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Abstract

Iceland became one of the symbols of the financial crisis that gripped the world in 2007 when its banking system collapsed in October 2008. We show how Iceland played both a passive role in absorbing savings surpluses within the European single market as well as an active role when some of its capitalists turned its commercial banks into investment banks to fund their foreign adventures. The causes of the collapse in 2008 are described as well as the response of the economy to the banking crisis. Finally the role of the independent currency in the fall and recovery of Iceland is highlighted.

JEL: E65, E42, E44

Keywords: Financial crises, exchange rate regimes.

1. Introduction

The idyllic sparsely-populated Iceland became a symbol of the current world recession when its banking system collapsed in October 2008, only a couple of weeks after the failure of Lehman Brothers. Iceland's woes provide a case study of the impact of a country's entire banking system collapsing. This was the perfect storm of bank failures, currency crisis, business insolvencies, household insolvencies, inflation, unemployment, falling aggregate demand and sovereign debt problems. The bankruptcies of the three largest banks were among the largest bankruptcies in world history.¹

The causes of the crash can be traced partly to the effect of macroeconomic imbalances within the European single market that also affected the Baltic countries, Greece, Portugal and Spain as recipient countries of capital inflows, as well as many other countries – such as Germany and Austria – whose banks suffered losses on their loan books. But there were important country-specific elements at work. If Iceland had only been a passive recipient of foreign capital the collapse would not have been as spectacular.

In this paper we will describe the imbalances within the single European market, the persistent current account surpluses of Germany and the corresponding current account deficits of many other countries. We will then describe the differences in the nature of the capital inflows of the recipient countries and compare Iceland's problems to those of the others. The macroeconomic developments of Iceland will be described, the crash of 2008 and the nature and its collapse. We conclude by discussing the economic recovery programme and the macroeconomic developments since the crash before drawing some lessons from the episode.

2. A glimpse of history

Iceland enjoyed economic growth throughout the 20th century that made the country leave the group of poor countries and become one of the richest societies in the world. In 1904 the PPP-adjusted GDP per capita was similar to that of Ghana today while at the beginning of the 21st century it had surpassed that of Denmark, the results of growing at 2.6% on average in the 20th century (Gylfason et al., 2010). This growth was propelled by the mechanisation of the

¹ Total assets of the banks were 182 billion dollars three months before the crash which is about 1.8 times the assets of WorldCom before its failure in 2002 and almost three times the assets of Enron before its failure in 2001. Taken as one entity the banks would come third in the history of bankruptcies in US history, with Lehman (691 billion dollars) and Washington Mutual (328 billion dollars) coming first and second. As separate entities, Kaupthing (83 billion dollars) would rank 5th, Landsbanki (50 billion dollars) 9th and Glitnir (49 billion dollars) 10th. The banking failures resulted in a loss of around 60 billion dollars to creditors. Source: Financial Services Authority of Iceland (FME).

fishing fleet as trawlers replaced sailboats made possible by the creation of a private commercial bank at the beginning of the 20th century; a massive increase in the number and capacity of fishing vessels; the extension of the fishing limits from 3 miles in 1904 to 200 miles in 1976; the utilisation of hydroelectric energy; and long working hours of a labour force whose education was steadily improving. Growth was thus both driven by investment in human and physical capital but also by improving technology brought about by the importation of foreign technological discoveries. In addition, the country took advantage of international trade by joining EFTA in 1970 and the European Economic Area in 1994.

The development of capital markets lagged behind the overall economic development. Banks were state owned, interest rates set by the government usually well below the inflation rate, the bank boards filled with political appointees who rationed credit to favoured businesses and industries. The fishing industry's survival was guaranteed by adjusting the exchange rate of the krona so as to make the average operating profits in the industry close to zero; a fall in the fish catch was then met automatically by an exchange rate depreciation that lowered the purchasing power of wages among the population. The exchange rate policy also guaranteed full employment since any sign of rising unemployment was met with expansionary monetary policy. Inflation, not surprisingly, was high and volatile due to full employment being guaranteed by the government. The implicit subsidy to favoured firms and businesses through negative real rates of interest was financed by an inflation tax on all holding of monetary assets, bank deposits included. The only way to protect personal savings was to buy real assets.

The consequences of the negative real rates of interest were predictable. Saving fell and the volume of deposits in the banking system shrank. The gap between the needs of the business sector for funds and the supply of funds from households could be temporarily bridged through foreign borrowing but eventually the government decided to make real interest rates positive in the 1980s. This they did by indexing loan contracts, as well as bank deposits, to the CPI and making interest rates market determined. In the 1990s the government embarked on a policy of privatisation of state industries. The country also joined the European Economic Area in 1994 but did not follow Finland and Sweden to become full members of the European Union because of the interests of fishing and agriculture.² However, as a member of the EEA, Iceland now became a part of the Single European Market in services, output, labour and capital. Only one step remained of the liberalisation of the

² The European Economic Area was established in 1994 and includes the member states of the European Union, Iceland, Lichtenstein and Norway.

economy which was the privatisation of the banking system which took place between 1998 and 2002. This last step in the privatisation process turned out to have dire consequences.

3. The Icelandic economy 2000-2008

The story about Iceland's economic collapse has to start with an account of the state of the economy before the credit-driven boom. While the capital inflow temporarily increased GDP, and especially consumption and investment, this was from a very high base. Table 1 shows some economic indicators for Iceland and selected countries. The table includes some of the countries that were in the coming decade to receive capital inflows – Estonia, Greece, Ireland,³ Latvia, Lithuania, Portugal and Spain, the big EU countries France, Germany, Italy and the U.K. and the United States. We note that in year 2000 the labour force participation rate was higher in Iceland than in any of the other countries, the unemployment rate lower and GDP per capita (PPP adjusted) was second to that of the United States, higher than in all the European countries listed in the table. In other respects, Iceland does not stand out, except perhaps in having the highest share of output devoted to government purchases.

Table 1. Economic indicators in 2000

	Labour force participation (%)	Unemployment (%)	Investment (% of GDP)	Private consumption (% GDP)	Government purchases (% GDP)	GDP per capita (\$ in 2005 constant prices)
Iceland	86.6	2.3	22.9	60.6	23.4	31489.1
Estonia	70.5	13.9	25.7	55.5	19.8	10404.6
Greece	63.0	11.3	21.6	72.4	17.8	20707.5
Ireland	68.1	4.6	23.4	48.5	13.6	31389.1
Latvia	67.2	14.6	24.2	62.5	20.8	8118.7
Lithuania	70.5	16.7	18.8	64.7	22.8	8565.8
Portugal	71.2	4.2	27.1	63.9	19.3	19606.1
Spain	66.7	13.9	25.8	59.7	17.2	24945.1
France	68.0	10.1	19.5	55.7	22.9	27310.7
Germany	71.1	7.8	21.5	58.9	19.0	29051.4
Italy	60.3	10.6	20.4	59.9	18.4	27141.7
UK	76.4	5.5	17.7	65.5	18.6	27031.8
USA	77.2	4.0	20.3	68.6	14.3	39241.0

Source: OECD, IFS, Statistics Estonia, Statistics Latvia, Statistics Lithuania and Penn World Tables.

Iceland's GDP per capita is significantly higher than in the other capital inflow countries, in fact higher than that of Germany which turned out to be the main source of the capital inflow

³ Ireland had a current account surplus from 1991 to 1999, a very small deficit from 2000-2004 and then a current account deficit between 3.5% and 5.3% of GDP in 2005-2007.

into Iceland in 2003-2007. Iceland is an example of an affluent society living beyond its means in the first decade of this century.

Table 2 shows the effect of the capital inflow from 2003 to 2007 and the reversal that occurred in 2008. The table reveals a credit-driven consumption and investment boom where the current account deficit averages 14.3% of GDP from 2003-2007. The M1 money supply increased by an average of 42% per year, real share prices increased by 35% per year and real house prices by 12% per year. The labour market boomed during this period, real hourly earnings grew by an average of 3.16% and an index of real wages per employee grew by 2.8% per year. The share of labour of GDP was close to 68.5% on average and 71.6% in 2007. Behind the current account deficit we find that the public sector is saving but the sum of private and public saving falls far short of gross domestic investment, the difference financed through foreign borrowing.

The reversal of the capital flows in 2008 caused a reversal of the macroeconomic trends. Gross domestic product falls by close to 3% on average per year in 2008-2009, consumption falls, investment goes from being 27% of GDP to being 19% of a lower GDP, real imports fall by 21%, lending falls by 34%, share prices fall by 72% annually and house prices by 13%. The labour market is hit so that real wages fall, unemployment goes up and the share of labour of GDP falls by 8% of GDP to just over 60%.

4. The prelude to the crisis

Iceland's crisis can be partly traced to the global imbalances of saving and investment that have affected many other countries, the United States as the world's consumer of last resort being the most prominent example. The existence of "surplus countries" such as Germany, China and Japan that export part of their savings implies that some other countries must spend more than they earn. But Iceland was more than passive in receiving capital inflows. Local businessmen took the opportunity to borrow through Iceland's commercial banking system to finance the acquisition of businesses in other countries. This explained an unparalleled expansion of the country's banking system, whose assets grew from amounting to one year's GDP in 2000 to more than seven year's GDP at the end of 2007. These businessmen also bought up businesses locally where share prices rose by a factor of nine from its bottom value in 2001 to its peak value in 2007.

4.1 Global imbalances

During the past two decades saving and investment have tended to become less correlated across countries, implying that capital markets have become more global in nature. This trend is particularly strong in the eurozone where there is no correlation between the two variables; a high ratio of saving to GDP does not say anything about whether a country is a high investment country.

The global imbalances are revealed in Table 3 which reports the results of a panel regression of investment on saving using a cross section of OECD countries. If capital were not mobile across countries we would expect to have a coefficient of saving equal to one in the investment equation, that is savings and investment would go hand in hand; a high-saving country would also be a high-investment country. If capital mobility were perfect we would in contrast expect a coefficient insignificantly different from zero. Felstein and Horioka (1980) showed that the equality of the coefficient to one could not be rejected in a world of perfect capital mobility. A number of explanations have been put forth to explain the puzzle, such as Coakley et al. (1996) who attribute the finding to countries being concerned about their current account balances since persistent current account deficits raise the risk of a hard landing of the economy. In a more recent paper, Blanchard and Giavazzi (2002) repeat the Feldstein-Horioka estimation using more recent data and find that the puzzle appears to be disappearing in the euro zone where the coefficient is falling towards zero indicating greater capital market integration and the absence of a relationship between saving and unemployment. One potential explanation – sometimes attributed to Alan Greenspan – is a belief by policy makers and market participants that efficient capital markets will smoothly finance and absorb large global imbalances.⁴

⁴ See Obstfeld (2010).

Table 2. Macroeconomic indicators for Iceland (Annual average growth unless indicated otherwise)

	2003-07	2008-09*		2003-07	2008-09*
National accounts			Asset prices		
Real GDP growth	5.6	-2.8	Real share prices growth	34.6	-72.4
Real private consumption growth	7.0	-11.3	Real residential house prices growth***	11.9	-13.4
Real gross capital formation growth	17.2	-35.5	Labour market		
Gross capital formation (% of GDP)	26.9	14.1	Unemployment (% of labour force)	2.9	7.2
Real exports growth	6.2	6.7	Unemployment growth (% of itself)	-6.2	85.2
Real imports growth	12.8	-21.1	Unemployment growth (2009, % of itself)	-	140
Current account (% of GDP)	-14.3	-3.6	Total employment growth	2.5	-2.7
Savings			Total employment (% of pop.)	82.0	80.9
Gross household saving (% of disposable income)**	16.3	23.9	Average real wage growth	2.8	-5.5
Public saving (% of GDP)	2.8	-9.1	Private sector real hourly earnings growth	3.2	-6.3
Money and the banking sector			Labour share (% of GDP)	68.5	56.8
Real money stock (M1) growth	41.9	-0.1	Other variables		
Real domestic lending of banking sector growth	29.9	-34.2	Business bankruptcies (yearly average number)	598	910

*Growth refers average annual growth. Numbers that are expressed as % of GDP, % of labour force or % of population refer to 2009 only. Number of business bankruptcies refers also to 2009 only.

**2008-09 refers to 2008 because data for 2009 is unavailable. The gross household saving is defined as gross disposable income minus household final consumption expenditures plus depreciation plus change of net equity of households in pension funds.

*** Capital area.

Source: Statistics Iceland, Central Bank of Iceland, Iceland Property Registry and OECD

Using annual data for the OECD countries, starting in 1990 and ending in 2007, we estimated the following equation where I denotes gross capital formation, S is saving and Y denotes GDP,

$$\frac{I_i}{Y_i} = (\alpha + e\alpha_e) + (e \cdot \beta_e + (1 - e)\beta_{ne}) \frac{S_i}{Y_i} + u_i$$

and e is a dummy variable for countries having adopted the euro and α_e and β_e are euro-specific coefficients and β_{ne} is the non-euro coefficient. In column (1) we report results when $\alpha_e = 0$ and $\beta_e = \beta_{ne}$ and then relax this restriction in column (2) for the whole sample period 1990-2007, for the first ten years 1990-1999 and for the second part of the sample period 200-2007.

Table 3. Felstein-Horioka regressions

	1990-2007		1990-1999		2000-2007	
	(1)	(2)	(1)	(2)	(1)	(2)
α	12.32 (13.14)	11.28 (10.31)	9.12 (9.41)	8.55 (7.68)	19.88 (12.59)	19.57 (12.42)
α_e		3.01 (6.56)		2.45 (4.82)		3.03 (3.71)
β	0.42 (11.06)		0.57 (12.79)		0.10 (1.65)	
$e \cdot \beta_e$		0.33 (9.36)		0.48 (16.17)		-0.15 (1.59)
$(1 - e) \cdot \beta_{ne}$		0.47 (9.70)		0.59 (11.50)		0.22 (3.91)
Cross sections	31	31	31	31	31	31
Observations	558	558	310	310	248	248
R-squared – weighted	0.96	0.96	0.99	0.99	0.99	0.99
R-squared – unweighted	0.67	0.67	0.78	0.77	0.78	0.78

White cross-section standard errors & covariance (d.f. corrected), cross-section fixed effects.

