2000:1-2008:2. In Column 9, we assess the existence of a "ratchet" effect and, therefore, separate between positive and negative changes in financial wealth and housing wealth. The major reason consumer's reaction to a fall in wealth may be greater than to an increase is the assumption of diminishing marginal utility of wealth. Under this assumption, investor preferences can be described by convex marginal utility functions. Such utility functions reflect risk aversion implying that consumer values an increase in wealth less highly than an equivalent decrease.

In all specifications, the lag of consumption is statistically significant, therefore, reflecting the strong persistence of consumption growth and its sluggish response to shocks.[14] In addition, the different components of wealth are statistically significant when all observations are included in the estimation (Columns 1 to 4). In fact, the empirical evidence suggests that: when housing wealth rises by 10%, private consumption increases by 0.25%-0.49%; a 10% increase in stock market wealth leads to an increase in consumption of 0.29%-0.35%; and a rise of 10% in money wealth is associated with a 0.41%-0.50% increase in consumption. The elasticity of consumption with respect to wages is, in general, small and ranges between

[12] All variables are expressed in log differences.

[13] In the Appendix B, we provide a summary of the results from the pooled OLS regression estimations. The main findings corroborate the ones from the GMM estimation.

[14] The persistence of consumption growth may be due to: household inattention; evaluation of household finances at periodic intervals (such as annual tax reporting times); adjustment costs to change consumption; and habit formation. All these factors can lead to a sluggish response of consumption (see, for example, Kennickell and Starr-McCluer, 1997; Dynan and Maki, 2001).

0.024 and 0.091. This may be signalling the importance of transitory shocks or relevance of precautionary savings in these countries.

When we focus on the period 2001:1-2006:4 (Columns 5 and 6), the results suggest that, in general, wealth effects remain statistically significant, the only exception being housing wealth effects for Asian countries.

Columns 7 and 8 suggest that housing wealth effects have been stronger for Asian countries in the second sub-sample. In fact, one observes an increase of the short-run elasticity of consumption to housing prices from 0.036 (in the period 1990:1-1999:4) to 0.042 (in the period 2000:1-2008:2). In contrast, financial wealth effects were larger in the first sample period (as reflected by the fall of the short-run elasticity of consumption to stock prices from 0.042 to 0.027). Finally, Column 9 suggests that consumption reacts asymmetrically to positive versus negative shocks in housing and/or financial wealth, and that the "ratchet" effect is particularly strong in the case of changes in property prices. [15]

Table 2 provides a summary of the long-run elasticities of consumption with respect to the wage, the property price, the equity price and the money wealth. We calculate the long-run elasticities using the (unrestricted) estimates of consumption persistence displayed in Table 1.[16]

Given the strong persistence of consumption growth, the estimates show that long-run elasticities of consumption are, in general, large (Columns 1 to 4). The estimates suggest that: (i) the long-run elasticity of consumption with respect to housing wealth ranges between 0.091 and 0.179; (ii) the long-run response of consumption to changes in equity wealth lies between 0.128 and 0.148; and (iii) the long-run elasticity of consumption with respect to money wealth is in the range of 0.151 to 0.227. The estimates of the long-run elasticities with respect to wages are small and range between 0.110 and 0.336. Despite the small magnitude, these results are more in line with the standard theory (than the short-run elasticities) and closer to the findings of other works that use international data (see Case et al., 2005).

When we restrict the analysis to the period 2001:1-2006:4 (Columns 5 and 6), the results show that the long-run elasticity of consumption with respect to equity wealth is stronger for Asian emerging market economies (0.097) than for Latin American countries (0.066). In contrast, the long-response of consumption to changes in property prices is bigger in Latin America (0.323).

Columns 7 and 8 show that the long-run elasticity of consumption with respect to financial wealth did not change significantly over time (an estimate of 0.097 in the period 1990:1-1999:4 that compares with 0.098 in the period 2000:1-2008:2). On the other hand, the long-run elasticity of consumption with respect to housing wealth has strongly increased in the second sub-sample (an estimate of 0.154). The rise is housing wealth effects is in accordance with the increased financial development in the region, which allows easier access to equity from housing than before.

Finally, column 9 highlights the significant differences in consumption responses to positive versus negative wealth shocks. Similarly to the short-run results, the estimated long-run elasticity for a negative property price shock (0.260) is particularly large.

[15] We also investigate the response of consumption to small *versus* large shocks in wealth, but the empirical evidence does not corroborate the existence of significantly different response. The results are available upon request.

[16] In practice, the long-run elasticity equals short-run elasticity/(1-coefficient on lagged consumption growth).

Table 1: Dynamic Panel Regression (GMM) - Short-Run Elasticities.

	All 90-08	All 90-08	All 90-08	All 90-08	EMAsia 01-06	LatAm 01-06	EMAsia 90-99	EMAsia 00-08	All 90-08
ΔConsumption	0.726***	0.729***	0.801***	0.781***	0.692***	0.569***	0.568***	0.726***	0.720***
	[0.028]	[0.054]	[0.035]	[0.039]	[0.050]	[0.042]	[0.113]	[0.050]	[0.033]
ΔWage	0.051**	0.091*	0.047***	0.024*	0.002	0.036*	0.202	0.023	0.049**
	[0.023]	[0.051]	[0.014]	[0.013]	[0.024]	[0.022]	[0.139]	[0.059]	[0.022]
ΔProperty price	0.025***	0.049***			0.012	0.139***	0.036***	0.042**	-0.001
	[0.007]	[0.012]			[0.015]	[0.028]	[0.010]	[0.021]	[0.009]
ΔEquity price	0.035***		0.029***		0.030***	0.028***	0.042***	0.027***	0.026***
	[0.004]		[0.006]		[0.007]	[0.004]	[0.010]	[0.005]	[0.005]
ΔMoney	0.041***			0.050***	0.081**	0.048***	0.055	0.058	0.050***
	[0.010]			[0.016]	[0.034]	[0.013]	[0.049]	[0.051]	[0.010]
ΔProperty price(-)									0.074***
									[0.022]
ΔEquity price(-)									0.021**
									[0.010]
Crisis	0.147	-0.263	-0.095	-1.410***	0.838***	1.076	-0.823	1.027**	0.791*
	[0.400]	[0.568]	[0.451]	[0.492]	[0.313]	[1.099]	[1.054]	[0.436]	[0.407]
Constant	2.079***	1.049***	0.679***	0.837***	4.221**	1.335***	5.808*	5.177***	2.812***
	[0.639]	[0.269]	[0.190]	[0.199]	[1.887]	[0.334]	[3.016]	[1.641]	[0.872]
Linear time trend	-0.014**				-0.030*		-0.055*	-0.040***	-0.017**
	[0.006]				[0.017]		[0.029]	[0.013]	[0.007]
Observations	555	555	696	690	189	83	131	194	555
Countries	14	14	14	14	8	4	6	6	14
Hansen p-value	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
AR1 p-value	0.02	0.01	0.01	0.01	0.05	0.15	0.11	0.05	0.02
AR2 p-value	0.51	0.37	0.2	0.13	0.99	0.33	0.40	0.78	0.66

Note: Estimation method Blundell-Bond (1998). Heteroscedasticity and serial correlation robust standard errors in brackets. All series are in log differences.* statistically significant at 10% level; ** at 5% level; *** at 1% level.

Table 2: Dynamic Panel Regression (GMM) - Long-Run Elasticities.

