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Abstract

The paper offers an empirical taxonomy of the factors driving China's current account. A simple present-value model with non-tradeable goods explains more than 70 percent of current account variability over the period 1982-2007, including the persistent surpluses since 2001. Expected increases in the prices of non-tradeables - housing and medical care - are the single most important channel of external adjustment, followed by consumption smoothing. Much of this pattern is driven by a permanent global shock that persistently depresses the world real interest rate and increases the current account, suggesting that shocks to precautionary saving are key in understanding China's surplus. These findings are robust to controlling for revaluation expectations in the fixed exchange rate regime and for measurement error in the current account balance.

Keywords: China, Current Account, Present-Value Models, External Adjustment, Global Imbalances, Savings Glut, Precautionary Saving

JEL Classification: F32, F30, F40

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1. Introduction

China's persistent current account surplus has attracted considerable academic and public attention in the last years. It is often regarded as one of the main sources of a perceived imbalance in global capital flows and as the mirror image of the persistent US trade deficit.

While a range of explanations have been discussed for China's surplus, surprisingly few attempts have been made to assess the relative merit of different mechanisms of China's external adjustment in a simple, unified theoretical framework.[1] This is what I seek to do in this paper. As the base of my empirical analysis, I use a simple intertemporal model of the current account with non-tradeable goods in the mould of Bergin and Sheffrin (2000). The model nests four basic channels of external adjustment: i) consumption smoothing, ii) net factor income payments, iii) consumption tilting due to expected changes in the world real interest rate and iv) consumption-tilting due to expected changes in the real exchange rate.

The main results can be summarized as follows: first, the simple model can explain more than 70 percent of the variation in China's current account over the period since 1982. It also explains most of the run-up in the Chinese current account surplus since the beginning of the decade. This result may in itself be surprising since it is probably fair to summarize the tenor of the recent debate as implying that the textbook model (see e.g. Obstfeld and Rogoff, 1995, ch. 2) would not fit China's recent experience. Turning to the channels of external adjustment, I identify consumption tilting due to expected rises in the relative price of non-tradeable goods and consumption smoothing (expected declines in net output growth) as the key factors. Net factor income plays only a negligible role whereas expected changes in the world interest rate is negatively correlated with China's current account.

I assess the robustness of my conclusions to various alterations in the definition of China's external surplus and the definition of the real exchange rate. Some recent analyses have emphasized the role of trade mis-invoicing and measurement error in China's current account balance (see Lane and Milesi-Ferretti, 2007; Zhang, 2008). To assess the importance of these issues for my conclusions, I also present results based on alternative calculations of China's external balance based on Zhang (2008).

These changes do not affect the main result though: the model still replicates most of the variability in China's current account patterns, including the run-up of surpluses in the last couple of years. Controlling for measurement error in the current account somewhat lowers the role of expected real exchange rate changes in favor of consumption smoothing, which is consistent with the explanation given by Zhang (2008) and others that revaluation expectations lead to trade mis-invoicing and therefore to an upward

[1] See e.g. Gruber and Kamin (2007) for a panel study of Asian surpluses.

bias in the measured current account balance. Still, expected rises in the relative price of non-tradeable consumption remain an important factor in determining the Chinese current account.

How can these findings be interpreted? First, at a general level, it is surprising that a simple intertemporal model without frictions seems to fit some key aspects of the data so well. This would seem to be at odds with the bulk of the literature that has emphasized the importance of various, often interacting frictions for the explanation of why capital tends to flow uphill, i.e. from major emerging markets to developed economies, primarily the US (see Mendoza *et al.*, 2009). I make two remarks: first, the frictionless model here is used as a vehicle to collect and structure a set of stylized facts, not as a definite theoretical description of the underlying mechanisms. This follows the approach taken in a series of recent papers on emerging market macroeconomics that have argued that simple, almost stylized models fit the data for these economies quite well provided the moments of some key shocks are changed vis-a-vis the typical specification chosen for already developed economies.[2] None of these papers denies the importance of frictions in explaining business cycles in emerging markets - quite to the contrary. But they argue that these frictions manifest themselves rather in changes in the structure of shocks (e.g. a higher importance of trend shocks, such as in Aguiar and Gopinath), and not so much in the structure of the basic model. This insight allows the basic model to be used as a vehicle to collect and discuss stylized facts.

Against this backdrop, it becomes possible to interpret the empirical results discussed above at a more specific level. The finding that expected exchange rate appreciation is a key driver of China's current account at first sight seems to support the Bretton-Woods II hypothesis (Dooley *et al.,* 2004) that identifies China's fixed exchange rate arrangement as a main source of global imbalances. However, it is important to note that appreciation expectations have been an important driver of China's current account dynamics for most of the sample period studied here, not only the last couple of years. What casts additional doubt on the interpretation that only revaluation expectations account for recent surpluses is the fact that the appreciation channel still plays an important role once the role of speculative capital flows (and ensuing measurement error) in the official current account balance is controlled for.

These facts therefore rather point to a ‘breaking-of-the-iron-rice-bowl’ interpretation of my results: the declining provision of public services (medical care, schooling) and housing in China and the ensuing rise in the price of these non-tradeable goods and services present a strong incentive for private households to save. This interpretation is in line with micro-data evidence as reported in e.g. Chamon and Prasad

2 In Aguiar and Gopinath (2007) this is the variance of permanent shocks to trend output. For a similar setup see also Neumeyer and Perri (2007).

(2008) who identify exactly these factors as the drivers of the secular increase in the savings rate of Chinese private households during the 1980s and 1990s.[3]

The role of expected price increases for housing and education for private saving could also be driven by China's changing demographics. As recently noted by Wei and Zhang (2009), a rising sex ratio provides a strong competitive savings incentive, especially for parents with a son, since wealth accumulation may help increase a son's chances in the marriage market. This excess savings spills over into prices for housing and education.

A second robust fact that my framework allows me to document is the quite remarkable showing of intertemporal smoothing as a factor driving current account dynamics. Rationalizing the persistent surpluses characterizing China's current account using the logic of intertemporal smoothing requires that the current account actually predicts *declines* in national cash flow. That would seem to be at odds with the increasing output growth rates of the recent past but becomes consistent once one acknowledges that in particular private investment has grown much faster than output itself over extended periods of time. While micro data evidence suggests that private households do little intertemporal smoothing (Chamon and Prasad, 2008), firms may have to finance future investment from retained earnings if they cannot access private capital markets (see e.g. Song *et al.,* 2008).

I also use the empirical framework to identify the structural shocks that drive China's external dynamics. I distinguish between country-specific and global shocks, and allow both types of shocks to be either permanent or transitory. These two categories of shocks should be crucially important from the point of view of current account dynamics. In a simple intertemporal small-open-economy model positive permanent shocks to output should be associated with current account deficits whereas transitory shocks should lead to surpluses (see e.g. Aguiar and Gopinath, 2007; Hoffmann, 2001b). Equally, the current account should predominantly be driven by country-specific shocks since not all can run surpluses or deficits in response to common (global) shocks.[4] Exactly because China is *not* a small-open-economy, it is interesting to ask to what extent the response of the current account is consistent with these stylized predictions. Specifically, I ask whether the dynamic response of the global and domestic tilting factors and of consumption smoothing is consistent with the actual current account response. This leads to my third main result. The response of China's current account is quite in line with the predicted response of the channels of external adjustment to both transitory and permanent shocks (be they global or country-specific). However, the permanent global shock triggers a considerable current account surplus in the

[3] The fixed exchange rate regime may have facilitated this transition: the ensuing accumulation of foreign reserves provides a centralized way to back up the public banking sector and to increase its credibility. This in turn puts private households -- most of which do not otherwise have access to financial markets -- in a position to hold international assets indirectly by channeling their savings through the public banking. This interpretation is supported by the findings in Caballero *et al.* (2008) who argue that official reserve accumulation is indirectly held by the private sector through low-return sterilization bonds.

[4] See Glick and Rogoff (1995) and Engel and Rogers (2006). Clearly, this will only be true to a first order: if shocks (though common) impact on different countries with different strength or if countries have very heterogeneous net foreign asset positions, then global shocks may also affect the current account.

data which is not fully replicated by the model. The main reason for this discrepancy is that, according to the model, the permanent global shock is associated with a persistent decrease in the world interest rate, which should lead to a *decline* rather than an increase in the current account. One possible interpretation of this mismatch between the model and the data is that the global permanent shock - at least partially - reflects an (unmodelled) Chinese precautionary savings shock that increases the current account and depresses the world interest rate at the same time.[5]

The paper is now structured as follows. Section two outlines the theoretical framework and explains the econometrics used to test it. Section three presents the data and section four the main results. Section five offers further discussion and concludes.

