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SPECIAL ISSUE
Financial Globalization and Integration

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Current account balances, financial development and institutions: Assaying the world “saving glut”

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Abstract

We critically assess several of the key assertions underlying the global saving glut hypothesis. First, we investigate whether the behavior of the U.S. current account is anomalous in light of previous industrial country experience. Second, we determine whether East Asian current account balances are predictable using standard macroeconomic variables, augmented with institutional factors. Finally, we investigate whether higher levels of financial development in key East Asian economies would result in smaller current account surpluses. We find that a 1 percentage point increase in the budget balance would increase the current account balance by 0.10–0.49 percentage points for industrialized countries, and that the U.S. current account performance over the last four years is borderline anomalous. While more developed financial markets would lead to smaller current account balances for countries with highly developed legal systems and open financial markets, for key East Asian countries, greater financial development would cause *higher* saving. Asian current account surpluses seem to be driven by depressed investment, not excess saving.

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1. Introduction

The development of enormous and persistent current account imbalances over the past decade has been the topic of intense debate in academic and policy circles. The 2006 U.S. current account to GDP deficit of 6.1 percentage points is unprecedented by historical standards, and high in comparison to other developed economies.

A number of explanations have been forwarded for this phenomenon. At the risk of oversimplification, the explanations can be categorized as either domestic or international in nature. Some argue that the main reason for the increase in U.S. current account imbalances is the decline in U.S. saving, especially public sector saving, since 2002. In this “twin deficits” argument, the current Administration’s expansionary fiscal policy bears the greatest blame. Greenspan (2005a,b), Ferguson (2004) and others have, on the other hand, argued that the impact of fiscal policy on the current account balance is small.

A “global saving glut” explanation has been expounded by Bernanke (2005), Clarida (2005a,b), and Hubbard (2005). This argument views excess saving from Asian emerging market countries, driven by rising saving and collapsing investment in the aftermath of the financial crisis (and to a lesser extent Europe), as the cause of the U.S. current account deficit. More recently, the burgeoning surpluses of the oil exporters, ranging from the Persian Gulf countries to Russia, have moved to the fore as sources of excess saving. From this perspective, the U.S. external imbalance is a problem made abroad, and amenable to a solution only in the longer term, as better developed and more open financial systems mitigate this excess saving problem.

Surprisingly, despite the popularity of the saving conjecture in American policy circles, there has been little empirical work that takes seriously the global saving glut thesis.¹ In this paper, we remedy this deficiency by analyzing the determinants of current account balances for industrial and developing countries, while controlling for differences in institutional environment across countries. The data set we employ covers a large and heterogeneous group of countries (19 industrial, 70 developing) over a relatively long time span (1971–2004).

Our empirical approach relies upon the methodology developed by Chinn and Prasad (2003). Their study provided a broad empirical characterization of the medium-term determinants of current account balances for a sample of industrial and developing countries from the perspective of longer-run saving–investment balances. This paper updates and extends their work by incorporating a potentially important factor identified by Bernanke (2005), namely the effects of legal and institutional development.

Whether one takes the twin deficits or global saving glut argument, the effect of legal and institutional development cannot be dismissed a priori. In addition to macroeconomic attributes such as the stage of development, the demographic profile, and the government budget balance, the legal environment and the level of institutional development should also be important determinants for saving and investment decisions since they affect the rate of returns from these activities.

The extent of institutional development should enhance the effectiveness of financial development and other policy measures such as financial opening. Hence, this paper also devotes

¹ One exception is Gruber and Kamin (2005). Roughly contemporaneously with us, they have written a paper closely related to this one. They examine different aspects of the “saving glut” and “Bretton Woods II” (Dooley et al., 2003) hypotheses. General discussion of global savings and investment patterns is contained in IMF (2005), CBO (2005), Higgins (2005) and the Economist (2005).

special attention to the effect of financial development and examine whether the “financial deepening” argument (Edwards, 1996) or the saving glut argument is applicable for sample countries’ saving determination. In this regard, we estimate a model that controls for financial deepening and interacts it with other variables such as institutional development and financial openness.

The key findings are as follows. The budget balance is an important determinant of the current account balance for industrial countries; the coefficient for the budget balance variable is 0.15 in a model controlling for institutional variables. A series of robustness checks yield the results that a 1 percentage point increase in the budget balance (above the world weighted average) should lead to a 0.1–0.5 percentage point increase in the current account balance. For the United States, our analysis confirms the view that it is a saving drought – not investment boom – that is contributing to the enlargement of current account deficits, although there is some evidence of anomalous behavior in the latest four-year period.

For the East Asian countries, we find some evidence that the budget balances are somewhat larger than predicted by our empirical models. However, we also find that the data are *not* consistent with the argument that the more developed financial markets are, the less saving a country undertakes. For these countries, the reverse is true: more financial development leads to *higher* saving. In this context, there is no evidence of “excess domestic saving” in the East Asian emerging market countries. Rather they appear to be suffering from an investment drought over the post-crisis period.

2. Is the U.S. current account imbalance extraordinary?

2.1. Theoretical framework and data

We estimate regressions of the general form:

$$y_{i,t} = \alpha + X_{i,t}B + Z_{i,t}\Gamma + u_{i,t}, \quad (1)$$

where y is either the current account balance, national saving, or investment, all expressed as a share of GDP, X is a vector of macroeconomic and policy variables such as net foreign assets and the budget surplus, and Z is a vector of financial development factors, all except net foreign assets expressed relative to the global mean. The choice of the first set of variables follows Chinn and Prasad (2003), while that of the second set is inspired by the literature on financial development as surveyed by Chinn and Ito (2006). The idea that financial development might drive, and interact with, growth to influence saving and investment behavior is extensively discussed in the finance and growth literature. Levine (2005) reviews this vast literature.

One potential problem with developing country data is the possibility of significant measurement error in annual data. To mitigate these concerns, and since our interest is primarily in medium-term rather than short-term variations in current accounts, we construct a panel that contains non-overlapping five-year averages of the data for each country.² This procedure also has the advantage of abstracting from short-run variations in current accounts and related variables, which are not of central interest.

² The 2001–2004 period has been compressed into one observation, and so represents only four years instead of the standard five.

The variables we incorporate into the analysis are the following:

Net foreign assets to GDP ratio: From an intertemporal perspective, the stock of net foreign assets (NFA) serves as an important initial condition, given that the current account is the sum of the trade balance and the return on a country's stock of NFA (or payment on its net foreign liabilities position). Alternatively, from a buffer stock saving perspective, higher levels of initial net foreign assets should be associated with subsequent lower current account balances.

Government budget surplus to GDP ratio: A variety of models predict a positive relationship between government budget balances and current accounts over the medium term. In the absence of a full Ricardian offset via private saving, an increase in the government budget balance could lead to an increase in national saving. In developing economies, where a greater proportion of agents may be liquidity constrained, this relationship might be expected to be more pronounced.

Relative income: The “stages of development” hypothesis for the balance of payments suggests that countries, as they move from a low to an intermediate stage of development, typically import capital and, therefore, run current account deficits. As they reach an advanced stage of development, countries run current account surpluses in order to pay off accumulated external liabilities and also to export capital to less advanced economies.

Demographics: The literature on the determinants of national saving has pointed to a number of additional “structural” determinants such as demographics. [Masson et al. \(1998\)](#) show that the dependency ratio is one of the key determinants of private saving.

Uncertainty: Terms of trade volatility is another potential determinant of medium-term fluctuations in current accounts. Agents in economies that face more volatile terms of trade might save more for precautionary reasons in order to smooth their consumption streams in the face of volatile income flows.

Trade Openness: Country characteristics that reflect macroeconomic policies could also be relevant for current account determination. The degree of openness to international trade could reflect policy choices, including tariff regimes.

