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Capital controls, financial crisis and the investment saving nexus: Evidence from Iceland

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Abstract: We investigate the Feldstein and Horioka (1980) hypothesis for Iceland. First, we analyse the saving-investment (S-I) correlation for the period of restricted capital mobility between 1960 and 1994. We then add a period of free capital mobility between 1994 and 2008 and estimate the correlation for the period 1960-2008. Finally, we extend our analysis to the 2008 to 2014 period, when capital controls were imposed in response to the financial crisis. Finding cointegration between savings and investment for all the three regimes, the evidence shows that the S-I correlation is stronger during the period of capital controls that prevailed in 1960-1994 and becomes weaker when the capital mobility regime is included. However, the correlation weakens further when the post-crisis regime of capital controls is included, which implies that savings and investment are not related during the recent period of crisis and capital controls. The implications of our findings for post-crisis policy making are discussed.

Keywords: Feldstein-Horioka puzzle, capital mobility, financial crisis.
JEL Classification: E2

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1. Introduction

We explore the relationship between savings and investment in one of the countries most affected by the recent global financial crisis. Iceland experienced large capital inflows during a credit boom from 2004 to 2008 ending in a collapse of its financial system, when the inflows stopped suddenly in the fall of 2008 (see Calvo, 1998, on sudden stops). The period of free capital flows ended when capital controls were imposed as part of an IMF programme in November 2008. We use the Icelandic crisis experience to test for the correlation between savings and investment under three different regimes; a period of limited capital mobility lasting from 1960 to 1994, a period of capital mobility starting in 1994 when Iceland joined the European Union Single Market (European Economic Area or EEA) and ending in 2008 and, finally, a period of capital controls reintroduced during a financial crisis in 2008 that are still in effect as we write in 2015.

Our paper has two main contributions. We, for the first time, take advantage of economic turbulence in a country hit by the recent crisis to test for regime shifts while investigating the relationship between savings and investment as in the literature on the Feldstein-Horioka (FH) puzzle. Previous literature on the FH hypothesis mainly included Iceland in a panel of advanced countries without highlighting its regime shifts and taking advantage of its interesting data and unique structural features (for example, Katsimi and Zoega, 2014 and Keun-Yeob et al, 1999). Second, our paper distinguishes the scenarios of capital controls imposed in response to the crisis from the capital controls which prevailed historically in normal circumstances, i.e. before Iceland joined the European Economic Area and abolished limited capital controls. We thus test whether the effect of capital controls on the savings-investment relationship depends on the level of economic turmoil, i.e. whether there is an ongoing financial crisis. Our work also contributes to the emerging literature on the effectiveness of capital controls, summarized in Fernandéz et al. (2015).

2. Brief history

Iceland joined the European Single Market in 1994 and as a result had to allow capital to flow freely into and out of its currency. The 1990s brought a capital inflow, domestic

credit expansion and a booming stock market ending in a sudden stop, a fall in the exchange rate and a fall of the stock market in 2001. Because the banks were state owned at the time the magnitude of the inflow was manageable and the reversal in 2001 did not cause a systemic crisis. In the following two years the country's banks were privatised and the mixture of private banks, capital mobility and low risk premium in international capital markets brought unprecedented speculative inflows that were around 35% of GDP in the autumn of 2008.[1] In addition the banks borrowed abroad and used the money to lend to local businesses, which invested heavily abroad. The capital inflow raised the exchange rate and made the stock market and the housing market boom. Stock prices increased by 35 per cent per year and house prices by 12 per cent per year.[2] Consumption and investment increased at a rapid rate and the current account deficit averaged 14 per cent from 2003 to 2008. Unemployment fell below 3%.[3] Gross foreign debt grew from a stable level of about 60 percent of GDP in the 1990s to nearly 700 percent.

The sudden stop of the capital inflow in 2008 caused the currency to lose half its value, the price of imports surged and the fall in imports made the current account go from a deficit to a surplus in 2009. Stock prices fell by 95% and house prices plummeted.[4] Due to the prevalence of foreign currency loans, the exchange rate depreciation made large sections of economy insolvent. The banks collapsed in November 2008 following the collapse of Lehman Brothers bringing about a perfect storm of a currency crisis, inflation, unemployment and a failed banking system. The country sought the assistance of the IMF.

