

Mansori, Kashif

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# Working Papers

## ECONOMIC LIBERALIZATION AND SAVINGS RATES

Kashif S. Mansori\*

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Center for Economic Studies & Ifo Institute for Economic Research  
Poschingerstr. 5, 81679 Munich, Germany

Tel.: +49 (89) 9224-1410

Fax: +49 (89) 9224-1409

e-mail: [office@CESifo.de](mailto:office@CESifo.de)



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## ECONOMIC LIBERALIZATION AND SAVINGS RATES

### Abstract

This paper considers the possibility that economic liberalization, by which is meant a reduction in tariffs, quotas, capital controls, and other government distortions of international transactions, may reduce private savings rates. A two stage approach is used to analyze a panel data set covering OECD countries during the past two decades. The conclusion is that there is a significant and robust relationship between economic liberalization and lower rates of savings. One implication is that at least part of the decline in savings rates in some countries over the past two decades may be explained by the liberalization process.

JEL Classification: E21, F15

*Kashif S. Mansori  
Colby College  
Department of Economics  
Waterville, Maine 04901-8852  
USA  
e-mail: kmansori@colby.edu*

# 1 Introduction

Economic liberalization has been a prominent feature of many countries' economic policies over the past 20 years. Tariff rates have fallen, capital controls have been lifted, and government-owned enterprises have been sold in a wide variety of countries around the world. The microeconomic effects that these policies have had are the focus of a large body of research. Less research has been done into the macroeconomic impacts that such reforms might have.

This paper looks for one specific effect of economic liberalization: the effect of such reforms on private savings rates. Note that throughout this paper I will use the term "economic liberalization" to broadly capture the process of increased exposure to global market forces, or a reduction in government interference in international transactions. This term may therefore include reductions in trade barriers, reductions in capital controls or other barriers to foreign investment, and reductions in other market interventions by governments, for example through production subsidies. What these reforms have in common is that they are all intended to allow domestic firms to receive less distorted price signals from the market.

I will argue that such reforms can have a significant impact on savings rates. The determinants of savings typically fall into a couple of general categories of reasons: first, the need for precautionary savings, particularly when there are credit market imperfections; second, life-cycle and consumption smoothing considerations; and third, intertemporal substitution of consumption that may arise due to changes in personal discount or interest rates, for example. To the degree that economic liberalization policies can affect interest rates, credit markets, and permanent income, they may affect the rate of savings.

Specifically, it is possible that liberalization policies may cause a belief that lifetime income will be higher after the reform. This is one possible result of an economy's increased exposure to market forces. To the extent that undistorted market pressures may send more accurate signals regarding supply and demand, liberalization should lead to a more efficient allocation of resources. If this is the case, then we would expect economic liberalization to lead to increased economic efficiency, and eventually to higher production. We may well then expect a consumption boom to follow such a series of economic reforms, and the savings rate to fall.

The decline in savings rates in numerous industrialized countries over the

past couple of decades has been widely documented, and at times, lamented. The implication of this paper is that at least part of this decline can be explained by the process of economic liberalization.

In this paper I will use a panel data set to try to estimate the impact of economic liberalization on saving rates. In the next section I will outline the theory involved, and discuss some previous literature that is applicable to this question. The econometric analysis will be discussed in the following section, and the final section concludes.

## 2 Theory and Related Literature

In this section I will outline in slightly more detail the intuition about the effect of economic liberalization on savings rates, and then I will briefly survey various other influences on savings rates.

### 2.1 The Impact of Economic Liberalization on Savings

The trend toward less government intervention in international transactions during the past two decades, while not universal, is quite widespread. Average tariff rates have fallen substantially in most developed countries, as well as in developing nations. The volume of international trade has grown significantly faster than income.

Even more dramatic has been the very significant reduction in controls on international capital mobility. Controls on capital flows were common and often restrictive in many developed countries in the 1970's and even into the 1980's, while now a huge amount of capital can move from country to country virtually unfettered. A good survey of the widespread steps taken toward capital market liberalization is contained in Williamson and Mahar (1998). In addition, numerous governments have made efforts toward privatizing or deregulating various industries, reducing government influence on output and prices as a consequence.

In what follows I will outline a theory to explain why liberalization might be expected to cause lower savings. The central point is that liberalization should be expected to cause higher expected future income.