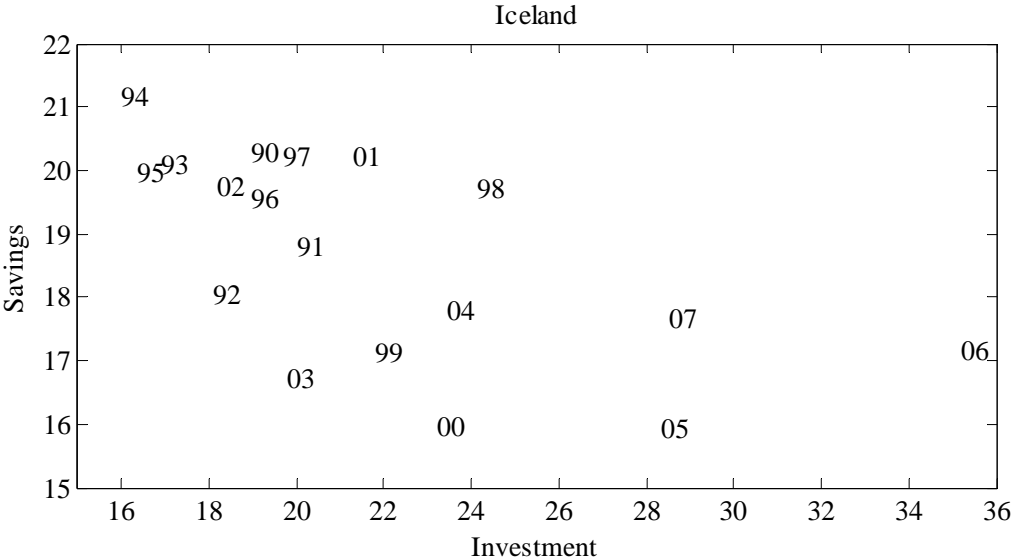
The results show that the relationship between saving and investment becomes much weaker in the period 2000-2007 for the whole sample and disappeared for the countries in the euro zone but is still significant for the non-euro countries although the coefficient is significantly different from one. It is in this period 2000-2007 of increased capital mobility and/or lessened concern about current account imbalances that Iceland privatized its banking system.

4.2 Imbalances in the single European market

Iceland experienced two credit-driven booms during the 1990s and the 2000s. These are clearly visible in Figure 1 below which plots saving and investment, each as a share of GDP, for the period 1990-2007. The first started before the turn of the century and coincided with the dot-com bubble in the

United States. The second boom started in 2003, was much stronger, and ended with the collapse of the banking system.

Figure 1. Gross domestic saving and investment in Iceland, 1990-2007 (% of GDP)



Source: World Bank.

In both credit booms the expansion of credit went together with consumption and investment booming, current account deficits and rising asset prices. The turn-of-the-century boom was the much milder, starting in 1998 with an abrupt reversal in the spring of 2001 when the capital inflows ceased. The dots corresponding to the years 1998, 99 and 2000 form a distinct pattern in the figure, having high investment without a corresponding saving boom. The privatisation of Iceland’s banking system after year 2000 set the stage for an even stronger credit-driven boom. In 2006 investment was close to 36% of GDP while saving was just above 17% generating a current account deficit as a ratio of GDP around 27% of GDP.⁵

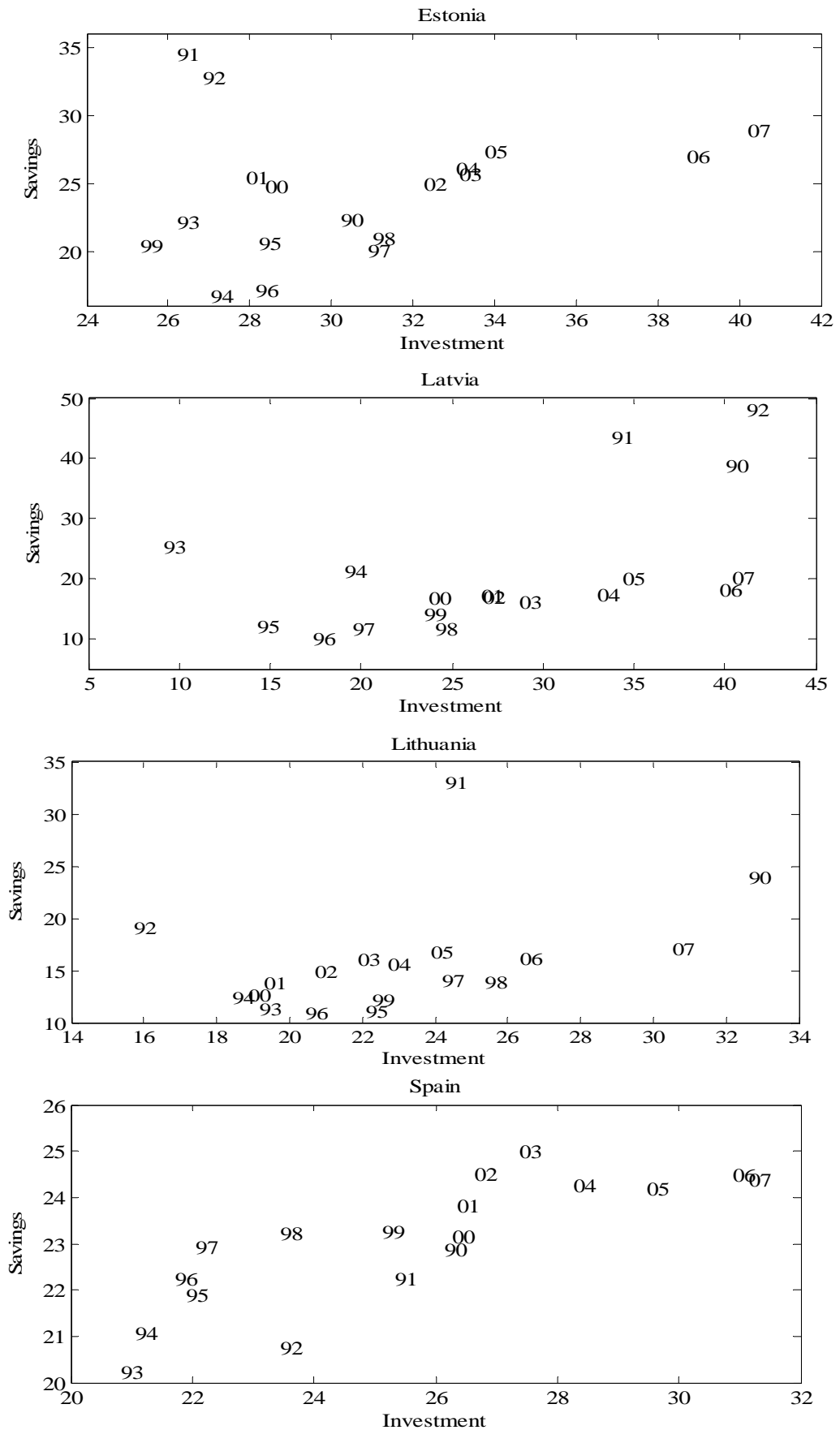
Iceland was not the only recipient country when it came to capital flows within the European single market in this period. Figure 2 shows the saving-investment data for Estonia, Latvia, Lithuania and Spain for the same period. Note that the years 2005-2007 form distinct outliers, as in Figure 1, showing high investment not matched by similarly high rates of saving. The observations in 2005-2008 for the Baltic economies match those from the early 1990s when these countries emerged from the collapsed communist block. For Spain these years are unmatched in the period 1990-2004 with investment close to 34% of GDP and saving between 24% and 25% of GDP. Appendix I has the saving-investment charts for Greece, Ireland and Portugal, which are three more countries facing

⁵ Household debt rose from 178% of disposable income in 2000 to 221% of disposable income in 2007 (103% of GDP).

current problems. Greece and Spain differ from the Baltic countries, Spain and Iceland, in that Greece had saving persistently below investment for the whole period and the same applies to Portugal although the magnitude of the imbalances is much smaller. Ireland appears to differ from our reference group in that saving exceeds investment for the whole period but this due to the omission of outflows of profits from foreign subsidiaries in our data. Ireland did in fact have a current account deficit for most of this period and experienced a domestically financed investment boom in 2005-2007. Appendix II shows the saving-investment combinations for the euro-zone founding member countries and Appendix III the relationship for the remaining OECD countries. Note the excess of saving over investment in Germany that grew larger in 2005-2007 due to higher saving and lower investment, providing the sources of some of the funds that flowed into the capital-recipient countries. Among the non-euro countries, note the surpluses of Japan and most of the other countries and the big deficits in the U.S. and the U.K.

The behaviour of investment and saving in the Baltic countries, Greece Iceland, Ireland, Portugal and Spain that developed during the last decade reflects different patters when it comes to private and public saving and investment. This is shown in Table 4 below. In Iceland there was an investment boom but domestic saving remained more or less constant, masking falling private saving and increasing public saving. In Estonia, Latvia and Lithuania there was an investment boom with the public sector in balance and steady or moderately increasing private saving. In Spain there was an investment boom, accompanied by steady saving. Private saving, public saving and investment were more or less stable over the period in Ireland although investment did increase in 2005-2007. Greece had a persistent gap between saving and investment in the other direction, with saving around 12% of GDP and investment in excess of 20%. The gap narrowed a bit towards the end of the sample period with saving increasing somewhat from 9.8% of GDP in 2000 to 12.1% in 2007. Portugal also had investment exceeding saving but investment has been falling from 27.7% in 2000 to 22.2% in 2007. Of these three latter countries, Greece has the lowest level of private saving and the highest public sector deficits.

Figure 2. Gross domestic saving and investment in selected countries (% of GDP)



Source: World Bank.

Table 4. Private and public saving and investment in selected countries (% of GDP)

	2000	2001	2002	2003	2004	2005	2006	2007
Estonia								
Domestic saving	24.8	25.4	24.9	25.7	26	27.3	26.9	28.9
Public saving	0.2	0.8	1.0	2.1	2.1	1.9	2.8	3.1
Private saving	24.6	24.6	23.9	23.6	23.9	25.3	24.1	25.8
Investment	28.4	27.9	32.3	33.1	33.1	33.8	38.7	40.2
Greece								
Domestic savings	9.8	10.0	8.8	11.7	12.7	12.0	12.3	12.1
Public saving	-3.7	-4.6	-4.8	-5.7	-7.3	-5.2	-3.0	-3.7
Private saving	13.5	14.6	13.6	17.4	20.0	17.2	15.3	15.8
Investment	23.3	23.2	22.3	24.3	22.7	20.9	21.6	22.6
Iceland								
Domestic saving	16.0	20.2	19.8	16.7	17.8	15.9	17.2	17.7
Public saving	2.7	-0.1	-1.2	-2.1	0.8	4.8	6.0	4.8
Private saving	13.2	20.3	21.0	18.8	17.0	11.1	11.2	12.9
Investment	23.2	21.3	18.2	19.8	23.4	28.3	35.2	28.5
Ireland								
Domestic saving	37.5	38.3	39.4	39.5	39.6	39.1	38.4	36.9
Public saving	4.9	1.5	0.0	0.1	1.3	1.5	2.8	0.4
Private saving	32.6	36.9	39.5	39.4	38.4	37.6	35.6	36.5
Investment	23.9	22.7	22.1	23.2	24.5	27.0	27.6	26.3
Latvia								
Domestic saving	16.7	17.1	16.9	16.2	17.4	20.0	18.2	20.2
Public saving	-2.2	-1.1	-1.8	-1.3	-0.9	-0.9	-0.5	0.8
Private saving	18.9	18.2	18.8	17.4	18.4	20.9	18.7	19.4
Investment	23.7	26.6	26.7	28.8	33.0	34.4	39.7	40.4
Lithuania								
Domestic saving	12.6	13.8	15.0	16.1	15.6	16.8	16.2	17.1
Public saving	-2.8	-1.7	-1.3	-1.2	-1.7	-0.5	-0.1	-0.9
Private saving	15.4	15.5	16.3	17.3	17.3	17.3	16.3	18.0
Investment	18.9	19.3	20.7	21.9	22.7	23.9	26.3	30.5
Portugal								
Domestic saving	16.8	17.1	16.9	16.3	15.3	13.7	14	14.8
Public saving	-2.6	-3.9	-2.5	-2.7	-3.4	-5.8	-4.0	-2.6
Private saving	19.4	21.0	19.4	19.0	18.7	19.5	17.9	17.3
Investment	27.7	27.1	25.2	22.9	23.1	22.6	22.2	22.2
Spain								
Domestic saving	23.1	23.8	24.5	25.0	24.3	24.2	24.5	24.4
Public saving	-0.5	0.2	0.3	0.7	-0.3	1.3	2.0	2.4
Private saving	23.6	23.7	24.2	24.3	24.6	22.9	22.5	21.9
Investment	26.3	26.4	26.6	27.4	28.3	29.5	30.9	31.2

Source: World Bank.

4.3 Surplus and deficit countries in the world economy

The imbalances within the European single market mirror those in the world economy where the United States has served as the consumer of last resort. Table 5 lists the surplus and deficit countries at the height of the boom before the collapse in 2007. China, Germany and Japan were the biggest net savers – had the biggest current account surpluses – all supplied in excess of 200 billion dollars in 2007. China comes on top with 371 billion, then Germany with 263 billion and Japan with 210 billion dollars. A distant fourth is Saudi Arabia with 93 billion dollars. The United States is the biggest deficit country with an annual deficit of 727 billion dollars. The U.S. alone spends approximately the surplus saving of China, Japan, Saudi Arabia and Norway while in Europe Spain, the U.K. and Greece manage to spend the surplus saving of Germany.

Table 5. Current account surplus/deficit in 2007 (Millions of US dollars)

Surplus countries		Deficit countries	
China	371,833	United States	-726,571
Germany	263,056	Spain	-144,657
Japan	210,490	United Kingdom	-74,729
Saudi Arabia	93,390	Australia	-58,032
Russian Federation	77,012	Italy	-51,574
Netherlands	67,462	Greece	-44,587
Norway	60,459	Turkey	-37,697
Switzerland	40,566	France	-26,620
Sweden	39,130	Portugal	-21,179
Canada	29,936	South Africa	-20,572
Austria	13,189	Poland	-20,253
Indonesia	10,493	Ireland	-13,850
Finland	10,481	India	-11,284
Belgium	9,512	New Zealand	-10,542
Argentina	7,384	Hungary	-9,375
Chile	7,189	Mexico	-8,335
Korea, Rep.	5,876	Latvia	-6,425
Luxembourg	4,988	Czech Republic	-5,754
Denmark	4,769	Lithuania	-5,692
Brazil	1,551	Slovak Republic	-4,103
		Iceland	-4,096
		Estonia	-3,805

Source: World Bank.

