Response to "Composition and Growth Effects of the Current Account: A Synthesized Portfolio View" by Kai Guo and Keyu Jin

Aart Kraay
The World Bank

and

Jaume Ventura
CREI and Universitat Pompeu Fabra

March 2009

Abstract: *Guo and Jin (2009) (GJ) critique the empirical work in Kraay and Ventura (2000, 2003) (KV), making the headline claim that one of KV's main empirical findings is due to an "accounting approximation". This note explains why GJ's claim is incorrect.*

---

akraay@worldbank.org, jventura@crei.cat. The views expressed here are the authors and do not reflect those of the World Bank, its Executive Directors, or the countries they represent.

1. Background

Let F_{it} and W_{it} be the net foreign assets and wealth of country i in year t. They are related as follows: $W_{it}=F_{it}+K_{it}$, where K_{it} is the domestic capital stock. Define x_{it} as the share of net foreign assets in wealth, i.e. $x_{it}=F_{it}/W_{it}$. This is just an identity, and differencing it over time leads to another identity that usefully decomposes the change in net foreign assets in country i and year t:

$$(1) \qquad \Delta F_{it} = x_{it} \cdot \Delta W_{it} + \Delta x_{it} \cdot W_{it-1}$$

KV introduced this decomposition and referred to the first term as portfolio growth, i.e. $PG_{it} = x_{it} \cdot \Delta W_{it}$ which captures changes in the size of a country's portfolio holding constant its composition, and the second term as portfolio rebalancing, i.e. $PR_{it} = \Delta x_{it} \cdot W_{it-1}$ which captures changes in the composition of a country's portfolio.[1] KV developed a series of theoretical models characterizing the savings and portfolio choice decisions of small open economies, and used them to interpret the behavior of these terms. KV then compared the predictions of these models with actual data to reach conclusions about which type of model provides a better approximation to reality.

KV(2000) first developed a theoretical small open economy model of savings, investment and the current account. This model showed that when diminishing returns are weak and investment risk is strong, countries have little incentive to change the composition of their portfolios in response to temporary fluctuations in income, and so the second term in Equation (1) is small, i.e. $\Delta x_{it} \approx 0$ and $\Delta F_{it} \approx x_{it} \cdot \Delta W_{it}$. KV(2000) referred to this benchmark theoretical result as the "new rule" of the current account.[2] The model also showed that, when diminishing returns are strong and investment risk is weak, countries are reluctant to change the level of domestic investment in response to temporary fluctuations in income, and so fluctuations in net foreign assets are mostly driven by fluctuations in savings, $\Delta K_{it} \approx 0$ and $\Delta F_{it} \approx \Delta W_{it}$. KV(2000) referred to this alternative benchmark theoretical result as the “traditional” rule, since these were (implicitly or explicitly) the set of assumptions made by previous literature. In fact, since the notion that an increase in savings leads to a current account improvement is so ingrained in the views of the profession, showing theoretically that this need not be the

[1] We quote from KV (2003, p. 72) “The model captures what we think are the essential elements of a portfolio-based theory of the current account. This theory is based around the concept of country portfolio and a simple decomposition of the current account that relies on this concept. By the country portfolio, we refer to the sum of all productive assets located within the country plus its net foreign asset position. (…) By the *composition* of the country portfolio, we refer to the share of the net foreign asset position in it. To interpret the evolution of the current account it is useful to break it into two pieces: changes in the size of the country portfolio, which we call *portfolio growth*; and changes in the composition of the country portfolio, or *portfolio rebalancing*” (italics in the original).

[2] We quote from KV (2000, p. 1137) “What is the current account response to a transitory income shock such as temporary changes in the terms of trade, transfers from abroad, or fluctuations in production? We propose this new rule: the current account response equals the savings generated by the shock multiplied by the country's share of foreign assets in total assets".

case under very standard assumptions is, we think, the major theoretical insight of KV(2000).

KV(2000) measured the change in net foreign assets as the current account and the change in wealth as gross national savings (both expressed as a fraction of GDP), and estimated a series of panel regressions of the current account on portfolio growth:

$$(2) \qquad \Delta F_{it} = \alpha + \beta \cdot PG_{it} + u_{it}$$

KV(2000) found that these regressions deliver a slope coefficient statistically indistinguishable from one and a high R-squared. The coefficient being close to one means that portfolio growth and portfolio rebalancing are orthogonal, while the high R-squared means that portfolio growth explains a substantial fraction of the variance of the current account. KV(2000) noted that these findings were primarily driven by the between-country or long-run variation in the data, and did not apply to the within-country or short-run variation in the data. But the model was not equipped to speak about this difference, and the limited sample available made inference difficult. As a result, KV(2000) were unable to say more on this point.