**Economic Liberalization Causes Faster Growth.** There are at least two good reasons to believe that liberalization efforts may increase the av-

erage rate of growth of income. First, from a theoretical point of view, such efforts may lead to a more efficient allocation of resources. As governments allow prices to more accurately reflect true conditions of supply and demand, it is natural to expect that this would happen. Activities that were inefficient and were simply kept alive by government regulation or intervention should presumably shut down, freeing resources to move to those enterprises which were relatively disadvantaged under the earlier government interference. Since such movements of resources will be toward productions that are more desired by the market, they should be unambiguously welfare improving at the national level, though obviously not necessarily at the individual level.

Theoretical models such as those presented by Bencivenga and Smith (1991) and Saint-Paul (1992) illustrate this possibility rigorously. In their models they show that that financial development and deregulation can improve income growth simply by increasing the efficiency of the allocation of investment, rather than from a larger volume of investment. Some research has attempted to document this at the level of individual countries, though most typically these studies have focused on developing countries. Nevertheless, the theoretical logic is just as relevant for developed countries.

Another reason to believe that economic liberalization could lead to higher growth rates is that there is a fair amount of empirical evidence to suggest this. Williamson and Mahar (1998) survey several empirical studies that find significant, robust, and positive relationships between financial liberalization and rates of income growth. Finally, one simply must note that moves toward liberalizing markets have been very commonly pursued by numerous countries during the past 20 years. One can easily argue that these countries would not undertake such reforms if they did not believe that it would make them better off in the future.

**Faster Expected Growth Causes Lower Savings.** The final link in the argument that liberalization should lead to lower savings rates is simply to note that higher lifetime income should lead to higher lifetime consumption. Thus according to the life-cycle model of consumption, when expected future income growth increases, individuals may rationally choose to consume part of their future (lifetime) income even before that income is actually earned.

One last theoretical conclusion that can be drawn from this is that such a fall in the rate of savings in the face of higher expected future income is that

it may be socially optimal. The life-cycle model of consumption assumes that individuals optimize, of course, and the simple model therefore suggests that lower savings in the face of economic liberalization is an optimal response. At the national level, this is simply a reflection of the reallocation of resources that may cause the faster income growth. Even if there is a trade-off between savings and future growth (for example if we assume for the moment that the country has limited ability to borrow and lend overseas, for whatever reason), the more efficient use of capital may result in the optimal rate of investment being lower than it was before. If national investment should be lower than before, then optimal national savings may be lower as well.<sup>1</sup>

**Previous Literature on Liberalization and Savings.** Some previous papers have addressed the possibility that economic reforms may influence the pattern of consumption and savings. For example, Calvo and Drazen (1998) develop a framework to examine the effects of reform policies on consumption when the duration of such reforms is unclear. Their theoretical model suggests that, depending on the credibility of the reforms, policy shifts that either reduce tariffs or that are otherwise endowment-augmenting (a possible reason might be greater private-sector efficiency due to the reforms) may indeed be expected to produce a consumption boom.

Bergman and Hutchison (1999) analyze the experience of Denmark following a fiscal reform in the early 1980's, and specifically test the 'German View' that lower government spending, if it causes lower expected government spending, may cause higher consumption. They conclude that there is some evidence that government retrenchings may indeed cause consumption to increase (and the savings rate to decrease). However, they conclude that this effect was not significant in the Danish case, and attribute most of the change in Danish consumption/savings behavior to an improvement in Denmark's terms of trade, and to higher permanent income in Denmark for unspecified reasons.

An alternative possibility is examined by many other authors: the possibility that financial deregulation might alleviate credit rationing and thus lead to a consumption boom and fall in savings rates. For a survey of this literature, see Agell and Berg (1996). They look for evidence that financial deregulation in Sweden in the 1980's led to a decline in savings rates in the

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<sup>1</sup>Naturally this argument abstracts from the possibility that there are positive externalities to savings.

late 1980's. They conclude, like Bergman and Hutchison (1999), that most of the decline in savings in Sweden was due to real wage growth, and is thus consistent with a permanent income story.

These findings fit nicely with the story that I have sketched above. The added insight that I would like to suggest in this paper is simply that the increases in permanent income that accompanied these examples of falling savings may well have been due to liberalization efforts. In addition, I will attempt to directly estimate the impact that economic liberalization has had on savings rates of a set of countries, unlike any previous work of which I am aware.