In Europe we also have the Netherlands as a big saver (67 billion dollars), Norway and Sweden (60 and 39 billion dollars respectively), Austria (13 billion), Finland (10 billion), Belgium (9.5 billion) and Luxembourg and Denmark (each with close to 5 billion dollars.) The big spender in Europe is Spain

(144 billion deficit), which uses up more than half the German surplus, then there is the U.K. with a deficit of 74 billion dollars, Italy with 51 billion dollars, Greece with 44.5 billion, France with 26.5 billion, Portugal with a deficit of 21 billion, Poland with 20 billion, Ireland at 13 billion and Hungary at 9 billion dollars. The deficits of the three Baltic states together come out at around 16 billion dollars and Iceland plays its part by spending 4 billion dollars in excess of its income. The European Union comes out at close to zero vis-à-vis the rest of the world.

Relative to GDP, the ranking of the countries is much different. Saudi-Arabia now becomes the biggest saver, followed by Norway, China and Luxembourg while Latvia, Iceland, Estonia, Lithuania, Greece, Spain and Portugal are the biggest dis-savers.

Table 6. Current account surplus/deficit in 2007 (% of GDP)

Surplus countries		Deficit countries	
Saudi Arabia	24.3	Latvia	-22.3
Norway	15.6	Iceland	-20.2
China	11.0	Estonia	-17.7
Luxembourg	10.0	Lithuania	-14.6
Switzerland	9.5	Greece	-14.3
Netherlands	8.7	Spain	-10.1
Sweden	8.6	Portugal	-9.5
Germany	7.9	New Zealand	-7.8
Russia	5.9	South Africa	-7.3
Japan	4.8	Australia	-7.1
Chile	4.4	Hungary	-6.8
Finland	4.3	Turkey	-5.8
Austria	3.6	Ireland	-5.3
Argentina	2.8	United States	-5.3
Indonesia	2.4	Slovak Republic	-4.9
Canada	2.1	Poland	-4.8
Belgium	2.1	Czech Republic	-3.3
Denmark	1.5	United Kingdom	-2.7
Korea, Rep.	0.6	Italy	-2.4
Brazil	0.1	France	-1.0
		India	-1.0
		Mexico	-0.8

Source: World Bank.

The recipient countries in Table 6 are currently facing economic turmoil. In fact the ranking of the countries is a good indication of the extent of current troubles. In contrast, the surplus countries are doing relatively well. However, the current travail of the recipient countries have to be compared to the

economic booms that preceded the crisis. We now turn to describing the economic development of Iceland and the other recipient countries.

4.4 Macroeconomic developments in recipient countries

The capital inflow into the Baltic countries, Spain, Greece, Portugal and Iceland created a domestic credit expansion and a boom that preceded the bust. Ireland also experienced a credit expansion and a construction boom but this was mostly financed domestically. Table 7 shows the development of key macroeconomic variables in the period 2000-2007 and 2008-2009. All share the pattern of very high investment, rising asset price, low inflation and high growth during this period with a very large current account deficits in all countries except for Ireland. Estonia, Latvia and Lithuania experienced annual growth of GDP in excess of 7%; Ireland had annual growth of 6%, followed by Iceland at 4.5%, Greece at 4.2% and Spain at 3.6% and Portugal at 1.4%. Portugal's boom actually occurred earlier, in the late 1990s in the run up to the adoption of the euro. In spite of the robust economic growth inflation remained low in these countries, in all cases below 5%. The economic growth was mainly driven by investment, but exports and consumption also showed robust growth. House prices increased in all countries, propelled by the expansion of credit. The average rate of change of house prices was 24.9% in Estonia, 16.7% in Lithuania, 12.4% in Spain and 13.9% in Iceland and 9.6% in Greece. Stock prices rose at a rapid rate but less than house prices with one exception, the stock market boom in Iceland was much stronger than the house price boom. See table in Appendix IV.

The reversal that occurred in 2008 made growth negative in all the countries, the most severe contractions taking place some of the euro-zone countries and the fixed exchange rate countries Estonia, Latvia and Lithuania. Stock prices fell as did house prices. The record fall in stock prices occurred in Iceland 76% while house prices managed an annual fall of 25.8% in Estonia. The slump was characterised by a fall in the share of investment of GDP. Private debt accumulation was replaced by public sector deficits, which exceeded 10% of GDP in Greece, Iceland and Ireland.

Table 7. Macroeconomic developments

	Estonia		Greece		Iceland		Ireland		Latvia		Lithuania		Portugal		Spain	
	2003-07	2008-09	2003-07	2008-09	2003-07	2008-09	2003-07	2008-09	2003-07	2008-09	2003-07	2008-09	2003-07	2008-09	2003-07	2008-09
Real GDP growth	8.3	-8.8	4.4	0.0	5.5	-2.5	5.3	-5.1	9.7	-11.1	8.6	-6.0	1.0	-1.3	3.5	-1.4
Nominal GDP growth	15.0	-5.9	7.7	2.5	10.0	7.2	7.8	-7.1	21.0	-4.8	13.7	-2.3	3.8	0.3	7.6	0.0
CPI growth (inflation)	3.9	5.1	3.2	2.7	4.2	12.3	3.4	-0.2	6.5	9.5	2.4	7.7	2.7	0.9	3.2	1.8
Private consumption growth	14.5	-7.5	11.7	3.0	10.9	1.6	7.9	-4.4	21.0	-6.0	13.9	0.3	4.4	0.9	7.3	-1.2
Export growth	15.7	-6.7	9.4	-5.8	8.6	32.1	4.7	-1.6	21.7	-3.7	14.5	-0.3	7.2	-6.5	7.3	-5.9
Stock market growth (%)	39.3	-38.3	19.3	-33.3	43.7	-71.8	13.9	-19.6	28.4	-38.2	46.9	-35.3	17.6	-8.9	21.4	-6.7
Credit expansion																
House price growth (index)	26.7	-25.8	7.6	-1.4	16.6	-2.8	9.2	-11.4			30.1	-11.8		-3.1	13.0	-3.3
Fixed investment growth	18.7	-24.5	6.7	-9.0	21.3	-22.3	12.1	-27.8	29.7	-22.7	21.7	-22.0	1.1	-6.1	11.1	-10.4
Fixed investment/GDP (%)	32.8	25.6	21.0	17.5	26.9	19.2	25.3	18.6	29.8	25.4	23.9	21.1	22.2	20.3	29.2	26.9
Unemployment (%)	7.7	9.8	9.6	8.7	2.9	5.2	4.7	9.0	8.7	12.6	8.5	9.9	7.7	9.0	9.7	14.8
Current account/GDP	-13.1	-2.6	-9.1	-12.9	-14.3	-11.2	-2.6	-4.3	-15.7	-1.8	-9.3	-4.1	-9.2	-11.5	-6.9	-7.5
Household gross saving/disposable income (%)*	-2.9	3.0			16.3	23.9	10.2	10.0	0.2	0.8	0.2	-1.3	8.8	6.4	11.3	12.9
Business bankruptcies (number)																
Public saving/GDP (%)	2.0	-2.2	-5.4	-10.7	2.8	-11.3	1.3	-10.8	-0.8	-6.6	-0.9	-6.1	-3.8	-6.1	0.9	-7.7
Real exchange rate appreciation (%)**	2.2	4.3	1.1	2.4	3.6	-19.4	1.3	1.9	0.8	8.0	0.6	6.6	0.6	0.4	1.3	1.8

*Data is not available for 2009

**Data from Eurostat is based on 27 trading partners and data from the Central Bank of Iceland is based on 8 trading partners and the euro zone.

Growth refers to arithmetic mean of annual growth rates.

x/GDP and % refers to arithmetic mean of yearly observations.

Source: IFS, OECD, Bank of Estonia, Statistics Estonia, Bank of Greece, Iceland Property Registry, Statistics Latvia, The Economic and Social Research Institute, Ober Haus Real Estate Advisors, Statistics Portugal, Bank of Spain. Bank of Latvia, Bank of Lithuania, Eurostat, Statistics Iceland, Central Bank of Iceland.

4.5 Iceland's bubble economy

The inflow of capital in 2003-2008 distorted the allocation of the factor of production across sectors in Iceland. Employment in the construction industry went from 6.88% of total employment in 2003 to 9.80% in 2008; employment in financial services and insurance went from 3.95% of total employment to 5.04% of total employment in 2008. The share of other industries than construction fell over time as did the share of employment in agriculture and fisheries.

Table 8. The allocation of labour (% of employment)

	2003	2004	2005	2006	2007	2008
Agriculture and fisheries, total	6.8	6.4	6.6	6.5	5.9	4.8
Agriculture	3.6	3.5	3.4	3.8	3.4	2.5
Fisheries	3.3	3.0	3.2	2.7	2.5	2.4
Industry non-service, total	21.8	22.4	21.6	21.2	20.7	22.2
Fishing industry	3.5	3.5	2.9	2.2	1.6	1.7
Other industries	10.4	10.6	10.1	9.5	9.3	9.7
Utilities	1.0	1.02	0.9	0.9	1.0	1.0
Construction	6.9	7.4	7.7	8.7	8.9	9.8
Services, total	71.4	71.2	71.8	72.2	73.4	73.0
Retail, wholesale and repairs	13.1	12.8	14.0	13.9	14.4	12.9
Hotels and restaurants	3.5	3.4	3.4	3.6	3.5	3.6
Travel and transport	6.3	6.9	7.3	7.1	6.3	6.4
Financial services and insurance	4.0	4.4	4.1	4.3	4.9	5.0
Real estate	9.1	9.3	9.3	9.0	9.7	9.1
Public administration	5.2	4.8	4.5	5.2	5.1	5.4
Education	7.8	7.8	7.4	7.5	7.6	8.2
Health	15.8	14.7	15.3	15.0	14.7	15.2
Other public service	6.7	7.2	6.7	6.7	7.1	7.1

Categorisation is according to NACE Rev. 1.1. (ISAT95). Source: Statistics Iceland.

The shifting allocation of employment was matched with a shift in the share of each industry in GDP. As seen in Table 9 below, construction and financial services took on increased significance in generating value added. Construction went from 7.5% of GDP in 2003 to 11.7% of GDP in 2008 and the corresponding numbers for financial services and insurance are 7.3% and 8.7%.

Table 9. Output by sector (% of GDP)

	2003	2004	2005	2006	2007	2008
Agriculture and fisheries, total	7.9	6.8	6.3	6.3	5.7	6.4
Agriculture	1.6	1.5	1.5	1.4	1.4	1.4
Fisheries	6.3	5.3	4.8	4.9	4.3	5.0
Industry non-service, total	23.2	24.1	24.3	26.4	26.2	27.3
Fishing industry	2.7	2.2	2.1	2.3	1.8	2.8
Other industries	9.7	9.8	8.4	9.1	8.8	10.1
Utilities	3.3	3.2	3.3	3.9	3.9	4.8
Construction	7.5	8.9	10.5	11.1	11.7	9.6
Services, total	68.7	68.9	69.4	67.0	68.0	66.4
Retail, wholesale and repairs	10.2	10.7	11.2	10.0	10.6	10.9
Hotels and restaurants	1.7	1.6	1.6	1.5	1.7	1.7
Travel and transport	7.6	7.4	6.1	6.7	7.5	6.8
Financial services and insurance	7.3	8.2	8.8	8.8	8.7	7.2
Real estate	15.7	15.8	16.7	16.3	17.4	17.3
Public administration	6.1	5.9	5.8	5.6	5.2	5.4
Education	6.0	5.4	5.4	5.7	4.1	4.3
Health	10.1	10.0	9.9	9.0	9.2	9.0
Other public service	4.0	3.9	3.9	3.4	3.6	3.8

Categorisation is according to NACE Rev. 1.1. (ISAT95).

Source: Statistics Iceland.

4.6 Financial liberalisation and asset markets

Iceland would not have become a symbol of the global credit crunch if it had remained a passive recipient of the global saving glut. The collapse of its financial system can be traced to the privatisation of its banking system and its expansion into other countries and the borrowing by the banks to finance the buying of foreign businesses by their owners.

The timeline of the privatisation of the banking system is described in Figure 3 below. The privatisation of the banks in a setting of capital mobility in a formerly repressed financial system with very limited experience of modern banking practices set the stage for the subsequent development. The expansion of the banking system did not occur spontaneously, instead it resulted from the policies of the ruling political parties. With an expanding population of young well-educated workers and the limits of growth reached in the fishing industry, as well as in the utilisation of geothermal energy, a way forward had to be found, both to enhance the standard of living as well as to provide jobs to university graduates. A book published in 2001 by the Prime Minister's political and economic adviser shows how the idea of Iceland becoming an international financial centre was conceived and popularised.

It is titled “How to Make Iceland the Richest Country in the World” and in it one can find the recipe for transforming the country into a low-tax financial centre, akin to Luxemburg, Jersey, Guernsey, the Isle of Man, Bermuda, the Bahamas, the Cayman Islands and the British Virgin Islands. The author lists the number of banks in each of these countries; the volume of total deposits in the banking system, number of holding companies and investment banks, and so forth. He argues that Iceland has the human capital and institutions to develop an international financial centre and proposes cutting taxes and passing banking secrecy laws to create a competitive advantage.⁶ A committee appointed by the Prime Minister in 2005 and headed by the CEO of Kaupthing Bank reached a similar conclusion that policy should be guided by the goal of making Iceland an international banking centre.

There were rumours at the time about the privatisation of the banks being mishandled. This was later confirmed to be true by a parliamentary investigative committee into the causes of the financial collapse (see Hreinsson, chapter 6). Each of the two governing parties effectively took over one of the two largest banks. The new owners had no experience when it came to international banking practices but less obvious at the time was the motive behind the acquisitions which was to use the banks to further other business objectives, that is to turn the banks into investment banks that could be used to help the owners acquire most of Iceland’s economy as well as fund the acquisition of foreign enterprises. To borrow and to invest became the business of Iceland. This business model was of course symbolic for the times of cheap credit throughout the world, but what set Iceland apart was the scale of borrowing and investing in comparison to the national economy. Operating in country with very little sovereign debt the banks could count on high rating from the rating agencies due to an implicit government guarantee, the de facto investment banks were also the country’s commercial banks and hence too big and too important to fail. This was the combustible mixture that led to the collapse; a debt-free sovereign, adventurous business men in possession of banks backed by the political class, perfect capital mobility, a government that had a benevolent attitude to the expansion of the banking sector and a world full of cheap credit due to the global saving glut.