To improve our understanding of these differences in the within- and between-country variation in the data, KV(2003) developed a new theoretical model of a small open economy with adjustment costs to investment. This model showed that, when adjustment costs are important, after a transitory income shock the current account will follow a pattern which resembles the "traditional" rule in the short-run, but the "new" rule in the long-run. That is, countries will react to an income shock by saving most of the windfall abroad initially, and then bringing it back home slowly until the initial portfolio composition has been restored, thus minimizing adjustment costs. To determine whether the model was consistent with the data, KV(2003) put together data for a larger sample of advanced OECD countries over a longer period, and estimated dynamic regressions of portfolio rebalancing on savings. The empirical impulse-response functions obtained through this methodology turned out to be consistent with the theoretical ones.

To be clear in what follows, the GJ critique questions only the validity of the between-country regressions in KV(2000, 2003). The GJ critique has nothing to say about the theoretical models in KV and the insights they provide. The GJ critique also has nothing to say about KV's rich results about the dynamics of short-run portfolio rebalancing obtained using the within-country or short-run variation in the data. This is very important to remember, given the extravagant claims contained in GJ that we discuss later in this note. GJ *only* argue that our finding of a slope coefficient close to one in regression (2), when using the between-country variation in the data, is due to an "accounting approximation." Although this term is never clearly defined in GJ, it is used to claim that our result is an artifact of data construction and that it would be impossible to find something different.

2. Interpreting the KV Long-Run Regressions

Since GJ focus their critique on KV's between-country regressions of the current account on portfolio growth, it is useful to provide a little more interpretation of this specification. Let PG_i and PR_i denote the averages over time of portfolio growth and

portfolio rebalancing for each country. Then, the probability limit of the slope coefficient in the KV cross-sectional regression using only the between-country variation is:[3]

$$(3) \quad \beta = \frac{COV(PG_i + PR_i, PG_i)}{V(PG_i)} = 1 + CORR(PG_i, PR_i) \cdot \frac{SD(PR_i)}{SD(PG_i)}$$

As is clear from this expression, the KV regression will deliver a slope coefficient close to one if (i) the correlation between portfolio growth and portfolio rebalancing is close to zero; and/or (ii) the variation in portfolio rebalancing is small relative to the variation in portfolio growth.

Condition (i) holds in the new rule theoretical benchmark laid out in KV(2000). In this case, transitory shocks to income affect only portfolio growth, while shocks to asset returns affect only portfolio rebalancing. This is true regardless of the relative importance of transitory income shocks and asset return shocks, i.e. regardless of whether condition (ii) holds. Therefore, KV concluded that finding a coefficient in the regression which is close to one was consistent with the new rule benchmark.

Condition (i) does not apply under alternative theoretical assumptions. For instance, in the traditional rule theoretical benchmark, transitory income shocks would affect asset returns and the composition of the country portfolio. This means that condition (i) no longer holds. Moreover, since transitory income shocks lead to portfolio rebalancing, condition (ii) does not hold either. Therefore, KV concluded that finding a coefficient in the regression which is close to one was inconsistent with the traditional rule benchmark.

The theory developed in KV was intended to describe the behavior of industrial countries. In fact KV(2000) cautioned that these findings were unlikely to hold in developing countries with less-developed financial markets.[4] Unfortunately, KV could not verify this at the time since appropriate data for developing countries was not available. But it is interesting to note with hindsight that this warning was worth making, as can be seen clearly in the top panel of Table 1. The first column replicates the KV long-run regression using the original sample in KV (2003) of 21 advanced OECD countries. The second column estimates the same regression using an alternative sample of 21 non-OECD countries.[5] The first sample delivers a slope coefficient of 1.09 with a standard error of 0.12, and a R-squared of 0.85. The second sample delivers a

[3] To be clear, we are referring to the probability limit as the cross-sectional dimension becomes large, for a fixed length of the time dimension.

[4] Quoting from KV(2000, p. 1162) "One should also keep in mind that our sample includes only thirteen industrial countries. These countries have the most advanced financial markets in the world, and the ability of financial markets to eliminate unexploited trading opportunities migh be considerable less in other samples of countries. For instance, it seems reasonable to predict that a theory of capital flows based on well-functioning financial markets might be a poor approximation to the reality of many developing countries that have only rudimentary financial markets."