## 2.2 Other Determinants of Savings

In order to isolate any significant effect of economic liberalization on savings rates, it is essential that we consider other important determinants of savings behavior. Studies of savings rates abound, and contain a wide variety of possible explanations for changes in savings behavior. Some of the most widely analyzed possible determinants of the savings rate are:

**Income Growth.** Income growth is typically expected to cause higher savings, for at least two possible theoretical reasons. The first is due to the life-cycle model of consumption. When income rises, consumption may be expected to rise by less so that the higher income can be consumed over the entire life cycle. There is a lot of strong evidence to show that savings rates are indeed pro-cyclical. For a recent example, see Lane and Tornell (1998), who document the strongly pro-cyclical behavior of savings in developed countries. Carroll and Weil (1994) argue for a second channel of causation. While they also find that savings are significantly pro-cyclical, they argue that this may be due to habit formation of consumption, rather than the life-cycle model. The relationship between savings and income growth remains unambiguously positive according to either theory.

**Interest Rates.** As the 'price' of consumption versus savings, interest rates must naturally be included in any discussion about savings rates. Theoretically the response of savings to interest rates is ambiguous, of course, with countervailing income and substitution effects. Empirical evidence has also been inconclusive and somewhat contradictory. For example, Bosworth



(1993) finds a negative interest rate elasticity of savings in a panel data set, but a positive elasticity using country-specific time series analyses. Many other studies find a statistically insignificant relationship between savings and interest rates, suggesting that in many cases the income and substitution effects are roughly offsetting.

**Terms of Trade.** The Laursen-Metzler model predicts that an improvement in the terms of trade should lead to higher savings rates. This is because, if the change in the terms of trade is perceived as being temporary, any improvement would essentially generate a windfall for consumers, which they should largely save in order to maintain a smooth level of lifetime consumption. If the improvement of the terms of trade is permanent, then the theoretical prediction is ambiguous. As noted by Masson, Bayoumi, and Samiei (1998), empirical evidence seems to confirm that there is some positive relationship between the terms of trade and the savings rate, lending some support to the Laursen-Metzler prediction.

**Government Savings.** The notion of Ricardian equivalence predicts that private individuals should offset changes in government savings (or dissavings). Generally most empirical studies have rejected the hypotheses that full Ricardian equivalence holds. Most estimates conclude that there is a statistically significant partial offset of private savings for changes in government savings, however, typically in the neighborhood of one-half. For example, Bernheim (1987) estimates that the offset of private savings for public savings is between  $-.5$  and  $-.6$  in industrial countries. Edwards (1995) estimates an offset ratio of between roughly  $-.4$  and  $-.65$ , and Masson, Bayoumi, and Samiei (1998) find the offset ratio in the neighborhood between  $-.5$  and  $-.7$ .

**Other Factors.** The age structure of a country's population may also shape the pattern of savings, particularly according to the life-cycle model of consumption. However, as the age structure of the population in any given country tends to change relatively little over time (unless periods of more than 30 or 40 years are examined), most of the previous literature has concluded that demography plays a much more important role in explaining cross-country differences in savings than in explaining variations over time. Similarly, per capita income levels seem to play a role in explaining cross-country differences, but not over time within a country.

Finally, we would expect the stock of wealth to be negatively correlated with savings. This possible effect has garnered much recent attention in the United States, as many observers have attributed the sharp decline in the savings rate in the US during the late 1990's to a rapid rise in stock market values. Presumably this effect would be less important in countries with less widespread stock ownership, but it remains a consideration in the determination of savings rates.

### 3 Econometric Modelling and Estimation

This section will first briefly describe the data, then discuss the variables designed to indicate the extent of economic liberalization, and finally present the econometric results.

#### 3.1 Data Description

Many countries have engaged in economic reforms over the past couple of decades. In this paper I focus on the OECD countries, however. This is done for a couple of reasons. First, the OECD countries are more likely to exhibit savings behavior that is similar to one another. Second, comparable data across countries is more readily available for the OECD countries. The data set consists of 18 OECD countries for which net savings data was available for more than 10 years before 1998. The panel data set is unbalanced, however, with some countries having data available much further back. The specific countries and years of data are given in the appendix.

The data used to test this theory consists primarily of main macroeconomic indicators and Balance of Payments data from the IMF<sup>2</sup>. The private savings rate is defined as net private savings divided by income. In most of the 18 countries examined here, the savings rate fell significantly between the early 1980's and late 1990's. This trend has been widely documented in the literature.<sup>3</sup> The average savings rate during the period 1975-78 was 18.3%, while during the period 1995-98 it averaged 13.9% across the countries in our data set.. This summary statistic hides very significant downward trends over time in each country, however. When the savings rate is regressed against

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<sup>2</sup>See appendix for details.