The expansion of the banking system is a testimony of the consequences of the tangled web of bankers, politics and government. In such an environment it becomes very difficult to regulate, monitor and reign in the expanding banking system. The actions that were taken by the government were intended to increase the competitiveness of the banking system, not to

⁶ See Hannes H. Gissurarson (2001).

slow its rate of expansion. A new government that came into power in 2007 had the stated objective of helping the country's international enterprises and inducing them remain domiciled in Iceland. True to this spirit, the central bank lowered the reserve requirement and it did nothing to make the wholesale borrowing in international markets more costly to the banks. The financial supervisor did not get resources to match the rapidly expanding banking system and no political backing to tackle the problems that it may have encountered in the banking system, such as related-party lending and weak equity.

4.7 The expansion of the banking sector

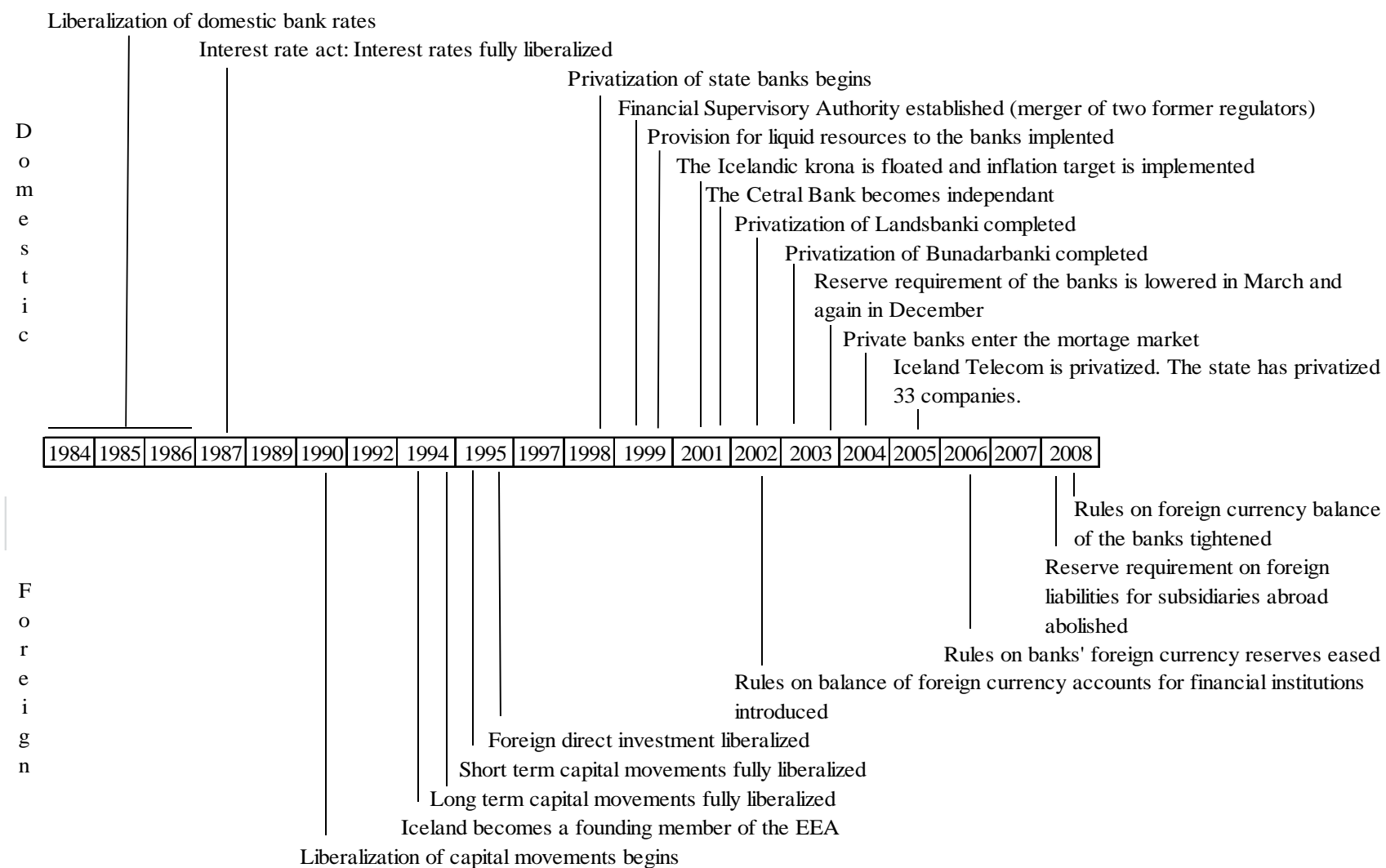
What sets Iceland apart from other recipient countries such as Greece, Portugal, Spain and the Baltics was the rapid pace of growth of its banking sector. The numbers speak for themselves. Table 10 has the total assets of the banking system from 2000 to 2009. Total assets amounted to one year's GDP in 2000, one and a half year's GDP in 2003, then rose to 193% of GDP in 2004, 303% in 2005, 390% in 2006 and 744% at the end of 2007.⁷

This expansion was almost entirely driven by foreign borrowing. Foreign liabilities went from being 75% of GDP in 2003 to becoming 476% of GDP at the end of 2007. At the same time, domestic liabilities rose from 60% to 268% of GDP. During their initial expansionary phase, the banks borrowed initially in the European wholesale market and were helped by the sovereign's good credit rating. In the period 2004-2006, the three biggest banks borrowed 14 billion EUR in foreign debt securities markets, mostly in the form of debt securities for a period of 3 to 5 years at only 15 to 25 points over the benchmark interest rate (Hreinsson et al., chapter 21). Following the publication of negative reports by ratings agencies at the beginning of 2006 the banks access to the European securities market was increasingly closed but they then had success in selling securities to American banks that packaged the Icelandic debt securities into CDOs.⁸ When the US subprime crisis gathered momentum in 2007 foreign deposits – the Icesave accounts by the Landsbanki and the Edge accounts by Kaupthing – became an important source of financing.

⁷ During 2008 the value of the Icelandic krona fell, starting in March, and the total assets and liabilities of the banking system in relation to Iceland's GDP rose as a result to reach ten year's GDP in September.

⁸ A Fitch Ratings published report published on February 22 says that Fitch has revised the outlook on Iceland's long-term sovereign rating to negative from stable. Fitch describes the macroeconomic imbalances and raised concerns about how well the broader financial system would cope if the economy suffered a hard landing. Another report written by economists at the Danske Bank (Christensen et al.), appeared in March 2006 titled "The Geyser Crisis." The authors are quite explicit in their warnings about the dangers facing the country.

Figure 3. The liberalisation of Iceland's economy



Source: Sigurjonsson (200X)

Table 10. Financial parameters for the Icelandic banking system (billions of krona and relative to GDP, end of period)

	2000	2001	2002	2003	2004	2005	2006	2007
Total assets	778 (1.14)	902 (1.17)	986 (1.21)	1,294 (1.54)	1,797 (1.93)	3,106 (3.03)	4,552 (3.90)	9,739 (7.44)
Domestic assets	738 (1.08)	831 (1.08)	889 (1.09)	1,103 (1.31)	1,494 (1.61)	2,315 (2.25)	3,100 (2.65)	4,854 (3.71)
Domestic credit	701 (1.02)	805 (1.04)	867 (1.06)	1,052 (1.25)	1,438 (1.55)	2,213 (2.15)	2,995 (2.56)	3,878 (2.96)
Other domestic assets	37 (0.05)	26 (0.03)	22 (0.03)	51 (0.06)	55 (0.06)	102 (0.10)	105 (0.09)	977 (0.75)
Foreign assets	40 (0.06)	71 (0.09)	97 (0.12)	191 (0.23)	303 (0.33)	791 (0.77)	1,452 (1.24)	4,885 (3.73)
Total liabilities	540 (0.79)	669 (0.87)	788 (0.97)	1,142 (1.36)	1,710 (1.84)	3,292 (3.21)	5,302 (4.54)	9,739 (7.44)
Domestic liabilities	358 (0.52)	407 (0.53)	461 (0.57)	507 (0.60)	582 (0.63)	947 (0.92)	1,330 (1.14)	3,513 (2.68)
Broad money (M3)	229 (0.34)	268 (0.35)	299 (0.37)	343 (0.41)	395 (0.43)	658 (0.64)	786 (0.67)	1,230 (0.94)
DMBs bond issues	72 (0.10)	50 (0.06)	73 (0.09)	76 (0.09)	96 (0.10)	146 (0.14)	252 (0.22)	409 (0.31)
Capital accounts	20 (0.03)	34 (0.04)	39 (0.05)	40 (0.05)	34 (0.04)	36 (0.04)	48 (0.04)	1,013 (0.77)
Other domestic liabilities	38 (0.05)	55 (0.07)	51 (0.06)	48 (0.06)	57 (0.06)	107 (0.10)	243 (0.21)	860 (0.66)
Foreign liabilities	181 (0.27)	262 (0.34)	327 (0.40)	635 (0.75)	1,128 (1.21)	2,345 (2.28)	3,972 (3.4)	6,226 (4.76)

Source: Central bank of Iceland and Statistics Iceland.

A rapid expansion of the banks' capital made the expansion of the balance sheets possible. This occurred through the banks' direct ownership of shares when share prices were rising rapidly (because of the banks' credit expansion!) but also through the banks artificially inflating their capital, as discussed below. A paper by Robert Z Aliber, written in the spring of 2008 (Aliber (2010)), describes how a capital inflow can generate asset price inflation which is self-sustaining in that the higher asset prices augment the banks' capital which enables them to continue the borrowing. This goes some way to explain the rapid expansion of the Icelandic banks but the banks also deliberately inflated their capital by lending to finance investment in their own shares. The weak capital turned out to be one of the main sources of fragility in the banking system when the credit crunch started to affect them badly in 2007 and contributed to their collapse in 2008.

5 The downturn and its causes

The economy developed macroeconomic imbalances during the expansionary phase 2003-2008, as shown in Table 2. These are reflected in the large current-account deficit, very low rates of unemployment; the unsustainable expansion of certain sectors such as construction and banking and rising wage inflation. Less attention was paid to the dangers of having an oversized banking system, described in the previous section. While the macroeconomic imbalances would eventually have caused the economy to suffer a hard landing, the oversized banking system became increasingly fragile as foreign sources of funding dried up.

5.1 Overheated economy

Table 11 below casts further light on the macroeconomic imbalances that developed between 2003 and 2008. The current-account deficit grew from 4.78% in 2003 to 24.19% in 2006 to 18.71% in 2008; the growth of GDP went from 2.42% to 7.49% in 2005 and 5.55% in 2007; unemployment fell to 2.30% and net foreign indebtedness grew from 62.60% of GDP to 131% before the collapse to 357.18% of GDP in 2008. At the same time house prices almost doubled in real terms and share prices (taken from the IMF's *International Financial Statistics*) rose fourfold in real terms (nominal increase from January 2002 to July 2007 was 528%). The OMX15 – which includes the 15 largest corporations – increased by a factor of six over the same period and almost by a factor of nine from its bottom in 2001 to its peak value in 2007.

The general picture is of the capital inflow driving the national economy. An inflow of capital elevated asset prices and the real exchange rate. Higher wealth and cheaper imports then propelled consumption and investment which made output grow and unemployment fall. Because the inflow of capital was unsustainable, it was only a matter of time until the expansion would come to and end in a sudden stop.

Table 11. Macroeconomic imbalances

Year	Net external debt/GDP (%)	M2/foreign reserves (%)	Real house price (index)	Real share price (index)	C.A. balance (% of GDP)	Real GDP growth (%)	Unem- ployment (%)	Inflation (%)
2000	-67.1	4.0	100.0	100.0	-10.1	4.6	2.3	5.1
2001	-77.8	3.7	99.9	68.1	-4.7	3.9	2.3	6.4
2002	-68.8	3.7	99.5	77.4	1.5	0.2	3.3	5.2
2003	-62.6	2.5	109.0	94.1	-4.8	2.4	3.3	2.1
2004	-66.3	2.5	119.2	157.6	-9.7	7.7	3.1	3.2
2005	-84.8	4.5	155.1	214.4	-16.0	7.5	2.6	4.0
2006	-123.5	2.2	163.8	273.1	-24.2	4.4	2.9	6.7
2007	-131.4	4.0	171.8	330.4	-16.6	5.6	2.3	5.0
2008	-54.5*	2.5	158.3	141.5	-18.7	1.3	3.0	12.7
2009	-38.3*	2.1	127.9	17.3	-3.6	-6.3	7.2	12.0

Source: Central Bank of Iceland, Statistics Iceland, Iceland Property Registry and OECD.

*International investment position excluding DMBs undergoing winding up proceedings.

5.2 Sudden stop of capital flows

An economy experiencing a capital inflow can suffer a sudden stop when foreign investors lose confidence, see Calvo (1998). The sudden stop of the inflow of capital into Iceland could be expected to reverse the macroeconomic development described in Table 11 above. A sudden depreciation of the currency, the reversal of current account deficits, falling output and rising unemployment would be the predictable consequence (see Reinhart and Rogoff, 2009). This is what happened when the Icelandic banks started to have difficulties borrowing in international capital markets from the middle of 2007 onwards.

The end of the capital inflow affected the economy but also the viability of the banks themselves. While the macroeconomic development could be predicted and would not necessarily lead to a collapse, the effect on the banks' liquidity was more ominous when their default became imminent. The smallest of the banks, Glitnir, was the first to run into liquidity problems. It faced a payment on its loans in October without having the adequate liquidity. It has been claimed that the bank was "a walking dead" for most of 2008 (see

Jonsson, 2009). The second largest, the Landsbanki, could only remain liquid by attracting deposits in the U.K. and the Netherlands and by using ingenious means at accessing ECB liquidity support.⁹ The largest, Kaupthing, was the most liquid but relied to an increasing extent on its subsidiary and its branches in the U.K. The capital of all three banks was weak, as discussed below.