[5] In the 2000 NBER Working Paper version of Kraay, Loayza, Serven and Ventura (2005), we constructed data on net foreign asset positions for a large sample of developed and developing countries. We used this dataset for 21 OECD countries in KV(2003), but did not use data from developing countries. Here we take 21 non-OECD countries from that dataset that have at least 20 years of continuous annual observations on net foreign assets.

slope coefficient of 0.66 with a standard error of 0.18, and a R-squared of 0.34. The theory works when it should work, and the theory fails when it should fail.

3. The GJ Critique of the KV Long-Run Regressions

GJ argue that the cross-sectional finding of a slope coefficient equal to one in the KV regressions is generated by an "accounting approximation" when the time dimension of the data is short. We have already seen that this claim cannot possibly be correct, since we have just obtained a slope coefficient that is different from one in a sample of non-OECD countries. Nevertheless, we want to clarify the GJ critique so that its fundamental flaws are apparent. The GJ critique has three steps:

STEP 1: GJ propose the following approximation:

$$(4) \qquad x_{iT} \equiv \frac{F_{i0} + \Delta F_i}{W_{i0} + \Delta W_i} \approx \frac{\Delta F_i}{\Delta W_i}$$

where ΔF_i and ΔW_i denote the cumulative changes in F and W between t=0 and t=T. Also define $\Delta F_i^A \equiv x_{iT} \cdot \Delta W_i$. GJ argue that ΔF_i^A is a good approximation to the current account when initial values, i.e. F_{i0} and W_{i0}; are quantitatively small relative to end-of-period values, i.e. $F_{i0}+\Delta F_i$ and $W_{i,0}+\Delta W_i$. This is of course correct. GJ then claim that F_{i0} is about 5% of $F_{i0}+\Delta F_i$; and W_{i0} is about 10% of $W_{i,0}+\Delta W_i$ in their data. This leads GJ to conclude that ΔF_i^A is a good approximation to ΔF_i regardless of other considerations. In particular, GJ argue that this approximation is a good one even if the new rule does not apply.

We have two observations regarding this first step:

A) The claim that initial stocks are negligible relative to end-of-period stocks is very dubious. For instance, if initial wealth is on average just 10 percent of final wealth, the growth rate of wealth for the average OECD country must have been 1/0.1-1=9 or *nine hundred percent* over the 30 years spanned by their data. This strikes us as wildly implausible: in fact in the KV(2003) sample the median growth rate of wealth is just 40 percent between the mid-1970s and the mid-1990s.

B) GJ fail to recognize that the approximation in Equation (4) will in fact be a good one *precisely when the new rule applies*, since then $x_{i0}=x_{iT}= x_i$ and thus $F_{i0}=x_i \cdot W_{i0}$ and $\Delta F_i=x_i \cdot \Delta W_i$. Note that, under any other set of theoretical assumptions the approximation would not be a good one. This is the case, for instance, for the set of assumptions emphasized by the literature before KV. These assumptions lead to the “traditional” rule and the latter says that $\Delta F_i=\Delta W_i$, and then the approximation cannot possibly hold.

Therefore, once we rule out the absurdity that wealth has grown by 900% over the sample period, finding that the approximation works in the KV sample does nothing but confirm that the new rule applies! To make this clear, we examine the validity of the approximation in the KV(2003) sample, and in the alternative sample of non-OECD countries. This is done in Figure 1, which plots the actual current account ΔF_i on the

horizontal axis, and the approximate current account ΔF_i^A on the vertical axis. We also plot the 45-degree line to aid in visually interpreting the quality of the approximation (as a bold line), and also the regression line of the approximate on the actual (as a thin line). It is clear from Figure 1 that the GJ approximation is reasonable (although far from perfect) in the sample of OECD countries where we have seen that the new rule holds, but not in the sample of non-OECD countries where it does not. Once again, this is just what the theory predicts.

STEP 2: GJ propose a second approximation:

$$(5) \qquad PG_i^A = x_i \cdot \Delta F_i \approx \left(x \cdot \Delta F\right)_i = PG_i$$

That is, the product of the time-averages of the share of foreign assets and the current account is close to the time-average of portfolio growth. GJ do not explain the properties of this approximation, but simply claim that PG_i^A and PG_i are very correlated in their sample. Once again, GJ fail to observe that this approximation would be a good one if the data is generated by the new rule, but not otherwise. For instance, it would not be a good approximation if the data is generated by the traditional rule.