2. The Framework

The empirical analysis in this paper is based on a simple intertemporal model of the current account in which the representative consumer maximizes

$$\sum_{t=0}^{\infty} E_0 \left[\frac{X(C_{Nt}, C_{Tt})^{1-\gamma}}{1-\gamma}\right]$$

where C_N is non-tradeables consumption, C_T is tradeables consumption and $X(.)$defines a consumption bundle to be defined below. We denote the value of consumption in terms of tradeable goods with

$$C_t = C_{Tt} + PC_{Nt}$$

where P is the relative price of the non-tradeable good. Then we write the budget constraint (expressed in tradeable goods) as

$$B_t = (1 + r_t^W)B_{t-1} + Y_t - I_t - G_t - C_t$$

where B_t is the stock of foreign assets, r_t^W the world real interest rate and Y_t, I_t, G_t and C_t denote the value of real output, investment, government consumption and private consumption respectively. In this model, the current account balance is given by

5 This interpretation is consistent with the theoretical results in Mendoza *et al.* (2009) who explain global imbalances as resulting from the interaction between low domestic financial development (which leads to a lack of intra-national risk sharing and a high precautionary demand for assets) with financial integration at a global level (which provides the safe, low interest rate assets required to satisfy the precautionary savings demand).

$$CA_{t+1} = \Delta B_t = r_t^W B_{t-1} + NO_t - C_t$$

where I introduce the notation $NO_t = Y_t - I_t - G_t$ to denote net output, i.e. the national cash flow available for consumption.

Following Bergin and Sheffrin (2000) the consumption bundle X is a CES aggregate of tradeable and non-tradeable goods with unit elasticity of substitution, so that

$$X_t = C_{Tt}^{\alpha} \times C_{Nt}^{1-\alpha}$$

In this setting, it is well known that the intertemporal consumption allocation can be solved for independently from the intratemporal allocation between tradeable and non-tradeable goods. Specifically, we can define the price index of aggregate consumption by recognizing that for any such index P_t^* it must be true that $P_t^* X_t = C_{Tt} + PC_{Nt} = C_t$ for all P_t. Then replacing C_t with $P_t^* X_t$ in the budget constraint, one obtains the Euler equation

$$E_t\left(\frac{P_t^*}{P_{t+1}^*}\left(\frac{X_t}{X_{t+1}}\right)^{\gamma}\right) = \frac{1}{1 + r_{t+1}^W}$$

which can be rewritten in terms of aggregate consumption expenditure as

$$E_t\left(\left(\frac{C_t}{C_{t+1}}\right)^{\gamma}\left(\frac{P_t^*}{P_{t+1}^*}\right)^{1+\gamma}\right) = \frac{1}{1 + r_{t+1}^W} \qquad (1)$$

As shown in Obstfeld and Rogoff (1995), the aggregate price index for consumption is an expenditure-weighted CES aggregate of the tradeable and non-tradeable goods prices so that $P_{t+1}^*/P_t^* = (P_{t+1}/P_t)^{1-\alpha}$. Hence, (1) links aggregate consumption expenditure growth to the consumption-based real interest rate, which is the world real interest rate corrected for real exchange rate changes (defined as the change in the relative price of non-traded goods). Assuming that consumption growth, the real exchange rate, and the real interest rate are jointly log-normal, Bergin and Sheffrin (2000) show that this condition can be log-linearized to obtain

$$E_t(\Delta c_{t+1}) = \frac{1}{\gamma} E_t(r_{t+1}) + constant$$

where $r_{t+1} = r_{t+1}^W + (1-\alpha)(\frac{1}{\gamma} - 1)\Delta p_{t+1}$ is the consumption-based real interest rate.

We are now interested in obtaining a representation for the current account. As is well known, this model does not have a closed-form solution, but Bergin and Sheffrin (2000) and Kano (2008) have suggested different log-linearizations of the intertemporal budget constraint. Here, I follow Kano and consider a log-linearization of the current account / net output ratio which can be represented as

$$\frac{\widetilde{CA}_t}{NO_t} = b\tilde{r}_t^W + c\sum_{k=1}^{\infty} \kappa^k E_t\{\Delta\tilde{c}_{t+k} - \tilde{r}_{t+k}^W\} + \sum_{k=1}^{\infty} \kappa^k E_t\{\tilde{r}_{t+k}^W - \Delta\widetilde{no}_{t+k}\}$$

where Δno is the growth rate of net output and the tilde denotes deviations from the unconditional mean of the respective variable. The parameters b, c, are the long-term means of B/NO, C/NO respectively and $\kappa = exp[E(\Delta no_t) - E(r_t)]$. Note that the above approximation follows directly from the intertemporal budget constraint. The condition is therefore consistent with arbitrary processes for investment and output and would also hold in a production economy.

Our analysis here goes beyond Kano's in that we now substitute for consumption growth and the real interest rate term on the right hand side of the expression using the fact that $r_t = r_{t+1}^W + (1-\alpha)(\frac{1}{\gamma} - 1)\Delta p_{t+1}$. In Kano's model, there are no non-tradeable goods, so the consumption based real interest rate directly coincides with the world real interest rate. In the model here, there is an additional channel of intertemporal adjustment, which is given by expected real exchange rate changes.[6] Plugging in for r_t, I obtain the equation which is the focus of my empirical analysis:

$$\frac{\widetilde{CA}_t}{NO_t} = b\widetilde{r_t^W} + \left[\left(\frac{1}{\gamma} - 1\right)c + 1\right]\sum_{k=1}^{\infty} \kappa^k E_t\widetilde{r^W}_{t+k} + c\left[1 - \frac{1}{\gamma}\right]\sum_{k=1}^{\infty} \kappa^k E_t\widetilde{\Delta q}_{t+k} - \sum_{k=1}^{\infty} \kappa^k E_t\Delta\widetilde{no}_{t+k} \quad (2)$$

where I have introduced additional notation so that $\Delta q = (1-\alpha)\Delta p_{t+1}$ is the real exchange rate.

This equation suggests four channels of current account adjustment. The first term measures the role of net factor income flows. The second term is consumption-tilting due to expected variation in the world real

[6] The analytics of this follows Bergin and Sheffrin (2000). However, these authors do not disentangle the role of real exchange rate changes and variation in the world real rate of interest in external adjustment, as I will do below.

rate of interest: if interest rates are temporarily high, so that the sum of future interest-rate deviations from the long-term mean interest rate is positive, consumers will want to defer consumption and save more. I call this the global tilting term since it is determined by global variation in interest rates. Clearly, this global tilting effect becomes stronger as the intertemporal elasticity of substitution, $1/\gamma$, increases. The third term is the effect on intertemporal substitution of expected real exchange rate changes. If the price of the domestic consumption bundle relative to tradeable goods is expected to rise in the future, there is an incentive to save more. I refer to this channel as 'domestic tilting' since it is driven by relative variation in expected prices of only domestically (non-tradeable) to internationally consumed goods. Finally, the last term reflects the classical consumption smoothing channel: if output is below (above) trend, so that the sum of expected changes is positive (negative), the country should run a deficit (surplus) *ceteris paribus*.