5.3 The absence of a lender of last resort

The stability of a banking system is a function of the fiscal capacity of the sovereign and the liquidity that the central bank can produce in times of trouble. The fragility of the banking system was described by Buitert and Sibert (2010) in a paper written in the spring of 2008 see also Sibert (2010b) The total liabilities of the banking system as a ratio to the country's GDP were 744% at the end of 2007 and approached 1000% in the weeks before the October 2008 collapse (Source: Central Bank of Iceland). Clearly, the sovereign would have found it difficult to come to the help of the banking system with a capital injection if it had run into solvency problems. At the end of 2007 the capital of the system was 77% of GDP and over 100% at the time of the collapse. But the greatest weakness lay in operating international banks in a very small currency area. The foreign liabilities of the banking system were close to five times GDP at the end of 2007 and seven times GDP at the time of the collapse. Deposits in foreign branches of the Icelandic banks alone were around 7 billion UK pounds or close to one year's GDP and 5.3 times greater than the country's foreign reserves.¹⁰ Not having a lender of last resort could be predicted to coordinate a modern bank run when foreign banks refuse to roll over debt making the banking system default on its external obligations.

5.4 Regulation issues

In addition to liquidity problems and a lack of a credible lender of last resort, the banking system was fragile because of its weak equity base and operational irregularities. When Iceland became a member of the EEA Treaty it adopted the EU's directives into Icelandic law. These directives provided minimum coordination relating to the establishment and operation of financial institutions and for the principle of mutual recognition. The directives did not prevent member states from maintaining or laying down stricter rules in relation to

⁹ See Sibert (2010a).

¹⁰ Using the median exchange rate of GBP on 31 December 2007; seven billion pounds multiplied by the exchange rate divided by the foreign exchange reserves of the Central Bank.

the credit institutions in the home country as long as they satisfied the main objectives required by the provisions of EU and the EEA treaties. Icelandic authorities did not lay down stricter rules concerning the authorisation of financial institutions. Instead, their objective was to improve the competitive position of Icelandic financial institutions in the single market.

The Icelandic authorities relaxed the regulations within that framework as described by Benediktsdottir et al. (2010). In particular, after Iceland joined the EEA it: increased authorisation to invest in non-financial businesses; increased authorisation to extend credit to directors; increased authorisation to invest in real estate companies; increased authorisation to lend money to buy own shares; reduced requirements concerning the operating structure of securities companies; increased authorisation to operate insurance companies; and increased authorisation for ownership in other credit institutions. These changes amounted to relaxing requirements without violating the minimum requirements of the EU directives.

The banks used various ingenious ways to augment their capital base. One way used initially was to lend money to employees to buy back stock using the stock as collateral. They also granted loans to large customers with the condition that these buy shares in the bank. Other means of enlarging the capital base included a pattern of cross ownerships and investment funds borrowing to buy shares in the bank and then using the bank to fund other investments.¹¹ The biggest investors were holding companies that each invested predominantly in one of the banks and borrowed from all of them but particularly from their own bank.

The capital ratios of the three Icelandic banks were always above the CAD ratio, but because of the manipulation discussed above, a significant bulk of the equity could be termed weak.¹² The Special Investigation Commission appointed by Parliament (Hreinsson et al. (2010)) describes how the largest owners of all the big banks had abnormally easy access to credit at the banks they owned, apparently in their capacity as owners. They conclude that the operations of the Icelandic banks were apparently intended to serve the

¹¹ The banks were allowed to count shares bought with borrowed money from them as a part of the capital. According to the Hreinsson et al. (2010) the capital created through the banks' own lending activities – that is lending money to employees or holding companies to purchase new shares – amounted to around 25% of the total capital of the three largest banks.

¹² Such weak equity was in mid 2008 above 20% of the capital of Glitnir and had increased significantly in the spring of 2008 when the bank lent funds to holding companies that then bought shares in the bank. The comparable figure was 60% for Kaupthing and also grew markedly in the spring of 2008. The share of weak capital was somewhat lower for Landsbanki. For all three banks put together the share of weak capital was more than 25% of the capital base and more than 50% of core capital (Hreinsson et al., chapter 9).

interest of the larger shareholders, who managed the banks, rather than running solid banks with the interests of all shareholders and responsibility towards creditors (Hreinsson et al., chapter 8).^{13,14}

But the owners did not only borrow directly from the bank. Depositors were advised to withdraw deposits and put them into the bank's money market funds where they collected much higher rates of interest from bonds issued by the bank's owners. (Hreinsson et al., chapter 14).¹⁵

5.5 Fiscal and monetary policy before collapse

While monetary policy was given the task of containing inflation, fiscal policy was used to promote long-term growth. Fiscal policy had the objective of lowering tax rates in order to spur investment and labour supply. The ruling parties appear to have been true believers in the benefits of low taxes, even sometimes showing signs of believing in supply-side economics and wanting to emulate the policies of Ronald Reagan and Margaret Thatcher in the 1980s as described in Gissurarson (2001). The government lowered corporate taxes from 30% to 18% at the end of 2001 and in February 2008 they were further lowered to 15%. The government also lowered the income tax rate by 1% in each of the three years 2005, 2006 and 2007, abolished property taxes and lowered the value added tax in 2007. However, the rising tax revenues that were generated by the booming financial sector, rising wages and import duties were used to increase government spending in addition to paying down the government debt. The combination of low tax rates and expanding tax revenue was taken by

¹³ Extensive market manipulations were one manifestation of this problem. These market manipulations became pervasive prior to the collapse. In 2008 the banks were buyers on average in 45% of cases of automatically matched trades in their own shares. In comparison they were sellers in less than 2% of cases of automatically matched trades during the same period all the banks in this manner attempted to elicit abnormal demand for their own shares.

¹⁴ The smallest bank of the three, Glitnir, was acquired by Baugur Group, which owns businesses in the U.K. and elsewhere, in 2007. Baugur quickly changed the management of the bank and borrowed around 1.3 billion EUR on top of the 900 million EUR they had borrowed previously. Lending to this owner reached 80% of the bank's capital. The principal Owner of the Landsbanki was Mr Bjorgolfur Gudmundsson and his son Bjorgolfur Thor Bjorgolfsson. The loans by the bank to these owners amounted to half its capital base at the time of the bank's collapse. Interestingly, the bank lent 153 million EUR to Mr Bjorgolfsson just days before collapsing due to liquidity problems. Mr Bjorgolfsson was also the biggest shareholder in Straumur-Burdaras and he and his father were among its biggest debtors. Loans to Mr Bjorgolfsson amounted to around 30% of the bank's capital.

¹⁵ This way, the owners of Glitnir got around 300 million EUR from depositors in year 2008. Another money market fund, this one operated by the biggest of the three banks Kaupthing, was used to invest in the parent company and during the latter half of 2006 this ratio was about 50% of the total assets of the fund and even higher in 2008.

some as a sign that a supply-side policy programme was working, such as Arthur Laffer who visited the country in 2007.

Monetary policy bore the brunt of containing the domestic expansion. The central bank was independent by law since March 2001 and guided by an inflation-targeting framework. It raised interest rates from 5.3% in 2003 to 15.5% in the months before the collapse in 2008. In so doing it revealed many problems that plague independent monetary policy in a small country faced with perfect capital mobility. The central bank lost control of the money supply when commercial banks used wholesale funding abroad to finance their credit expansion, charging the foreign rates of interest on loans to customers. The pace of credit expansion was breathtaking and independent of the domestic currency interest rate. The central bank did not try to control liquidity in the banking system (see Hreinsson et al., chapter 4). Second, the prevalence of exchange-rate-linked loans bearing foreign interest rates meant that the transmission channel of monetary policy going through domestic interest rates to investment was very weak. In addition, a public mortgage system where households borrow CPI-indexed with fixed interest rates had the same effect. Third, the weakness of the interest rate channel of monetary policy resulted in the central bank raising interest rates all the way to 15.5 in order to curb domestic demand pressures. This led to the carry trade when foreign banks and investors took advantage of the interest differential by issuing bonds denominated in domestic currency. Lastly, the central bank appears to have responded asymmetrically to falling and rising exchange rates; raising interest rates to counter depreciations and not lowering them to counter appreciations, because the appreciation of the currency helped the bank reach its inflation target of 2.5% inflation per annum while a depreciation made it miss the target by raising the domestic price of imports (see Hreinsson et al., chapter 4). The asymmetric policy response convinced many borrowers to take on low-interest foreign currency debt.

During the expansionary phase exchange-rate-linked loans became increasingly prevalent, especially in the business sector, and this also applied to businesses that had revenues in the domestic currency. Currency mismatch between debt repayments, revenues and other costs were striking in the business sector and a depreciation of the currency could for this reason very easily trigger a financial crisis. The central bank found it therefore increasingly difficult to abandon its policy of high interest rates, realising that lower interest rates would trigger a depreciation, which would damage balance sheets of businesses, and through the CPI indexation, also household balance sheets.

6. The IMF programme

A delegation from the International Monetary Fund entered the country the weekend before the collapse of the banks. On 15 November the government asked formally for its assistance. The ensuing economic programme aims at restoring a functioning banking system, to stabilise the currency and to embark on a long-term fiscal consolidation while allowing automatic fiscal stabilisers to maintain demand in the first years of the programme.

6.1 Banking sector restructuring

A new “home bank” was created on the ruins of each of the big three banks and the foreign operations – the old bank – put into receivership. In this way the domestic operations of the banks would be secured as well as the domestic payment system. Each of the old banks was given a resolution committee and a team of auditors given the task of assessing the quality of its assets. The assets of both the new bank and the old bank were valued to ensure that creditor recovery would not be affected by the split. Following the asset valuation, each of the three new banks was supposed to be recapitalised with tradable government bonds issued on market terms. As it turned out, creditors took over two of the new banks leaving only the one of them to be recapitalised.¹⁶

A new piece of legislation was passed by parliament which is meant to prevent the worst malpractice, discussed in Section 5.4, from reappearing in the banks. The legislation increases the discretionary powers of the financial supervisor (FME); establishes a national credit registry at the financial services authority (FME); introduced more stringent provisions on large exposures, connected lending, and related party loans – which include a mandatory approval of related party loans by bank board members and proper requirements for owners. These changes are meant to reduce systemic credit risk, provide a better overview of large exposures at the national level and increase the supervisory and regulatory capacity of the financial supervisor.

¹⁶ Creditors took over two of the new banks. Arion bank manages the home operations – deposits and loan portfolio – of Kaupthing bank that is currently in receivership. Arion was state owned until November 2009 when creditors took over 87% of its ownership while the state retained 13%. Islandsbanki took over the deposits and the home loan portfolio of Glitnir bank that is currently in receivership. Since November 2009 the creditors of Glitnir own 95% of the bank while the Icelandic state retains ownership of 5%. The last of the three large banks is still in state ownership. This is the Landsbankinn which is 81.33% owned by the state and 18.67% owned by resolution committee of the old Landsbanki which is in receivership.

6.2 Monetary policy: Stabilising the exchange rate

The IMF programme called for a combination of capital controls and high interest rates to stabilise the currency, in addition to the use of foreign reserves to prevent excessive volatility of the currency. The policy rate was raised to 18% on 28 October 2008 and capital inflows and outflows were blocked with the exception that interest payments on foreign-owned financial assets were allowed to leave the country. The plan was for the restoration of confidence in the currency to subsequently enable the central bank to lower interest rates. With the help of the capital controls, a rising current account surplus, falling inflation, a restructured banking system and a sustainable trajectory for the government's budget, interest rates could be lowered gradually in many steps.

The Central bank started gradual monetary easing in March 2009. It reduced its policy rate by 1% from 18% to 17% on 3 March and then continued to relax monetary restraint until the policy rate reached 8 in June 2010. Table 12 shows changes in the central bank's interest rate corridor since October 2008.

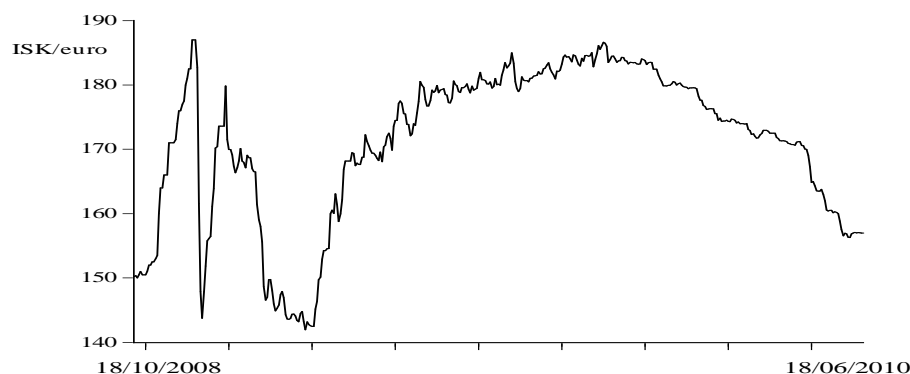
Table 12 – Central bank interest rate changes

Dates of interest rate decisions	Deposit rate	Policy rate (repo)	Overnight lending rate
10 April 2008	15.0	15.5	16.5
15 October 2008	11.5	12.0	14.0
28 October 2008	11.5	18.0	20.0
18 December 2008	15.0	18.0	22.0
19 March 2009	14.0	17.0	21.0
8 April 2009	12.5	15.5	19.5
7 May 2009	9.5	13.0	17.0
4 June 2009	9.5	12.0	16.0
24 September 2009	9.5	12.0	14.5
5 November 2009	9.0	11.0	13.0
10 December 2009	8.5	10.0	11.5
27 January 2010	8.0	9.5	11.0
17 March 2010	7.5	9.0	10.5
5 May 2010	7.0	8.5	10.0
23 June 2010	6.5	8.0	9.5

Source: Central Bank of Iceland (www.sedlabanki.is).

The central bank's primary objective was to stabilize the on-shore exchange rate in order to bring inflation down. Figure 4 shows the on-shore exchange rate between 13 October 2008 and 18 June 2010 (weekdays).

Figure 4. The on-shore exchange rate, October 2008 to May 2010



The plots show numbers for weekdays, weekends omitted. For national holidays in Iceland we use the previous day's exchange rate. Source: Central Bank of Iceland (www.sedlabanki.is).