<sup>3</sup>See Elmeskov, Shafer, and Tease (1992) for one survey of the evidence of a trend toward lower savings.

time (allowing for fixed effects), the average savings rate falls by a highly significant .22% per year, with a standard error of only .027%.

The explanatory variables used, other than the proxies for economic liberalization, follow the examples of other studies in the literature mentioned above. They include the following: the annual growth rate of GDP; the annual rate of inflation, measured with the GDP deflator; real interest rates, for which the yield on a 10 year government bond is used, minus the rate of inflation; the percentage change in the real exchange rate over the previous year; the percentage change in the value of the stock market; and the total government balance as a percentage of GDP. Note that the real exchange rate is expressed in terms of US \$ per unit of foreign currency, adjusted for the inflation differential between the US inflation rate and the home country's inflation rate. This implies that positive numbers indicate a real appreciation, while negative numbers indicate a real depreciation.<sup>4</sup>

### 3.2 Explanatory Variables: Proxies for Liberalization

The basic model to be tested will be as follows:

$$s = \beta_0 + \beta_1 L + \beta_2 X + \varepsilon$$

where  $s$  is the savings rate,  $L$  is a vector of the variables indicating the extent of economic liberalization, and  $X$  is a vector of all other variables that determine savings behavior.

The explanatory variables in the vector  $L$  should illustrate the process of, or serve as a proxy for, economic liberalization as defined at the beginning of this paper. I have chosen not to attempt to construct a direct measure of liberalization policies because of the potential subjectivity of such an endeavor. Instead, I attempt to use proxies that hopefully illustrate some of the effects of those policy decisions. There are several possibilities for this, of which I have chosen two.

The first proxy for economic liberalization that I use is the import penetration ratio. This should reflect the degree to which trading barriers in the country in question have fallen. Alternatively, the ratio of imports plus exports to national income could be considered; however, I have chosen to

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<sup>4</sup>In the case of the US, the real exchange rate is calculated against an arithmetic average of its exchange rate against Japan and Germany, adjusted for those countries' average inflation rate minus the US inflation rate.

use the ratio of imports to GDP as a more direct measure of own-country economic liberalization. As a country reduces trade restrictions, we would expect to see its import penetration ratio to rise.<sup>5</sup> Thus higher import penetration should be an indicator of the degree of economic liberalization in a country.

The second measure of liberalization is intended to capture the relaxation of capital controls and investment restrictions. For this aspect of economic liberalization I use the ratio of total foreign investment to GDP, as measured by the IMF's Balance of Payments Statistics. As a country reduces its restrictions on capital flows and foreign ownership of assets, we would expect to see foreign investors increasing the amount of direct and portfolio investment in a country. Countries that are easing capital controls may also exhibit the repatriation of flight capital. Both of these effects should cause this ratio to rise.

These two measures have risen in most of the countries in our sample during the period, illustrating increasing economic integration. The table below contains a few summary statistics for two variables:

**Table 1:**

	'75-78 average	'95-98 average	Average Trend
Imports/GDP	23.6% (9.4)	28.6% (9.7)	+ .14%/yr (.02)
Foreign Inv./GDP	4.1% (2.4)	8.4% (5.9)	+ .13%/yr (.04)

Standard deviations / standard errors are in parentheses.

The table illustrates a steady progression of economic integration between countries, with significantly increasing trade and foreign investment.<sup>6</sup> Changes in these variables might be policy driven, but of course they may also be due to a host of other reasons. Specifically, we might expect both of our exogenous variables, Imports/GDP and F.I./GDP, to be functions of many of the same variables that the savings rate should depend on, possibly including a time trend.. Therefore a two stage approach is used, estimating the two exogenous variables using some of our other macroeconomic variables, and then using the residual disturbances in the exogenous variables as proxies for policy shocks. Of course, even these residual changes in imports

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<sup>5</sup>Under a balanced trade assumption, of course, lower trade restrictions should lead to higher exports as well.

<sup>6</sup>Note that the average levels are only for those countries for which there was data covering the entire period 1975-1998.

or foreign investment could be due to reasons other than a policy decision to liberalize the economy. The direct cause of the liberalization episode does not matter in this case; any liberalization that is perceived to change permanent income should lead to a lower savings rate. For intuitive clarity, however, throughout the paper I will assume that the liberalization episode was initiated by a policy decision.