To test this model, I proxy the expectation terms on the right hand side of (2) using a vector autoregressive model (VAR):

$$X_t = \sum_{\boldsymbol{l=1}}^{\boldsymbol{p}} \boldsymbol{A}_l X_{t-l} + \boldsymbol{\varepsilon}_t$$

where $X_t = [\Delta no_t \quad \Delta q_t \quad r_t^W \quad CA_t/NO_t]'$ is the vector of endogenous variables, the $\boldsymbol{A}_l$ are 4×4 coefficient matrices of the p-th order VAR and $\boldsymbol{\varepsilon_t}$ is the vector of reduced-form residuals. Stacking $Z_t = [X_t, \quad X_{t-1}, \quad \ldots \quad , X_{t-p+1}]'$, I write the VAR companion form as VAR(1) so that

$$Z_t = \boldsymbol{A} Z_{t-1} + U_t \tag{3}$$

where $\boldsymbol{A}$ is the companion matrix and $U_t = [\boldsymbol{\varepsilon}_t, \quad 0, \quad \ldots \quad , 0]$ the vector of shocks. Then, once the VAR-parameters have been estimated, the expectation terms are easily backed out as

$$\sum_{k=1}^{\infty} \kappa^k \boldsymbol{E}_t x_{t+k} = \boldsymbol{e'}_x \kappa \boldsymbol{A} [\boldsymbol{I} - \kappa \boldsymbol{A}]^{-1} Z_t$$

where x_t stands, in turn, for Δno_t, Δq_t, r_t^W, $\frac{CA_t}{NO_t}$ and $\boldsymbol{e}_x$ is the unit vector associated with the position of x in the vector Z_t (i.e. the first unit vector for Δno, the second for Δq_t etc.). Plugging this representation of the expectation terms into (2) above, one gets the CA/NO ratio predicted by the model

$$\frac{\widehat{CA}_t}{NO_t} = b\tilde{r}_t^W + \left[\left(\left(\frac{1}{\gamma} - 1\right)c + 1\right)e_r' - c\left(\frac{1}{\gamma} - 1\right)e_{\Delta q} - e_{\Delta no}'\right]\kappa G[I - \kappa G]^{-1}Z_t \tag{4}$$

where I denote the predicted value from the model with a hat.

For any known set of parameter values b, $1/\gamma$, and c the predicted current account can now be compared to the actual current account. The steady-state share of foreign assets, b, and c (the long-term consumption / net output ratio) could in principle be calibrated from the data, while the elasticity of intertemporal substitution, $1/\gamma$, is unobservable. Here, I only fix c from the data and estimate both $1/\gamma$ and b using a GMM-procedure in which I perform a grid search to minimize the in-sample sum of squared deviations between the actual and predicted CA/NO. The reason for not imputing b from the data directly is is that the long-term net foreign asset position may actually be very imperfectly proxied through reported net foreign asset positions or through cumulated current accounts (see Lane and Milesi-Ferretti, 2007). This is particularly true for China, for which some authors have argued that current account data may understate actual foreign liabilities and overstate foreign assets (see Zhang, 2008).

Based on the representation (4), I now decompose the variance of the current account as follows. Write the component that is unexplained by the model as $res = CA/NO - \widehat{CA/NO}$, take the variance on both sides and plug in for $\widehat{CA/NO}$ from (4). Then, dividing by $var(CA/NO)$, one gets

$$1 = \beta_b + \beta_r + \beta_{\Delta q} + \beta_{\Delta no} + \beta_{res} \tag{5}$$

where

$$\beta_b = \frac{cov(b(\boldsymbol{e}_r' Z_t, CA/NO)}{var(CA/NO)}$$

$$\beta_r = \frac{cov((\phi + 1)\boldsymbol{e}_r' \kappa \boldsymbol{A}[\boldsymbol{I} - \kappa \boldsymbol{A}]^{-1} Z_t, CA/NO)}{var(CA/NO)}$$

$$\beta_{\Delta q} = \frac{cov\left(-\phi \boldsymbol{e}_{\Delta q}' \kappa \boldsymbol{A}[\boldsymbol{I} - \kappa \boldsymbol{A}]^{-1} Z_t, CA/NO\right)}{var(CA/NO)}$$

$$\beta_{\Delta no} = \frac{cov(-\boldsymbol{e}_{\Delta no}' \kappa \boldsymbol{A}[\boldsymbol{I} - \kappa \boldsymbol{A}]^{-1} Z_t, CA/NO)}{var(CA/NO)}$$

$$\beta_{res} = \frac{cov(res, CA/NO)}{var(CA/NO)}$$

where $\phi = \left(\frac{1}{\gamma} - 1\right) c$. Here, β_b is the contribution of net factor income to the variance of the current account, β_r the contribution of (expected) variation in the world real rate of interest (the global tilting factor), $\beta_{\Delta q}$ the contribution of expected changes in the real exchange rate (the domestic tilting factor), and $\beta_{\Delta no}$ the contribution of output variation (consumption smoothing). The coefficient β_{res} is the fraction of the variance of the current account that remains unexplained by the model.

I now use this framework to identify the drivers of China's current account adjustment. The next section first describes the data set. Section four presents empirical results.

3. Data and Estimation

The main data used in this study are from the International Monetary Fund's International Financial Statistics and were taken from the June 2009 CD. The data are annual and range from 1982 to 2007. China's economic reform started in 1979 but transformation to a market economy was gradual in the beginning. I therefore report most results based on a somewhat shorter baseline sample starting in 1987.

Investment is constructed as the sum of gross fixed capital formation (line xxx93E) and inventory investment (line xxx93I). GDP is taken from line xxx99B , government consumption expenditure is from line xxx91F. Net output, GDP less investment and government consumption, is then turned into real quantities by deflating with the GDP deflator (92499BIPZF...). Further, I turn this variable into per capita terms using the population data from the IFS.

I use two measures of the current account balance. The baseline measure is the official series from the IFS (series code 92478ALDZF...). The second measure is obtained from Zhang (2008). This series is identical to the IFS until 2003 but makes some important adjustments for the last years of the sample. Specifically, Zhang (2008) argues that current account surpluses since 2003 are considerably overstated in official statistics. He identifies two main sources of measurement error: first, a large part of China's foreign trade is actually accounted for by foreign firms. According to the IMF's Balance of Payments (BoP) manual, returns on foreign direct investment should figure in a country's current account as a negative item, irrespective of whether these returns are repatriated or not. For China, the rate of return on foreign firms' investment are likely to be under-reported. Based on BoP data, they amount to around 5 percent in 2007, whereas a number of studies that estimate the return on capital directly reach estimates of an average rate of return of 14 percent. This discrepancy could lead to a considerable overstatement of China's current account surplus.

A second channel identified by Zhang (2008) is the incentive for mis-invoicing of imports and exports by foreign firms which could be presented by China's fixed exchange rate in conjunction with its capital control regime. Revaluation expectations for the Renminbi (RMB) will provide an incentive for capital inflows which, however, are officially restricted. One way for foreign firms to circumvent these capital controls is to under-invoice purchases from the foreign mother companies and to over-invoice their exports which would lead to an upward bias in the current account balance. Zhang provides empirical evidence for the quantitative importance of this channel. I therefore report many of my results based on Zhang's adjusted data and refer to these data as the valuation-adjusted current account. Doing so serves as a robustness check as to how strongly the results obtained from official data are affected by measurement error and, in particular, revaluation expectations.

I also employ two measures of the relative price of non-tradeable goods. The first is again taken from the IFS, the real effective exchange rate based on consumer prices (series code 924..RECZF...). As a more direct measure of the relative price of non-tradeable goods, I use a breakdown of the CPI into various expenditure categories (food, tobacco, clothing, household facilities, medical care, traffic and communications, recreation and residence) and construct the non-tradeable component as the ratio of the CPI for housing, medical care and residence relative to the aggregate CPI. These data are, however, only available from 1994 onwards.[7]

The VAR in the four variables $X_t = [\Delta no_t \quad \Delta q_t \quad r_t^W \quad CA_t/NO_t]'$ is estimated with two lags. To obtain the estimates of b and $1/\gamma$, I use the GMM- procedure outlined above: based on a grid search, I choose the values of b and $1/\gamma$ so as to minimize the sum of squared deviations $\sum_{t=1}^{T} (\widehat{CA_t/NO_t} - CA_t/NO_t)^2$. To initialize the grid search, I obtain averages for China's net foreign asset position (which is also available from the IFS but only for the last couple of years). I then let the grid search procedure choose b in the interval of plus / minus one hundred percent of net output around this initial value. The grid search for $1/\gamma$ is constrained to the positive unit interval. Allowing values greater than one for $1/\gamma$ does not change the estimates, though.

4. Results

Figure 1, Panel A plots the predicted against the actual current account for the baseline period 1987-2007. Panel B plots the same figure for the full sample, 1982-2007. In both cases, the correlation between the actual and the predicted time series appears visually very high across the whole sample period. The actual and the predicted current account also match in terms of relative variability. However, while the specification estimated from the shorter period explains a considerable part of the increase in the current account surplus since the beginning of the 2000s, the model estimated from the full sample seems to do less well on that account. The first two columns of Table 1 report more formal evidence, first on

[7] I thank the Hong Kong Monetary Authority for kindly providing these data.

correlations and relative variability, second on the estimated parameter values. Correlations exceed 0.8 in both the full and the baseline samples and in both samples the relative volatilities of the actual and the predicted current account are close to unity.[8] The estimate of the intertemporal elasticity of substitution $(1/\gamma)$ is somewhat higher for the baseline specification. The estimate of the long-run mean of the share of foreign assets, b, is virtually zero in both cases.