	All 90-08	All 90-08	All 90-08	All 90-08	EMAsia 01-06	LatAm 01-06	EMAsia 90-99	EMAsia 00-08	All 90-08
ΔWage	0.185**	0.336*	0.234***	0.110*	0.007	0.084*	0.468	0.085	0.175**
ΔProperty price	0.091***	0.179***			0.040	0.323***	0.084***	0.154**	-0.004
ΔEquity price	0.128***		0.148***		0.098***	0.066***	0.097***	0.098***	0.092***
ΔMoney	0.151***			0.227***	0.263**	0.111***	0.128	0.210	0.180***
ΔProperty price(-)									0.260***
ΔEquity price(-)									0.167**

Note: Estimation method Blundell-Bond (1998). See more details on sample size and specification tests in the table of short-run elasticities.

Table 3: Dynamic Single Equation Regression (GMM) - Short-Run Elasticities.

	China	Hong Kong	Korea	Singapore	Taiwan	Thailand
	4/99 - 4/07	4/90 - 1/08	4/90 - 4/07	3/98 - 1/08	2/93 - 1/08	4/98 - 3/07
ΔConsumption	0.756***	0.646***	0.649***	0.635***	0.652***	0.770***
	[0.065]	[0.029]	[0.032]	[0.069]	[0.071]	[0.020]
ΔWage	0.059***	0.024	0.187***	0.141**	0.191**	0.143***
	[0.016]	[0.045]	[0.030]	[0.069]	[0.091]	[0.019]
ΔProperty price	0.030	0.025***	-0.008	0.055***	-0.028	0.089***
	[0.022]	[0.009]	[0.017]	[0.018]	[0.024]	[0.009]
ΔEquity price	0.012***	0.030***	0.037***	0.049***	0.016***	0.020***
	[0.002]	[0.005]	[0.003]	[0.009]	[0.004]	[0.002]
ΔMoney	-0.001	0.136***	0.003	-0.031	0.071	0.042***
	[0.027]	[0.024]	[0.032]	[0.020]	[0.047]	[0.015]
Crisis	0.696***	-2.144***	-0.767***	-1.247	0.403	3.092***
	[0.104]	[0.400]	[0.208]	[1.105]	[0.557]	[0.293]
Constant	0.763	1.795***	4.815***	11.402***	0.466**	6.609***
	[0.549]	[0.444]	[1.258]	[1.842]	[0.224]	[0.651]
Linear time trend		-0.015***	-0.039***	-0.090***		-0.051***
		[0.005]	[0.009]	[0.013]		[0.005]
Observations	33	70	69	39	60	36
R-squared	0.93	0.86	0.80	0.86	0.70	0.91
Hansen J-stat	13.09	7.36	4.2	8.25	17.11	3.03
P-value	0.79	0.99	0.99	0.97	0.52	0.99

Note: Heteroscedasticity and serial correlation robust standard errors in brackets. All series are in log differences.* statistically significant at 10% level; ** at 5% level; *** at 1% level.

Table 3 provides a summary of the country level evidence, that is, we estimate by GMM and for each country the dynamic model defined in (2).[17] We focus on the analysis of 6 emerging Asian economies (China, Hong Kong, Korea, Singapore, Taiwan and Thailand) for which the number of observations is the largest. Consistently with the previous findings, the lag of consumption is always statistically significant and large in magnitude, revealing a strong persistence in consumption growth. In addition, stock market wealth effects are also statistically significant for all countries, ranging between 0.12% (in the case of China) and 0.49% (in the case of Singapore) of increase in consumption following a 10% rise in stock prices, that is, they tend to be larger in the most developed financial markets. In what concerns the housing wealth effects, the results show that they are only statistically significant in the case of Thailand (0.089), Singapore (0.055) and Hong Kong (0.025). These are the economies where the price changes in the housing markets have been the most dynamic. In the case of money wealth, the empirical findings suggest that this category of wealth is statistically significant only for Hong Kong, where the associated wealth effect is quite large (a 10% increase in money wealth leads to an increase in consumption of around 1.36%), and Thailand, where the point estimate for the elasticity is 0.042. Moreover, the short-run wage

[17] In the Appendix, we report the results from the dynamic OLS (DOLS) estimation. The main findings do not change significantly.

Table 4: Dynamic Single Equation Regression (GMM) - Long-Run Elasticities.

	China 4/99 - 4/07	Hong Kong 4/90 - 1/08	Korea 4/90 - 4/07	Singapore 3/98 - 1/08	Taiwan 2/93 - 1/08	Thailand 4/98 - 3/07
ΔWage	0.241***	0.067	0.532***	0.386**	0.548**	0.623***
ΔProperty price	0.124	0.069***	-0.023	0.151***	-0.081	0.386***
ΔEquity price	0.049***	0.085***	0.105***	0.135***	0.047***	0.087***
ΔMoney	-0.004	0.384***	0.009	-0.084	0.205	0.183***

Note: See more details on sample size and specification tests in the table of short-run elasticities.

elasticities range from 0.059 estimated for China to 0.191 for Taiwan, being rather small in magnitude compared to the existing literature on advanced economies. As noted earlier, this could due to the importance of transitory shocks or precautionary savings in these countries. Finally, for China, Hong Kong, Korea and Thailand, the dummy variable aimed at capturing episodes of economic/financial crises is statistically significant.

Table 4 presents the long-run elasticities of consumption for the Asian economies. As before, consumption is strongly responsive to changes in equity prices, and the long-run elasticity with respect to this component of wealth ranges between 0.047 (in the case of Taiwan) and 0.135 (in the case of Singapore). In addition, the long-run response of consumption to changes in housing prices is larger for Thailand (0.386), Singapore (0.151) and Hong Kong (0.069). Finally, the magnitude of the long-run elasticities with respect to wages are reasonable, ranging between 0.241 (in the case of China) and 0.623 (for Thailand).

6 Conclusion

In this paper, we analyze the relationship between consumption and several wealth components for a panel of 14 main emerging economies. We estimate the magnitude of the effects of stock market wealth (proxied by the equity price index), housing wealth (proxied by the housing price index), and money wealth (proxied by the per capita broad money) on private consumption using modern panel data econometric techniques.

Drawing upon quarterly data for the period 1990:1-2008:2, we show that wealth effects are statistically significant and relatively large: a 10% rise in housing prices leads to an increase in private consumption of between 0.25% and 0.49%; an increase of 10% in stock prices is associated with a 0.29% to 0.35% increase in consumption; and when money wealth rises by 10%, consumption increases by 0.41% to 0.50%. In addition, the empirical findings suggest that housing wealth effects: (*i*) are, in general, larger for Latin American emerging markets; and (*ii*) have substantially increased for Asian emerging economies in recent years. In contrast, financial wealth effects: (*i*) have similar magnitudes for Asian and Latin American countries; and (*ii*) have fallen for Asian emerging economies.

For both financial and housing wealth we find that consumption reacts asymmetrically, i.e. that a negative shock has a bigger impact than a positive shock.

Among Asian countries, stock market wealth effects tend to be larger in the most developed

financial markets (for instance, Singapore). Moreover, housing wealth effects are particularly important in Thailand, Singapore and Hong Kong.

Finally, our results suggest that consumption growth exhibits a substantial persistence and responds sluggishly to shocks. This may be an important reason for concern - particularly, in case of a negative downturn -, given that these economies have often witnessed episodes of economic, financial and currency crises.

References

[1] Altissimo F., Georgiou E., Sastre T., Valderrama M.T., Sterne G., Stocker M., Weth M., Whelan K., and A. Willman (2005).Wealth and asset price effects on economic activity. ECB Occasional Paper #29.

[2] Aoki, K., Proudman J., and G. Vlieghe (2002). Houses as collateral: Has the link between house prices and consumption in the U.K. changed? *Economic Policy Review*, 8(1),163-177.

