

The Icelandic economy is relatively volatile in comparison with other OECD countries. The standard deviation of changes in GDP is quite large, but not much larger than in several other OECD countries. It is possible to identify several reasonable explanations for this. What is more difficult to explain is why private consumption is much more volatile than GDP and income in Iceland.

The economic literature generally assumes that households attempt to smooth their consumption over time, and that wide fluctuations in private consumption are detrimental to economic well-being. That being the case, it could be expected that private consumption should fluctuate less than output and income. Iceland is not the only country in the OECD where private consumption fluctuates more than GDP, although it is the most extreme example. The ratio of the standard deviation of changes in private consumption and the standard deviation of changes in GDP is thus much higher in Iceland than anywhere else in the OECD. This Box attempts to shed light on the main reasons for this pronounced volatility in private consumption in Iceland.<sup>2</sup>

### Private consumption fluctuates more in Iceland than in most other countries

As Chart 1 shows, fluctuations in private consumption are considerably greater in Iceland than, for example, in Finland, which has the second-highest standard deviation of private consumption in the Nordic countries, and New Zealand, which is a small, open economy that resembles Iceland in many ways.<sup>3</sup>

In comparison with the OECD as a whole, Iceland has the second-largest fluctuation in private consumption and the fourth-highest fluctuation in GDP (see Chart 2). Only in Turkey does private consumption fluctuate more, and Turkey experienced a serious financial crisis during the middle of the period analysed. As can be seen in Chart 3, which shows the standard deviation of private consumption as a ratio to the standard deviation of GDP for the same countries as are shown in Chart 2, Iceland stands out, with a standard deviation of private consumption nearly twice as large as the standard deviation of GDP.

### Sharp fluctuations in spending on consumer durables

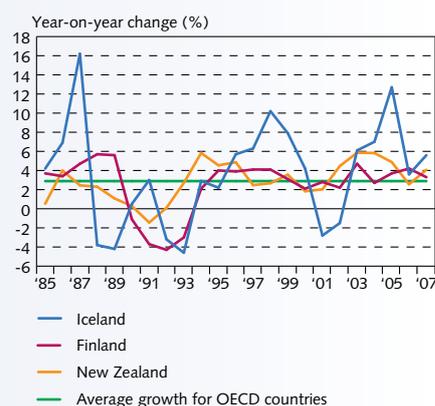
Private consumption can be divided into four categories: durables, non-durables, semi-durables, and services. Expenses for the purchase of automobiles, furniture, and large home appliances are classified as durables, and it is likely that these expenses fluctuate more than other consumption expenditures. Volatility in this category could therefore explain the dramatic swings in private consumption in Iceland.

Table 1 shows fluctuation in total private consumption, as well as in several sub-categories, for different time periods. As can be seen, consumption of durables is the most volatile. The standard deviation of service-related private consumption (such as healthcare services) is much lower. As could be expected, the standard deviation of inelastic consumer goods such as food, beverages, alcoholic

## Box IV-1

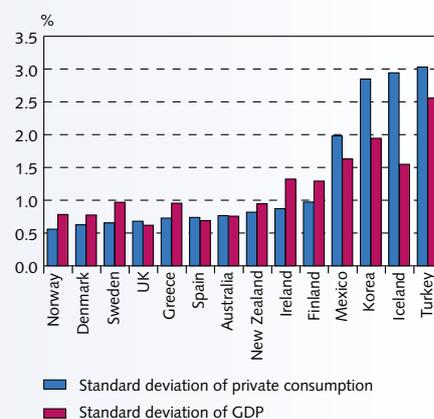
### Fluctuations in private consumption<sup>1</sup>

Chart 1  
Private consumption growth 1985 - 2007



Sources: Statistics Iceland, OECD.

Chart 2  
Standard deviation of private consumption and GDP for various OECD countries Q1/1987 - Q2/2007<sup>1</sup>



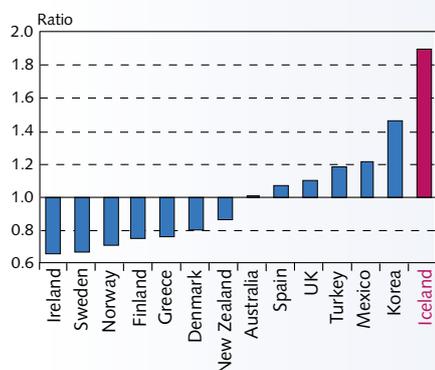
1. Data are seasonally adjusted and fitted with the Baxter-King bandpass filter.