The lower two panels of Figure 1 plot the actual against the estimated current account that I obtain based on Zhang's (2008) valuation-adjusted current account data. Measures of fit and estimated parameter values are in the last two columns of Table 2. Again, the correlation is visually striking. Interestingly, the model now mimics virtually all of the pick-up in the Chinese surplus after 2001, irrespective of whether the full or the baseline sample are used. When the model is estimated on the long sample, it seems that the overall fit is comparable to the model estimated on official data for the same period overall, but -- at least visually -- the model based on valuation adjusted data seems to perform somewhat better on the last couple of years (i.e. exactly those years for which current account data are subject to the adjustment). The estimate of the intertemporal elasticity of substitution does not change very much vis-a-vis the specification based on official data, nor does the long-run share of foreign assets which is still estimated to be close to zero.[9]

Figure 2 provides a graphical representation of the individual expectation components in the predicted current account. It is apparent that the real exchange rate channel plays a key role. Turning to the formal variance decomposition (5), this impression is confirmed: as shown in the first column of Table 2, the exchange rate channel accounts for virtually all of the variability of the current account over the sample period. The global tilting factor and consumption smoothing seem to offset each other: the real interest rate channel seems to be positively correlated with current account fluctuations over the sample period, expected net output fluctuations appear negatively correlated with the overall effect netting out. The net factor income channel is virtually mute.

Turning to the longer sample period (2nd column of Table 2), the model still explains 70 percent of the variability in the actual current account, with the real exchange rate channel still accounting for virtually all of this. Expected net output changes do not seem to explain much nor do, again, net factor income flows. Expected variation in world interest rates is significantly negatively correlated with the current account. This latter fact seems to be at odds with the model, since the predicted current account from (2) should

8 In particular, getting relative volatilities to be of the same order of magnitude often proves difficult in empirical implementations of present-value models (see e.g. Kano, 2008; Campbell and Shiller, 1987).

9 That the estimate of b is so close to zero seems at odds with the almost explosive path of China's net foreign asset position over the last years. Two remarks are in order: first, the number reported here is an estimated (in-sample) long-run average value. Very little information about China's foreign asset position exists for most of the sample period considered here. As a matter of fact, however, it is likely that China's net foreign asset position has only turned positive shortly after the turn of the millennium (see Dollar and Kraay, 2006). This may make a sample average close to zero appear quite plausible. Secondly, some theoretical papers have attempted to calibrate the long-run value of China's external position, projecting current demographic and financial development patterns into the future. For example, Dollar and Kraay (2006) find a slightly negative long-term average asset position, again reasonably close to the numbers estimated here.

be positively correlated with the world real rate of interest - provided that $\left(\frac{1}{\gamma}-1\right)c+1$ is positive, which it is for the value of the intertemporal elasticity of substitution that we have estimated here. I explore this result in more detail below.

The third column provides the beta-decomposition for the period after 2001 (but with the expectations calculated from the VAR estimated from the long sample 1982-2007). This shows that the model estimated on the long sample cannot explain the IFS current account data after 2001: the share of the variance explained by the model drops to around 30 percent (i.e. β_u rises to 0.68) for this subperiod.

The last three columns report the results for the valuation-adjusted current account. Based on the shorter period, the model still explains almost 80 percent of the variance of CA/NO. Based on the long sample it still explains roundabout 70 percent, practically unchanged vis-a-vis the model estimated from official data. However, based on the valuation-adjusted data, the model now also does well on the post-2001 period: the share of the explained variance in CA remains stable at around 70 percent, in line with the estimate for the whole period 1982-2007.

Digging deeper into the relative contribution of the various channels, it is also apparent from Table 2 that the role of the exchange rate expectations channel is more subdued when the valuation-adjusted instead of the IFS current account data are used. For the post- 2001 period, price expectations now do not seem to play a role at all. This is consistent with Zhang's interpretation that the difference between the valuation adjusted and the baseline current account represents mis-invoicing that is in turn driven by appreciation expectations. However, taken over the whole sample, expected changes in the real exchange rate remain an important driver of current account fluctuations.

Based on the valuation-adjusted current account, the decomposition in Table 2 also documents a stronger effect of the consumption smoothing channel (i.e. variation in expected net output growth). This is interesting because the consumption smoothing channel is center stage in even the most simplified version of the intertemporal model that does not allow for time variation in interest rates. It is the insights from this baseline textbook model (see Obstfeld and Rogoff, 1996, ch. 2) that make surpluses in emerging markets -- and in China in particular -- appear puzzling in the first place: in an economy that is expected to grow fast over a protracted period of time we would expect to see persistent current account deficits. It is therefore surprising that this channel contributes so much to the explanation of China's recent surplus: the channel is significant over the whole sample but it contributes equally strongly also after 2001, the period of rising surpluses. In looking for a possible explanation of this finding, it is important to note that the model does not make a claim about future output growth. Rather, what figures on the right hand side of the current-account equation (2) is national cash flow actually available for consumption, i.e. output less investment and government spending. A shock that leads to a persistent increase in output growth could lead the sum of growth rates in investment and government spending (weighted by their weights in aggregate GDP) to temporarily exceed that of output. This, in turn, could mean that the discounted sum of expected growth rates in net output turns negative, which would justify a current account surplus.

To explore the apparently prominent role of the real exchange rate in external adjustment, I repeat the exercise reported in Table 2 but now based on an alternative measure of non-tradeables prices. I construct an index of the relative price of non-tradeable goods using a weighted average of the CPI for medical care and housing. This data is available monthly from 1994 onwards. To obtain an annual series, I take the end-of-year observations as stand-ins. Since estimating the model for the period after 1994 would make the sample very short, I splice this series together with the real exchange rate index used so far and report estimates for the period 1987-2007. The actual cumulated weight of housing and medical care in the CPI is around 0.25. But I assume it is not known *a priori* and extend the grid search procedure described above to also iterate over α, the share of tradeables in the CPI. The results are in Table 3 and show that the flavour of all previous results is preserved also under this specification: the model still fits the current account data in terms of correlations and relative variability. The estimate of the elasticity of intertemporal substitution becomes somewhat unstable, but the share of foreign assets is still estimated to be virtually zero. The share of non-tradeable goods, $(1-\alpha)=0.2$, matches the weight in the data (0.25) closely. The decomposition into the channels of external adjustment shows a lower contribution of consumption smoothing but, importantly, the prominent role of expected price changes stays unaffected in this specification. This, once again, suggests that expected increases in the price of non-tradeables (rather than, say, expectations of nominal exchange rate appreciation alone) are the key driver of current account dynamics.

The results here reveal an important role for consumption tilting in determining the Chinese current account. Most of this tilting is driven by domestic influences, i.e. by expectations about rising prices of non-tradeable goods. Surprisingly however, the international component of consumption tilting - the term driven by the world real interest rate - is significantly negative in the specifications based on the long sample (1982-2007). In spite of the surprisingly good fit of the model overall, this negative correlation could be an important challenge: theory would predict that this correlation should be zero or positive for standard parameter values.

The next section explores to what extent the response of the current account to different types of structural shocks is in line with the framework here. This also helps shed light on the negative correlation between the current account and the global tilting factor.

4.1 Dynamic Analysis

From the results reported so far, it seems that standard channels of external adjustment can explain the bulk of the variation in the Chinese current account: intertemporal smoothing and consumption tilting driven by expected increases in the relative price of non-tradeable goods. However, the model still leaves around a third of the variation unexplained and the role of the global interest rate channel remains somewhat of a puzzle: there is a significantly negative relationship between the global (world-interest-rate) tilting term and the current account in the specifications obtained from the full sample in Table 2.