Growth Rates: Countries with high labor productivity growth may attract more capital inflows with higher expected rates of returns in their asset markets, as has been argued to be the case with the U.S. whose buoyant labor productivity growth may have been the main cause of the recent rise in current account deficits. As a proxy to productivity growth, we include real output growth rates.³

Financial Development/Deepening: A large body of literature has identified the positive effect of development in financial instruments, markets, and institutions — or financial development or deepening — on economic growth (see [Levine, 2005](#) for a comprehensive review). That is, financial development enhances saving and investment because it contributes to raising returns as well as lowering the cost of capital and the risk of investment by ameliorating information asymmetry, reducing information and transaction cost, improving corporate governance, and/or facilitating risk management ([King and Levine, 1993](#); [Rajan and Zingales, 1998](#); [Wurgler, 2000](#)). Hence, it is important to consider financial development/deepening as one of the determinants for the saving and investment decision.

³ Details regarding data sources and construction are contained in [Data appendix](#).

While the effect of financial development on investment is unambiguous (i.e., positive), that on saving is not, because higher returns and lower risk of financial investment create effects on saving akin to income and substitution effects. The traditional view on the effect of financial development on saving suggests a positive association between the two variables; further financial deepening could induce more saving through more depth and sophistication of the financial system. However, a contrasting view suggests that more developed financial markets lessen the need for precautionary saving, and thereby lower the saving rate.

Bernanke (2005) argues that greater financial development will remedy the global saving glut in the long run by inducing a decline in the saving rate in the emerging Asia. Similarly, Clarida (2005a,b) argues that the sophisticated equity markets in the U.S. absorb excess saving from all over the world, leading to higher current account deficits. Given these arguments, we believe that financial market development must be taken seriously in any empirical examination of the saving glut hypothesis.

To measure financial development, we use private credit as a ratio to GDP (PCGDP) whose data are drawn from Beck et al. (2001a,b and updates).^{4,5} Also, we measure the level of financial development using the level of private credit creation as the deviation from the world weighted average. By measuring the level of financial development in relative terms, we believe that we can examine the effect of financial development for both creditor and debtor countries and test whether the saving glut or financial deepening view is applicable. That is, a negative correlation between the overall effect of further financial development and current account or saving suggests that countries with underdeveloped (well-developed) financial markets are creditor (debtor) countries and export their excess capital to the rest of the world (import excess capital from abroad) and run current account surplus (deficit) – the saving glut argument. A positive correlation, on the other hand, is more consistent with the conventional financial deepening argument.

All the variables, except for net foreign assets to GDP, are converted into the deviations from their GDP-weighted world mean prior to the calculation of five-year averages. The demeaning of the data series controls for rest-of-the-world effects. In other words, a country's current account balance is determined by developments at home as well as abroad.

2.2. Empirical results: do budget balances matter?

The sample for our analysis covers both industrial and developing countries. The underlying dataset has annual data for 19 industrial and 70 developing countries covering the period 1971–2004. In this part of the analysis, we focus upon the industrial country data.

Table 1 shows a significantly positive relationship between current account and government budget balances for all the sample groups. A 1 percentage point increase (above the world GDP-weighted average) in the budget balance would lead to a 0.16 percentage point increase in the current account balance for industrialized countries (IDC), a different result from Chinn and Prasad (2003), who examined a shorter sample from 1971 to 1995. For purposes of

⁴ One might also consider equity market development. While the data set of Beck et al. also contains data to measure the development in equity markets – namely, stock market capitalization (SMKC), total value of stocks traded (SMTV), and stock market turn over ratio (SMTO) – it is extremely difficult to rely upon these measures as indicators of equity market development since one cannot clearly distinguish between bubble behavior and actual market development. Therefore, we do not include equity market development measures in our estimation. However, we will still examine the effect of equity market development using these measures in work reported in the working paper version.

⁵ We use PCGDP, while Chinn and Prasad (2003) use M2 to GDP, primarily for data availability reasons.

Table 1
Current account regressions

	(1) Full sample	(2) Industrial countries (IDC)	(3) Less developed (LDC)	(4) LDC w/out Africa
Government budget balance	0.15 [0.068]**	0.16 [0.086]*	0.15 [0.081]*	0.242 [0.092]***
Net foreign assets (initial)	0.049 [0.005]***	0.063 [0.011]***	0.047 [0.005]***	0.05 [0.006]***
Relative income	0.027 [0.019]	0.059 [0.025]**	0.032 [0.085]	0.09 [0.090]
Relative income squared	0.016 [0.029]	−0.212 [0.080]***	0.008 [0.096]	0.118 [0.105]
Dependency ratio (young)	−0.06 [0.020]***	0.021 [0.073]	−0.071 [0.025]***	−0.075 [0.025]***
Dependency ratio (old)	−0.205 [0.061]***	0.001 [0.081]	−0.313 [0.093]***	−0.241 [0.098]**
Financial deepening (PCGDP)	0.001 [0.008]	−0.006 [0.010]	0.005 [0.013]	0.013 [0.014]
TOT volatility	−0.013 [0.019]	0.063 [0.058]	−0.017 [0.020]	−0.006 [0.018]
Avg. GDP growth	−0.151 [0.141]	−0.101 [0.207]	−0.161 [0.155]	−0.145 [0.117]
Trade openness	0.003 [0.009]	0.037 [0.011]***	−0.003 [0.010]	−0.008 [0.011]
Oil exporting countries	0.046 [0.013]***	—	0.047 [0.013]***	0.039 [0.011]***
Observations	502	132	370	235
Adjusted R-squared	0.42	0.50	0.39	0.53

All the variables to be included in the estimation, except for net foreign assets to GDP, are converted into the deviations from the GDP-weighted world mean before being calculated into the five-year averages. Robust standard errors in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%. The estimated coefficients for the time-fixed dummies and constant are not shown.

comparison, we also report estimated coefficients for the less developed countries and those excluding African countries.⁶ The corresponding parameter for non-African less developed countries (ex-Africa LDC) is 0.24, suggesting that it is important to disaggregate the sample along the industrial/developing country dimension.⁷

One noteworthy aspect in Table 1 relates to the financial deepening variable. In the industrial countries' current account regressions, it exhibits a negative, although statistically insignificant, coefficient. In contrast, this coefficient is positive in the less developed country regressions. With these results, one may very well question the proposition that more developed financial markets lead to decreased current account balances, as posited by the adherents of the global saving glut thesis.⁸

One attribute of pooled OLS is that one imposes the restriction that the effect of a change in a given right hand side variable has the same cross-country effect as within-country. That is, if the budget balance were to increase in a given country, the effect over time would quantitatively be the same as between countries. This restriction can be relaxed by using a fixed effects specification.⁹

The most interesting finding is that the coefficient on the government budget balance rises to 0.38 for industrial countries, and is significant at the 1% marginal significance level (see Table 2 for comparison). Based on the results from the national saving to GDP regression (not reported),

⁶ As can be seen in the table, inclusion of the latter countries makes the empirical results sensitive. Therefore, we report separate sets of results with and without the African countries included for the developing country sample.

⁷ Homogeneity of all coefficients was rejected for all pairs of subsamples, confirming heterogeneity of saving—investment determinations among subgroups of countries.

⁸ In the saving regressions (not reported), all the sample groups except for the industrial country group have significantly *positive* coefficients for the financial deepening variable. This issue will be examined more carefully in a later section.

⁹ We drop the variables that have no time variation — terms of trade volatility and the openness indicator.

Table 2

Estimated coefficients on the government budget balance (% of GDP) in the current account regressions

Model specifications	Estimated coefficient
w/Five-year average data	
(1) Fixed effects	0.377***
(2) 2SLS – IV w/out institutional vars	0.325**
(3) 2SLS – IV w/institutional vars	0.448*
w/HP-filtered annual data	
(4) HP – OLS w/out institutional vars	0.125***
(5) HP – OLS w/institutional vars	0.095**
(6) HP – fixed effects	0.485***
(7) HP – GLS w/out institutional vars	0.375***
(8) HP – GLS w/institutional vars	0.326***

Notes: robust standard errors are used, *significant at 10%; **significant at 5%; ***significant at 1%.