[3] Arellano, M., and S. Bond (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58, 277–297.

[4] Arellano, M., and O. Bover (1995). Another look at the instrumental variable estimation of error-component models. *Journal of Econometrics*, 68, 29–51.

[5] Attanasio, O. P. (1999). Consumption. In Taylor, J. B., and M. Woodford (eds.), *Handbook of Macroeconomics*, 1b, Chap. 11, 741–812. Amsterdam: Elsevier Science B. V.

[6] Bajari, P., Benkard, C., and J. Krainer (2005). House prices and consumer welfare. *Journal of Urban Economics*, 58(3), 474-487.

[7] Bertaut, C. (2002). Equity prices, household wealth, and consumption growth in foreign industrial countries: wealth effects in the 1990s. Board of Governors of the Federal Reserve System, International Finance Discussion Papers #724.

[8] Blundell, R., and S. Bond (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87, 115–143.

[9] Bonner, X., and E. Dubois (1995). Peut-on comprendre la hausse imprévue du taux d'épargne des ménages depuis 1990? Ministère de l'Economie, *Economie et Prévisions*, 121.

[10] Boone, L., Giorno, C., and P. Richardson (1998). Stock market fluctuations and consumption behavior: some recent evidence, OECD Working Paper #208.

[11] Boone, L., Girouard, N., and I. Wanner (2001). Financial liberalization, wealth and consumption. OECD, Economics Department Working Papers #308.

[12] Brayton, F., and P. Tinsley (1996). A guide to FRB/US. Board of Governors of the Federal Reserve System, Finance and Economics Discussion Papers #42.

[13] Campbell, J., and G. Mankiw (1989). Consumption, income and interest rates: reinterpreting the time series evidence. In Blanchard, O., and S. Fischer (eds.), *NBER Macroeconomics Annual*, MIT Press, Cambridge, MA.

[14] Campbell, J., Lo, A., and C. MacKinlay (1997). *The Econometrics of Financial Markets.* Princeton: Princeton University Press.

[15] Caporale, G., and G. Williams (1997). Revisiting Forward Looking Consumption and Financial Liberalization in the United Kingdom. London Business School Discussion Papers #20.

[16] Carroll, C. D., M. Otsuka, and J. Slacalek (2006), How large is the housing wealth effect? A new approach. NBER Working Paper #12746.

[17] Carroll, C., J. Slacalek, and M. Sommer (2008), International evidence on sticky consumption growth. ECB Working Paper No. 886.

[18] Case, K. (1992). The real estate cycle and the economy: consequences of the Massachusetts boom of 1984-1987. *Urban Studies*, 29(2), 171-183.

[19] Case K., Shiller R., and J. Quigley (2005). Comparing wealth effects: The stock market versus the housing market. *Advances in Macroeconomics*, 5(1), 1-32.

[20] Cho, S. (2006). Evidence of a stock market wealth effect using household level data. *Economic Letters*, 90(3), 403-406.

[21] Cochrane, J. (1994). Permanent and transitory components of GDP and stock prices. *Quarterly Journal of Economics*, 109(1), 241-265.

[22] Davis, M., and M. Palumbo (2001). A primer on the economics and time-series econometrics of wealth effects. Federal Reserve Board of Governors, Finance and Economics Discussion Papers #09.

[23] Desnoyers, Y. (2001). L'effet de la richesse sur la consommation aux Etats-Unis, Banque du Canada. Document de Travail #14.

[24] Dorrucci E., Meyer-Cirkel A., Rzepkowski B., and D. Santabarbara (2008). Index of Domestic Financial Development in Emerging Market Economies. ECB Occasional Paper (forthcoming).

[25] Dvornak, N., and M. Kohler (2003). Housing wealth, stock market wealth and consumption: A panel analysis for Australia. Reserve Bank of Australia, Research Discussion Paper #07.

[26] Dynan, K., and D. Maki (2001). Does stock market wealth matter for Consumption? Board of Governors of the Federal Reserve System, Finance and Economics Discussion Paper #23.

[27] Elliott, J. (1980). Wealth and wealth proxies in a permanent income model. *Quarterly Journal of Economics*, 95(3), 509-535.

[28] Fernandez-Corugedo, E., Price, S., and A. Blake (2003). The dynamics of consumers' expenditure: the UK consumption ECM redux. Bank of England Working Paper #204.

[29] Flavin, M. (1981). The adjustment of consumption to changing expectations about future income, *Journal of Political Economy*, 89(5), 974-1009.

[30] Funke, N. (2004). Is there a stock market wealth effect in emerging markets? *Economics Letters*, 83, 417-421.

[31] Gale, W., and J. Sabelhaus (1999). Perspectives on the Household Savings Rate. *Brookings Papers on Economic Activity*, 1, 1181–224.

[32] Girouard, N., and S. Blöndal (2001). House prices and economic activity. OECD, Economics Department Working Papers #279.

[33] Grunspan, T., and P. Sicsic (1997). Les effets de richesse. Conseil National du Crédit et du Titre, Rapport annuel, 187-192.

[34] Holtz-Eakin, D., Newey, W., and H. S. Rosen (1988). Estimating vector autoregressions with panel data. *Econometrica*, 56, 1371–1395.

[35] Horioka, C. (1996). Capital gains in Japan: their magnitude and impact on consumption. *Economic Journal*, 106(436), 560-577.

[36] Hoynes, H., and D. McFadden (1997). The impact of demographics on housing and nonhousing wealth in the United States. In Hurd, M., and Y. Naohiro (eds.) *The economic effects of aging in the United States and Japan*, Chicago: Chicago University Press, 153-194.

[37] Im, K. S., M. H, Pesaran, and Y. Shin (2003). Testing for Unit Roots in Heterogeneous Panels, *Journal of Econometrics*, 115, 53-74.

[38] IMF (2008). *World Economic Outlook*, April 2008. Available at www.imf.org.

[39] Kaminsky, G., S. Lizondo, and C.M. Reinhart (1998). Leading Indicators of Currency Crises. *IMF Staff Papers* Vol. 45, No. 1 (March 1998).

[40] Kaminsky, G., and C.M. Reinhart (1999). The Twin Crises: The Causes of Banking and Balance-of-Payments Problems, *American Economic Review* Vol. 89 No. 3 (June 1999).

[41] Kennickell, A. B., and M. Starr-McCluer (1997). Retrospective Reporting of Household Wealth: Evidence from the 1983-89 Survey of Consumer Finances. *Journal of Business and Economic Statistics*, 15, 452-463.

[42] Kent, C., and P. Lowe (1998). Property-price cycles and monetary policy. in *The role of asset prices in the formulation of monetary policy*, BIS Papers #5, Basel, 239-263.

[43] Kiley, M. (2000). Identifying the Effect of Stock Market Wealth on Consumption: Pitfalls and New Evidence. Board of Governors of the Federal Reserve System.

[44] Lettau, M., Ludvigson, S., and N. Barczi (2001). A primer on the economics and time series econometrics of wealth effects: A comment. Federal Reserve Bank of New York, Working Paper #131.

[45] Lettau, M., and S. Ludvigson (2001). Consumption, aggregate wealth, and expected stock returns, *Journal of Finance*, 56(9), 815-849.

[46] Lettau, M., and S. Ludvigson (2004). Understanding trend and cycle in asset values: Reevaluating the wealth effect on consumption. *American Economic Review*, 94(1), 276-299.

[47] Levin, L. (1998). Are assets fungible? Testing the behavioral theory of life-cycle savings. *Journal of Economic Organization and Behavior*, 36, 59-83.

[48] Levin, A., Lin, C. F., and C. Chu (2002). Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties, *Journal of Econometrics*, 108, 1–24.