As a response to the currency crisis the IMF and the government imposed capital controls in November 2008, in effect prohibiting all capital flows but allowing investors to convert interest revenue from local-currency investments into foreign currency.

[1] See Benediktsdottir et al. (2011), Hreinsson et al. (2011), Nielsson and Torfason (2012) and Johnsen (2014) on Iceland's financial crisis.
[2] The OMX15 covering the 15 largest corporations increased sixfold over the same period and nearly by a factor of nine from its bottom in 2001 to its peak value in 2007. See Aliber (2011) and Halldorsson and Zoega (2010).
[3] Sources: *Statistics Iceland* (hagstofa.is), Central Bank of Iceland (sedlabanki.is), World Bank, *World Development Indicators*, and Trading Economics (tradingeconomics.com/iceland/stock-market). See also Halldorsson and Zoega (2010).
[4] Source: Registers Iceland (skra.is/Markadurinn/Talnaefni).

Interest rates were increased to very high levels; the policy rate was increased to 18% in November 2008 and then gradually lowered in subsequent years. Fiscal policy was expansionary in the years after the collapse as the automatic stabilizers were allowed to have an effect but the deficit gradually brought under control. Meanwhile the authorities created a new banking system by effectively cutting off the banks' foreign operations and putting them into receivership while recapitalizing the domestic operations under a new name.

A recovery started in the middle of 2010. Real GDP has at the time of this writing increased beyond its peak in 2007, unemployment is currently around 4% and the current account surplus is close to 7% of GDP.

3. **Data and Methodology**

To investigate the relationship between investment and saving in Iceland, we use annual data from 1960 to 2014. The data are taken from *Statistics Iceland*. We set up the following long-run model

$$I_t = \alpha_0 + \beta_1 S_t + \varepsilon_t \qquad (1)$$

where I_t represents the investment to GDP ratio, S_t represents the savings to GDP ratio, α_0 is the intercept, and ε_t is the error term in the model. With perfect capital mobility across countries, we would find the coefficient β_1 to be close to zero, indicating that changes in savings in one country do not affect interest rates or investment in that country.[5] FH found that the coefficient of the saving rate was 0.887 in a cross section of industrialized countries for the period 1960 and 1974 and attributed the finding to barriers to capital mobility.[6]

[5] There is now a large literature testing the FH hypothesis. Miller (1988) uses standard cointegration techniques while Caporale et al. (2005) employ various asymptotically efficient cointegration estimators. For a survey see Apergis and Tsoumas (2009) and Kumar and Bhaskara (2011). De Vita and Abbott (2002), Kollias et al (2008) and Coackley et al (1996) study the FH relationship using estimators that are consistent even in the absence of cointegration.

[6] A variety of explanations have been proposed for the FH puzzle. Coakley et al. (1996) argue that large and persistent current account deficits may reduce access to international capital markets. According to Tobin (1983) and Summers (1988), governments may try to avoid deficits for financial stability reasons and also surpluses because the existence of surpluses implies room for expansionary policies. Bai and Zhang (2010) show that financial frictions can explain the FH puzzle. Frankel (1992) shows how the puzzle may arise if omitted variables, such as tax rates, affect both savings and investment.

We are not the first to explore the time-varying profile of the FH coefficient. Choudhry et al. (2014) estimate the time-varying FH coefficient using rolling panel regressions for both EU and non-EU countries with five-year windows and find that deepening economic integration in the European Union lowered the value of the coefficient, indicating greater capital mobility. Moreover, the advent of the recent financial crisis raised the value of the coefficient implying reduced capital mobility. Katsimi and Zoega (2014) estimate the Feldstein-Horioka equation using a panel of 30 countries for the period 1960-2012 and test for structural breaks in the FH coefficient. They find structural breaks that coincide with the introduction of the European single market in 1993, the introduction of the euro in 1999 and the financial crisis in 2008. They find that the former effect occurs most strongly in single-market countries that are outside the euro zone whereas the second break is greater in the euro zone countries. Increased capital mobility within the euro zone consisted of capital moving from nations with a higher output per capita and lower government budget deficits.