(1) “Fixed effects” refers to the fixed effects model applied to the five-year panel data. (2) “2SLS – IV w/out institutional vars” refers to the 2SLS model applied to the five-year panel data, instrumented with the instrumental variables of the dummy for the left-wing government (LEFT) from the World Bank’s Database of Political Institutions (DPI 2004); military spending as a ratio to GDP (MILEXP) from the Stockholm International Peace Research Institute (SIPRI); yearly changes in unemployment rates (D_U); and regional dummies, but does not include “institutional variables” mentioned in the text. (3) “2SLS – IV w/institutional vars” is a five-year panel model instrumented with the same IVs, but does include the institutional variables. (4) “HP – OLS w/out institutional vars” refers to the OLS model applied to a set of RHS variables that include variables detrended with HP-filter, but does not include institutional variables. (5) “HP – OLS w/institutional vars” refers to the OLS model applied to a set of RHS variables that include variables detrended with HP-filter. (6) “HP – Fixed effects” refers to the fixed effects model applied to a set of RHS variables that include variables annual HP-filtered data, but not institutional and interaction terms. (7) “HP – GLS w/out institutional vars” refers to the GLS model applied to a set of RHS variables that include HP-filtered variables, but no institutional variables and interaction terms. (8) “HP – GLS w/institutional vars” refers to the GLS model applied to a set of RHS variables that include HP-filtered variables, institutional variables, and their interaction terms.

we know that the effect mainly comes from a “non-Ricardian” improvement in the level of national saving, which is found only in the industrial country subgroup.¹⁰

It is important to carefully interpret this statistical result. It means that, *given* country-specific characteristics, a 1 percentage point increase in the budget surplus to GDP ratio in, for instance the U.S., would result in a roughly 0.4 percentage point improvement in the current account balance. This number is substantially higher than estimates reported in Gruber and Kamin (2005) and cited by Ferguson (2005). On the other hand, the fixed effects estimates are difficult to use to determine the “normal” current account balance, to the extent that a country’s fixed effect is a reflection of the effects not captured by the variables included in the regression.

Another interesting finding is that the estimated coefficient on the financial development variable (PCGDP) is now significantly negative for the industrialized and emerging market groups in both the current account and national saving regressions (not reported), consistent with the Bernanke’s conjecture, indicating that once cross-country differences are controlled for, more developed financial markets lead to decreased current account balances. Presumably, this effect occurs through the reduction in national saving due to more efficient allocation of financial

¹⁰ Such non-Ricardian effect is also found in emerging market countries, a subgroup of the less developed country group (see the country list appendix in the working paper version), though the magnitude is much smaller. Also, budgetary improvement leads to a statistically significant deterioration of investment for all subgroups except for the industrial country group, signifying the non-Ricardian effect on current account unique for the latter group.

resources and thereby reduced need for precautionary saving, although our analysis cannot confirm that. Interestingly, this effect is detected only for higher income countries.

2.3. Robustness checks

Clearly, all the variables involved in our analysis are to one degree or another endogenous. Hence, one has to worry about simultaneity bias. One particularly plausible source of simultaneity can arise from the possible feedback of the current account balance on government budget balances (through tax receipts or government spending, for instance). To guard against this possibility, we undertake a series of robustness tests. First, we implement two-stage least squares (2SLS) estimation instrumenting the budget balance variable with selected variables. The instruments include the dummy for the left-wing government (LEFT); military spending as a ratio to GDP (MILEXP); yearly changes in unemployment rates (D_U); and regional dummies.¹¹ The estimation results are shown in Table 2, in which we only show estimated coefficients on budget balances for different model specifications. Rows (2) and (3) show the results from the 2SLS estimation.¹² When compared to the results from the OLS estimation, the magnitudes of the estimates (in absolute value) are mostly larger, while the degree of statistical significance remains essentially unchanged, or greater.

Second, we estimate the regressions using data sampled at an annual frequency, using HP-detrended series for the variables that exhibit business cycles variation – namely, the budget balance, net foreign asset, relative income, output growth, and financial deepening (PCGDP) to control for business cycles effects. While sampling five-year period averages should mitigate the effect of business cycles, this might not be sufficient. We apply OLS and the fixed effects model to the detrended data. The results are displayed in rows (4), (5), and (6) in Table 2, respectively. Since estimation errors using annual panel data may involve serial correlation, we also estimate the model using feasible GLS. Those results, without and with institutional variables and corresponding interaction terms, are reported in rows (7) and (8), respectively.

The magnitude and statistical significance of the estimated coefficients are largely consistent with what we have found in the previous analyses. A 1 percentage point increase in the budget balance leads to a 0.10–0.49 percentage point increase in the current account balances, and a 0.17–0.81 percentage point increase in national saving. We can safely conclude that an improvement in the government budget balance does improve current account balances for

¹¹ The military spending ratio is not included as an instrument in the regressions for industrial countries because it turned out to be insignificant in the first stage regression. The interaction between the left-wing government dummy and the change in the unemployment rate is included in the IDC regressions to capture the left-wing government's reaction to change in the unemployment rate. In the LDC and EMG regressions, on the other hand, while the military spending variable is included, neither the unemployment rate change variable nor its interaction with the left-wing government dummy is included due to their statistical insignificance. The rationale for using these instruments follows the past literature on the determinants of budget balances such as Roubini (1991), Roubini and Sachs (1989a,b), Persson and Tabellini (2001), and Braconier and Holden (2004). The definitions and sources of the instruments can be found in Data appendix. In addition to the variables mentioned in the text, we also tested the dummy for countries with plural political systems; government fragmentation (both from DPI 2004); political constraint, or democracy, index (from Henisz, 2000); and the standard deviation of tax revenues (following Talvi and Vegh, 2005). These variables turned out to be insignificant, and were thereby not included as instruments.

¹² In the next section, we will also examine the effects of institutional development such as the level of legal development and of financial openness, and their interactions. Therefore, for comparison purposes, we list the results from the model specifications “with” and “without” institutional variables. The effect of these variables will be carefully discussed in a later section.

industrialized countries, and that the improvement is mainly achieved through an improvement in national saving.

Does this set of results make sense? Between 2000 and 2005, there was approximately a 4.3 percentage point swing in the Federal budget balance, and a 2.2 percentage point swing in the current account balance. This outcome is consistent with a 0.5 coefficient.¹³

2.4. In-sample and out-of-sample fit

We next investigate whether the pattern of current account imbalances observed over the past decade is atypical. One way to examine the alignment of current account balances is to see the predicted values based on the estimation results. Fig. 1 displays the implied current account balances for the United States along with 95% prediction intervals that are calculated using the estimation results shown in Table 1. Fig. 1 indicates that the U.S. current account deviated from the predicted path in the last two periods while such consistent deviation is not observed in other countries or country group. Given that the 2001–2004 observation is just outside the ± 2 standard error band, there is some indication that something is omitted from the model. In a similar vein, Gruber and Kamin (2005) also find an unexplained component in the most recent years.

Another way to explore this question is to conduct out-of-sample predictions for the 1996–2000 and 2001–2004 periods using the estimated coefficients from the regressions implemented over the 1971–1995 time periods.¹⁴ We implement two models, one with only the Chinn–Prasad macro-variables and one augmented with other institutional variables (described in the next section), and compare these predicted values with the actual values of current account balances as a proportion of GDP in Fig. 2. One can see that actual U.S. current account deficits are larger in 2001–2004 than what could be predicted using the pre-1995 estimation results whether with or without institutional variables. The magnitude of the under-prediction for the 2001–2004 period is about 2 percentage points for either model.

3. An East Asian saving glut?

3.1. Including institutional factors

In order to assess whether East Asia has been providing excess saving to the rest of the world, we augment the basic model in Eq. (1) with institutional variables suggested in the discussion by Bernanke (2005).

¹³ Data sourced from pages 1, 34, 36 of the August *Economic Indicators* (jointly published by CEA and JEC). The GDP and Federal budget figures are on an NIPA basis, while the current account numbers are reported on a Balance of Payments basis.

¹⁴ Since the time-fixed effects for the post-1995 time periods are not available, we use the average of the time effects for the 1971–1995 period. This exercise allows us to observe how much the actual current account balances in the post-1995 period differ from what could be predicted using the relationships obtained up to 1995. Generally, when we examine a subsample, the predicted values will be based on the estimation for that sample group. For example, the predicted values for the group of industrialized countries will be based on the estimation results from the regressions for the subsample, and the predictions for non-industrialized countries will be based on the estimation for ex-African LDC subsample, etc.