[49] Ludvigson, S., and C. Steindel (1999). How important is the stock market effect on consumption. *FRBNY Economic Policy Review*, 29-51.

[50] Ludwig, A. and T. Sløk (2002). The impact of changes in stock prices and house prices on consumption in OECD countries. IMF Working Paper #01.

[51] Macklem, T. (1994). Wealth, disposable income and consumption: some evidence for Canada. Banque du Canada, Rapport technique, 71.

[52] Maddala, G. S. and S. Wu (1999). A Comparative Study of Unit Root Tests with Panel Data and A New Simple Test, *Oxford Bulletin of Economics and Statistics*, 61, 631–652.

[53] Mankiw, N., and S. Zeldes (1991). The consumption of stockholders and nonstockholders, *Journal of Financial Economics,* 29(1), 97-112.

[54] Mayer, C., and K. Simons (1994). Reverse mortgages and the equity of housing wealth. *Journal of the American Real Estate and Urban Economics*, 22(2), 235-255.

[55] McKibbin, W., and A. Richards (1988). Consumption and permanent income: the Australian case. Reserve Bank of Australia Discussion Paper #8808.

[56] Mehra, Y. P. (2001). The wealth effect in empirical life-cycle aggregate consumption equations. *Federal Reserve Bank of Richmond Economic Quarterly*, 87(2), 45–68.

[57] Miles, D. K. (1992). Housing markets, consumption and financial liberalization in the major economies. *European Economic Review*, 36, 1093–1136.

[58] Mutoh, H., H. Kawai, and M. Sano (1993). Consumption and adverse wealth effect. *Nihon Keizei Kenkyu*, 26, 57-92.

[59] Nickell, S. (1981). Biases in Dynamic Models with Fixed Effects. *Econometrica*, 49, 1417–1426.

[60] Ogawa, K. (1992). An econometric analysis of Japanese households behavior. *Financial Review*, 25, 112-134.

[61] Ogawa, K., Kitasaka, S., Yamaoka, H., and Y. Iwata (1996). An empirical re-evaluation of wealth effect in Japanese household behavior. *Japan and the World Economy*, 8(4), 423-442.

[62] Otoo, M. (1999). Consumer sentiment and the stock market. Board of Governors of the Federal Reserve System, Finance and Economics Discussion Papers #60.

[63] Pichette, L. (2000). Les effets réels du cours des actions sur la consommation. Banque du Canada, Document de travail #21.

[64] Pissarides, C. (1978). Liquidity considerations in the theory of consumption. *Quarterly Journal of Economics*, 92(2), 279-296.

[65] Poterba, J. M. (2000). Stock market wealth and consumption. *Journal of Economic Perspectives*, 13, 91–118.

[66] Poterba, J., and A. Samwick (1995). Stock ownership patterns, stock market fluctuations, and consumption, *Brookings Papers on Economic Activity*, 2, 295-372.

[67] Romer, C. (1990). The great crash and the onset of the great depression. *Quarterly Journal of Economics*, 105, 597–624.

[68] Rossi, N., and I. Visco (1995). National saving and social security in Italy. *Ricerche Economiche*, 49(4), 329-356.

[69] Shefrin, H., and R. Thaler (1988). The behavioral life-cycle hypothesis. *Economic Inquiry*, 26(4), 609-643.

[70] Sheiner, L. (1995). House prices and the savings of renters. *Journal of Urban Economics*, 38(1), 94-125.

[71] Skinner, J. (1999). Housing wealth and aggregate saving. *Regional Science and Urban Economics*, 19, 305-324.

[72] Slacalek, J. (2006). What drives personal consumption? The role of housing and financial wealth. DIW Berlin Discussion Paper #647.

[73] Sousa, R. M. (2003). Property of stocks and wealth effects on consumption. University of Minho, NIPE Working Paper #2/2003.

[74] Starr-McCluer, M. (1998). Stock market wealth and consumer spending, Board of Governors of the Federal Reserve System, Finance and Economics Discussion Paper #20.

[75] Starr-McCluer, M. (2002) Stock market wealth and consumer spending. *Economic Inquiry*, 40 (1), 69-79.

[76] Tan, A., and G. Voss (2003). Consumption and wealth in Australia. *The Economic Record*, 79(244), 39-56.

[77] Thaler, R. (1990). Anomalies: saving, fungibility and mental accounts. *Journal of Economic Perspectives*, 4, 193-206.

7 Appendix

A Data and Summary Statistics

Table A.1: Sample period and number of observations per country.

Country	Obs	Sample Period
Argentina	17	2002:4-2006:4
Brazil	18	2002:3-2006:4
Chile	24	2001:1-2006:4
China	36	1999:1-2007:4
Hong Kong	73	1990:1-2008:1
Indonesia	26	2001:4-2008:1
Korea	72	1990:1-2007:4
Malaysia	28	2001:1-2007:4
Mexico	24	2001:1-2006:4
Russia	21	2003:1-2008:1
Singapore	42	1997:1-2008:1
South Africa	72	1990:1-2007:4
Taiwan	63	1992:3-2008:1
Thailand	39	1998:1-2007:3

Table A.2: Annual average changes.

Variable	Obs	Mean	St. Dev.	Min	Max
Consumption	555	4.693	4.086	-16.191	14.886
Wage	555	3.092	5.414	-28.190	25.269
Property	555	0.284	10.604	-50.086	42.436
Equity	555	7.292	28.578	-99.015	109.946
Money	555	6.783	7.790	-17.268	43.652

Note: All series are in log differences.

Table A.3: Annual average changes.

Country	Consumption	Wage	Property	Equity	Money
All (555 obs)	4.693	3.092	0.284	7.292	6.783
Emerging Asia (379 obs)	4.618	3.235	-0.903	5.013	5.904
Latin America (83 obs)	4.529	1.673	-1.759	16.131	8.619
Other (93 obs)	5.141	3.779	6.943	8.692	8.728
Argentina (17 obs)	7.320	2.641	-1.326	25.792	19.557
Brazil (18 obs)	2.922	0.730	-7.687	17.796	4.911
Chile (24 obs)	4.939	1.686	0.931	9.714	6.134
China (36 obs)	6.502	11.270	-2.130	10.898	11.402
Hong Kong (73 obs)	3.963	0.930	2.866	9.471	6.184
Indonesia (26 obs)	4.101	2.325	-4.213	16.279	-1.734
Korea (72 obs)	4.659	3.745	-2.529	-1.920	7.499
Malaysia (28 obs)	7.020	1.787	1.118	5.587	7.585
Mexico (24 obs)	3.348	1.682	-0.310	14.455	6.136
Russia (21 obs)	10.337	11.325	16.886	20.400	25.463
Singapore (42 obs)	4.613	4.674	-1.031	4.613	6.214
South Africa (72 obs)	3.623	1.578	4.044	5.277	3.847
Taiwan (63 obs)	4.546	2.979	-1.571	2.456	5.712
Thailand 39 obs)	2.777	-0.301	-1.854	0.672	1.220

Note: All series are in log differences.

Table A.4: Correlation Coefficients.

Variable	Consumption	Wage	Property	Equity	Money
Consumption	1.000				
Wage	0.387	1.000			
Property	0.485	0.140	1.000		
Equity	0.415	0.081	0.268	1.000	
Money	0.348	0.354	0.219	0.220	1.000

Note: All series are in log differences.

Table A.5: Panel Unit Root Test Results.