To understand these patterns in the data better, I identify two groups of structural shocks from the VAR that are key for external adjustment: permanent and transitory shocks and global and country-specific shocks. Whether a shock to net output is permanent or transitory has fundamentally different implications for the sign and magnitude of the current account response. In theory, permanent shocks to national cash-flow should lead to a negative response of the current account, whereas transitory shocks should be associated with positive current account responses (see Aguiar and Gopinath, 2007). Conversely, Glick and Rogoff (1995) and Hoffmann (2003, 2001b) have emphasized that (net of interest rate movements) mainly country-specific shocks should drive current account movements.[10]

The structure of my empirical model allows me to separate permanent and transitory components without further identifying restrictions. To see this note first that the VAR model is essentially a cointegrated system: collect $\Delta\boldsymbol{x}_t = [\Delta q_t \quad \Delta no_t]'$ and $\boldsymbol{z}_t = \left[r_t^W \quad \frac{CA}{NO_t}\right]'$. Then $X_t = [\Delta\boldsymbol{x_t} \quad \boldsymbol{z_t}]'$ and the VAR-model from (3) above can be represented as

$$\begin{bmatrix}\Delta\boldsymbol{x}_t\\ \boldsymbol{z}_t\end{bmatrix} = \begin{bmatrix}B_1(L) & D_1(L)\\ B_2(L) & D_2(L)\end{bmatrix}\begin{bmatrix}\Delta\boldsymbol{x}_{t-1}\\ \boldsymbol{z}_{t-1}\end{bmatrix} + \boldsymbol{\varepsilon}_t$$

with appropriately partitioned matrix polynomials $\boldsymbol{B_1(L)}$, $\boldsymbol{B_2(L)}$, $\boldsymbol{D_1(L)}$, and $\boldsymbol{D_2(L)}$. It is then easily verified that this system can be rewritten as a vector error correction model with

$$\Delta X_t = \boldsymbol{\Gamma(L)}\Delta X_{t-1} + \boldsymbol{\alpha\beta}' X_{t-1} + \boldsymbol{\varepsilon}_t$$

where

[10] Nason and Rogers (2002) examine various identification schemes in an SVAR-context.

$$\mathbf{\Gamma}(L) = \begin{bmatrix} \boldsymbol{B_1}(L) & \dfrac{\boldsymbol{D_1}(\boldsymbol{L}) - \boldsymbol{D_1}(\mathbf{1})}{1-L} \\ \boldsymbol{B_2}(L) & \dfrac{\boldsymbol{D_2}(\boldsymbol{L}) - \boldsymbol{D_2}(\mathbf{1})}{1-L} \end{bmatrix} \text{ and } \boldsymbol{\alpha} = \begin{bmatrix} \boldsymbol{D_1}(1) \\ \boldsymbol{D_2}(1) - \boldsymbol{I} \end{bmatrix}$$

and where $\boldsymbol{z_t} = \boldsymbol{\beta}' X_t$ is the error-correction term. The matrix $\boldsymbol{\beta}$ stacks the cointegrating vectors, which here are ‘trivial’ in the sense that they are just the third and fourth unit vectors.[11]

It is well known that in such a system, the space of permanent and transitory shocks can be directly identified from the adjustment loadings $\boldsymbol{\alpha}$: in the four-dimensional system here, there are two cointegrating relations, implying that there are two common trends (permanent shocks) and two transitory shocks. As shown by Johansen (1995) and as discussed in Hoffmann (2001a, b), the vector of permanent shocks, $\boldsymbol{\pi_t}$, is then identified from

$$\boldsymbol{\pi}_t = \boldsymbol{S}_p' \boldsymbol{\alpha}_\perp' \boldsymbol{\varepsilon_t} \tag{6}$$

where $\boldsymbol{\alpha}_\perp$ is the orthogonal complement of $\boldsymbol{\alpha}$. Here, $\boldsymbol{S}_p = (\boldsymbol{\alpha}_\perp' \boldsymbol{\Omega} \boldsymbol{\alpha}_\perp)^{-1/2}$ is a normalization matrix that ensures that the permanent shocks are mutually orthogonal and have unit variance: $var(\boldsymbol{\pi}_t) = I_2$. I will discuss the choice of this matrix shortly. Requiring that transitory shocks are orthogonal to $\boldsymbol{\pi}_t$, one obtains

$$\boldsymbol{\tau}_t = \boldsymbol{S}_\tau' \boldsymbol{\alpha}' \boldsymbol{\Omega}^{-1} \boldsymbol{\varepsilon}_t$$

where $\boldsymbol{\Omega}$ is the covariance matrix of the reduced-form, residuals $\boldsymbol{\varepsilon_t}$ and $\boldsymbol{S}_\tau = (\boldsymbol{\alpha}' \boldsymbol{\Omega}^{-\mathbf{1}} \boldsymbol{\alpha})^{1/2}$ is again a normalization matrix. The matrices $\boldsymbol{S}_\pi$ and $\boldsymbol{S}_\tau$ are not uniquely identified. The orthogonality restrictions $var(\boldsymbol{\pi}_t) = \boldsymbol{I}_2$ and $var(\boldsymbol{\tau}_t) = \boldsymbol{I}_2$ impose three non-redundant restrictions on each of them. Therefore, to achieve just-identification, one additional restriction is required for each pair of shocks. I obtain these restrictions by distinguishing between global and a country-specific shock of each type (permanent and transitory). In so doing, I build on Kano (2008) in arguing that only global shocks should have a bearing on the world real rate of interest. To see how this restricts the choice of $\boldsymbol{S}_p$ and $\boldsymbol{S}_\tau$, note that the relation between the reduced-form residuals and the permanent and transitory shocks can be inverted to obtain

[11] The matrices $\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ are not to be confounded with the scalars α and β in the theoretical model above or with the coefficients of the variance decomposition.

$$\boldsymbol{\varepsilon}_t = \boldsymbol{P}\begin{bmatrix}\tau_t^g \\ \tau_t^c \\ \pi_t^g \\ \pi_t\end{bmatrix}$$

Here, the superscripts g and c now denote the global and country-specific shocks respectively and where the matrix $\boldsymbol{P}$ can be shown to be of the form (see Hoffmann, 2001a):

$$\boldsymbol{P} = \left[\boldsymbol{\alpha S_\tau^{-1}}, \quad \boldsymbol{\Omega\alpha_\perp^{'} S_p^{-1}}\right]$$

The first two columns of $\boldsymbol{P}$ give the period-zero impulse response to the transitory shocks and the last two columns to the permanent shocks. Then recalling the ordering of the variables in our system (the world real interest rate is ordered third), the restrictions on $\boldsymbol{S}_\tau$ and $\boldsymbol{S}_p$ are given by

$$\boldsymbol{\alpha S_\tau^{-1}} = \begin{bmatrix} * & * \\ * & * \\ * & 0 \\ * & * \end{bmatrix} \text{ and } \boldsymbol{\Omega\alpha_\perp^{'} S_p^{-1}} = \begin{bmatrix} * & * \\ * & * \\ * & 0 \\ * & * \end{bmatrix}$$

This completes the identification of the shocks.

4.1.1 Impulse Responses

In my exploration of the dynamic properties of the model I propose a novel approach that to my knowledge has not been explored in the literature on present-value models: this approach recognizes that the set of VAR cross-equation restrictions that are imposed by the fundamental current account equation (2) should not only hold unconditionally, but also conditionally, for any of the four structural shocks that I have identified above. Given the parameters b, $1/\gamma$, and α, the current account response to any given shock should equal the sum of the responses on the right hand side of (2). By plotting the predicted and actual responses against each other, I therefore obtain an impression to what extent the fundamental current account equation[12] (2) holds along the dynamic adjustment path of the VAR-model *conditional* on a shock of a particular type. Figure 3A provides the results of this exercise, based on the IFS data for the period 1982-2007.[13] For all four shocks, the actual current account response lines up with the restrictions imposed by theory: the bootstrapped confidence intervals suggest that the actual response of the current

12 This term was coined by Obstfeld and Rogoff (1995).

13 In presenting my results, I abstract from the role of the net factor income channel since b is estimated to be so close to zero that multiplying it with the interest rate response is negligible. Note also that results based on the valuation-adjusted current account are very similar.

account and the one predicted by the right hand side of (2) are statistically almost indistinguishable. Still, some issues remain: first, standard theory would predict that permanent global shocks should not affect the current account. In the data however, we see a strong positive response. Though the predicted response is somewhat weaker, it is still persistently positive. Secondly, the model also predicts that there should be a positive correlation (at least for the parameter configurations that have been estimated above) between the actual current account response and the response of the tilting and smoothing channels.