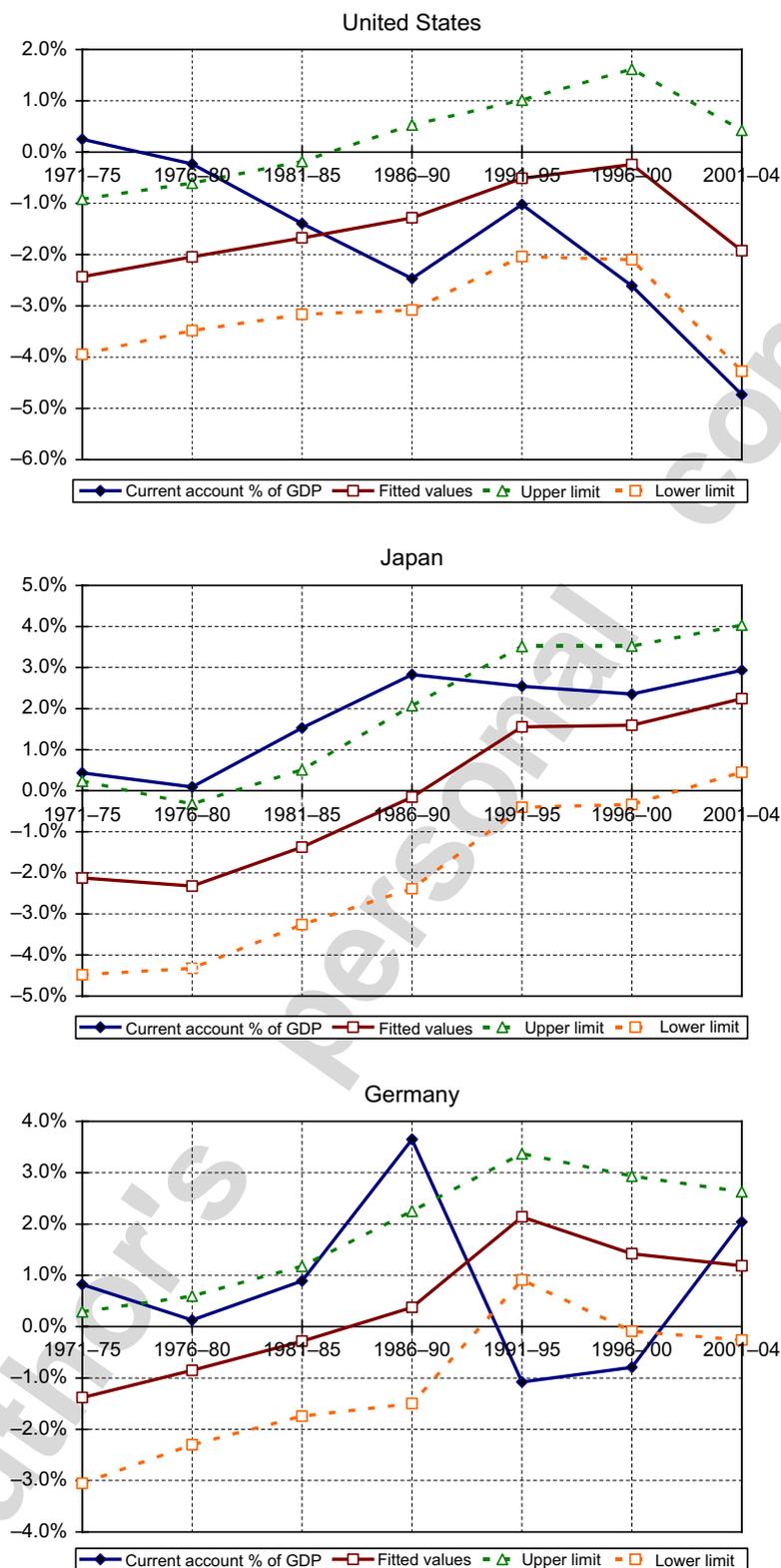


Fig. 1. In-sample predicted current account balances for industrial countries.

3.1.1. Financial openness

The openness of a country to cross-border financial transactions should affect capital flows, and thus the current account. One critique of the global saving glut view focuses on the question of timing – why does excess saving now flow to U.S. financial markets,

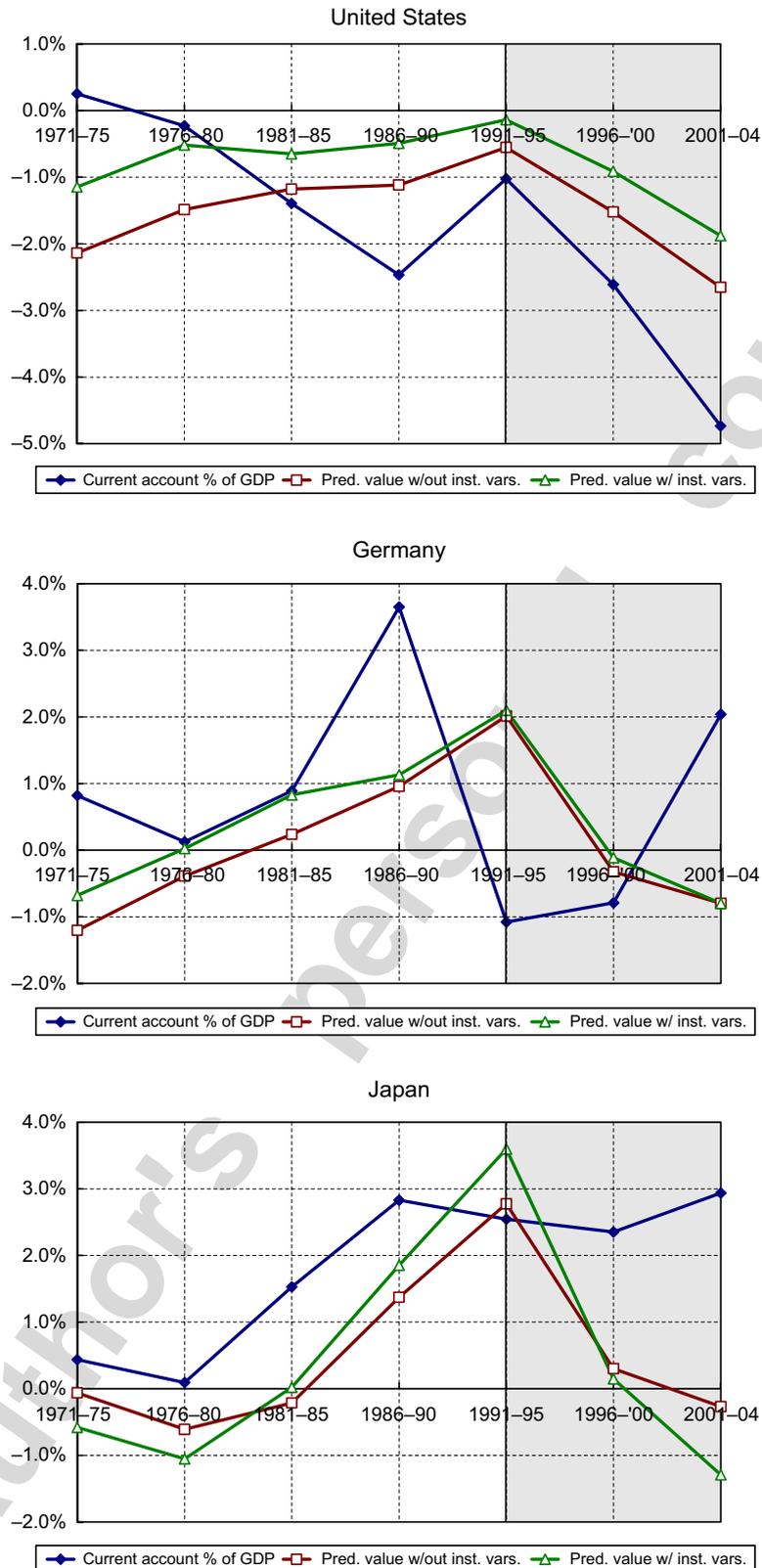


Fig. 2. Out-of-sample predictions of current account balances for industrial countries.

and not in earlier periods? A common rejoinder is that, especially for the East Asian economies, comprehensive financial liberalization policies have been implemented, allowing excess saving to flow into the U.S., and other countries with developed financial markets.