Test	Consumption	Income	Property	Equity	Money
Levin, Lin Chu t-stat	-2.389	-2.834	-4.445	-3.257	-2.312
p-value	0.008	0.002	0.000	0.006	0.010
Im, Pesaran and Shin W-stat	-4.469	-6.122	-5.398	-4.899	-4.169
p-value	0.000	0.000	0.000	0.000	0.000
ADF - Fisher Chi-square	74.078	94.630	89.726	80.283	70.363
p-value	0.000	0.000	0.000	0.000	0.000
PP - Fisher Chi-square	63.666	100.014	58.657	83.848	54.745
p-value	0.000	0.000	0.000	0.000	0.002

Note: All series are in log differences.

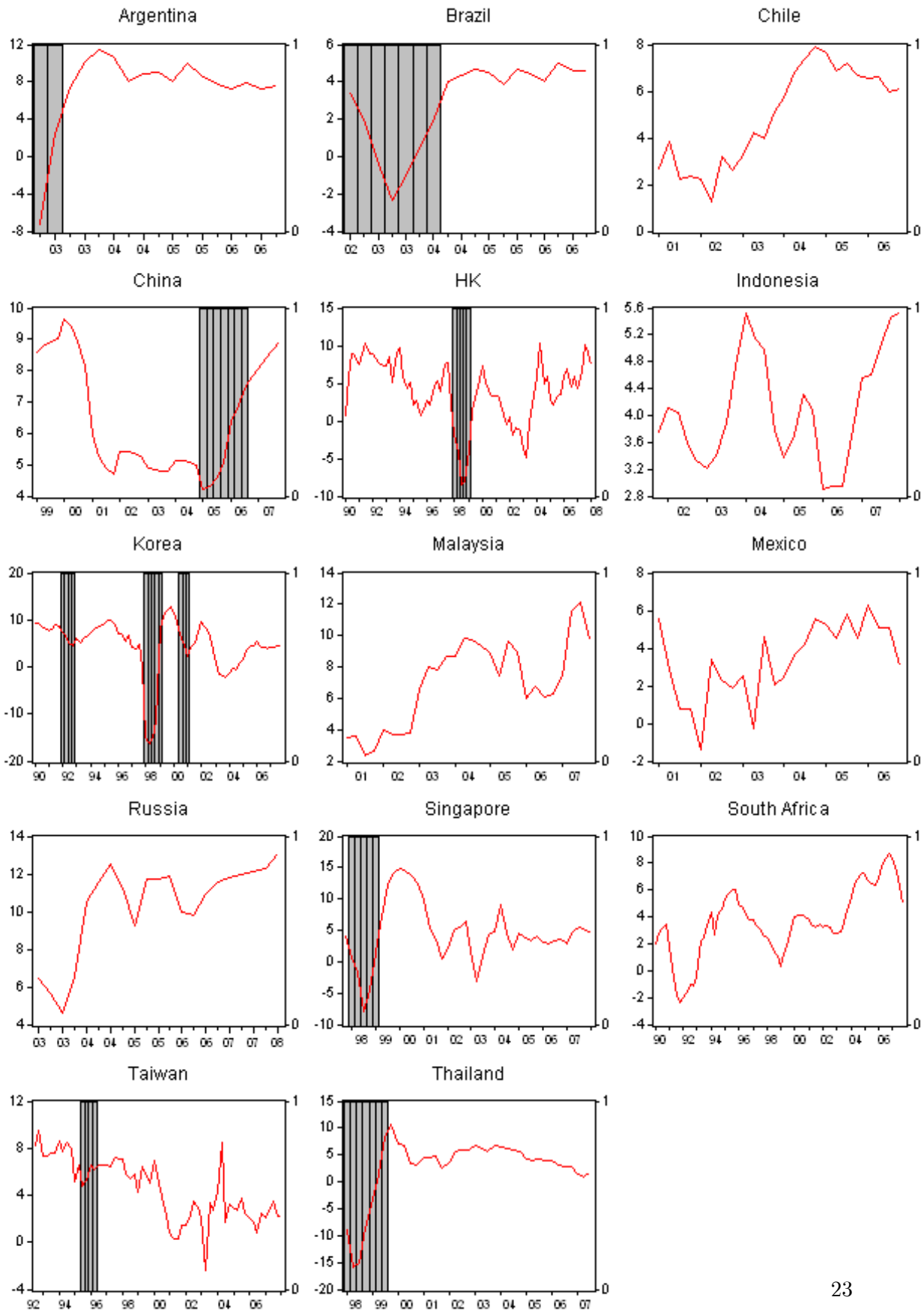

Figure 1: Real private consumption (year-on-year change in logs). Financial crisis periods are shown as shaded areas.

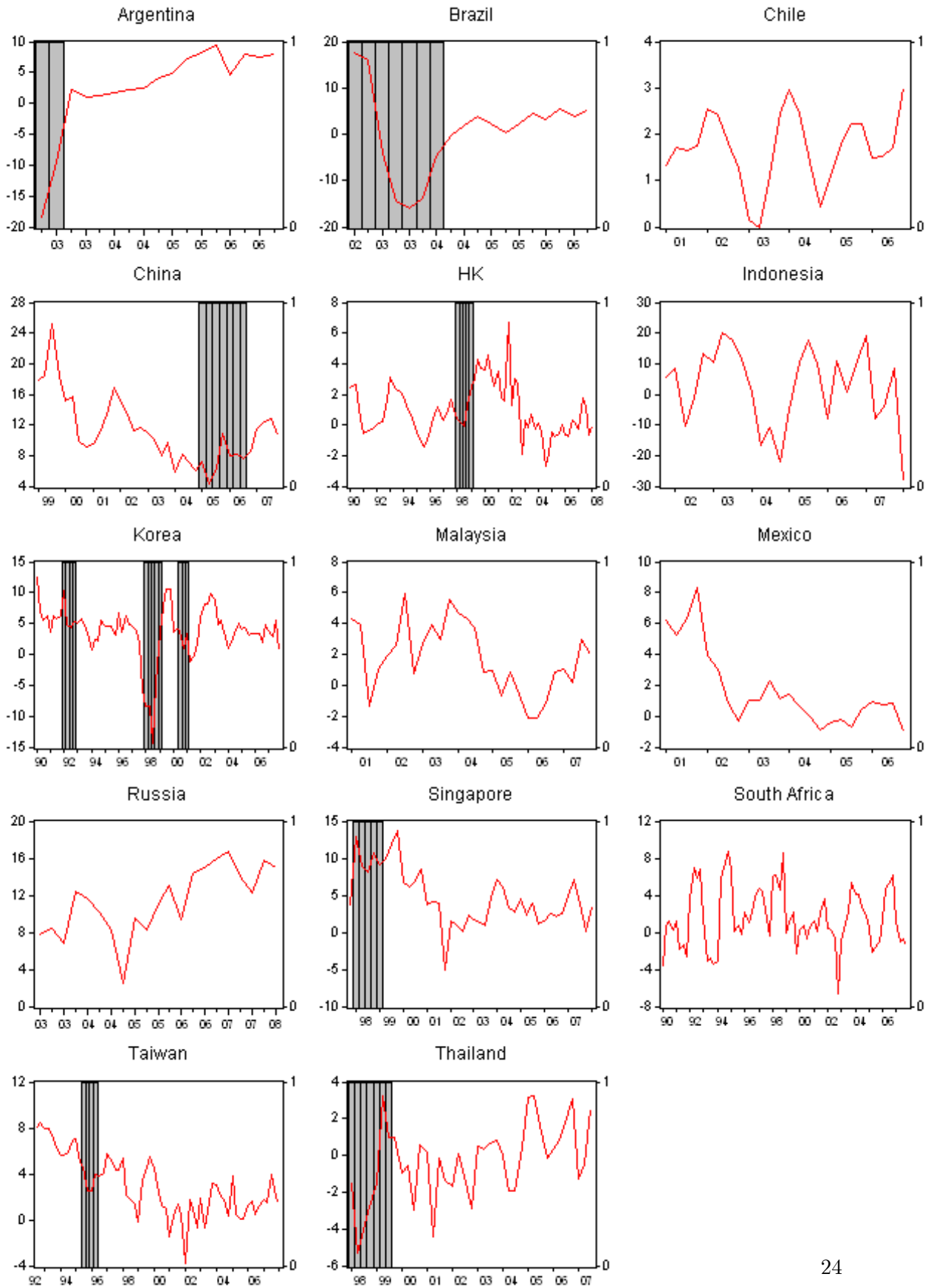

Figure 2: Real wage (year-on-year change in logs). Financial crisis periods are shown as shaded areas.