Following the econometric approach used in Narayan (2005), and Abbott and Vita (2003), we analyze the S-I correlation for different regimes by estimating the model in equation (1) for different sample periods. First we estimate the model for a period of capital controls with an adjustable peg exchange rate regime using the sample period 1960-1994. We then add the period of free capital movements that started with Iceland's membership of the European Economic Area (EEA) in 1994 and ended, at least temporarily, with the introduction of capital controls during the financial crisis of 2008. During this second period there was an adjustable peg from 1994 to 2001 and then a floating floating regime with inflation targeting. Finally, we estimate the model for the whole sample using data for 1960-2014, a period that also includes the years of capital controls during the financial crisis that hit the country in 2008. We would expect the S-I correlation for the whole sample to be stronger than for the sample period 1960-2008 because of limited capital mobility during the most recent period.

As shown in Frankel (1992) and explored by Katsimi and Zoega (2014), a zero correlation between savings and investment implies real interest parity. When real interest rates are not equalised across countries a fall in savings in one country may

make real interest rates rise and investment fall, hence creating a positive correlation. The real interest rate differential can be written as:

$$(r - \pi^e) - (r^* - \pi^{e*}) = (r - r^* - fd) + (fd - \Delta s^e) + (\Delta s^e - (\pi^e - \pi^{e*})) \qquad (2)$$

where r and r^* denote domestic and foreign nominal interest rates, π^e and π^{e*} are the domestic and foreign expected rates of inflation, *fd* is the forward discount rate on the domestic currency and Δs^e is the expected depreciation of the domestic currency. The first term on the RHS of equation (2) is the covered interest differential and is defined by Frankel (1992) as the 'country premium' since it captures country specific factors that may not allow real interest rates to be equal as capital controls or default risk. The second and third terms represent the exchange risk premium and the expected real depreciation and together they form the 'currency premium'. Clearly, the membership of the EEA could be expected to have decreased the country premium by making the imposition of capital controls less likely. However, in the case of Iceland, the currency premium would be unaffected since the country never joined the Eurozone. Thus, we expect the country premium to have fallen in 1994 when Iceland joined the European single market as one of the member countries of the European Economic Area. The country premium would then have increased markedly in 2008 when the banking system collapsed, the currency tanked and capital controls were imposed.

3.1 Unit root and structural breaks in Iceland

We test the data for unit roots in several ways. We first use the Augmented Dicky Fuller (ADF) and Phillip-Perron (PP) test on the data. In general, the PP test is preferred over the ADF test as its reported statistics are adjusted for heteroscedasticity and serial correlation. However, a problem associated with both of these traditional tests is that the result might be contaminated by the presence of a structural break in the series. We therefore extend our analysis to the unit root structural break tests by implementing[7] Zivot and Andrews (1992) as well as 'Innovational Outlier[8]' (hereafter IO) test by Perron (1997). Both these tests endogenously determine the structural break in the

[7] In implementing these tests we follow the sequential procedure discussed in Chowdhury and Shrestha (2005). Both ZA and IO are closely related, however, IO is more flexible than ZA (for a technical discussion, see Perron 1997).

[8] The 'Innovation Outlier' of Perron (1997) allows for a gradual shift in the time series.

model. There are three versions of Zivot and Andrews (hereafter ZA); 'Model A' allows for a break in the intercept, 'Model B' allows for the break in trend, and 'Model C' allows for a break in both the intercept and trend. There is no consensus on which version is preferable. We implement Model C for completeness.