Our metric of financial openness is the Chinn–Ito (2006) index. This index is the first principle component of the binary variables pertaining to cross-border financial transactions based on the IMF's categorical enumeration reported in *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*. Higher values of this index indicate greater financial openness.¹⁵

3.1.2. Legal variables

Since a key innovation in our analysis is the inclusion of legal factors, the role of these types of variables merits some extended discussion. As the burgeoning literature on finance and growth has emphasized, society's legal foundations and institutions define the context wherein financial transactions and economic decisions are made. Levine et al. (2000) find that the cross-country differences in legal and regulatory systems influence the development of the financial intermediary.¹⁶ The effect of legal and institutional development can have implications along any number of dimensions. Whether the legal system clearly establishes law and order, minimizes corruption, or whether the administrative branch of the government protects property rights efficiently are all important determinants of the incentives to save and invest. Decisions by foreign residents will also be affected.

We incorporate the effect of legal and institutional development by inclusion of the variable LEGAL, calculated as the first principal component of law and order (LAO), corruption (CORRUPT), and bureaucracy quality (BQ), all drawn from the ICRG. The data series are available for the period 1984–2004, but are included in the regression as the period average.¹⁷

Furthermore, we include interaction terms involving these variables because environmental factors might affect the way in which financial development affect saving and investment. These include interactions between the financial development and legal variables (PCGDP times LEGAL), interactions between the financial development and financial openness variables (PCGDP times KAOPEN), and interactions between legal development and financial openness (LEGAL times KAOPEN). The financial and legal interaction effect is motivated by the conjecture that deepening financial markets might lead to higher saving rates, but the effect might be magnified under conditions of better developed legal institutions. Alternatively, if greater financial deepening leads to a lower saving rate or a lower investment rate, that effect could be mitigated when financial markets are equipped with highly developed legal systems. A similar argument can be applied to the effect of financial openness on current account balances.

In Table 3, despite inclusion of institutional variables and their interactions, the significantly positive relationship between current account and government budget balances is detected in all sample groups as in the previous analysis.¹⁸ The point estimate on budget balances is a statistically significant unchanged value, 0.15, for the industrialized countries group, which implies

¹⁵ Greater detail about the construction of this index can be found in Chinn and Ito (2006). The data are updated to 2005 and cover more countries (181 countries) than what can be found in Chinn and Ito. The updated data are available at <http://www.ssc.wisc.edu/~mchinn/>. This variable is also included as the deviation from the world mean.

¹⁶ For the analysis of legal development on financial development, see Beck and Levine (2004) and Johnson et al. (2002) among others.

¹⁷ In other words, the data on legal/institutional development are cross-sectional in nature. However, inclusion of these variables as time-invariant factors should not pose a substantial problem for our analysis since these legal/institutional variables are likely to change only very slowly. Furthermore, in order to minimize measurement errors and possible bias (as Wei, 2000 points out in reference to the corruption indexes in his paper), we think it is better to use period averages.

¹⁸ When the *F*-test is conducted to test the hypothesis that the legal variable, the financial openness index, and their interaction terms are jointly zero, the null hypothesis is constantly rejected for all three models for the industrialized and less developing countries groups (marginally for the emerging market country (EMG) group).

Table 3
Current account regression with institutional variables

	(1) Industrial countries (IDC)	(2) Less developed (LDC)	(3) LDC w/out Africa	(4) EMG
Government budget balance	0.154 [0.095]*	0.168 [0.079]**	0.251 [0.091]***	0.23 [0.075]***
Net foreign assets (initial)	0.069 [0.011]***	0.047 [0.005]***	0.051 [0.006]***	0.041 [0.009]***
Relative income	0.058 [0.028]**	0.115 [0.096]	0.16 [0.106]	0.216 [0.103]**
Relative income squared	−0.097 [0.120]	0.057 [0.102]	0.157 [0.121]	0.166 [0.111]
Dependency ratio (young)	−0.027 [0.082]	−0.076 [0.022]***	−0.099 [0.030]***	−0.044 [0.023]*
Dependency ratio (old)	0.099 [0.098]	−0.368 [0.096]***	−0.331 [0.114]***	−0.529 [0.127]***
Financial development (PCGDP)	0.01 [0.012]	−0.043 [0.032]	−0.038 [0.040]	−0.082 [0.038]**
Legal development (LEGAL)	0.002 [0.007]	−0.017 [0.008]**	−0.02 [0.009]**	−0.018 [0.010]*
PCGDP × LEGAL	−0.035 [0.015]**	−0.021 [0.011]*	−0.025 [0.012]**	−0.037 [0.016]**
Financial openness (KAOPEN)	−0.002 [0.003]	0.002 [0.007]	0.005 [0.008]	0.008 [0.010]
KAOPEN × LEGAL	0.012 [0.003]***	0.002 [0.002]	0.002 [0.002]	0.005 [0.003]
KAOPEN × PCGDP	0.002 [0.009]	0 [0.007]	0.002 [0.008]	−0.002 [0.009]
TOT volatility	0.1 [0.054]*	−0.015 [0.018]	−0.002 [0.019]	−0.003 [0.022]
Avg. GDP growth	−0.036 [0.243]	−0.09 [0.096]	−0.107 [0.124]	−0.132 [0.118]
Trade openness	0.046 [0.014]***	0.005 [0.013]	0 [0.014]	0.004 [0.014]
Oil exporting countries	—	0.04 [0.013]***	0.035 [0.012]***	0.025 [0.013]*
Observations	126	345	234	203
Adjusted R-squared	0.55	0.46	0.54	0.51

All the variables to be included in the estimation, except for net foreign assets to GDP, are converted into the deviations from the GDP-weighted world mean before being calculated into the five-year averages. Robust standard errors in brackets, *significant at 10%; **significant at 5%; ***significant at 1%. The estimated coefficients for the time-fixed dummies and constant are not shown.

that the coefficient on the budget balance for the IDC group is robust to inclusion of institutional variables (note that a ± 2 standard error confidence interval encompasses values as high as 0.34).¹⁹ The estimated coefficients on budget balances remain close to what we found in Table 1, the other sample groups.

Gruber and Kamin (2005) obtain similar results in their analysis. Analyzing a smaller sample of 71 countries over the 1982–2003 period, they find that the budget balance has a positive effect on the current account, with a magnitude of 0.09–0.14. Trade openness exhibits an effect similar to what we obtain. Perhaps most importantly, they also find that their governance indicators (the Kaufmann et al. measure) induce a reduction in the current account balance.²⁰ These findings suggest that several of the key effects we have detected are robust.

We re-estimate the same regressions using each of the components of the LEGAL variables — namely, CORRUPT, BQ, and LAO — in order to isolate which factors drive the results. The test results (not reported) suggest that the (inverse) corruption index is the most significant contributor among the three institutions variables, followed by law and order and the bureaucracy quality index in the order of significance. When the (inverse) corruption index is used, the estimated coefficient on the budget balance for the industrial countries group becomes as high as 0.24. Also,

¹⁹ This finding is similar to the finding of Erceg et al. (2005) whose simulation results show the coefficient of the budget balance is around 0.20.

²⁰ In their analysis, they include the change in growth rate, as well as dummy variables for financial (i.e., banking) crises. On the other hand, they omit measures of capital account openness, financial development as well as terms of trade variability. They also exclude interaction effects involving legal development, thus ruling out nonlinearities of this type.

the estimated coefficient on the inverse-corruption index is negative, insignificantly for the IDC group and significantly for the LDC and ex-Africa LCD groups, suggesting that countries with lower degrees of corruption may experience capital inflows (see e.g., Wei, 2000).

3.2. In-sample and out-of-sample fit

The in-sample fit for East Asian countries is remarkably good. Japan's current account imbalance is predicted almost exactly (Fig. 1). As shown in Fig. 3, a similar result obtains for developing East Asia ex-China. Indeed, Korea's current account surplus is over-predicted. And for China, the mis-prediction is only 1 percentage point too low, and well within the 2 standard error prediction interval.