Figure 3B provides more detail on these issues. Here, I decompose the predicted current account response into the individual responses of the two tilting and the smoothing terms. This decomposition reveals that in particular the permanent global shock leads to a marked decrease in the global tilting term (i.e. the sum of expected real interest rates). This drop in world interest rates offsets the otherwise positive impact of the shock on the the other two terms (smoothing and domestic tilting) and seems to be the main reason why the predicted current account response (in Figure 3A) appears much flatter than the actual response. The real interest rate response to the permanent global shock therefore also seems to be the main driver for the negative (unconditional) correlation between the global tilting channel and the current account as it appeared in Table 2. The findings here suggest that the global permanent shock is - at least partly - explained by shocks to the Chinese current account itself. In fact, it seems to represent a Chinese savings shock that drives down the world real interest rate, consistent with Bernanke's “savings glut” hypothesis (Bernanke, 2005). This shock may reflect precautionary savings e.g. due to time-variation in idiosyncratic risk faced by households (see Mendozaetal *et al.,* 2009; Chamon and Prasad, 2008) or due to changing demographics (Wei and Zhang, 2009). It could also reflect a lack of domestic financial development that may force small and medium private-sector firms to finance investment through retained earnings (as in Song *et al.*, 2008).

Table 4 provides further insight into the dynamics of the model. It presents variance decompositions of the four variables in the system. First, it is noteworthy that both the permanent and the transitory global shocks together explain most of the variance of the world (US) interest rate at all horizons. This suggests that the identification of global factors works quite well. Note also that the country-specific shock explains most of the transitory variation in the current account. However, permanent shocks - and here in particular the global breed - seem to explain a considerable share of the variation in the current account as well, consistent with my previous interpretation that much of the current account variation is owed to what is ultimately a domestic Chinese savings shock: altogether these factors seem to account for around half of China's current account variability at longer to medium horizons. Interestingly, net output seems to be driven mainly by domestic factors in the long run, which again is consistent with my previous finding that simple consumption smoothing considerations are also important for China's current account: as elaborated in e.g. Glick and Rogoff (1995), consumption smoothing will only be possible with respect to the country-specific component of national cash flow.[14]

5. Discussion and Conclusion

A simple present-value model of the current account explains more than 70 percent of the variation in China's current account over the period 1982-2007 and most of the recent run-up in surpluses. The model nests four channels of external adjustment: net factor income flows, the standard consumption smoothing motive and two forms of consumption tilting: i) tilting due to variation in the world real rate of interest - the global component of tilting, and ii) tilting due to expected changes in the relative price of non-tradeables (i.e. the real exchange rate) - the domestic component of tilting. My results reveal an important role for the domestic component of tilting and for consumption smoothing. These results hold even once I control for revaluation expectations and measurement error in China's current account. They suggest that expected increases in the price of non-tradeable goods and services such as housing and medical care provide a strong incentive for Chinese households to defer tradeable consumption. My interpretation of the strong showing of the consumption smoothing channel is that low financial development, capital controls or physical adjustment costs may force households and firms to finance future investment from retained earnings. In this way, an ultimately positive TFP shock could lead to a persistent (though ultimately temporary) decline in the cash flow available for consumption because investment may be deferred for some while but will then temporarily grow more quickly than output itself.

My taxonomy of the channels of China's external adjustment also reveals a negative correlation between the global tilting component (expected variation in the world interest rate) and the current account. To shed light on this correlation and on external adjustment more generally, I explore the conditional dynamics of the model by distinguishing between country-specifc and global as well as between permanent and transitory shocks. Economic theory predicts that this distinction is particularly relevant for understanding current account dynamics (see e.g. Glick and Rogoff, 1995; Aguiar and Gopinath, 2007). One methodical innovation of the present paper is that I use the cointegrated structure of the present-value model to recover these four shock categories from the VAR with only minimal identifying assumptions.

As a key driver of China's current account (and of the negative correlation with world real interest rates) I identify the permanent global shock: while associated with a decline in the world interest rate, it also leads to a persistent increase in China's current account. At the same time, it also contributes to the strong positive association between the current account and expected price changes for non-tradeables. This

[14] Note from figure 3B, that there is a temporary increase in the smoothing term following the permanent idiosyncratic shock, implying that the sum of discounted future net output growth is negative on impact: though the shock may ultimately increase output, it may lead to temporarily even higher growth in investment or government spending which in turn would temporarily lower resources available for consumption.

pattern suggests that the permanent global shock may, ultimately, reflect variation in China's precautionary demand for global assets.

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Table 1. Fit of the Intertemporal Model and Parameter Estimates

		IFS data		Valuation-adj. CA	
		1987-2007	1982-2007	1987-2007	1982-2007
Correlation	$(\rho(\widehat{CA/NO}, CA/NO))$	0.96	0.82	0.85	0.82
Rel. Std. Dev.	$(\frac{\sigma(\widehat{CA/NO})}{\sigma(CA/NO)})$	1.16	0.80	0.89	0.83
Subst. Elasticity	$(1/\gamma)$	0.71	0.61	0.91	0.71
Net Foreign Assets	(b)	0.11	0.01	0.01	0.01

The Table presents correlations of the predicted and the actual current account and their relative standard deviations along with the parameter estimates (substitution elasticity $(1/\gamma)$ and long-term net foreign asset position (b)) obtained from the GMM procedure described in the main text. The predicted current account is given by equation (2) as

$$\frac{\widehat{CA}_t}{NO_t} = b\widetilde{r}_t^W + \left[\left(\frac{1}{\gamma} - 1\right)c + 1\right]\sum_{k=1}^{\infty} \kappa^k E_t \widetilde{r^W}_{t+k} + c\left[1 - \frac{1}{\gamma}\right]\sum_{k=1}^{\infty} \kappa^k E_t \widetilde{\Delta q}_{t+k} - \sum_{k=1}^{\infty} \kappa^k E_t \Delta\widetilde{no}_{t+k}$$

Table 2. Channels of External Adjustment

	IFS data			Valuation adjusted CA		
Channel	1987-2007	1982-2007	2001-2007	1987-2007	1982-2007	2001-07
Net factor income	-0.01	**-0.01**	0.00	-0.00	**-0.01**	0.00
	(-0.97)	(-2.59)	(1.41)	(-0.15)	(-2.16)	(1.36)
World interest rate	**0.11**	**-0.12**	**0.29**	-0.04	**-0.24**	**0.29**
	(2.56)	(-3.02)	(2.22)	(-0.47)	(-3.62)	(1.56)
Real exchange rate changes	**1.14**	**0.75**	**-0.30**	**0.19**	**0.60**	-0.16
	(11.02)	(6.15)	(-1.95)	(4.72)	(4.94)	(-1.05)
Net output changes	**-0.13**	0.03	**0.33**	**0.61**	**0.31**	**0.55**
	(-2.01)	(0.54)	(2.62)	(6.24)	(4.08)	(4.76)
Unexplained	-0.11	**0.34**	0.67	**0.23**	**0.32**	0.32
	(-1.35)	(3.49)	(1.63)	(2.04)	(3.07)	(0.71)

The table presents estimates of the coefficients β_x from the variance decomposition (5), where $x = b, r, \Delta q, \Delta no$ in turn. Numbers in parentheses are t-statistics. Boldface indicates significance at the five percent level.

Table 3. Model Fit and Channels, Based on Price Index of Housing and Medical Care

Val. adjusted CA, 1987-2007				
Fit of the model & parameter estimates			Channels of external adjustment	
Correlation	$(\rho(\widehat{CA/NO}, CA/NO))$	0.94	Net factor income	0.00
				(0.83)
Rel. Std. Dev.	$(\frac{\sigma(\widehat{CA/NO})}{\sigma(CA/NO)})$	0.94	World interest rate	-0.01
				(-1.49)
Subst. Elasticity	$(1/\gamma)$	0.01	Real exchange rate	0.87
				(6.70)
Net Foreign Assets	(b)	0.01	Consumption Smoothing	0.02
				(0.27)
Share of tradeables in CPI	(α)	0.80	Unexplained	0.11
				(1.47)