STEP 3: GJ claim that the properties of the slope coefficient of the KV long run regressions are the same as those of the slope coefficient of this alternative regression:

$$(6) \qquad \Delta F_i^A = \alpha^A + \beta^A \cdot PG_i^A + u_{it}$$

We label this the GJ regression. In particular, GJ calculate β^A under three alternative (and hypothetical) stochastic processes for $x_{i,t}$.[6] In these three examples, they claim that β^A will be close to one if the terminal foreign asset share $x_{i,T}$ and its average value x_i are "close" to each other when the time dimension of the panel is short. [7] This, according to GJ (2009, p.11), proves that "…running the cross-section regression in Kraay and Ventura (2000, 2003) can always yield β=1 (…). While β=1 is certainly consistent with the new rule, β=1 is in fact, consistent with any rule. Therefore, it cannot be taken as evidence for, or for that matter against, the new rule."

This claim simply is wrong, and reflects an elementary misunderstanding of econometrics. Approximations are mis-measured versions of the true variables. Any textbook discussion of measurement error shows that a slope coefficient estimated using mis-measured data will be biased relative to the slope coefficient using actual data, and

[6] We note that GJ are not fully explicit on this key step in their argument. However, this essential step in their argument is clear in their appendix. In each of the three examples considered, GJ write down an expression for the KV slope coefficient that is precisely the covariance between ΔF_i^A and PG_i^A, divided by the variance of PG_i^A.

[7] We note also that GJ are imprecise and internally inconsistent about the probability limit calculations they perform. In particular they claim that the KV result will automatically obtain when the time dimension is small. Yet at the same time they rely on imprecise claims about T being large to eliminate terms in their probability limit calculations. These two claims are of course incompatible.

that the nature of these biases will depend on the variances of the measurement errors and their covariances with the actual data. Yet GJ totally ignore this simple point and instead claim, with no justification, that the slope coefficient in Equation (6) will be a good approximation to the slope coefficient in Equation (2).

We can see most clearly why this claim is wrong in the second panel of Table 1. Here we use actual data to construct the approximate current account and portfolio growth suggested by GJ. We then estimate the regression in Equation (6), i.e. using the approximate versions of the current account and portfolio growth. In the original KV(2003) sample of 21 advanced OECD countries we find a slope coefficient of 1.02 using the approximate data, which is not very different from the slope coefficient of 1.09 that obtains in the actual data. This is not very surprising as we have already seen that the approximate current account is fairly close to the actual current account in this sample. And this in turn was precisely because the new rule held in this sample. However, in the second column reporting results for the non-OECD sample, we find that the regression using approximate data delivers a slope coefficient of 0.97, even though the true slope coefficient using the actual data is much smaller at 0.66. Again this is not suprising: the new rule does not hold in this sample, and so the approximation advocated by GJ is poor, and so the slope coefficient estimated using approximate data bears little resemblance to the actual one.

To sum up, KV run a regression with correctly measured variables, i.e. ΔF_i and PG_i, and interpret the results using well-formulated economic theories. GJ propose an alternative regression estimated with intentionally mis-measured variables, i.e. ΔF_i^A and PG_i^A, and provide three examples of arbitrarily-chosen stochastic processes for which this alternative regression would generate a slope of one. From this fragile base, GJ leap to the heroic claim that the original KV regression estimated using actual data has no informational content. We cannot understand how this obviously faulty line of reasoning could be the basis of a paper accepted for publication in the Journal of International Economics.

4. Further Incorrect and Unsubstantiated Claims Made by GJ

Our concerns with this paper go well beyond the fact that its main argument is simply incorrect. Its poor scholarship is compounded by the fact that GJ egregiously misrepresent our earlier work, and make a number of extravagant and unsubstantiated claims about their own findings.

GJ misquote our previous work in a variety of ways, caricaturing our earlier theoretical contributions as holding that the current account consists exclusively of portfolio growth and that portfolio shares are constant. For example,

- GJ write that "*According to their theory...the current account is caused by portfolio growth"* (p. 2), and that the KV "*theory puts forward the 'growth effect' as the source of long-run current account movements"* (p.3), and they suggest further on p.3 that KV view portfolio rebalancing as only a "*theoretical plausiblity* [sic]". This is a gross mischaracterization of the theoretical contributions of KV (2000, 2003), both of which feature models in which the composition of country

portfolios does in fact fluctuate endogenously over time, reflecting the competing forces of investment risk, diminishing returns, and adjustment costs to investment. In fact, explaining the theoretical and empirical dynamics of portfolio rebalancing is the main contribution of KV(2003).