Following the significant volatility in the first weeks of the capital control regime, the currency appreciated due to foreign exchange market interventions that were later stopped in March 2009. The exchange rate continued to depreciate thereafter until the capital controls were tightened in the autumn of 2009. The first year of the capital controls was characterized by very loose monitoring and enforcement. This was changed in the autumn of 2009 when first a formal capital control system was set up at the Central Bank on 18 September, which then went on to tighten the rules in November by preventing individuals and firms from using loopholes to profit from the spread between the on-shore and the off-shore exchange rate. Since November 2009 there were no interventions in the currency market.¹⁷

Lax enforcing of the capital controls resulted in a rising level of evasions during the first phase of the capital controls. These circumventions or leakages show up in rising demand for local currency off shore and falling demand on shore until November 2009, which explains why the currency depreciated on shore and appreciated off shore. Starting in November, the on-shore rate started to increase while the off-shore rate weakened. This is consistent with the effect of stronger monitoring of the capital controls. A growing current account surplus has also helped to maintain the real exchange rate appreciation.

¹⁷ During the period of lax controls the off-shore exchange rate was relatively low – around 200 kronur for the euro – but the off-shore rate fell dramatically when the controls were tightened in November to a range of 280-300 kronur per euro. Since November 2009 the on-shore rate rose while the off-shore rate remained at a low level. The (on-shore) currency appreciation was propelled by the capital controls but also by an increasing current account surplus.

6.3 Fiscal policy

The resolution of the banking crisis and the deficits of 2008-2010 will put a burden on the public sector. However, so as not to exacerbate the recession the fiscal deficits were allowed to widen in 2009 because of the effect of the recession on government spending and tax revenues. In this way the automatic stabilisers were allowed to work in 2008-2013. Starting with the 2010 budget a medium-term fiscal consolidation programme will be implemented with a view of reaching a balanced budget in 2014. The structural primary deficit is decreased by 2-3% annually with the aim of achieving a small surplus by 2011 and a larger one by 2012.

Table 13 shows the fiscal balance of the general government, the central government and the local government from 2000-2009. Note the deficits in the recession years 2001-2003, the surpluses that developed by the central government in 2005-2007 and then the large deficits in 2008-2009. In spite of the surpluses during the boom years the cyclically-adjusted deficit did increase in those years although they did not neutralise the automatic stabilisers completely. Similarly, the deficits that appear in 2008-2009 represent the effect of the automatic stabilisers with a weak reduction in the cyclically-adjusted deficits.

Table 13. Fiscal and primary balance (% of GDP)

	Fiscal government balance			Primary balance*		
	General government	Central government	Local government	General government	Central government	Local government
2000	1.7	1.8	-0.4	3.6	3.3	-0.01
2001	-0.7	-0.5	-0.6	0.9	0.9	-0.3
2002	-2.6	-1.3	-1.3	-1.4	-0.3	-1.1
2003	-2.8	-1.8	-0.8	-1.4	-0.7	-0.5
2004	0.0	1.0	-0.8	1.4	2.2	-0.6
2005	4.9	4.4	0.1	6.1	5.5	0.3
2006	6.3	5.3	0.3	6.7	5.6	0.5
2007	5.4	3.9	0.6	5.7	4.3	0.7
2008	-13.6	-13.0	-0.9	-13.6	-12.9	-0.8
2009	-9.1	-8.1	-1.1	-6.1	-5.2	-0.8

Primary balance is the government net borrowing or net lending excluding interest payments on government liabilities. Source: Statistics Iceland.

7. The aftermath

The macroeconomic response to the crisis has been typical in that changes in output, unemployment, asset prices and government deficits and debt have followed the stylised facts highlighted by Reinhart and Rogoff (2009). However, the response of the real economy

has been significantly milder than feared at the onset of the crisis. We will describe the evolution of output and unemployment, the structural adjustment of the economy and the fiscal situation briefly below.

Table 14 below shows real GDP growth and unemployment in Iceland and the comparator countries from the first quarter of 2007 to the first quarter of 2010 (seasonally adjusted). Note that cumulative negative growth since the first quarter of 2008 is much greater in the Baltic countries than in Iceland which puts Iceland in the middle of the group in spite of the much larger shock that hit the Icelandic economy. The adjustment of the real economy is also reflected in the unemployment figures with unemployment being lowest in Iceland at the end of 2009 at 7.1%¹⁸, which is only half the unemployment rate suffered by the Baltic countries.

The reason for the mild downturn suffered by Iceland can be found in the flexibility of its real exchange rate. Figure 6 below shows net exports (seasonally adjusted) as a fraction of GDP for Estonia, Iceland, Latvia and Lithuania, normalised as zero in the first quarter of 2000 juxtaposed against the real exchange rate for Iceland. Net exports in Iceland go from being negative 14% of GDP in the last quarter of 2006 to becoming positive 14% in the last quarter of 2009, an improvement of 28% of GDP. They grew by 11.3% in 2008 and 11.7% in 2009; mostly because of lower imports which fell by 18.2% in 2008 and 24% in 2009 while exports increased by 7.1% in 2008 and 6.2% in 2009. The improvement in net exports manages to offset some of the effect of collapsing investment and consumption. Investment in real terms fell by 21% in 2008 and 49.9% in 2009 while consumption fell by 7.9% in 2008 and 14.6% in 2009 (IMF, 2010). The path for net exports in Iceland in Figure 6 mirrors the path for the real exchange rate, which shows how real exchange rate flexibility can shield the real economy. This is not the case for the euro countries and the Baltic countries that have fixed exchange rates vis-à-vis the euro, as shown in Figure 7 below. This is consistent with the results of a recent study by Olafsson and Petursson (2010), which explains the variation in the post-crisis experience of a sample of 46 countries and find that greater exchange rate flexibility coincided with a smaller and shorter contraction at the same time increased the risk of a banking and currency crisis.

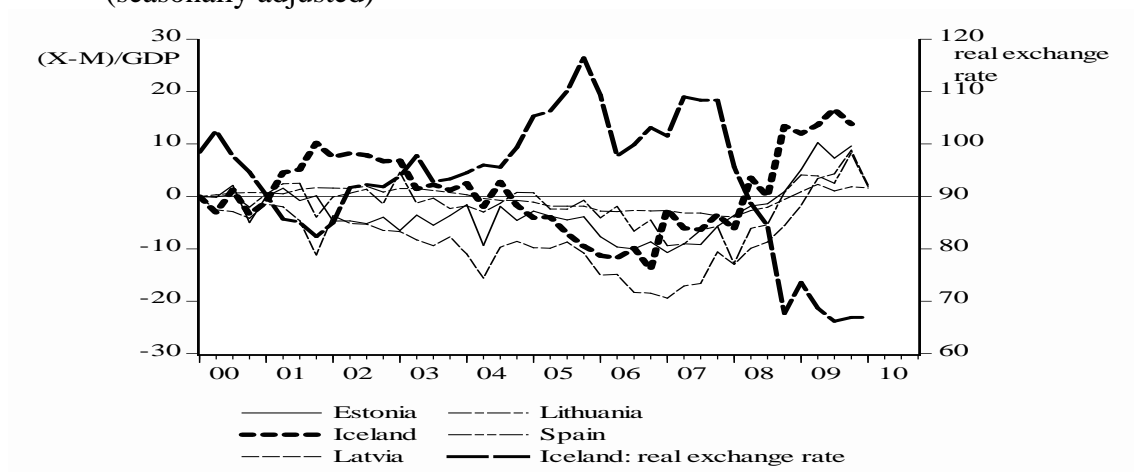
¹⁸ This refers to the survey based unemployment rate. Registered unemployment was 8.2% in December 2009 and reached 9.3% in February and March 2010. The differences are caused by the rather unusual definition of the number of unemployed and the workforce used by The Directorate of Labour. The number of unemployed is defined as the total number of working days paid by the Unemployment Insurance Fund regardless whether or not the person receiving benefits has a part-time job or not. The estimation of the work force is based on the number of working days rather than the number of people willing to work.

Table 14. Growth and unemployment in selected countries (Seasonally adjusted)

Year	2007	2007	2007	2007	2008	2008	2008	2004	2009	2009	2009	2009	2010
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1
Real GDP growth													
Estonia	3.8	0.02	1.8	1.4	-2.4	-0.9	-0.3	-5.0	-8.1	-2.3	0.3	2.2	-1.2
Greece	1.8	1.1	1.0	0.6	0.8	1.1	0.3	-0.7	-0.9	0.1	-0.3	-0.8	-0.9
Iceland	-0.6	7.6	2.9	-4.6	1.7	-0.4	1.1	-2.6	-0.6	-2.7	-5.4	0.7	0.6
Ireland	6.0	-1.4	-0.3	2.2	-1.6	-2.2	0.6	-6.4	-1.6	-0.6	0.9	-4.6	3.6
Latvia	2.9	2.9	5.4	0.6	-4.2	0.4	1.9	-5.4	-10.9	-0.1	0.7	-2.5	-1.6
Lithuania	1.7	5.4	1.2	2.0	-0.2	3.5	-1.8	-2.2	-10.3	-4.3	5.1	0.2	-1.9
Portugal	1.1	-0.2	0.01	1.3	-0.2	0.0	-0.4	-1.1	-2.3	1.3	0.1	0.6	0.2
Spain	1.3	1.1	0.3	1.3	-0.3	0.9	-0.4	-0.6	-3.1	-0.2	0.7	1.1	-2.2
Unemployment													
Estonia	4.9	5.1	4.6	4.1	3.8	4.1	6.6	7.6	11.0	13.6	15.0	15.5	19.4
Greece	8.5	8.4	8.3	8.0	7.7	7.5	7.6	7.8	8.7	9.2	9.7	10.2	-
Iceland	2.0	2.2	2.8	2.3	2.3	2.1	3.2	4.4	7.1	8.1	6.7	7.1	7.6
Ireland	4.3	4.5	4.8	4.8	4.7	5.1	6.6	7.7	10.2	11.9	12.7	12.7	13.3
Latvia	6.3	5.8	6.2	5.9	5.9	6.1	7.5	10.5	13.3	16.5	18.7	20.3	19.8
Lithuania	4.0	4.5	4.3	4.4	3.9	4.9	6.3	8.1	10.9	14.0	14.2	15.8	17.3
Portugal	8.3	8.3	8.1	7.8	7.6	7.6	7.9	7.9	8.8	9.6	10.1	10.2	10.4
Spain	8.2	8.1	8.3	8.5	9.3	10.5	11.6	13.8	17.1	18.1	18.2	18.7	19.7

Source: IFS and Statistics Iceland.

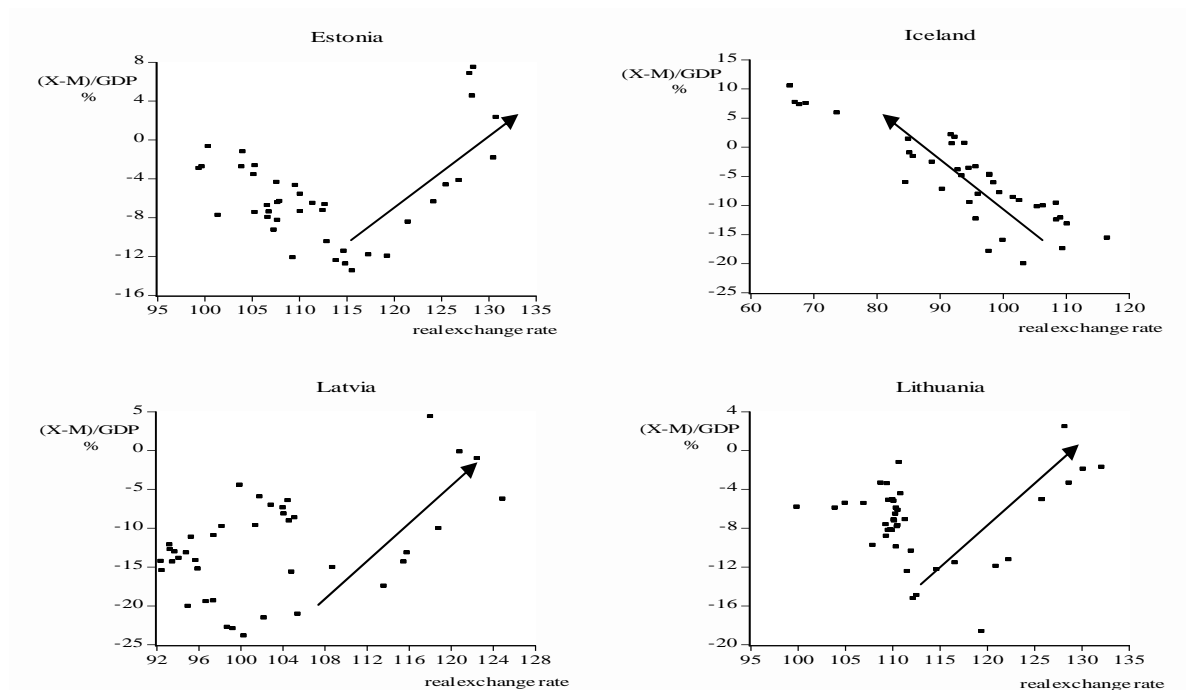
Figure 6. Net exports for selected countries and Iceland's real exchange rate (seasonally adjusted)



Source: IFS, Eurostat and Central Bank of Iceland.

The fundamental difference between Iceland and the other countries is that the real economy takes on the adjustment in the Baltic countries where unemployment increases and output contracts to a much greater extent than in Iceland as shown in Table 14 above.

Figure 7. Net exports and real exchange rates in Iceland and the Baltics



Source: IFS, Eurostat and Central Bank of Iceland.

In contrast, the improvement in net exports in the Baltic countries occurs without significant exchange rate depreciation and goes together with collapsing output and very high unemployment.

The reversal of capital flows in 2008-2009 made the bubble economy of construction and financial services shrink as shown in Table 15 below. Construction lost six thousand workers in 2008 and 2009; retail lost almost two thousand jobs and financial services one thousand. It should be noted that these numbers are somewhat deceptive since the banks are still overstaffed due to the delayed restructuring of the banking sector. The share of construction in total employment fell from 9.91% in 2008 to 6.97% in 2009 and the numbers for financial services and insurance are 5.04% and 4.71%.