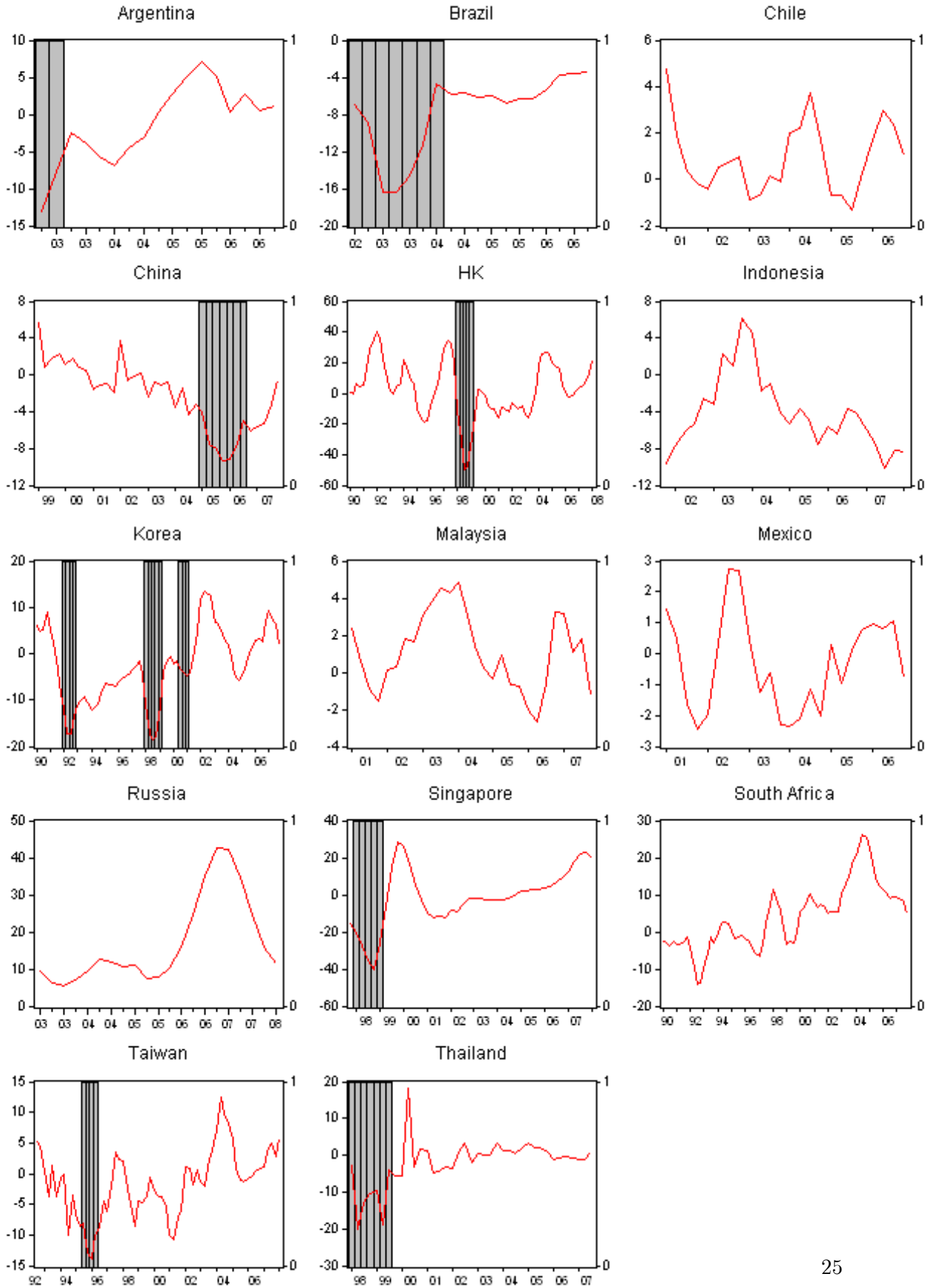

Figure 3: Real property price index (year-on-year change in logs). Financial crisis periods are shown as shaded areas.