The ZA model with a dummy for the shift in mean and trend (originally referred to as 'Model C' by ZA) is represented as follows

$$\Delta y_t = c + \alpha_1 y_{t-1} + \beta t + \theta_1 DU_t + \gamma_1 DT_t + \sum_{j=1}^{k} d_j \Delta y_{t-j} + \varepsilon_t \qquad (3)$$

where Δ is the lag operator, ε_t is a white noise term, t is the time index (t=1,..., T). DU_t in the model is a dummy for a shift in mean at a potential break point TB, and DT_t is a dummy for the shift in trend, where $DU_t = 1$ and $DT_t = t - TB$ if $t>TB$ and zero otherwise.

The results of the PP and ADF test in the case of all three samples (see Tables A1 and A2 in appendix) suggest that both investment and savings exhibit a unit root at the 1% significance level.

The results of the ZA test are reported in Table 1, while the IO results are reported in Table A3 in the appendix.

Table 1: Unit root structural break test (ZA: Model C)

	Investment			Saving		
Sample	1960-1994	1960-2008	1960-2014	1960-1994	1960-2008	1960-2014
TB(break point)	1972	1991	2002	1981	2000	2007
θ_1	6.48*** (1.50)	-2.60 (1.66)	6.12*** (1.95)	-4.51*** (1.34)	6.32*** (1.85)	-12.07** (2.03)
γ_1	-1.03*** (0.30)	0.70*** (0.18)	-0.50** (0.22)	0.01 0.13	-1.30*** (0.33)	3.02*** (0.45)
Test-statistics	-6.57(4)	-4.85(1)	-4.70(1)	-4.68(0)	-4.10(0)	-3.89(0)
Critical values						
1%	-5.57	-5.57	-5.57	-5.57	-5.57	-5.57
5%	-5.08	-5.08	-5.08	-5.08	-5.08	-5.08
10%	-4.82	-4.82	-4.82	-4.82	-4.82	-4.82

Numbers in the brackets with the T-statistics represent the lags.

The timing of the structural breaks for both ZA and IO test is shown in Table 2 below for the three sample periods.

Table 2: Structural break dates

	1960-1994		1960-2008		1960-2014	
	Investment	Savings	Investment	Savings	Investment	Savings
ZA test	1972	1981	1991	2000	2002	2007
IO test	1972	1982	1991	2000	2003	2007

The ZA and IO tests indicate that both investment and saving for the sample 1960-1994 have significant structural breaks, which tally with the historical experience of crisis in Iceland. In the presence of a structural break, the null hypothesis of a unit root cannot be rejected for saving at the 1% significance level while investment on the other hand is stationary at the 1% significance level. The results of ZA and IO tests in the case of investment are in contrast to the findings of the ADF and the PP tests.

According to ZA and IO tests, the structural break for investment occurs in 1972 when the renewal of the country's fishing fleet was started, which caused investment to increase. The break for savings occurs in 1981 (according to ZA) and 1982 (according to IO), which can be explained by a very large increase in real interest rates following the introduction of indexation of loan contracts in the late 1970s that ended a period of negative real interest rates in the 1970s.

The ZA and IO tests for the sample with the years of capital mobility 1994-2008 included – using data 1960-2008 – indicate that the presence of a unit root cannot be rejected for investment at the 10% significance level while saving exhibits a unit root at 1% significance level. Both the tests find significant structural breaks in investment and savings, indicating similar break points as shown in Table 2. The break for investment occurs in 1991, which can be attributed to interest rate deregulations in the late 1980s. In addition, inflation declined to single digits in the 1990s mainly due to strict income policy and rising unemployment. The break for savings occurs in 2000 when Iceland was going through financial market deregulation and privatization of the banks.

Finally, ZA and IO tests for the whole sample using data 1960-2014, indicate the presence of a unit root in both investment and savings at the 1% significance level. According to ZA test, the break point for investment is 2002 while IO indicates a break in 2003. These suggested break points coincide with the start of an investment boom following the privatisation of the banks and a capital inflow. The privatization of banks was eventually completed in 2003. The break point for savings is 2007 according to both the tests, which is consistent with the eruption of the liquidity crisis in global markets.