Table 15 . The bubble economy deflated
The allocation of labour (% of employment)

	2008	2009
Agriculture and fisheries, total	4.8	5.3
Agriculture	2.5	2.6
Fisheries	2.4	2.6
Industry non-service, total	22.2	19.8
Fishing industry	1.7	2.1
Other industries	9.6	9.8
Utilities	1.0	1.0
Construction	9.9	7.0
Services, total	73.0	75.2
Retail, wholesale and repairs	12.9	12.6
Hotels and restaurants	3.6	4.6
Travel and transport	6.4	7.2
Financial services and insurance	5.0	4.7
Real estate	9.4	9.8
Public administration	5.4	5.5
Education	12.0	12.1
Health	15.6	16.0
Other public service	2.7	2.7

Categorisation is according to NACE Rev. 2. (ISAT2008)
Source: Statistics Iceland.

The lack of employment creation in other sectors explains the rapid elevation of unemployment in 2008 and 2009.

The unemployment in Iceland, as in most other countries, is concentrated among the young and the less educated ones. Unemployment in the 16-24 age group is currently in the vicinity of 20% and the unemployment rate among those with only elementary school education almost twice as high as that of workers who have completed secondary school. Tables 2, 8 and 9 show how the bubble economy is characterised by low unemployment, rising real wages and a high share of labour of national income while the post-collapse economy has higher unemployment, lower real wages and a lower share of labour of

national income. This is a pattern shared with the Finland and Sweden following their financial crises in the 1990s.¹⁹

The situation of businesses and household is somewhat better than feared at the onset of the crisis. The level of non-performing loans stands at 50% for the corporate sector and 41% for small and medium sized enterprises. A large fraction of the FX exposures were found in holding companies that have already defaulted. Remaining FX borrowers are mostly exporters and more than a half of all Icelandic businesses have no FX liabilities (IMF, 2010). A minority of household loans are in trouble while FX exposures are much lower than feared at the onset. About 30% of retail loans under 100 million kronur are in default while about 15% of loans at the Housing Finance Fund are in default. The distress is concentrated among a small number of individuals, many of whom have direct FX exposures. Only 9% of households have FX mortgage debt and FX auto-loans are a small portion of total indebtedness. However, most households are indirectly exposed to the exchange rate through CPI-indexed debt.

At the end of 2009 general government debt stood at 105% of GDP with net debt standing at 72.9% of GDP. Gross external debt stands at 208% of GDP but net external debt is now only 38% of GDP, which is better than in any year since 2000. The main difficulties that lie ahead present themselves in the fiscal constraints created by the much higher levels of public debt.

Table 16. National external debt and total public outstanding debt (% of GDP)

Year	Net external debt (end of year, % of GDP)	Gross external debt (end of year, % of GDP)	Central government debt (% of GDP)**	General government debt (% of GDP)**
2000	-67.1	112.0	60.4	73.0
2001	-77.8	131.1	63.7	75.0
2002	-68.8	119.0	59.9	72.0
2003	-62.6	146.8	57.4	71.0
2004	-66.3	191.8	50.8	64.5
2005	-84.8	328.1	39.9	52.6
2006	-123.5	505.8	45.4	57.5
2007	-131.4	625.2	44.0	53.5
2008	-54.5*	253.7*	89.5	102.4
2009	-38.3*	208.7*	104.5	119.5

*International investment position excluding DMBs undergoing winding up proceedings

**Central/general government debt includes both trade credits and pension liabilities

Source: Central Bank of Iceland and Statistics Iceland.

¹⁹ See Honkapohja and Koskela (1999) and Zoega (2010).

In an international context, Iceland's public debt starts at a relatively low base in 2005 as shown in Table 17 below. The low level of public debt before the crisis hit compared to Greece, Portugal and Spain makes the public finance situation more manageable.

Table 17 Public debt (% of GDP)*

	Estonia	Greece	Iceland	Ireland	Latvia	Lithuania	Portugal	Spain
2000	5.1	103.4	n.a.	37.8	12.3	23.7	50.5	59.3
2001	4.8	103.7	n.a.	35.6	14.0	23.1	52.9	55.5
2002	5.7	101.7	n.a.	32.2	13.5	22.3	55.6	52.5
2003	5.6	97.4	n.a.	31.0	14.6	21.1	56.9	48.7
2004	5.0	98.6	n.a.	29.7	14.9	19.4	58.3	46.2
2005	4.6	100.0	26.0	27.4	12.4	18.4	63.6	43.0
2006	4.5	97.8	27.9	24.9	10.7	18.0	64.7	39.6
2007	3.8	95.7	29.1	25.0	9.0	16.9	63.6	36.2
2008	4.6	99.2	57.4	43.9	19.5	15.6	66.3	39.7
2009	7.2	115.1	n.a.	64.0	36.1	29.3	76.8	53.2

*Public debt is defined in the Maastricht Treaty as consolidated general government gross debt at nominal value, outstanding at the end of the year. The general government sector comprises central government, state government, local government, and social security funds. Source: Eurostat.

8. Lessons

The economic turmoil that hit Iceland offers several lessons when it comes to the choice of an exchange rate regime, financial regulation and the conduct of monetary policy.

First, a floating currency presents monetary authorities with severe challenges when it comes to controlling the supply of money, containing asset price inflation and curbing aggregate demand. Iceland's monetary authorities failed at all three tasks; lost control of the money supply, saw share prices multiply and aggregate demand expand and businesses and household become highly leveraged, often in foreign currencies. The oversized banking system collapsed because of a lack of a lender of last resort and weak capital. These problems created a full-scale currency crisis. In contrast the euro-zone countries and the Baltic economies that are in ERM II avoided a currency crisis; a banking crisis was avoided through international cooperation – liquidity support from the ECB in the case of Greece, Portugal and Spain.

Second, a flexible exchange rate makes the necessary adjustment of the real economy following the crisis easier on the real economy. Thus, in spite of having suffered the greatest shock, unemployment in Iceland rose by less than in any of the comparator countries and output contracted less than in the Baltic countries. The current account could only be

improved in the latter through a recession while the more flexible real exchange rate in Iceland allowed net exports to increase and offset some of the impact of lower investment and consumption on the real economy.

Third, Iceland's experience demonstrates the dangers of having an oversized banking system. Banks that do not have a lender of last resort are inherently unstable since the absence of a lender of last resort can synchronise the actions of other agents in triggering a bank run.

A floating exchange rate country will have to resolve how it can deal with capital inflows; prevent them from affecting asset prices and aggregate demand and prevent excessive leverage, especially in the presence of currency mismatches. In contrast, a euro-zone country will have to devise effective ways for fiscal policy to contain an upswing and deal with a slump, in effect replacing the flexible exchange rate policy. One method would entail adjusting employment taxes, raising them in a boom and lowering in a recession. Authorities operating in both regimes will have to devise ways how to contain the expansion of banks and the level of leverage in the household and the business sector.

Any future monetary arrangement for small open economies with floating exchange rates such as Iceland should be able to deal with capital inflows and the dangers of excessive leverage. One approach would be to tax capital inflows and outflows, as is currently practices in Brazil. Another approach would be to impose a pro-cyclical tax on real estate to prevent property booms and buss or to tax debt as recently proposed by Jeanne (2010). The Iceland experience is a stark lesson in the dangers of using only central bank interest rates in an inflation-targeting framework.

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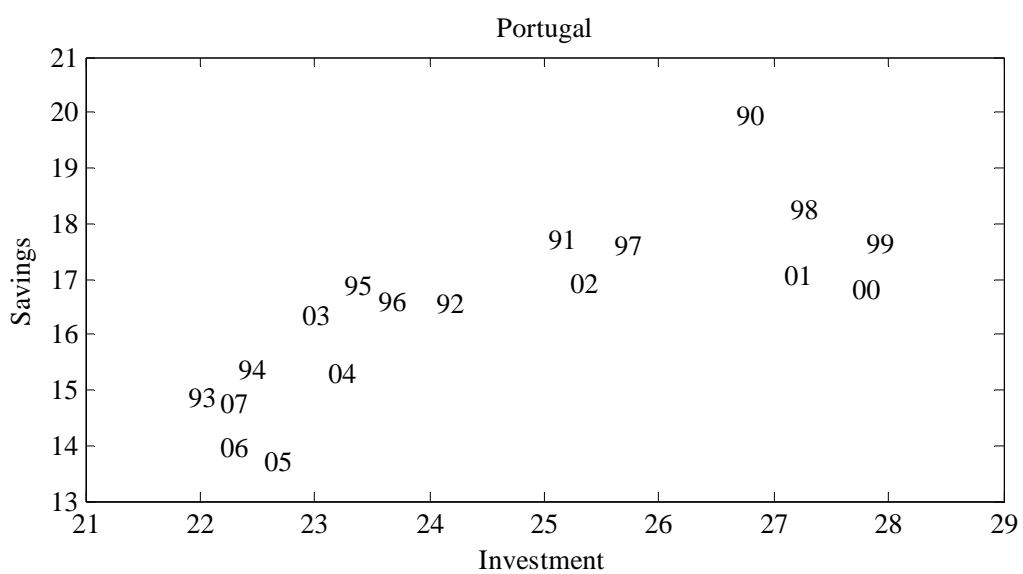
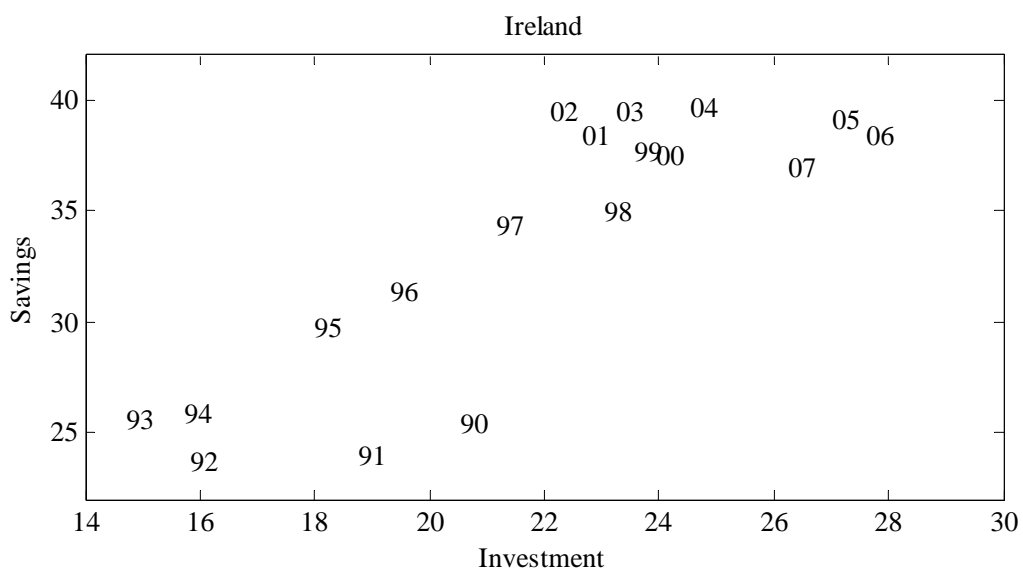
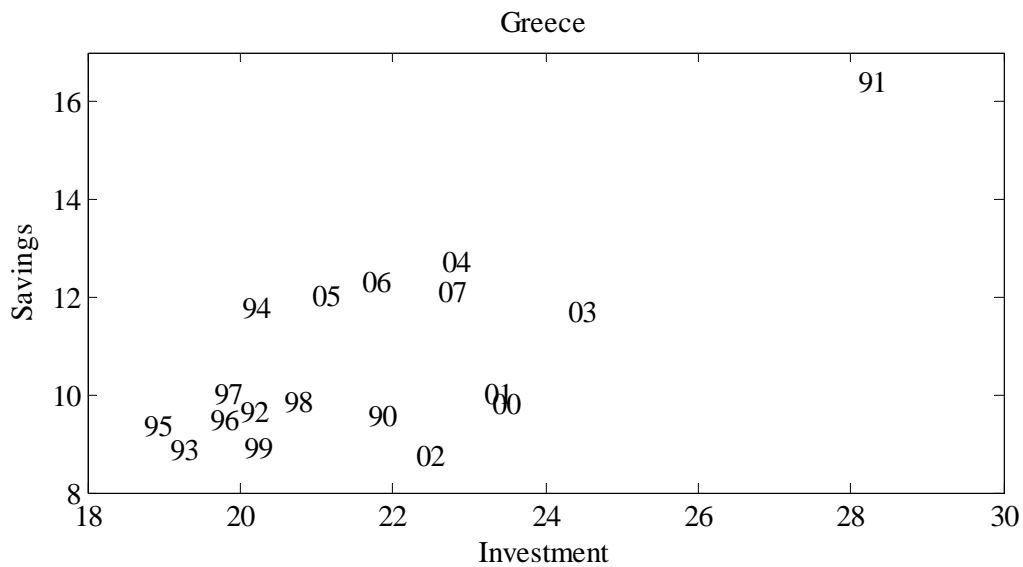
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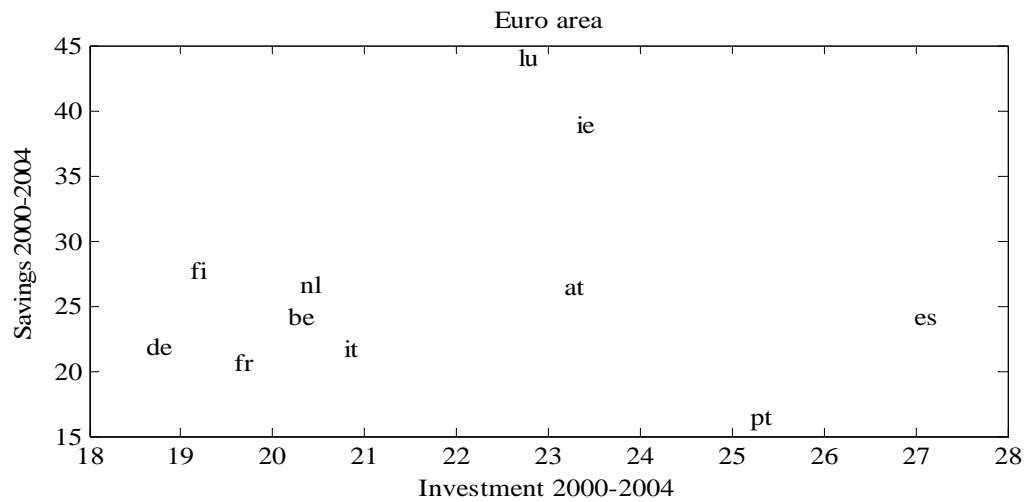
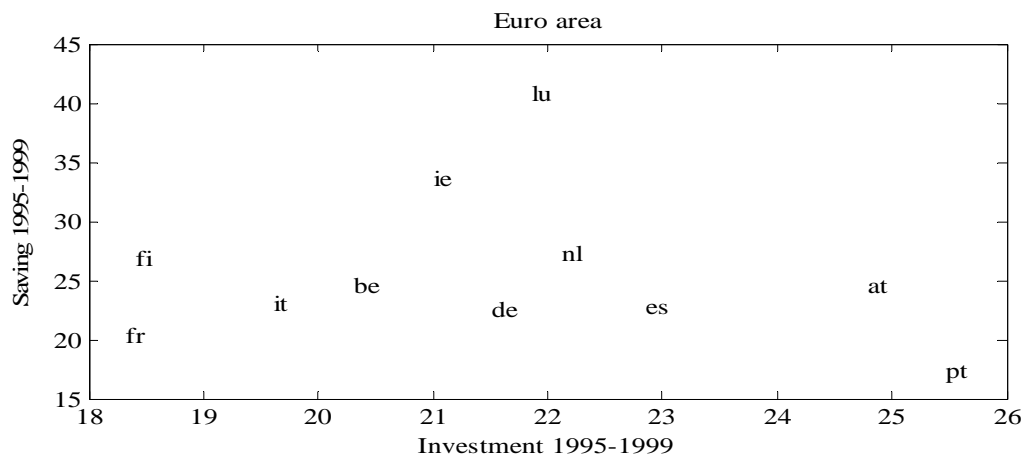
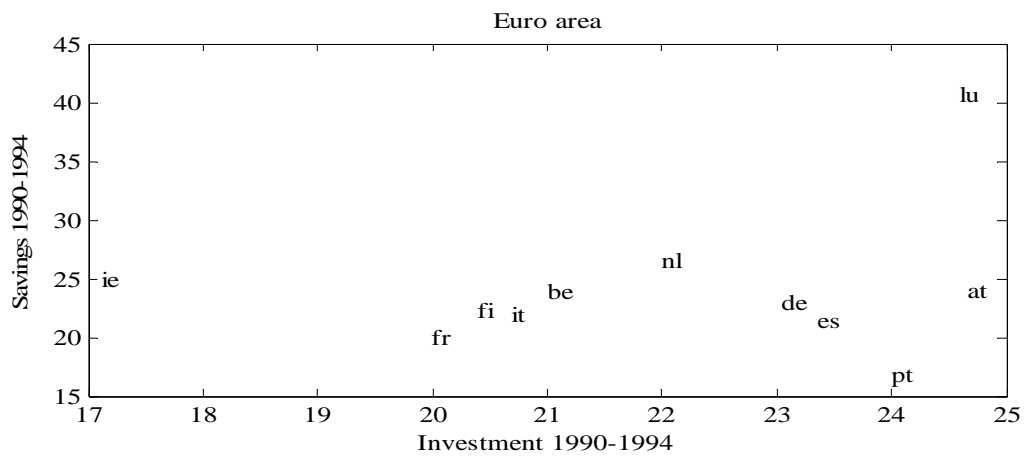
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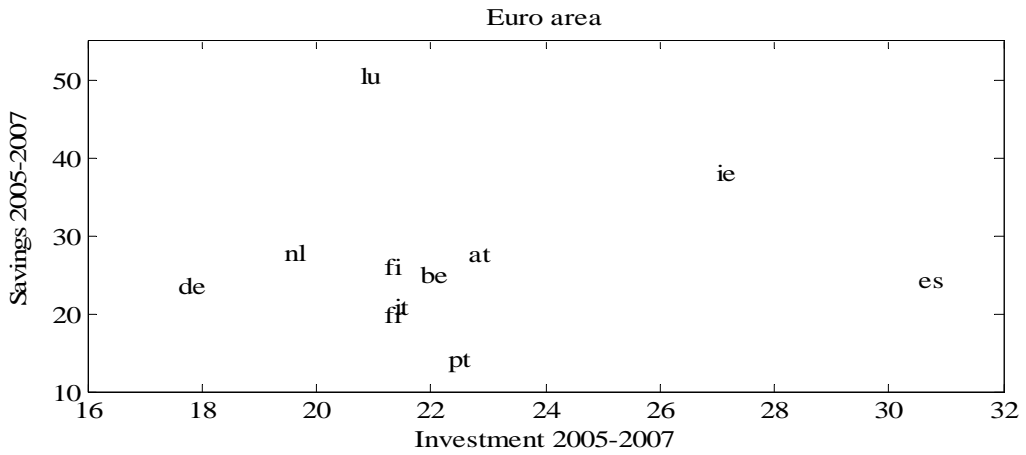
Appendix I. Saving and investment in Greece, Ireland and Portugal