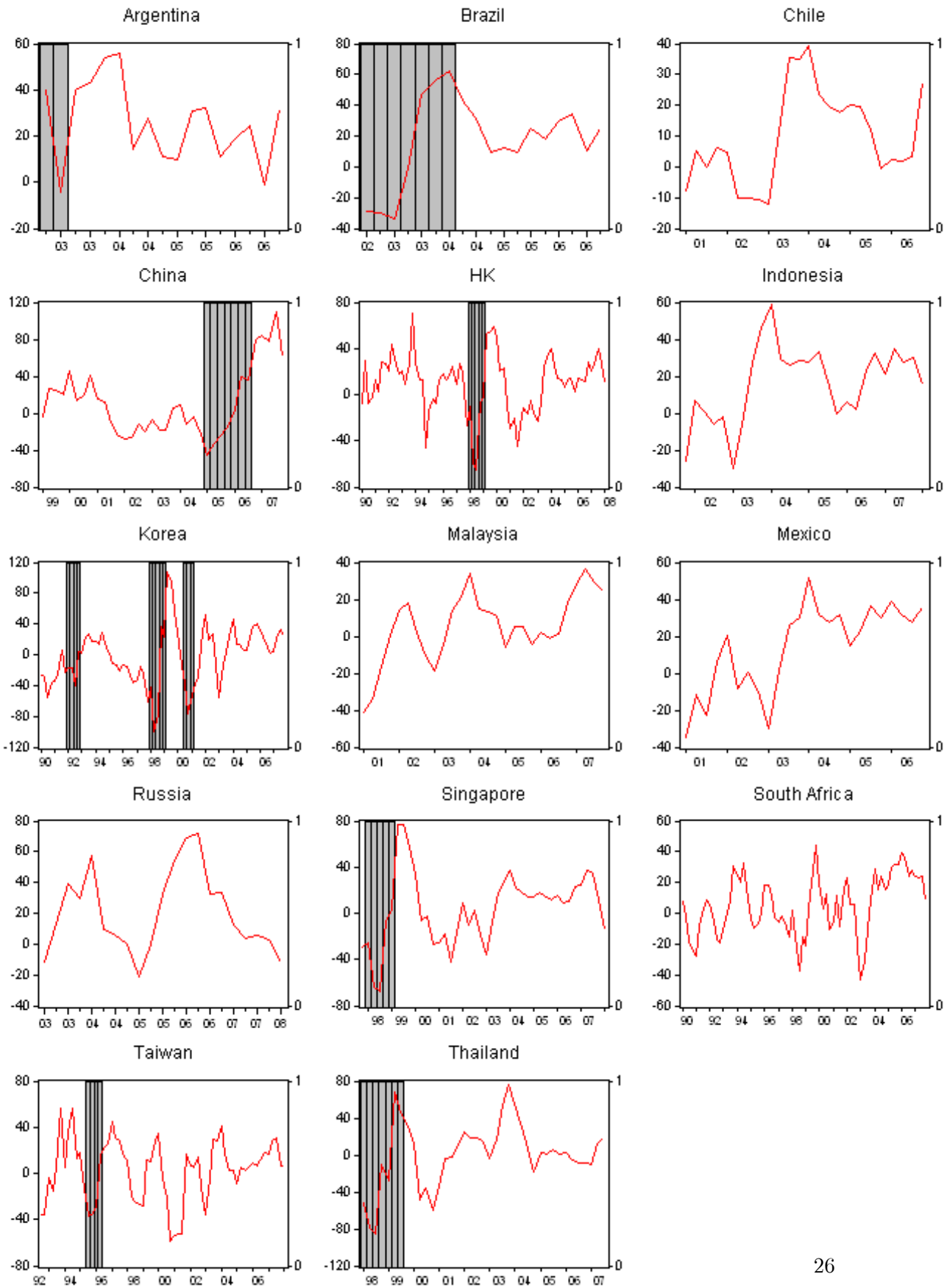

Figure 4: Real equity price index (year-on-year change in logs). Financial crisis periods are shown as shaded areas.

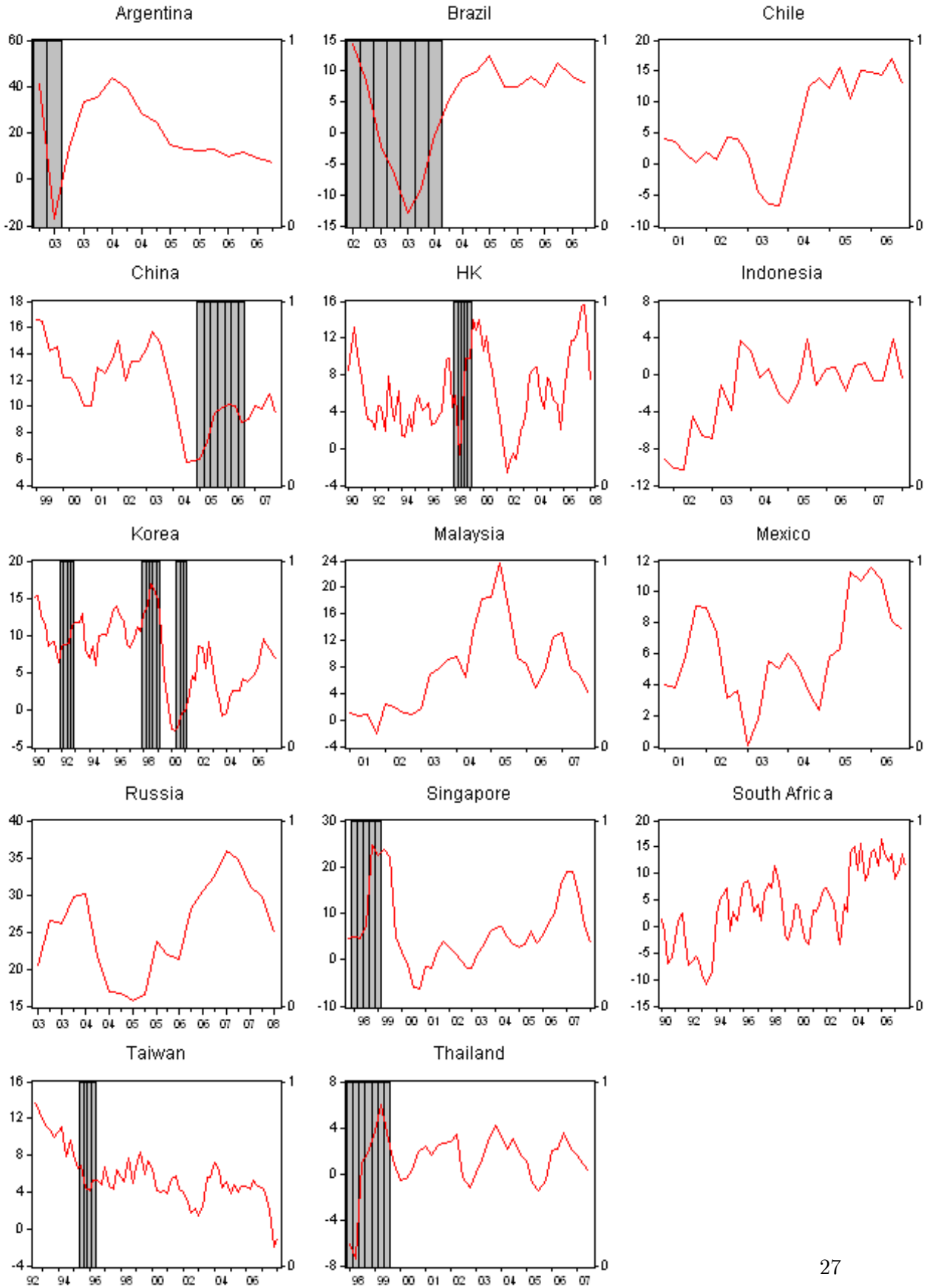

Figure 5: Real money (broad money per capita, year-on-year change in logs). Financial crisis periods are shown as shaded areas.

Table A.6: Variables and data sources.

Country	Consumption
Argentina	Haver: private consumption (real GDP)
Brazil	Haver: private consumption (real GDP)
Chile	Haver: private consumption (real GDP)
China	CEIC: private consumption (deflated with GDP deflator, interpolated from annual data)
HK	CEIC: private consumption (real GDP)
Indonesia	CEIC: private consumption (real GDP)
Korea	Haver: private consumption (real GDP)
Malaysia	Haver: private consumption (real GDP)
Mexico	Haver: private consumption (real GDP)
Russia	Haver: private consumption (real GDP)
Singapore	CEIC: private consumption (real GDP)
South Africa	Haver: private consumption (real GDP)
Taiwan	Haver: real GDP: private consumption
Thailand	Haver: real GDP: private consumption

Country	Income
Argentina	Haver: total salary index (deflated by private consumption deflator)
Brazil	Haver: real average earnings of employed persons
Chile	Haver: real hourly wage index
China	CEIC: average earning per employee (deflated by private consumption deflator)
HK	CEIC: real wage index, (missing obs interpolated)
Indonesia	Haver: average of manufacturing, mining and hotel wages (deflated by private consumption deflator)
Korea	CEIC: Monthly Earnings all Industries (deflated by private consumption deflator)
Malaysia	CEIC: monthly earnings manufacturing (deflated by private consumption deflator)
Mexico	Haver: real remunerations in manufacturing
Russia	Haver: nominal accrued monthly wages (deflated by private consumption deflator)
Singapore	CEIC: average real monthly earnings, total
South Africa	Haver: real remuneration per worker
Taiwan	CEIC: average real monthly earnings: industry and service
Thailand	CEIC: average monthly wage (deflated by private consumption deflator)

Country	Property
Argentina	IMF: house price index
Brazil	IMF: house price index
Chile	IMF: house price index
China	CEIC: residental property price index
HK	CEIC: domestic premise property price index
Indonesia	CEIC: residential property price index (either 12, 13 or 14 cities)
Korea	CEIC: total housing price index
Malaysia	CEIC: house price index
Mexico	IMF: house price index
Russia	Haver: prices for existing homes
Singapore	CEIC: private residential property price index
South Africa	Haver: ABSA house price index
Taiwan	CEIC: Sinyi residential property price index
Thailand	CEIC: average of housing price indices of single detached house and town house including land

Note: All variables deflated using private consumption deflator.