Fig. 4 shows the out-of-sample predictions for the Asian emerging market countries excluding China, China, and Korea, based on the models with and without the institutional variables. These figures make it clear that Asian emerging market countries, not just China, are experiencing an unpredictably large amount of current account surplus. In the 2001–2004 period, the actual current account balance of China is greater than what the model predicts by an impressive 6 percentage points, while the Asian emerging market countries excluding China, on average, experienced better current account balances than model predictions by 4 percentage point.²¹ Hence, from the perspective of the data up to 1995, East Asia is running a larger current account balance than is to be expected.

3.3. Will financial development reduce “excess saving”? And what is the source of excess saving?

What do our models imply for national saving and investment? We conducted out-of-sample predictions for national saving and investment. For the East Asian countries ex-China, the saving rate is fairly well predicted. On the other hand, investment is a full 2 percentage points below predicted. The fact that domestic saving is well predicted confirms for us that the problem is not too much saving, per se, but a regional drought in investment. By way of contrast, U.S. national saving is badly over-predicted – by about 3 percentage point – in the 2001–2004 period. The fact that it is U.S. saving that is low (rather than investment is high) makes one wonder indeed the high profitability of investment in the U.S. is what drives the global pattern of imbalances.

We can also use our model to evaluate Bernanke's assertion that greater financial and institutional development in East Asia would reduce the region's current account surplus over the long term.²² Because our model allows interactions between the financial development variable (PCGDP) and other institutional variables (LEGAL and KAOPEN), we should be able to detect nonlinearities that might prove to be too subtle to identify using a straightforward linear specification. Panel A in Table 4 reports the total effect of financial development on current account conditional on both legal development and financial openness if the level of private credit creation rises by 10 percentage points relative to the world weighted average (conditional on the

²¹ Gruber and Kamin (2005) associate these current account surpluses with the after-effects of financial crises. In this sense, their results are equivalent to the precautionary motive for reserve accumulation identified by Aizenman and Lee (2005).

²² Theoretical treatments of the phenomenon discussed by Bernanke include Caballero et al. (2006) and Mendoza et al. (2006).

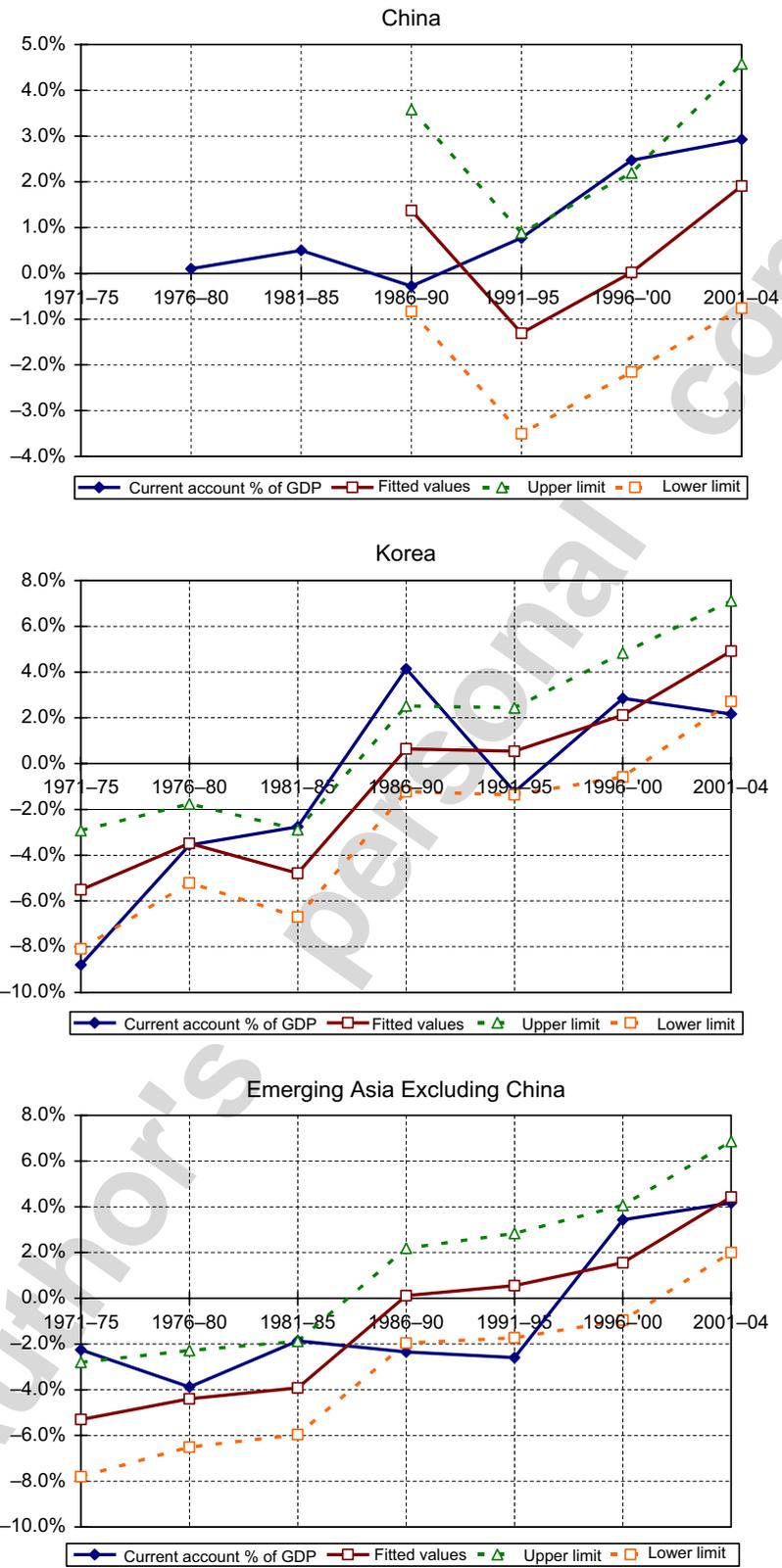


Fig. 3. In-sample predicted current account balances for less developed countries.