From our unit root analysis, we find sufficient evidence to argue that investment and saving exhibit unit roots. The only result going in the other direction is found in the case of investment using the sample period 1960-1994 when ZA indicates stationarity of the series in levels while PP and ADF on the other hand indicate the presence of a unit root. Although the result in this particular case is inconclusive, it is a well-established empirical fact that investment exhibits a unit root and is integrated of order one, i.e. *I(1)* (e.g., Bajo-Rubio (1998); Oh *et al* (1999); Abbott and Vita (2003); Narayan (2005)). Furthermore, the findings of all the tests are similar in rejecting the presence of a unit root when implemented in the case of first order differences, supporting the argument that the data are *I(1).*

3.2 Cointegration tests

We extend our analysis to ARDL bounds test of cointegration, where pre-testing of the variables for a unit root is not required. On the other hand, based on the argument that the variables are *I(1),* we first perform an additional cointegration test based on the residuals[9] of the model in equation (1). Both these tests provide more insight into cointegration in the presence of unit roots.

The ARDL bounds test is represented as follows.

$$\Delta I_t = \alpha_0 + \theta_1 I_{t-1} + \theta_2 S_{t-1} + \sum_{j=1}^{p} \gamma_i \Delta I_{t-i} + \sum_{k=0}^{p} \beta_k \Delta S_{t-k} + \varepsilon_t \qquad (4)$$

[9] A residuals-based test is only valid when the variables have a unit root and the order of integration is similar. In our case, the results indicate that both saving and investment are *I(1).*

where θ_1 and θ_1 represent long-run relationships, while $\gamma_i$and β_k represent the short-run dynamics of the model and Δ is the first difference operator. Standard Wald test and F-test are used to test the null hypothesis, H_0: θ_1=θ_2=0, which indicates no cointegration between the variables. The alternative hypothesis, H_1: $\theta_1 \neq \theta_2 \neq 0$, implies the presence of a long-run relationship between the variables. We compare the F-statistics with the set of critical values (i.e. lower and upper bounds) provided by Narayan (2005) for small samples instead of using critical values provided by Pesaran *et al.* (2001), which are only valid for large samples. If the F-statistics is larger than the upper bound, we reject the null hypothesis of no cointegration and conclude that the regressors are purely *I(1)*. In the presence of cointegration, the long-run coefficient on saving is represented by **-** $\left(\frac{\theta_1}{\theta_2}\right)$. If the F-statistic is smaller than the lower bound, we accept the null hypothesis of no cointegration, while the result is inconclusive if the F-statistics lies between the two bounds.

For residual-based tests of cointegration, we obtain the residuals of the model in equation (1) and implement the Dicky-Fuller (DF) test, where stationarity of the residuals implies that the linear combination of the variables is stationary and they share a long-run path. Conversely, non-stationarity of the residuals implies that the variables do not share a common long-run path.

For both ARDL bounds tests and residual based tests, we include intervention dummies for the break points indicated by the ZA and IO tests. The inclusion of dummies improves[10] the normality property of the residuals. For our sample of capital controls (1960-1994), we include dummies[11] for the potential break points in the model and find that the inclusion of dummies for structural breaks has no impact on the investment-saving relationship. We therefore estimate the model without a dummy. In addition, the inclusion of a dummy in the model does not alter the results in Table 3.

[10] The normality property of the residuals improves when the intervention dummies are correctly specified. In this paper, we use ZA test to specify break dates which coincides with the economic events in Iceland as explained earlier.

[11] We define two separate dummies; one dummy takes the value of one for the break points [1972, 1973], other dummy takes the value of 1 for the break points [1982, 1983], and zero for the rest of the sample. We first include these dummies separately in the model and find that the break point in [1982, 1983] is insignificant, while the break point for the period [1972, 1973] is significant but has almost no impact on the investment-saving relationship. The model also remains unaffected when we experiment by accounting for all the break points together in one dummy.

For the samples (1960-2008) and (1960-2014), we account for the structural break by defining dummies for the break points suggested by the ZA and IO tests. We find that all the potential break points are statistically insignificant for the investment-saving correlation, except for the structural break in 2007. Based on the literature and inspection of the residuals we conclude that during the period of free capital mobility a significant structural break occurred in 2006-08 due to the crisis. We therefore introduce a dummy, which takes the value of 1 for the years (2006, 2007, 2008) and zero for the rest of the years in both the samples. We also test the model without a dummy, finding that the power of the cointegration test is not affected by the inclusion of a dummy for the structural break.