Source: World Bank.

Appendix II. Saving and investment in the euro area 1990-2007

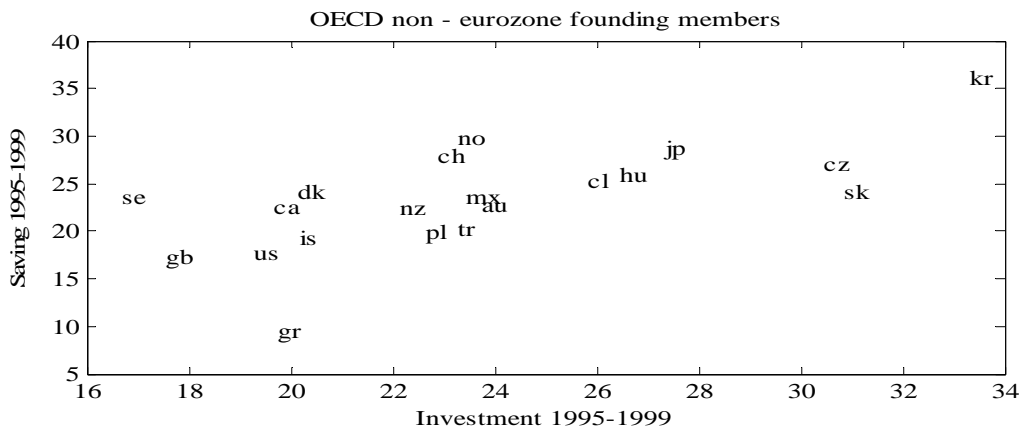
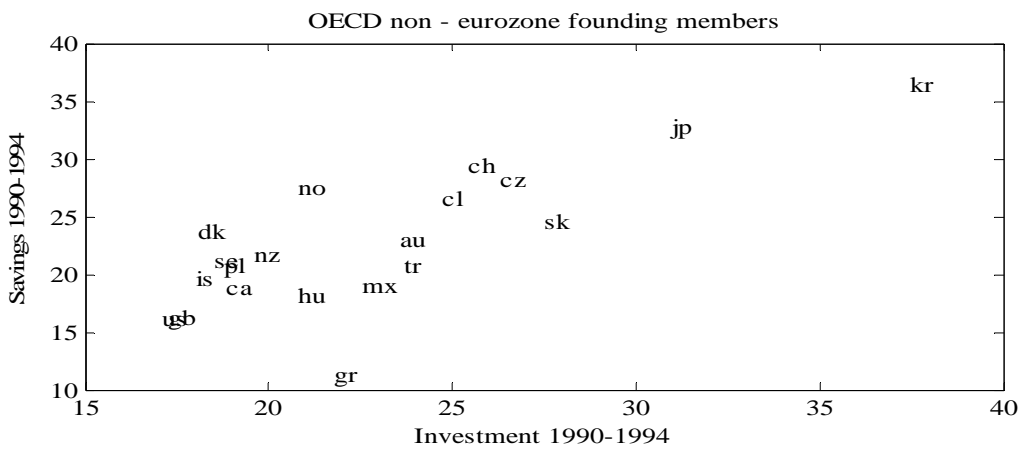


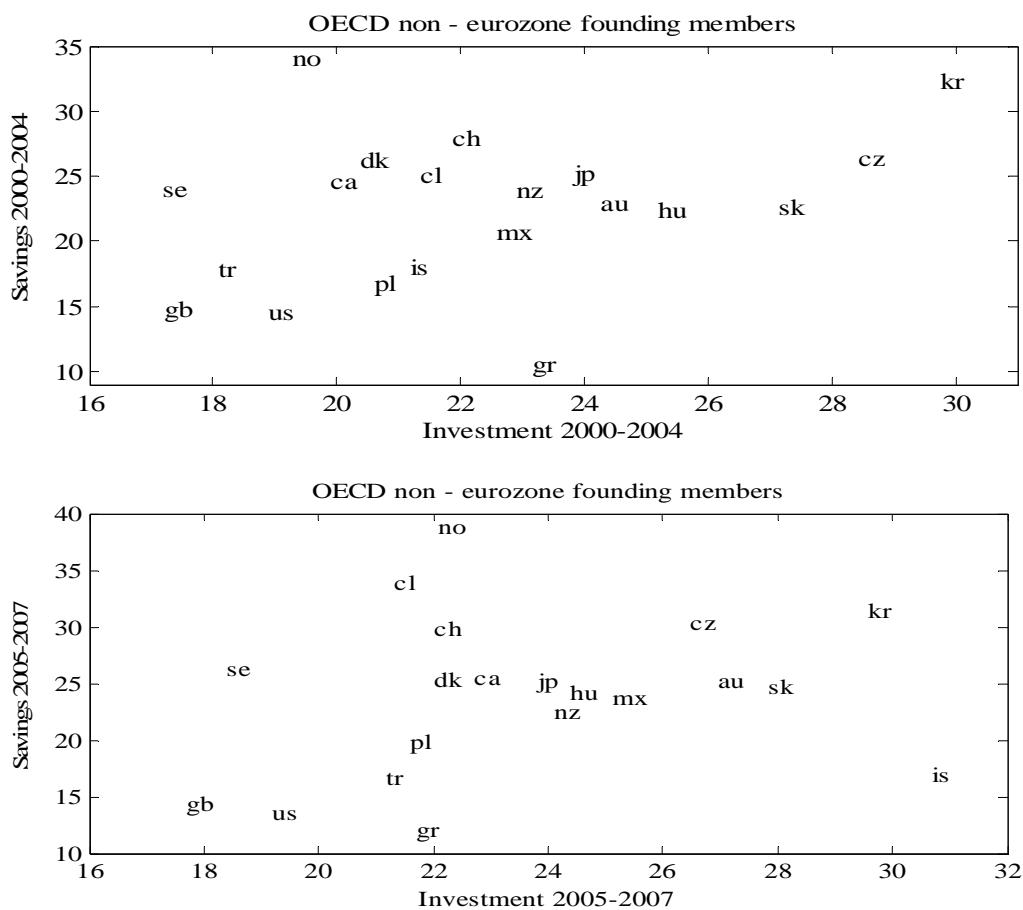


Source: World Bank.

Country abbreviations: at: Austria, be: Belgium, fi: Finland, fr: France, de: Germany, ie: Ireland, it: Italy, lu: Luxembourg, nl: Netherlands, pt: Portugal, es: Spain.

Appendix III. Saving and investment in other OECD countries 1990-2007





Source: World Bank.

Country abbreviations: au: Australia, ca: Canada, cl: Chile, cz: Czech Republic, dk: Denmark, gr: Greece, hu: Hungary, is: Iceland, jp: Japan, kr: Korea, Rep., mx: Mexico, nz: New Zealand, no: Norway, pl: Poland, sk: Slovak Republic, se: Sweden, ch: Switzerland, tr: Turkey, gb: United Kingdom, us: United States

Appendix IV. Nominal asset price growth (%)

	2003	2004	2005	2006	2007	2008	2009
Share price							
Estonia	39.6	41.5	72.2	11.1	32.1	-40.4	-36.3
Greece	-9.6	28.0	29.5	26.4	22.3	-32.8	-33.8
Iceland	20.9	86.1	43.6	39.7	28.4	-50.8	-92.7
Ireland	23.2	26.0	18.8	27.8	-26.3	-66.2	27.0
Latvia	22.3	35.9	50.3	21.5	11.9	-30.7	-45.6
Lithuania	57.6	62.7	87.0	2.2	25.1	-26.5	-44.2
Portugal	15.8	12.6	13.4	29.9	16.3	-51.3	33.5
Spain	27.4	18.7	20.6	34.5	5.6	-40.6	27.2
House price							
Estonia	12.9	27.8	30.9	51.8	10.1	-12.3	-39.4
Greece	5.4	2.3	10.9	13.0	6.2	1.5	-4.4
Iceland	11.9	12.8	35.3	12.7	10.2	3.9	-9.6
Ireland	14.2	11.2	7.4	13.6	-0.5	-9.1	-13.7
Latvia	-	-	27.3	98.0	77.3	-26.5	-
Lithuania	13.3	25.7	47.8	36.9	26.9	2.6	-26.2
Portugal	-	2.6	2.9	0.3	0.5	-4.3	-1.8
Spain	17.6	17.5	13.9	10.4	5.8	0.7	-7.4

Source: IFS, Statistics Estonia, Bank of Greece, Iceland Property Registry, The Economic and Social Research Institute, Statistics Latvia, Ober Haus Real Estate Advisors, Statistics Portugal and Bank of Spain.

Appendix V. Unemployment by age and education

Year	Quarter	Age: 16-24	Age: 25-54	Age: 55-74	Basic (ISCED 1,2)	Secondary and lower tertiary (ISCED 3,4)	University (ISCED 5,6)
2003	-	8.3	2.5	1.9	5.4	2.3	2.1
2004	-	8.1	2.0	2.5	4.9	2.6	1.4
2005	-	7.2	1.7	1.3	4.4	2.0	1.2
2006	-	8.2	1.8	1.5	4.9	2.2	1.3
2007	-	7.2	1.3	1.1	4.2	1.6	0.9
2008	1	6.5	1.6	1.2			
2008	2	10.8	1.4	1.1	5.3	1.9	1.6
2008	3	4.8	2.0	1.9			
2008	4	10.8	2.9	2.3			
2009	1	12.6	6.9	3.5			
2009	2	21.9	6.9	3.7	11.2	6.1	4.0
2009	3	12.3	5.1	3.3			
2009	4	16.1	5.6	3.2			
2010	1	16.4	6.5	4.8			
2010	2	21.3	6.3	4.4			

Source: Statistics Iceland.

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