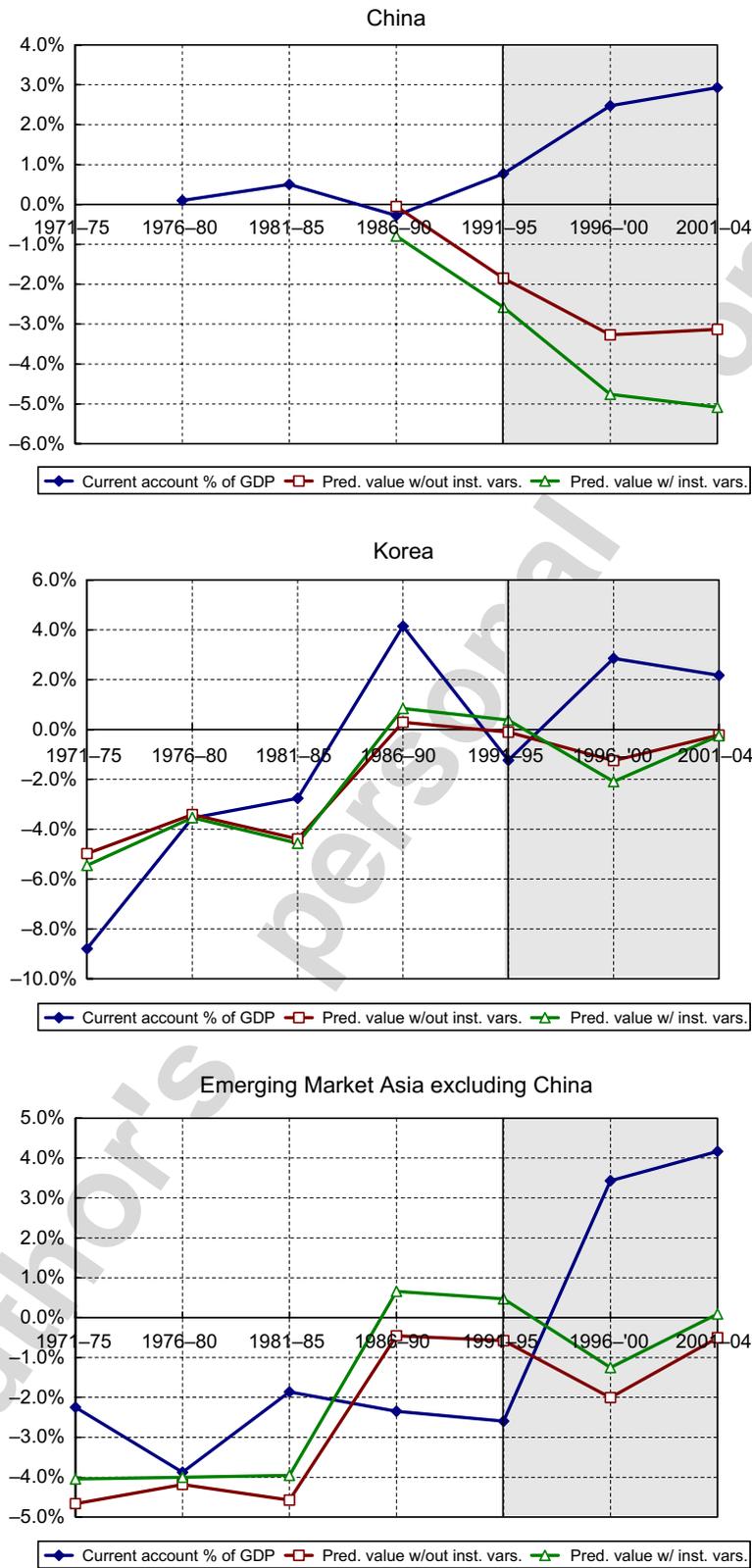


Fig. 4. Out-of-sample predicted current account balances for less developed countries.

Table 4

Total effects of a 10% increase in financial development (PCGDP) conditional on legal development and financial openness

(A) Current account				
Industrialized countries		KAOPEN [0, 4.38]		
		Low 10 percentile (3.55)	Mean (4.22)	High 10 percentile (4.38)
LEGAL [0, 6.51]	Low 10 percentile (4.37)	0.365	0.379	0.382
	Mean (5.69)	−0.095	−0.082	−0.079
	High 10 percentile (6.47)	−0.370	−0.357	−0.354
Less developed countries		KAOPEN [0, 4.38]		
		Low 10 percentile (0.66)	Mean (1.82)	High 10 percentile (4.08)
LEGAL [0, 6.51]	Low 10 percentile (1.15)	0.408	0.408	0.408
	Mean (2.48)	0.127	0.127	0.127
	High 10 percentile (3.89)	−0.167	−0.167	−0.167
Asian Emerging market countries		KAOPEN [0, 4.38]		
		Low 10 percentile (0.66)	Mean (1.90)	High 10 percentile (3.96)
LEGAL [0, 6.51]	Low 10 percentile (1.66)	0.528	0.503	0.462
	Mean (2.96)	0.058	0.033	−0.008
	High 10 percentile (4.50)	−0.523	−0.548	−0.589
(B) Matrix for emerging Asia				
		KAOPEN		
		Low 10 percentile (0.66)	Mean (1.90)	High 10 percentile (3.96)
LEGAL	Low 10 percentile (1.66)	Bangladesh	Indonesia, Philippines, Sri Lanka	
	Mean (2.93)	China	India, Korea, Malaysia, Thailand, ex-China EA	
	High 10 percentile (4.50)			Hong Kong, Singapore

levels of LEGAL and KAOPEN).²³ Specifically, the panel for the group of industrialized countries shows that when an industrialized country equipped with both legal development and financial openness levels above the high 10 percentile (i.e., the southeast cell in the matrix) experiences a 10 percentage point increase in financial development measured by PCGDP (measured as the deviation from the world weighted average), its current account as a ratio to GDP would worsen by a 0.35 percentage points. From this panel, we can see that only industrialized countries with low levels of legal development would experience a current account improvement when their financial markets develop regardless of the levels of financial openness. Among emerging market countries, the effect of financial development tends to be bigger

²³ Between the 1991–1995 and 2001–2004 time periods, the (five-year average of *relative*) PCGDP level increased by 20.6 percentage points for industrialized countries, 3.7 percentage points for less developed countries, 8.2 percentage points for Asian emerging market countries, and remarkable 32.4 percentage points for China.

for those countries with less open capital accounts and lower levels of legal development. As far as the EMG group is concerned, further financial development would lead to current account deterioration only if a country is equipped with high levels of legal development or with high levels of financial openness.

Additional insight into the results of increased financial development can be obtained by examining the components of the current account balance, namely national saving (the sum of private and public saving) and investment.

We have also investigated the total effect on national saving and investment, respectively, conditional on legal development and financial openness (results reported in the working paper version). For less developed and emerging market countries, the effect of higher levels of financial development on national saving is smaller for economies with higher levels of legal development and more open financial markets. Especially, for those countries with underdeveloped institutional infrastructure where it can be presumed that credit constraint and rationing is severe, the positive impact of further financial deepening on national saving seems to be considerable. However, it also appears that in order for further financial deepening to lead to an increase in investment among developing countries through improved financial intermediation, it is better for countries to be equipped with better legal systems and institutions. Interestingly, Bernanke's prediction that the more developed financial markets are, the less saving a country undertakes seem to be validated only by industrialized countries with high levels of legal development regardless of the openness of financial markets, or emerging market countries with high levels of legal development and financial openness. The results do seem to bolster Bernanke's argument that more financial development will solve the issue of the saving glut in emerging market countries *with high levels of both legal development and financial openness*. Is this finding applicable to emerging market Asian countries?

The short answer is no. Panel B in Table 4 categorizes emerging market countries in East Asia depending on the level of legal development and financial openness. The matrix shows that only Hong Kong and Singapore are categorized as countries with highest 10 percentile legal development and highest 10 percentile financial openness, while many Asian emerging market countries are categorized in the groups with the middle or lower level of legal development and financial openness.

In terms of the effect on the current account all countries except Indonesia and the Philippines will experience worsening of net saving as a result of further financial deepening because the magnitude of the effect on investment exceeds that on national saving. China experienced an amazing 32.4 percentage point increase in private credit creation (net of change in the world weighted average) between 1996 and 2004. This financial development *alone* led to an increase in national saving by 1.7 percentage points, but also an increase in investment by 2.4 percentage point, suggesting a negative effect of financial development on net saving, operating not through a reduction in saving, but through a higher increase in investment than that in saving.

4. Robustness checks

4.1. Alternative measures of financial development

We have used private credit creation as the measure of financial development motivated primarily by expediency. However, as Beck et al. (2001a,b) and Levine (2005) discuss, private credit creation represents only one aspect of financial development. Moreover, given

the size of current global imbalances, it is likely that capital flows are influenced not only by the level of banking system development, but also by that of securities markets. Hence, as a first step of robustness checks, we construct composite indexes that incorporate other types of financial development and re-estimate the regressions using the indexes instead of PCGDP.

We test three composite indexes of financial development. The first one (FD1) is the first principle component of private credit creation (PCGDP), stock market capitalization (SMKC), stock market total value (SMTV); the second one (FD2) of PCGDP, SMKC, SMTV, private bond market capitalization (PVBM), and public bond market capitalization (PBBM) – both as ratios to GDP; the third one (FD3) of SMKC, SMTV, PVBM, and PBBM. We repeat the previous exercise using one of the three composite indexes in place of PCGDP (including interactions).²⁴

In order to conserve space, we summarize the results and our observations. For the most part, the signs of the estimated coefficients on financial development and their interactions remain unchanged regardless of the choice of composite index. Moreover, across the three composite indexes, the index and its interaction terms remain significant – or become more significant – for the industrialized emerging market country groups, and particularly for the saving regressions. The generalization we made about the effect of financial development on national saving – the less open financial markets are and the lower levels of legal/institutional development they are equipped with, the larger the effect of financial development in emerging market countries – remains unaffected, regardless of the type of the composite indexes. However, this generalization for investment is confirmed only when FD1 is used, especially for the IDC group but not so much for the LDC and EMG groups. Generally, the results from the investment regressions with the composite indexes are not as robust as the original regressions. Lastly, for the IDC group, the results for the current account regressions are consistent with or even more significant than those with PCGDP, though that is not the case for the LDC or EMG group partly because of the weak performance of the investment regressions.