- GJ claim on p. 10 that the KV theory would be "invalidated" if there is any correlation between savings and the composition of country portfolios. This simply is false: the entire point of KV(2003) was to present a model in which fluctuations in savings might in fact lead to changes in the composition of country portfolios.
- GJ also mischaracterize KV (2000, 2003) as making claims about the role of portfolio growth in understanding the U.S. current account deficit in the 1990s (see bottom of p. 5). No such claims exist in those papers.[8]
- GJ attribute the "portfolio growth" and "portfolio rebalancing" decomposition of the current account to an unpublished recent paper by Tille and Van Wincoop (see top of p. 3) when in fact it was introduced by KV(2000, 2003). [9]
- The paper is littered with incorrect claims that portfolio growth and portfolio rebalancing can only be found in world equilibrium models, again citing Tille and Van Wincoop (2008) (p.6), and that the small open economy in KV (2000, 2003) can only deliver portfolio growth as a theoretical prediction (see for example the second paragraph of GJ's conclusion). This claim is again simply incorrect, as the theory in KV (2000, 2003) features both effects.

Finally, GJ make a number of extravagant and unsubstantiated claims about their own work. For example,

- In the introduction they claim that "*By overturning the Kraay-Ventura result*, *together with a variance decomposition of the current account, we are able to establish the composition effect as the main driver of external adjustment dynamics".* As discussed above we emphasize that GJ have in fact overturned nothing -- and moreover their claim about variance decompositions is nothing more than a reiteration of the observation already in KV (2000, 2003) that the new rule works poorly in the within-country variation in the data. Yet GJ pretend that this finding is new and somehow overturns KV.
- On p.4 GJ claim that the KV results are driven by an 'omitted variable bias' yet nowhere in the paper is this claim ever explained or substantiated.
- On p.6 GJ claim that "*No existing empirical work has specifically aimed at exploring the relative importance of the two effects* [i.e. portfolio growth and portfolio rebalancing] *in explaining the current account".* This is of course completely wrong: the whole point of the empirical work in KV (2000, 2003) was to do precisely this.

[8] It is useful to simply look at the data since we can construct the portfolio growth and portfolio rebalancing for the US. Ventura (2001) did this and found that indeed most of the US current account deficit in the 1990s was due to portfolio growth. A few years of data later, Kraay and Ventura (2007) saw that this was no longer the case and explored various alternative explanations of why the composition of the US portfolio has changed so much in the 2000s. GJ ignore both the data and these papers of ours.

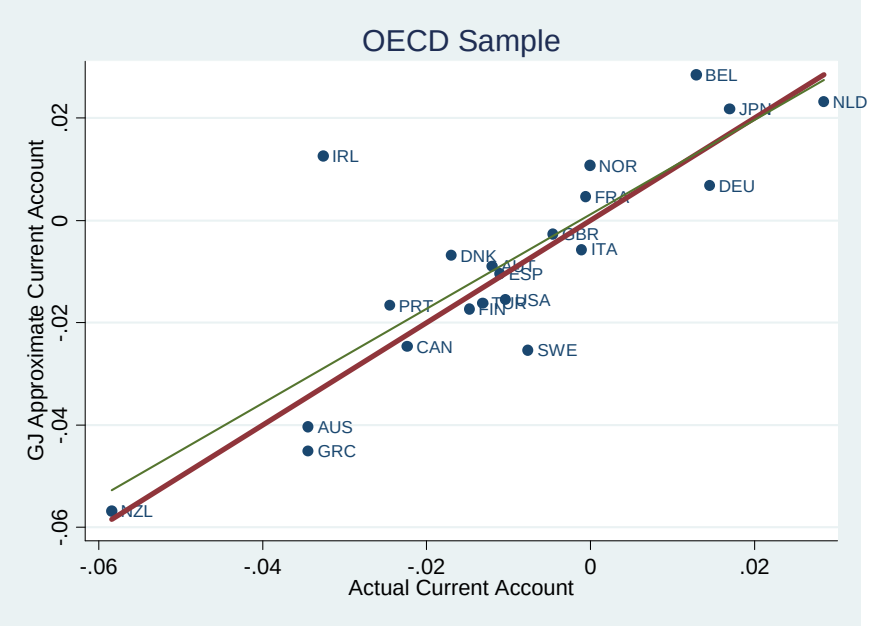
[9] In fact, we note that in earlier versions of the paper the authors made the remarkable claim that their decomposition of the current account into portfolio growth and portfolio rebalancing was entirely new while at the same time citing our papers in which this decomposition was introduced.