In the first stage of the analysis, the dependent variables are each regressed on GDP growth, inflation, the real exchange rate (including a one year lag term) and a time trend. The following table illustrates some of the results of the first stage.<sup>7</sup> The table lists episodes of unexpectedly large deviations (i.e. deviations by at least one standard error for at least 2 consecutive years) in each dependent variable from its predicted values:

**Table 2:**

Large + shocks to Imports	Large + shocks to Foreign Investment
Belgium 1989-90	Denmark 1987-89
Canada 1994-98	Finland 1990-91
Finland 1980-81	Iceland 1984-88
Iceland 1984-85	Korea 1980-82
Japan 1979-82	Mexico 1990-1993
Korea 1979-82	New Zealand 1994-95
Mexico 1995-98	Norway 1986-88
Norway 1979-81	Portugal 1994-96
Portugal 1980-84	Spain 1991-93
Spain 1996-98	Sweden 1989-91
U.K. 1974-77	U. K. 1986-90

Comparing the results in the table with anecdotal evidence of economic liberalization policies suggests that the variables above, particularly the shocks to foreign investment, may indeed serve as a reasonable (if only a partial) proxy for liberalization episodes. Positive shocks to foreign investment seem to correspond to well-known episodes of economic reform in many of the cases listed in the table. On the other hand, shocks to the import penetration ratio seem to reflect other factors; in particular, at least five of the

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<sup>7</sup>Specific first stage regression results are available from the author by request.

episodes in the first column of the table coincide with oil shocks, and thus may be primarily reflecting something other than a policy liberalization period. We would therefore expect the second measure to perform better as an explanatory variable for savings. Throughout what follows, however, we will maintain the assumption that these proxies indicate the degree of economic openness to global market pressures.

### 3.3 Econometric Results

Using the residuals estimated in the first stage, I then proceed to model the savings rate, using OLS on a panel data set covering 18 countries and 371 observations. Fixed country effects are allowed. This is intended to allow for the possibility that there is some country-specific cultural component to the savings/consumption choice that can not be captured using typical macroeconomic variables.<sup>8</sup> In addition, the issue of interest in this paper is whether economic liberalization may cause changes in the savings rate over time, rather than what causes cross-country differences in savings rates.

Initial regressions contained all of the explanatory variables mentioned above. However, in every specification tested, the variables for the stock market and inflation had virtually zero explanatory power. Therefore the results reported below exclude those variables.

The principal regression results are presented below in Table 3. In each case the dependent variable is the rate of private savings and all variables are expressed in percentage points.

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<sup>8</sup>Edwards (1995) makes the opposite choice, and constrains all of the countries in his data set to have the same intercept. But in that case he looks at savings rates in 36 Latin American countries. A good argument could be made that such unmeasurable country-specific cultural differences are relatively small.

**Table 3:**

	# 1	#2	#3	#4
GDP growth (%)	.38** (6.0)	.38** (6.1)	.38** (6.0)	.37** (6.0)
Real Interest Rates (%)	-.08** (3.3)	-.08** (3.2)	-.08** (3.3)	-.08** (3.2)
Government Bal. (%)	-.53** (9.8)	-.54** (9.8)	-.51** (9.1)	-.51** (9.2)
%Δ Real Exch.Rate	.02 (1.3)	.02 (1.3)	.02 (1.3)	.02 (1.3)
Time Trend	-.18** (8.0)	-.18** (8.0)	-.19** (8.2)	-.19** (8.1)
<b>F.I. Shocks (%)</b>			<b>-.07*</b> (2.5)	<b>-.06*</b> (2.3)
<b>Import shocks (%)</b>		<b>-.07</b> (1.2)		<b>-.05</b> (1.0)
S.E. of Regression	2.705	2.703	2.685	2.685
adj. R <sup>2</sup>	.87	.87	.88	.88

T-statistics are in parentheses.

\* indicates 95% significance; \*\* 99% significance.

**Analysis.** The first regression is the baseline case, in which I included the main variables shown to be significant in other cross-country studies of savings rates. Reassuringly, the signs are as expected, with only one minor exception. Savings is significantly pro-cyclical, with each additional percentage point in GDP growth leading to a rise in the savings rate of roughly .4 percentage points. Savings rates in this sample seem to respond negatively to higher real interest rates. According to the usual theory of interest elasticity, this would imply that the income effect outweighs the substitution effect; this is not a result that has been commonly found in the previous literature, but is certainly theoretically possible. On the other hand, this result may simply be an artifact of the poor measurement of real interest rates, which is the 10 year government bond yield minus the current rate of inflation. The real interest rate much more relevant to the savings decision is, of course, the expected future real interest rate.