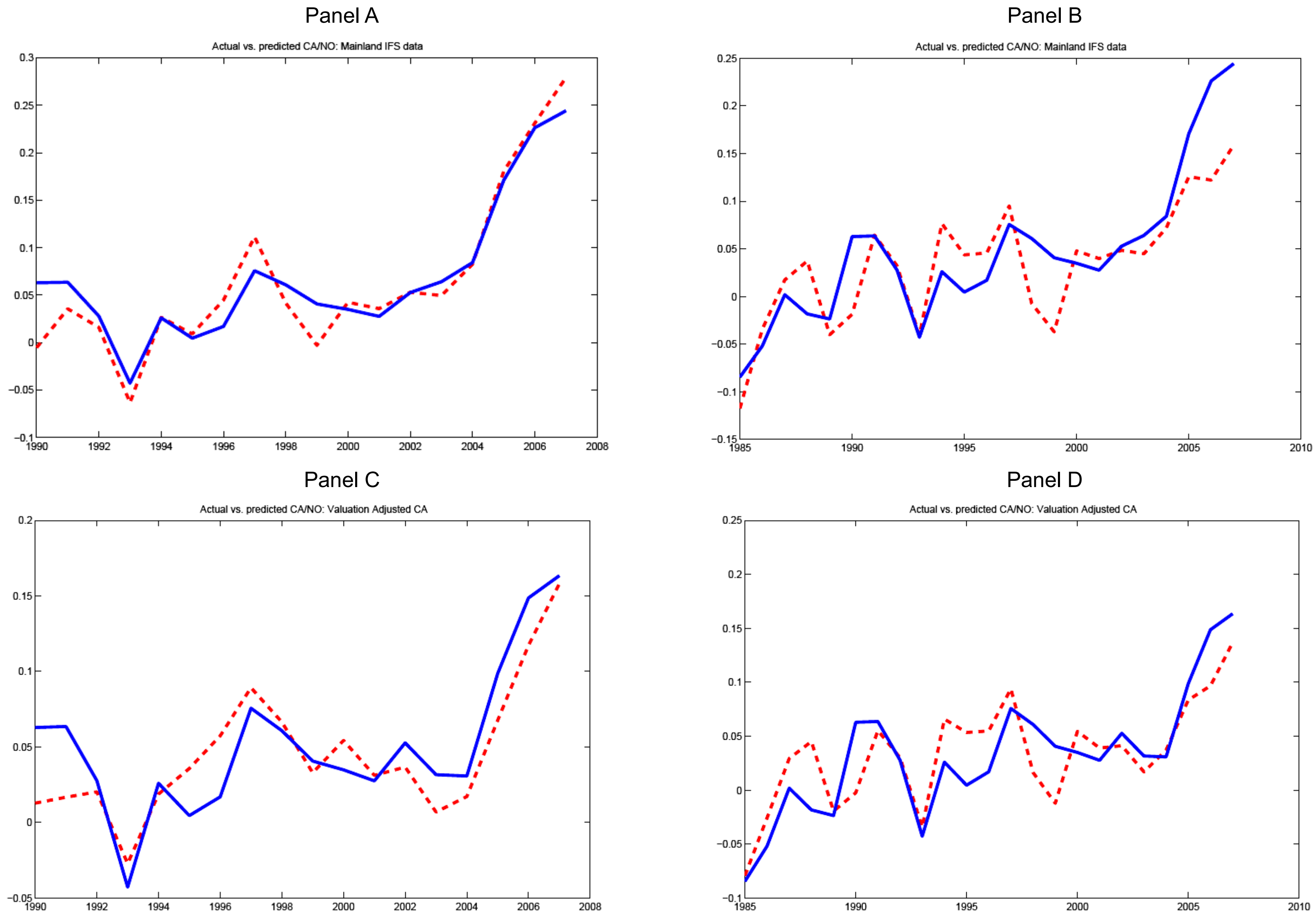
The left panel of the Table presents correlations and relative standard deviations for predicted and actual current account and the estimated parameters ($1/\gamma$, b and α) when the relative price of non-tradeables is measured using an aggregate of prices for housing and medical care. The right panel gives the relative importance of external adjustment channels for this model, based on the decomposition (5). See notes on Tables 1 and 2 for further details.

Table 4. Forecast Error Variance Decompositions 1982-2007

Horizon/yrs	$r_{t+k} - E_t(r_{t+k})$	$\frac{CA_{t+k}}{NO_{t+k}} - E_t\left(\frac{CA_{t+k}}{NO_{t+k}}\right)$	$q_{t+k} - E_t(q_{t+k})$	$no_{t+k} - E_t(no_{t+k})$
global, transitory				
1	0.64	0.09	0.16	0.10
3	0.56	0.05	0.15	0.07
5	0.42	0.04	0.07	0.03
	[0.14--0.56]	[0.02--0.22]	[0.02--0.14]	[0.02--0.14]
country-spec., trans.				
1	0.00	0.40	0.22	0.01
3	0.00	0.53	0.15	0.01
5	0.01	0.30	0.04	0.01
	[0.01--0.14]	[0.07--0.39]	[0.01--0.14]	[0.01-- 0.08]
global permanent				
1	0.36	0.02	0.52	0.07
3	0.42	0.16	0.30	0.13
5	0.45	0.51	0.32	0.15
	[0.13--0.67]	[0.09--0.64]	[0.08--0.73]	[0.03--0.82]
country-spec., permanent				
1	0.00	0.49	0.09	0.82
3	0.02	0.26	0.40	0.79
5	0.11	0.14	0.57	0.81
	[0.04--0.35]	[0.08--0.53]	[0.13--0.81]	[0.09--0.91]

Table presents forecast error variance decompositions based on IFS data for the 1982-2007 period. Numbers in rectangular brackets indicate 80 percent bootstrap confidence intervals at the 5-year horizon.

Figure 1. Actual Current Account Over Net Output Ratio (CA/NO) (Blue, Solid Line) vs. Model Prediction (Red, Dashed Line)



The left column (panel A and C) shows the results for the 1987-2007 period, the right column (panel B and D) for the 1982-2007 period. The results in panel A and B are obtained from the model estimated from the official IFS statistics, the ones on panels C and D from the valuation adjusted current account.

Figure 2. Current Account / Net Output Ratio (IFS Data) (Blue, Solid Line) vs. Individual Channel Components Extracted from the Model (Red, Dashed Line)