Table 3: Cointegration test

	1960-1994		**1960-2008**		**1960-2014**	
F-statistic	9.42		6.61		11.28	
Critical Value Bounds						
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
1%	7.87	8.96	7.56	8.68	7.43	8.46
5%	5.29	6.17	5.22	6.07	5.12	6.04
10%	4.22	5.05	4.19	4.94	4.15	4.92
Residual based test						
T-statistics	-4.82		-4.86		-4.74	
Critical Values						
1%	-2.64		-2.62		-2.61	
5%	-1.95		-1.95		-1.95	
10%	-1.61		-1.61		-1.61	

Sample 1960-2008 and 1960-2014 both include dummy.

The results of our cointegration tests indicate the presence of a long-run relationship between saving and investment as shown in Table 3. The ARDL bounds test indicates that the null hypothesis of no cointegration is rejected at 1% significance level for the samples (1960-1994) and (1960-2014), while the null hypothesis of no cointegration for the sample (1960-2008) is rejected at 5% significance level. Moreover, the residuals of the models for the three samples are stationary at 1% significance level, indicating strong evidence of cointegration. Based on these results, we proceed to estimate the long-run relationships in the next section.

4. Long-run relationships and the speed of adjustment estimated

Using the Schwarz Bayesian Criteria (SBC) criteria for the lag-selection, we estimate the ARDL model in equation (4) to explore the long-run and short-run dynamics of the model. We also report the long-run coefficients using Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS); these methods have been shown to provide robust results in small samples.

The long-run coefficients reported in Table 4 are similar for the three methods, confirming the robustness of the results. The results indicate that the S-I correlation is stronger during the period of restricted capital mobility (1960-1994) than the period of free capital mobility (1960-2008), which confirms the FH hypothesis that the correlation depends on capital mobility. In terms of equation (2) the country premium fell in 1994 since membership of the European Single Market guaranteed capital mobility.

Surprisingly, the correlation tends to weaken further when the period of capital controls after the crisis is included, contradicting the FH hypothesis in this case since capital mobility was much more limited during this period than during the period 1994-2008. We will address the possible reasons for this last result below.

Table 4: Long-run coefficients

	1960-1994			1960-2008			1960-2008		
	ARDL (1,2)	FMOLS	DOLS	ARDL (2,1)	FMOLS	DOLS	ARDL (2,1)	FMOLS	DOLS
S_t	1.18*** (0.15)	1.02*** (0.13)	1.08*** (0.11)	0.84*** (0.17)	0.87*** (0.14)	0.87*** (0.14)	0.73*** (0.14)	0.80*** (0.10)	0.82*** (0.11)
Constant	-2.72 (3.73)	1.56 (3.14)	0.16 (2.80)	6.81* (3.84)	5.60* (3.11)	5.37* (3.18)	8.84** (3.05)	6.87*** (2.23)	6.75*** (2.34)
Dummy				7.34* (4.05)	14.33*** (3.22)	13.06*** (2.95)	6.92* (4.01)	15.47*** (2.81)	12.07*** (2.87)

Table 5 reports the short-run dynamics of the model along with the speed of adjustment (i.e. error correction term, ECT). During the period of restricted capital mobility (1960-1994), short-run deviations (due to shocks) between saving and investment are corrected by 50% in the next year (i.e. the model converges to its long-run path in 2 years). The ECT for the period with free capital mobility (1960-2008) is lower than the period of restricted capital mobility (1960-1994). The speed of adjustment drops further when the period of capital controls after the crisis is included. Note that the speed of convergence tends to be lower when the S-I correlation becomes weaker.

