International Capital Mobility: Evidence from Panel Data

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Abstract

Krol (1996) reports estimates of the saving-investment correlation, based on panel regressions, that are much lower than commonly found in the literature. This note argues that this low estimate is not related to the panel estimation technique, as Krol claims, but largely to the inclusion of Luxembourg in the sample. Panel estimation only reduces the correlation's estimate by about 0.12.

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1. Introduction

In a recent article in this journal Krol (1996) reports estimates of the saving-investment (SI) correlation based on panel regressions. They are much lower than those obtained by Feldstein and Horioka (1980) and many others. He concludes that capital is internationally mobile, and that the large estimates reported in earlier work are attributable to problems with the estimation technique. In this note I argue that Krol's low estimate is not related to the panel estimation technique, but largely to the inclusion of data from Luxembourg in the sample (see also Coiteux and Olivier, 2000). Other authors – including Feldstein and Horioka – have routinely excluded Luxembourg from the sample, because its large international banking sector makes national accounts data less reliable (see Als, 1988). The panel estimation effect only accounts for a reduction of about 0.12 in the correlation's estimate.

2. Panel estimation

Krol estimates the following (fixed-effects) panel regression

$$IR(i,t) = a + c(i) + d(t) + \beta SR(i,t) + e(i,t)\,, \qquad (1)$$

where *IR* denotes the ratio of domestic investment to GDP, *SR* the ratio of national saving to GDP, and *e* the disturbance. The indices *i* and *t* denote country and time respectively. The dummy variable $c(i)$ takes on a different value for each country, while $d(t)$ takes on a different value for each period. $c(i)$ removes fixed differences between countries (size), while $d(t)$ removes time-related factors common to all countries (international business cycle). Krol's point estimate for the saving-investment correlation β is only 0.20.[1]

Krol's result is surprising in view of previous work, especially since he also finds that time effects $d(t)$ are not important. That makes his regression equation rather close to a set of time-series regression equations, which typically yield much larger estimates.

[1] I follow the literature in referring to β as a correlation, although it is a regression coefficient, hence a measure of linear association.

Moreover, recent work has found that saving and investment tend to be cointegrated variables, while the current account is a stationary variable, implying that β is one. See for example Gundlach and Sinn (1992), Jansen (1996), Coakley, Kulasi and Smith (1996) and Coiteux and Olivier (2000). This cointegration (long-run correlation) is interpreted as a manifestation of the intertemporal budget constraint, rather than evidence of low capital mobility. Since under certain conditions a panel regression in levels estimates the long-run relation between the variables (Pesaran and Smith, 1995), one would expect a rather high estimate for β.[2]

To assess the effects of Luxembourg and panel estimation I have reestimated Eq. (1).[3] Line 1 in Table 1 presents the estimation results for Krol's sample of 609 observations which includes data from Luxembourg (21 countries, 1962-90). The point estimate for β is 0.23, close to the value obtained by Krol. Dropping the Luxembourg data from the sample has dramatic consequences: the β-estimate shoots up to 0.57. Estimation for an updated sample of 840 observations (all 'old' OECD countries, 1960-94) produces a β-estimate of 0.37, which is already considerably higher than Krol's result of 0.20. Dropping Luxembourg now increases the point estimate to 0.60. Estimating Eq. (1) for the subperiods 1960-74 and 1975-94 we find that the SI-correlation has decreased a little bit, from 0.57 to 0.52. However, this small decline masks considerable variation over time. Line 7 of Table 1 and Figure 1 report estimates of Eq. (1) when β is allowed to be different for each year. Although the estimates average 0.60, the same as the time-invariant estimate in line 4, they sometimes vary a lot and display a downward trend. Since 1987 the correlation has been rather stable around 0.55. For comparison, Figure 1 also shows the β-estimates obtained by cross-section regressions on annual data. This is roughly equivalent to setting $c(i)$ equal to zero. The cross-sectional estimates average 0.72, and are always greater than the panel estimates. Ignoring fixed differences (in long-

[2] Pesaran and Smith (1995, p. 91) show that if there are fixed or random differences in β across countries the pooled regression will no longer provide a consistent estimator of the mean effect. However, the intertemporal budget constraint argument implies that β is one for each country.

[3] I report only estimates of fixed-effects models to make them comparable to Krol's results. Estimates of random-effects models are very close to those of fixed-effects models. See also Krol (1996, footnote 10).

run equilibrium current accounts) between countries thus increases the estimate of the SI-correlation by 0.12 on average. The panel estimation effect is about –0.12.

3. Conclusion

An eclectic reading of the literature learns that the SI-correlation may reflect the combined effects of three phenomena: (1) low capital mobility, (2) long-run current account targeting, and (3) the intertemporal budget constraint (Jansen, 1998). Although the third effect is always operative, the first two effects can be expected to have become less important after 1973, as capital controls have been abolished on a massive scale since the early 1970s, and macroeconomic policy is less likely to be influenced by balance of payments considerations under a system of flexible exchange rates. The finding that the SI-correlation has declined and has become more variable after 1973 is consistent with the view that (relatively) low capital mobility and/or long-run current account targeting are partly responsible for the correlation's high value in the past. The finding that the correlation is still 0.55 in the 1990s and has always been well above zero, is consistent with the view that the intertemporal budget constraint is an important force behind the correlation.

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Table 1: Panel estimates of the saving-investment correlation

Sample	#obs.	β	adjR2	F-test $c(i)=0$	F-test $d(t)=0$
21 countries 1962-90 (Krol 1996)	609	0.227 (7.47)	0.729	43.90 [.0000]	8.63 [.0000]
20 countries 1962-90 (no Luxembourg)	580	0.568 (12.9)	0.778	15.72 [.0000]	3.14 [.0000]
24 countries 1960-94	840	0.362 (13.8)	0.713	43.79 [.0000]	9.94 [.0000]
23 countries 1960-94 (no Luxembourg)	805	0.602 (19.0)	0.768	15.99 [.0000]	6.40 [.0000]
23 countries 1960-74 (no Luxembourg)	345	0.570 (11.5)	0.848	8.78 [.0000]	4.66 [.0000]
23 countries 1975-94 (no Luxembourg)	460	0.518 (12.3)	0.727	12.57 [.0000]	7.12 [.0000]
23 countries 1960-94 (no Luxembourg) β time-dependent	805	0.601 (average)	0.777	5.36 [.0000]	1.72 [.0072]

Note: t-statistics in parentheses; marginal significance values in brackets. Krol's sample comprises 21 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The group of 24 countries consists of all 'old' OECD countries, i.e. Krol's sample plus Iceland, Portugal and Turkey. The data are taken from the *OECD National Accounts*, *Volume I*, and refer to gross investment and gross saving. The maintained model for the *F*-tests includes both country and time effects.

Figure 1: Estimates of the saving-investment correlation, 1960-94