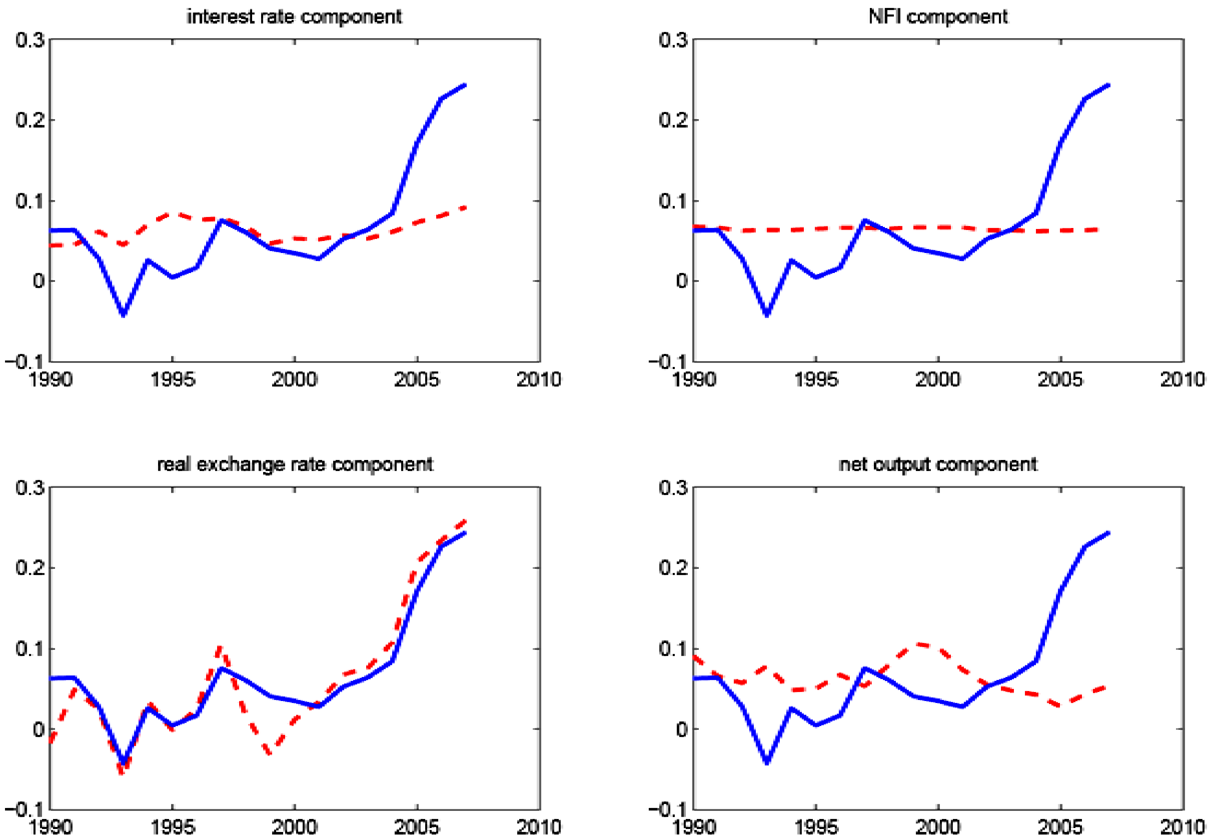
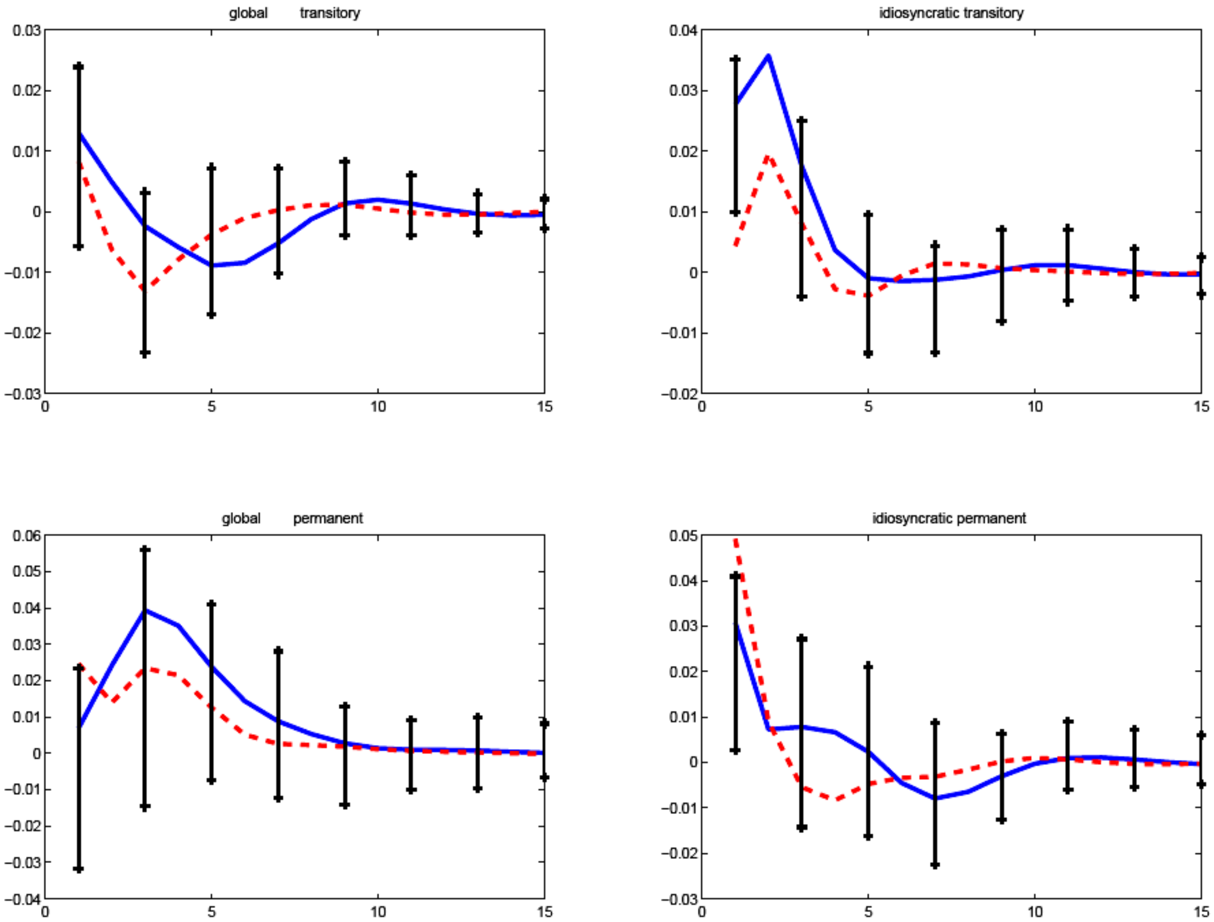
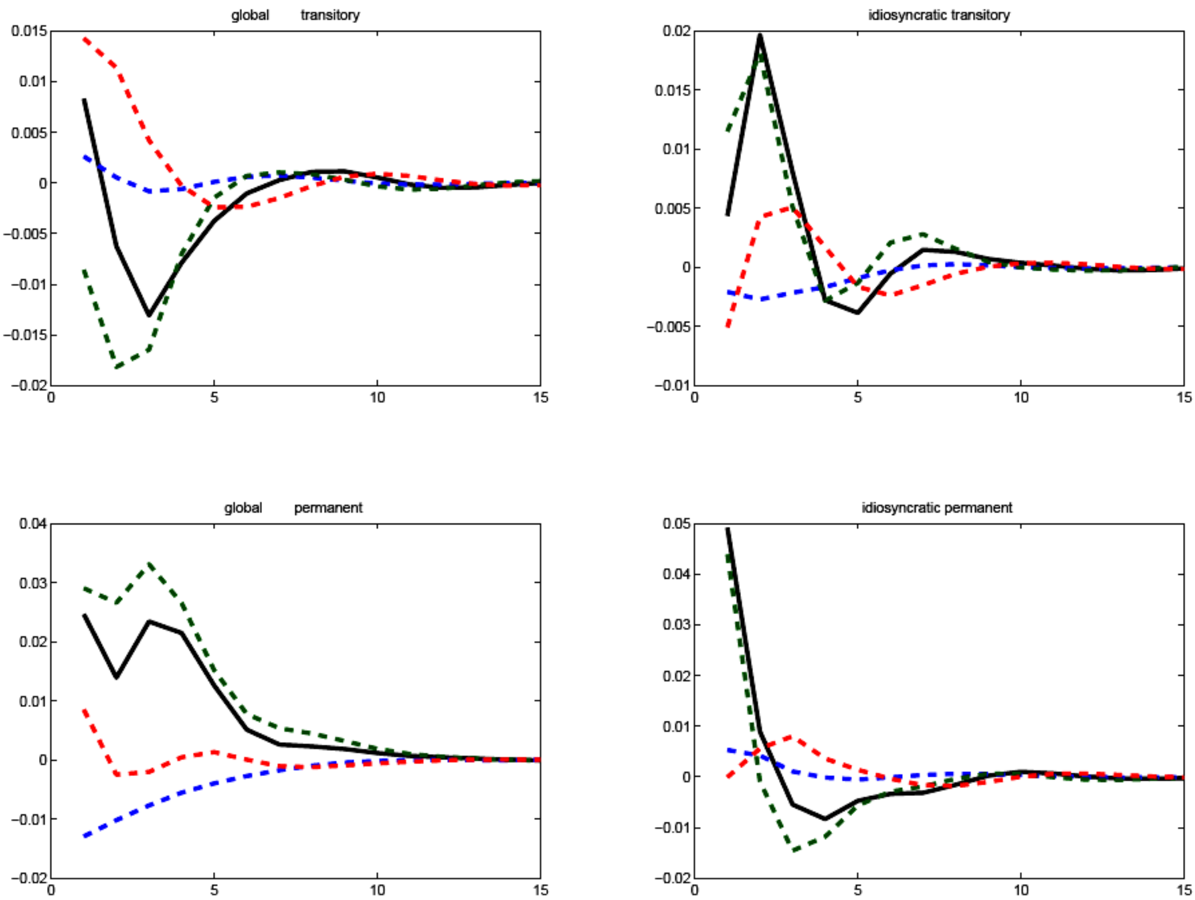


Figure 3A. Impulse Response of the Current Account: Actual (Blue, Solid Line) vs. Theoretically Predicted (Red, Dashed) Line



IFS data, 1982-2007. Vertical black lines indicate 80 percent bootstrapped confidence intervals of the actual response.

Figure 3B. Response of the Theoretically Predicted Current Account (Black, Solid Line) and Decomposition into the Impulse Response of the Individual Channels (Dashed Lines): Consumption Tilting due to World Real Interest Rate (Blue) and Real Exchange Rate (Olive) Changes and Consumption Smoothing due to Net Output Changes (Red)



IFS data, 1982-2007