Country	Equity
Argentina	GFD: Buenos Aires SE General Index
Brazil	GFD: Brazil Bolsa de Valores de Sao Paulo (BOVESPA)
Chile	GFD: Santiago SE Indice General de Precios de Acciones
China	GFD: Shanghai SE composite
HK	GFD: Hang Seng composite index
Indonesia	GFD: Jakarta SE composite index
Korea	GFD: Korea SE stock price index (KOSPI)
Malaysia	GFD: Malaysia KLSE composite
Mexico	GFD: Mexico SE Indice de Precios y Cotizaciones (IPC)
Russia	GFD: Moscow Times Rouble index
Singapore	GFD: FTSE Straits Times index
South Africa	GFD: FTSE JSE all share index
Taiwan	GFD: Taiwan SE capitalization weighted index
Thailand	GFD: Thailand SET general index

Note: All variables deflated using private consumption deflator.

Country	Money
Argentina	Haver: M2
Brazil	Haver: M2
Chile	Haver: M2
China	Haver: M2
HK	Haver: M2
Indonesia	Haver: M2
Korea	Haver: M2
Malaysia	Haver: M2
Mexico	Haver: M2
Russia	Haver: M2
Singapore	Haver: M2
South Africa	Haver: M2
Taiwan	Haver: M2
Thailand	Haver: M3

Note: All variables deflated using private consumption deflator.

B Additional Regression Results

Table B.1: Dynamic Panel Regression (OLS) - Short-Run Elasticities.

	All	All	All	All	EMAsia	LatAm	EMAsia	EMAsia	All
	90-08	90-08	90-08	90-08	01-06	01-06	90-99	00-08	90-08
ΔConsumption	0.725***	0.752***	0.771***	0.734***	0.680***	0.569***	0.576***	0.706***	0.718***
	[0.036]	[0.040]	[0.030]	[0.035]	[0.056]	[0.081]	[0.123]	[0.049]	[0.036]
ΔWage	0.052***	0.069***	0.057***	0.044**	0.015	0.036	0.194*	0.029	0.052***
	[0.018]	[0.021]	[0.021]	[0.021]	[0.015]	[0.039]	[0.117	[0.035]	[0.019]
ΔProperty price	0.028***	0.042***			0.010	0.139***	0.036**	0.041**	0.005
	[0.009]	[0.010]			[0.027]	[0.048]	[0.017]	[0.020]	[0.010]
ΔEquity price	0.033***		0.029***		0.031***	0.028***	0.043***	0.029***	0.024***
	[0.003]		[0.003]		[0.005]	[0.008]	[0.007]	[0.004]	[0.004]
ΔMoney	0.033**			0.054***	0.073***	0.048**	0.053	0.036	0.041***
	[0.013]			[0.015]	[0.020]	[0.019]	[0.077]	[0.029]	[0.014]
ΔProperty price(-)									0.067***
									[0.024]
ΔEquity price(-)									0.021**
									[0.010]
Crisis	0.130	-0.247	-0.340	-1.671***	0.855***	1.076	-0.721	1.079***	0.754
	[0.510]	[0.588]	[0.442]	[0.472]	[0.316]	[0.984]	[1.182]	[0.337]	[0.599]
Constant	2.030***	1.010***	0.821***	0.989***	3.961**	1.335***	5.759**	5.437***	2.729***
	[0.447]	[0.193]	[0.150]	[0.169]	[1.706]	[0.486]	[2.764]	[1.504]	[0.552]
Linear time trend	-0.012***				-0.028*		-0.055**	-0.041***	-0.015***
	[0.004]				[0.014]		[0.026]	[0.012]	[0.004]
Observations	555	555	696	690	189	83	131	194	555
R-squared	0.82	0.77	0.8	0.77	0.69	0.78	0.85	0.78	0.82

Note: Pooled panel estimation. Heteroscedasticity and serial correlation robust standard errors in brackets.
All series are in log differences.* statistically significant at 10% level; ** at 5% level; *** at 1% level.

Table B.2: Dynamic Panel Regression (OLS) - Long-Run Elasticities.

	All 90-08	All 90-08	All 90-08	All 90-08	EMAsia 01-06	LatAm 01-06	EMAsia 90-99	EMAsia 00-08	All 90-08
ΔWage	0.188***	0.277***	0.248***	0.167**	0.048	0.084	0.459*	0.098	0.184***
ΔProperty price	0.102***	0.170***			0.030	0.323***	0.084**	0.139**	
ΔEquity price	0.119***		0.124***		0.096***	0.066***	0.101***	0.098***	
ΔMoney	0.119**			0.204***	0.229***	0.111**	0.125	0.123	0.144***
ΔProperty price(-)									0.256***
ΔEquity price(-)									0.159**

Note: See more details on sample size and specification tests in the table of short-run elasticities. * statistically significant at 10% level; ** at 5% level; *** at 1% level.

Table B.3: Dynamic Single Equation Regression (OLS) - Short-Run Elasticities.

	China	Hong Kong	Korea	Singapore	Taiwan	Thailand
	1/99 - 4/07	1/90 - 1/08	1/90 - 4/07	4/97 - 1/08	3/92 - 1/08	1/98 - 3/07
ΔConsumption	0.700***	0.541***	0.579***	0.570***	0.231	0.762***
	[0.153]	[0.074]	[0.181]	[0.166]	[0.146]	[0.113]
ΔWage	0.052*	0.045	0.348	0.183	0.148	0.211
	[0.027]	[0.109]	[0.246]	[0.136]	[0.125]	[0.143]
ΔProperty price	0.065	0.045**	-0.029	0.056	0.088	0.169***
	[0.065]	[0.019]	[0.054]	[0.053]	[0.055]	[0.061]
ΔEquity price	0.015**	0.033**	0.031**	0.048**	0.020***	0.027**
	[0.006]	[0.014]	[0.013]	[0.021]	[0.005]	[0.011]
ΔMoney	0.009	0.156**	-0.010	-0.038	0.038	0.451***
	[0.044]	[0.061]	[0.085]	[0.057]	[0.068]	[0.122]
Crisis	0.913**	-2.207**	-0.917	-2.395	0.923	1.654
	[0.398]	[1.034]	[1.835]	[2.492]	[0.778]	[2.145]
Constant	1.080	2.541**	4.377*	10.966	10.537***	7.333
	[1.061]	[1.082]	[2.250]	[6.608]	[3.058]	[4.529]
Linear time trend		-0.020*	-0.037**	-0.085	-0.075***	-0.062*
		[0.011]	[0.016]	[0.051]	[0.022]	[0.035]
Observations	36	73	72	42	63	39
R-squared	0.94	0.86	0.81	0.86	0.79	0.95

Note: Heteroscedasticity and serial correlation robust standard errors in brackets.

All series are in log differences.* statistically significant at 10% level; ** at 5% level; *** at 1% level.

Table B.4: Dynamic Single Equation Regression (OLS) - Long-Run Elasticities.

	China 1/99 - 4/07	Hong Kong 1/90 - 1/08	Korea 1/90 - 4/07	Singapore 4/97 - 1/08	Taiwan 3/92 - 1/08	Thailand 1/98 - 3/07
ΔWage	0.174*	0.098	0.827	0.425	0.193	0.886
ΔProperty price	0.217	0.098**	-0.069	0.130	0.114	0.709***
ΔEquity price	0.049**	0.071**	0.074**	0.112**	0.026***	0.113**
ΔMoney	0.030	0.340**	-0.023	-0.088	0.050	1.893***

Note: See more details on sample size and specification tests in the table of short-run elasticities.
* statistically significant at 10% level; ** at 5% level; *** at 1% level.

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