One of the strongest predictors of the savings rate is the government's budget balance. Consistent with partial Ricardian equivalence, budget deficits are associated with higher private savings rates, and surpluses with lower private savings. In this case, every percentage point increase in a government's budget deficit (as a fraction of GDP) is associated with a roughly 0.5% increase in the rate of private savings. This is consistent with previous

estimates, which, as noted above, tend to cluster consistently around  $-.5$  or  $-.6$ . The results presented above thus fit nicely with previous work.

The regression provides some mild evidence that real appreciations are associated with an increase in savings. This is consistent with the Laursen-Metzler effect as described above. However, this result is not quite significant at the 90% level in this specification. Finally, the time trend is highly significant, indicating that there was some sort of unidentified secular decline in savings during the 80's and 90's, perhaps due to some omitted variable.

Equations #2 and #3 show the effects of adding our proxies for economic liberalization policies. Residual variations in the import penetration ratio ("*ImportShocks*") has the predicted sign, but is not significant at standard significance levels. On the other hand, unpredicted changes in foreign investment ("*F.I.shocks*") has the predicted sign and is also significant at the 95% level. This implies that a surges in foreign investment that are not due to changes in GDP, inflation, or the real exchange rate, are associated with a fall in the savings rate. To the degree that such shocks to foreign investment may reflect policy measures that open the domestic economy up to foreign market forces, this agrees with the theory outlined above wherein increased liberalization causes a consumption boom and a drop in the rate of savings. The fact that the proxy *F.I.shocks* performs better than the proxy *ImportShocks* is also consistent with the casual observation, made in the preceding section, that the episodes of unusually high foreign investment (listed in Table 2) seem better correlated with well-known liberalization periods in several countries.

Equation #4 contains both proxies for liberalization in the same regression. This is helpful to the degree that the two proxies each capture different aspect of economic liberalization, each of which might have different effects on the savings rate. The significance of each coefficient is somewhat reduced when they are included together, but the coefficient estimates remain roughly constant.<sup>9</sup>

**Possible Specification Problems.** One concern is that there might be serious endogeneity problems in this specification. In particular, the savings rate may be an important factor in the determination of income growth and the interest rate. Therefore an alternative specification was run in which

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<sup>9</sup>Multicollinearity does not seem to be a significant problem here. Note that the correlation coefficient between the two shock variables is only .11.



lagged income growth and interest rates were used as proxies for current interest rates and income growth. This simple check for endogeneity problems is reported below in Table 4. The only difference from the specification reported in table 3 is that one year lags of the first two variables are used instead of current period observations.

**Table 4:**

	# 1	#2	#3	#4
GDP growth (-1)	.40** (5.8)	.44** (6.4)	.43** (6.4)	.46** (6.9)
Real Interest Rates (-1)	-.06* (2.7)	-.07* (3.0)	-.08** (3.6)	-.09** (3.9)
Government Bal.	-.57** (9.9)	-.58** (10.2)	-.54** (9.5)	-.56** (9.8)
%Δ Real Exch.Rate	.03* (2.1)	.03* (2.1)	.03* (2.3)	.03* (2.4)
Time Trend	-.18** (8.1)	-.18** (7.2)	-.19** (7.1)	-.17** (7.1)
<b>F.I. Shocks (%)</b>			<b>-.13** (4.8)</b>	<b>-.13** (4.7)</b>
<b>Import shocks (%)</b>		<b>-.17** (3.3)</b>		<b>-.16* (3.1)</b>
S.E. of Regression	2.604	2.567	2.522	2.490
adj. R <sup>2</sup>	.88	.88	.89	.89

T-statistics are in parentheses.

\* indicates 95% significance; \*\* 99% significance.

The results are encouraging. They show roughly similar coefficient estimates for all of the independent variables, which all remain statistically significant. The change in the real exchange rate is now significant, and agrees with the Laursen-Metzler hypothesis. More interestingly, the two proxies for economic liberalization perform substantially better than in Table 3; both variables have larger coefficients and are now statistically significant at the 95% level, and the variable *F.I.Shocks* is significant at the 99% level. This suggests that the results are not simply an artifact of an endogeneity problem.