- On page 17, GJ conclude "*Our basic message is clear: never again run a K-V type cross-country regression .... there is simply no information embedded in this regression*". This is complete nonsense: the KV regressions are informative about the type of theory that has a chance to fit the data, as we have already explained in Section 2.

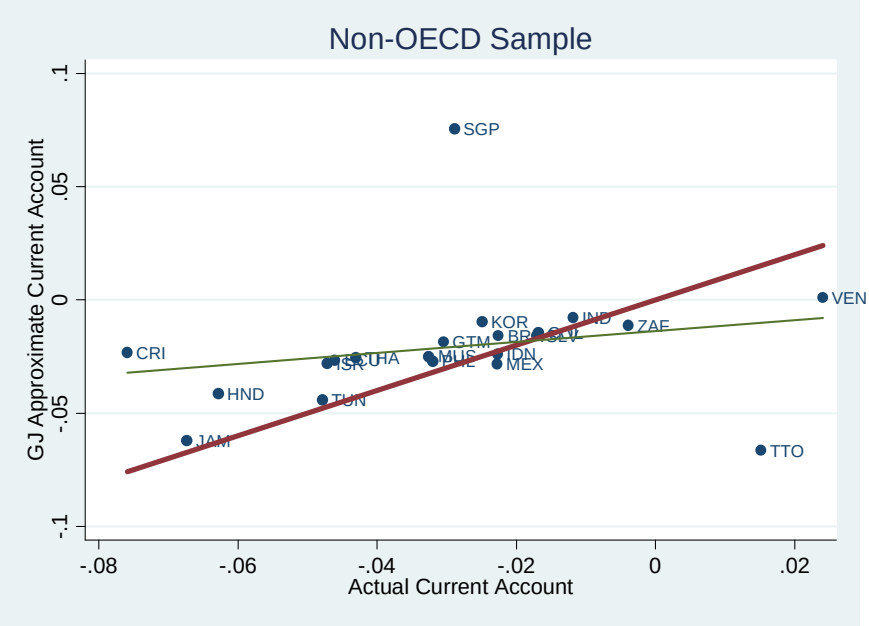
Table 1: KV Long Run Regressions

	OECD Sample (21 Countries, 1966-1997)	*Non-OECD Sample (21 Countries, 1966-1997)*
Panel A: New Rule Regressions Using Actual Data		
Slope	1.09	0.66
Std. Err.	0.12	0.18
R-squared	0.85	0.34
Panel B: New Rule Regressions Using GJ Approximations		
Slope	1.02	0.97
Std. Err.	0.16	0.32
R-squared	0.63	0.59

Figure 1: The GJ Approximation



Slope=0.92, R-squared=0.69



Slope=0.24, R-squared=0.05

References:

Guo, Kai and Keyu Jin (2009). "Composition and Growth Effects of the Current Account: A Synthesized Portfolio View". Manuscript accepted at Journal of International Economics (version of Feb.17 2009 downloaded from Keyu Jin's website).

Kraay, Aart and Jaume Ventura (2000). "Current Accounts in Debtor and Creditor Countries". Quarterly Journal of Economics. 115:1137-1166.

Kraay, Aart and Jaume Ventura (2003). "Current Accounts in the Long and Short Run", in Gertler, Mark and Kenneth Rogoff, eds. NBER Macroeconomics Annual. MIT Press, Cambridge.

Kraay, Aart and Jaume Ventura (2007). "The Dot-Com Bubble, The Bush Deficits, and the US Current Account", in Richard Clarida, ed.. G7 Current Account Imbalances. Chicago: University of Chicago Press.

Kraay, Aart, Norman Loayza, Luis Serven, and Jaume Ventura (2005). "Country Portfolios". Journal of the European Economic Association.

Ventura, Jaume (2001). "A Portfolio View of the U.S. Current Account Deficit". Brookings Papers on Economic Activity. 2001:241-258.