4.2. *Endogeneity of financial development*

Saving and investment could plausibly affect financial development, instead of interacting concurrently with institutions. To examine this reverse flow of causality, we conduct 2SLS analysis by instrumenting PCGDP with the LEGAL variable, financial openness, the rate of inflation, dummies for legal origins (British, French, German, and Scandinavian), and regional dummies.^{25,26}

²⁴ Because stock market development-related variables are available after 1976, the sample size is affected. PVBM and PBBM are more restricted and available only after 1990 for a much smaller number of countries (especially for developing countries). The changes in the sample size affect the magnitude and statistical significance of the estimated coefficients, but interestingly, the goodness of fit remained unaffected across different regressions.

²⁵ As was in the previous analysis, all instruments were included as five-year averages of the deviations from world weighted averages. Also, the instruments found to be insignificant in the first stage regressions were dropped.

²⁶ The choice of instruments is based on the past literature. [Levine et al. \(2000\)](#) find a positive link between the level of legal and regulatory infrastructure and that of financial intermediary development. [Chinn and Ito \(2006\)](#) find that financial openness leads to financial development especially when a country is equipped with developed legal systems and institutions. [Boyd et al. \(2001\)](#) show that inflation significantly negatively affect both the banking sector development and equity market activity. [La Porta et al. \(1998\)](#) demonstrate that the national legal origin (whether English, French, German, or Scandinavian) strongly explains cross-country differences in financial development.

The results from these regressions (not reported): the estimated coefficient on PCGDP is significantly positive for industrial countries in the current account regressions, and for all subsamples in both the national saving and investment regressions, all with larger coefficient magnitude and statistical significance. These findings are not directly comparable with what we found in Table 1 or 3 because of the differences in the model settings, but they do suggest that a country equipped with higher levels of legal development and financial openness can develop its financial markets and raise both the saving and investment rates, another finding inconsistent with Bernanke's conjecture.

4.3. A "magnification effect"?

Last, we also examine the notion that financial development can function as a magnifier for the effect of other saving–investment determinants, especially budget balances. The idea is that a country with highly developed financial markets may find its budget constraint relaxed because its highly developed financial markets make it easier for the government to finance its budget.²⁷ We examine the magnifying role of financial development by interacting the financial development variable with budget balances. The interaction term between financial development and budget balances was not found to be significant for any of the regressions and subsamples. We have investigated other ways of uncovering a magnification effect, without success. However, we freely admit that the data might not be sufficiently informative to allow us to discern such an effect.

5. Concluding remarks

We have investigated the medium-term determinants of the current account using a model that controls for institutional factors with an aim to informing the recent debate over the sources of, and solutions to, the "global saving glut" that has thus far lacked empirical content. Our study addresses that gap. Given our motivation, we focused our study on the behavior of current account balances for the United States and emerging market countries in East Asia.

We confirm the results obtained by Chinn and Prasad (2003) that – for the industrialized countries – budget balances play an important role in the determination of current account balances. A 1 percentage point increase in the budget balance is found to raise the current account balance by 0.15 percentage point. While smaller than the coefficient implied by some macro-models, the standard errors on the point estimate are sufficiently large so that one cannot rule out a coefficient as high as 0.40 at conventional significance levels. This result is supported by a sensitivity analysis that suggest that a 1 percentage point increase in the budget balance could lead to a 0.1–0.5 percentage point increase in the current account balances. We also find evidence for a similar effect among less developed countries. This finding is robust to inclusion of institutional variables, although the inclusion of financial factors seems to matter more – in a statistical sense – for industrialized countries than LDCs. Furthermore, we find evidence that the oft-claimed argument about the effect of financial and legal development as well as financial liberalization is only applicable to this group of countries. This finding suggests that the recommendations for financial development as a solution to the global saving glut have only a tenuous empirical basis.

²⁷ We thank the referee for pointing out this aspect of financial development. The idea of financial development as the magnifier could be applied to other determinants. However, since it is not the main focus of this paper, we reserve examination of other interaction effects for future research.

We also found that saving per se is not excessive among the East Asian emerging market countries. Rather, these countries have experienced a shortfall in investment. The United States, on the other hand, is experiencing saving drought, driven by developments in the public sector. We have not discussed at length the sources for our mis-predictions. However, in research we conducted elsewhere, industrial country current account behavior seems to be related with equity and housing market development, especially since the end of the 1990s. Based on those results, the more pronounced a country's asset market boom, the more likely that country is to experience a deterioration of its current account. Since these booms were temporary, policies to spur similar booms in East Asian countries would not provide a durable solution to the challenge posed by global imbalances.

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Data appendix

The data used in this paper were drawn from a number of different sources. We provide below a listing of the mnemonics for the variables used in the analysis, descriptions of these variables and the source(s) from which the primary data for constructing these variables were taken. A listing of the countries in the final sample, along with the country groupings used in the analysis, is provided in the working paper version of this paper. For most countries, data were available from 1971 through 2004. Taiwanese data are drawn from the Central Bank of China, International Center for the Study of East Asian Development (ICSEAD), and Asian Development Bank.

Key Indicators of Developing Asian and Pacific Countries

Mnemonic	Source ^a	Variable description
CAGDP	WDI	Current account to GDP ratio
NSGDP	WDI	National saving to GDP ratio
KFGDP	WDI	Capital formation to GDP ratio
GOVBGDP	WDI, IFS	General government budget balance, ratio to GDP
NFAGDP	LM	Stock of net foreign assets, ratio to GDP
RELY	WDI	Relative per capita income, adjusted by PPP exchange rates, measured relative to the U.S., range (0 to 1)

(continued on next page)

(continued)

Mnemonic	Source ^a	Variable description
RELDEPY	WDI	Youth dependency ratio (relative to mean across all countries), population under 15/population between 15 and 65
RELDEPO	WDI	Old dependency ratio (relative to mean across all countries), population over 65/population between 15 and 65
YGRAVG	WDI	Average real GDP growth
YGRSD	WDI	Standard deviation of GDP growth
TOTSD	WDI	Standard deviation of terms of trade
OPEN	WDI	Openness indicator: ratio of exports plus imports of goods and nonfactor services to GDP
PCGDP	BDL	Banking development, ratio of private credit to GDP
SMTV	BDL	Equity market development, stock market total value as a ratio to GDP
SMTO	BDL	Equity market development, stock market turnover
K2	GM, AREAER	Capital controls on current account transactions
K3	GM, AREAER	Capital controls on capital account transactions
KAOPEN ^b	CI	Capital account openness
BQ	ICRG	Quality of bureaucracy
LAO	ICRG	Law and order
CORRUPT	ICRG	Corruption index
LEGAL ^b	Authors' calculations	General level of legal development, first principal component of BQ, LAO, and CORRUPT.
LEFT	DPI 2004	Dummy for left-wing government
PLURAL	DPI 2004	Dummy for countries with plural political systems
MILEXP	SIPRI	Defense spending (as a ratio to GDP)
POLCONV	Henisz	Political constraint (democracy) index
SDTAXREV	Authors' calculations	Standard deviation of tax revenues
POLITY	Polity IV	Polity (democracy) score
U	WDI	Unemployment rate

^a These are mnemonics for the sources used to construct the corresponding. BDL: Beck et al. (2001b, updated in following years); CI: Chinn and Ito (2006); DPI 2004: database of political institutions, Beck et al. (2001a,b and updated); GM: Gian Maria Milesi-Ferretti (1998); Henisz: Henisz (2000); ICRG: *International Country Risk Guide*; IFS: IMF's *International Financial Statistics*; IMF: other IMF databases; LM: Lane and Milesi-Ferretti (2006); Polity IV: Polity IV project (Marshall and Jaggers, 2002, updated in 2004); SIPRI: Stockholm International Peace Research Institute (2005), and WDI: *World Development Indicators* (2006).

^b In the original series, KAOPEN and LEGAL series range between negative and positive values since they are the first principal components. However, in order to avoid the complexity of interpreting the estimated coefficients, these variables are adjusted such that the minimum value is zero, i.e., they range between zero and some positive value.

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