These results seem to be quite robust to other variations as well. For example, the regression was run excluding all countries with less than 16 observations, resulting in a sample size of 13 countries with 304 observations. The results were qualitatively similar, though with generally improved significance levels compared to Table 3. *F.I.shocks* had a slightly higher T-statistic, and *ImportShocks* were significant at the 90% level.

Since the Durbin-Watson statistics were quite low in this regressions

(ranging between 0.5 and 0.9) another set of regressions was run to make sure that these results are not merely the result of autocorrelation. Regressions were estimated containing a lagged term of the dependent variable as a crude but simple way to eliminate serial correlation. Nearly all the coefficients remained significant and with coefficients of similar magnitude, including the two independent variables of interest. Those results are reported in the appendix.

One final possibility to be considered is reverse causation. The theory outlined in the second section of this paper provides an explanation for why we would expect the causality to run from economic liberalization to lower savings rates. One could argue the opposite, namely that lower savings causes unexpectedly high import penetration, but in that case the mechanism of causation would be through higher income growth. Yet income growth was one of the explanatory variables in the first stage of our regression, and so income growth can not be a contributor to unexpectedly high imports. This channel of possible reverse causation is therefore not likely.

A more likely candidate for reverse causation is the second measure chosen, foreign investment. If one posits that future growth prospects have improved in country X for some unknown reason other than economic liberalization, and that restrictions on capital flows are not substantial inhibitors to foreign investment, then it is possible that this exogenous and unknown shock to future growth prospects could cause both lower savings (due to the higher expected future income) and higher foreign investment (due to prospects for greater future returns). The regressions estimated to test for endogeneity problems, containing lagged income growth instead of current income growth, suggest that this is not the case. Nevertheless, this theoretical possibility, as well as tests to distinguish between this possibility from the reverse, merits future investigation.

**Magnitude of the Effect.** The results indicate that the effect of economic liberalization on the rate of private savings is not extremely large, but neither is it negligible. The average country in the sample experienced an increase of 4.0% in its import penetration ratio during the past 20 years, and an increase of 4.2% of foreign investment over GDP. Multiplied by the coefficients from Table 4, this implies that the two effects together can explain an average fall in the savings rate of around 1.2% since the late 1970's, which is roughly one quarter of the average fall in savings rates in the sample.

For some countries, of course, the effect of liberalization on the savings rate can be larger. The following table lists the countries that experienced rather large drops in their savings rate (arbitrarily this is defined here as a fall in the savings rate of more than 2.5 percentage points), and the fraction of the decline in savings that can be explained by the liberalization proxies.

**Table 5:**

	$\Delta$ in Sav. Rate	$\Delta$ Due to Lib.	Pct. Explained
Australia	-8.2	-1.4	17%
Canada	-7.7	-2.0	26%
Japan	-7.6	-.03	0%
Korea	-3.2	-1.6	49%
New Zealand	-7.8	-1.5	19%
Norway	-3.6	-.4	8%
Portugal	-8.9	-2.0	23%
Spain	-2.5	-2.1	84%
Sweden	-2.7	-1.2	43%
United States	-5.9	-1.3	22%

The first column shows how much the savings rate fell in these countries over the past 20 years, measured in percentage points.<sup>10</sup> The second column shows the estimate (using the coefficients from Table 4 above) of the effect that liberalization should have had on the rate of savings for each country. The third column is simply the second divided by the first. In those countries in which the savings rate declined substantially during the past 20 years, economic liberalization is generally estimated to have contributed about one and two percentage points to the fall. Obviously there must be other explanations for the fall in the savings rate.<sup>11</sup> However, the contribution of economic liberalization is also substantial, and thus may warrant attention from policy makers.

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<sup>10</sup>The change in the savings ratio is measured between the 1975-78 average and the 1995-98 average, except for New Zealand, which uses the 1985-88 average as the starting point.

<sup>11</sup>The regression results attach most of the blame for the falling savings rates to the time trend, probably indicating that there was some factor at work not captured here.

## 4 Conclusions

The regression results provide robust and significant evidence that unexpected increases in imports and foreign investment are related to decreases in the savings rate. With the two assumptions suggested above we can conclude that economic liberalization does indeed cause lower rates of savings. First, we have assumed that unexpected changes in imports and foreign investment reflect economic liberalization, or more precisely, reflect an increase in a country's exposure to market pressures. Second, we assume that the causality runs from openness to lower savings, and not the other way around. As discussed above, there are good reasons to believe this, though further tests to determine the direction of causality may be an avenue for further research.