Table 5: Short-run dynamics

	1960-1994	1960-2008	1960-2014
ECT	-0.50*** (0.12)	-0.45*** (0.12)	-0.43*** (0.09)
ΔS_t	-0.21 (0.17)	-0.15 (0.15)	-0.12 (0.13)
ΔS_{t-1}	-0.48** (0.19)		

The different effects of capital controls on the investment-saving correlation in the "normal" 1960-1994 and the crisis period 2008 to 2014 needs to be explained. The main difference between these two periods is a forced current account surplus in the latter period when foreign creditors needed to be repaid, which was created by lower investment and higher private savings, hence making the two series diverge. In terms of equation (2), the country premium increased in 2008 making it necessary to both impose capital controls as well as raise domestic interest rates. The higher interest rates then increase savings and reduce investment.

5. **Conclusion**

We have explored the relationship between savings and investment using Icelandic data in order to test for the effect of capital mobility on the Feldstein-Horioka coefficient in different regimes of capital mobility. We found that institutional changes, in particular Iceland's entry into the European Single Market in 1994, coincided with a fall in the long-run correlation between savings and investment as well as the short-run speed of

adjustment, as measured by the error correction term. This confirms the interpretation of Feldstein and Horioka (1980) that a positive value of the coefficient of saving in the investment equation (1) above reflects the effect of limited capital mobility. However, the reintroduction of capital controls in 2008 neither increased the long-run correlation nor the error correction term, due to the effect of the financial crisis and the ensuing currency crisis that increased the country premium elevating interest rates and forcing Iceland to run persistent current account surpluses.

The implications of the results we obtain for policy makers are clear: real interest rates matter for small open economies, and closely monitoring the rate of growth of both saving and investment is vital. Institutional and structural changes can have far-reach effects on the development of all economies, but for small open economies, capital controls in particular can alter their potential growth rates, both positively and negatively, in both the medium and long run.

Further research is required to understand precisely how the presence of capital controls affects the saving/investment relationship for larger economies, and for economies within larger currency regimes, such as Cyprus and Greece. The interaction of capital controls and current account surplus targets, in particular, will be investigated.

Appendix

Table A1. Philip Perron Test

	Investment			Saving		
Sample	1960-1994	1960-2008	1960-2014	1960-1994	1960-2008	1960-2014
Test-statistics	-2.31	-2.35	-2.88	-3.24	-3.37	-3.10
Critical values						
1%	-4.25	-4.16	-4.14	-4.25	-4.16	-4.14
5%	-3.55	-3.51	-3.50	-3.55	-3.51	-3.50
10%	-3.21	-3.18	-3.18	-3.21	-3.18	-3.18

Table A2. ADF test

	Investment			Saving		
sample	1960-1994	1960-2008	1960-2014	1960-1994	1960-2008	1960-2014
Lags	2	1	1	4	0	0
Test-statistics	-2.18	-2.71	-3.45	-2.12	-3.39	-3.10
Critical values						
1%	-4.27	-4.17	-4.14	-4.30	-4.16	-4.14
5%	-3.56	-3.51	-3.50	-3.57	-3.51	-3.50
10%	-3.21	-3.18	-3.18	-3.22	-3.18	-3.18

Table A3. Innovation-outlier test

	Investment			Saving		
Sample	1960-1994	1960-2008	1960-2014	1960-1994	1960-2008	1960-2014
TB(break point)	1972	1991	2003	1982	2000	2007
θ_1	6.94*** (1.65)	-3.37* (1.88)	7.18*** (2.36)	-5.89*** (1.70)	7.53*** (0.33)	-14.48*** (2.32)
γ_1	-1.17*** (0.35)	0.70*** (0.18)	-0.62** (0.26)	-0.06 0.15	-1.30*** (2.78)	2.87*** (0.40)
Test-statistics	-6.54 (4)	-4.77 (1)	-4.74 (1)	-4.36 (1)	-4.03 (0)	-6.62 (0)
Critical values						
1%	-5.72	-5.72	-5.72	-5.72	-5.72	-5.72
5%	-5.18	-5.18	-5.18	-5.18	-5.18	-5.18
10%	-4.89	-4.89	-4.89	-4.89	-4.89	-4.89

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