Given the evidence presented above, it seems that there is a link between economic liberalization and lower rates of saving. This raises the normative question of whether this is a bad thing. As suggested by the theory, it is certainly possible that lower savings during a liberalization period may not be bad; lower national savings may be required to sustain long-term growth if the efficiency of investment is enhanced with liberalization. This possibility bears further research, however.

There are two important implications of these results. First, this story may explain at least a part of the widespread (and to many, mysterious) decline in savings rates in industrialized countries over the past couple of decades. Second, it seems that countries that wish to pursue further economic liberalization should be aware of this possible effect on the macroeconomy. If the timing of the savings fall during a liberalization episode can be better pinpointed, then macroeconomic policy may need to be adjusted to compensate for this effect, perhaps with a contractionary fiscal policy, for example. Effects on the current account may be significant as well. If private savings fall but investment does not, then substantially higher inflows of foreign capital (or a substantially weaker currency) may be required. Again, one appropriate response may be to increase government savings. Such potential changes may very well be on the order of one to two percent of GDP – magnitudes that warrant further policy consideration.

## 5 Appendix

**Data:** The following table lists the years and countries from which the data used in the paper was taken.

**Table A1: Data Observations**

Country	Years	Country	Years
Australia	1971-1998	Mexico	1988-1998
Belgium	1987-1998	New Zealand	1986-1998
Canada	1970-1998	Norway	1978-1998
Denmark	1987-1998	Portugal	1977-1998
Finland	1975-1998	Spain	1975-1998
Iceland	1980-1998	Sweden	1970-1998
Italy	1987-1998	Switzerland	1983-1998
Japan	1977-1998	United Kingdom	1970-1998
Korea	1976-1998	United States	1970-1998

Most data is from International Financial Statistics, IMF. Data on national savings is from the OECD for most countries. National savings data on the US, the UK, Spain, Portugal, and Sweden are from the respective national statistical agencies.

**Alternative specifications.** The dependent variable in the following two series of regressions was again the private savings ratio. The one year lag of the dependent variable was added to each regression.

**Table A2: Lagged Dependent Variable**

	#1	#2	#3	#4
GDP growth	.27** (6.2)	.27** (6.3)	.27** (6.2)	.26** (6.3)
Real Interest Rates	-.07** (3.4)	-.07** (3.4)	-.07** (3.6)	-.07** (3.6)
Government Bal.	-.43** (11.0)	-.43** (11.1)	-.41** (10.6)	-.41** (10.5)
%Δ Real Exch.Rate	.01 (1.0)	.01 (1.0)	.01 (1.2)	.01 (1.3)
Time Trend	-.07** (4.0)	-.07** (4.1)	-.07** (3.6)	-.07** (3.6)
Private Sav. (-1)	.60** (18.7)	.60** (19.3)	.58** (18.5)	.59** (18.8)
F.I. Shocks (%)			-.06** (3.2)	-.06* (3.0)
Import shocks (%)		-.11* (3.1)		-.10* (2.9)
S.E. of Regression	1.774	1.751	1.749	1.730
adj. R <sup>2</sup>	.94	.95	.95	.95

T-statistics are in parentheses.

\* indicates 95% significance; \*\* 99% significance.

**Table A3:**

**Lagged Dependent Variable and Lagged GDP, Interest Rates**

	#1	#2	#3	#4
GDP growth (-1)	.11* (2.1)	.14* (2.8)	.13* (2.6)	.16* (3.1)
Real Interest Rates (-1)	.00 (.3)	-.01 (.1)	-.01 (.5)	-.02 (.9)
Government Bal.	-.41** (9.5)	-.42** (9.8)	-.40** (9.3)	-.41** (9.6)
%Δ Real Exch.Rate	.02* (2.1)	.02* (2.2)	.02* (2.3)	.03* (2.5)
Time Trend	-.09** (5.1)	-.09** (5.1)	-.08** (5.1)	-.08** (4.4)
Private Sav. (-1)	.61** (17.1)	.61** (17.1)	.59** (16.7)	.58** (16.5)
F.I. Shocks (%)			-.07** (3.3)	-.07** (3.2)
Import shocks (%)		-.13** (3.2)		-.12** (3.3)
S.E. of Regression	1.885	1.855	1.857	1.830
adj. R <sup>2</sup>	.93	.94	.94	.94

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