Sources: Eurostat, Reuters EcoWin, Statistics Iceland, Eurostat.

1. This Box is based on the paper by Sveinsdóttir, Haraldsdóttir, and Pétursson (2010), "Business cycle fluctuations in Iceland", Central Bank of Iceland, *Working Papers*, forthcoming.
2. Danielsson (2008) discusses developments in the Icelandic business cycle in the context of global developments.
3. The comparison extends to all OECD countries during the period 1985 to 2007, with the exception of six countries for which data were only available for a shorter period. The data cover the period until the global financial crisis in 2008. Data on the composition of foreign trade are taken from the United Nations database ([www.unctad.org](http://www.unctad.org)).

Chart 3

Standard deviation of private consumption as a share of standard deviation of GDP  
Q1/1987 - Q2/2007<sup>1</sup>

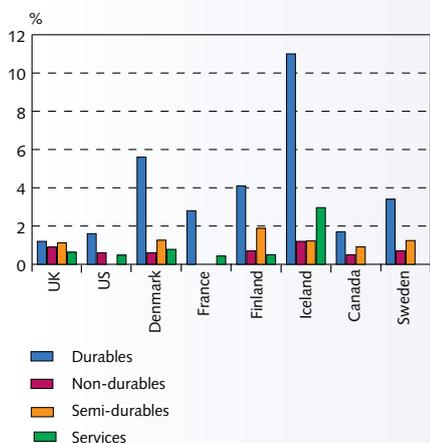


1. Data are seasonally adjusted and fitted with the Baxter-King bandpass filter.

Sources: Eurostat, Reuters EcoWin, Statistics Iceland.

Chart 4

Standard deviation of private consumption components for various countries<sup>1</sup>



1. Data are seasonally adjusted and fitted with the Baxter-King bandpass filter.

Sources: Reuters Ecwin, Statistics Iceland.

beverages and pharmaceuticals is rather low. The same applies to fluctuations in spending on non-durables, such as clothing, books, compact discs, and sporting goods.

Table 1 Fluctuation in private consumption and its components<sup>1</sup>

Standard deviation of changes (%)	Period		
	1992-2000	2001-2007	1992-2007
Private consumption	2.0	3.2	2.5
Private consumption excluding durables	1.7	2.5	2.1
Durables	6.1	15.4	11.0
Vehicles	8.6	27.7	19.0
Durables excluding vehicles	4.6	9.0	6.8
Non-durables	1.2	1.2	1.2
Semi-durables	1.1	1.3	1.2
Services	2.6	3.5	3.0
GDP	1.3	1.4	2.5
Exchange rate of the króna	2.8	7.2	5.1
Disposable income	1.8	2.1	1.9

1. Data are seasonally adjusted and fitted with the Baxter-King bandpass filter.

The standard deviation of changes in total private consumption is 2.5%. If private consumption excluding durables is examined, the standard deviation falls from 2.5% to 2.1%, even though spending on durables only accounts for about 9.5% of total consumption expenditure during the period.<sup>4</sup>

Comparing the sub-categories of private consumption in Iceland with those in the United States, United Kingdom, Denmark, France, Finland, Canada, and Sweden between 1992 and 2007, reveals that all sub-categories except semi-durables fluctuate most in Iceland.<sup>5</sup> Volatility is second-highest in Denmark. It is interesting to note that consumption tends to be more volatile in the Nordic region than in other countries in the comparison.

#### Economic theories on household consumption decisions

According to the permanent income hypothesis, private consumption is determined by permanent income, defined as the expected present value of lifetime income. When current income is higher than permanent income, households step up their savings while keeping private consumption more or less constant. In the same manner, households must spend their savings or increase their borrowings in order to maintain their consumption patterns if their current income is lower than permanent income. In this way, households use savings and borrowing to smooth consumption over time. This behaviour is known as the consumption smoothing hypothesis, and it is the main idea behind the permanent income hypothesis of Modigliani and Brumberg (1954) and Friedman (1957), as well as the basis of all modern economic theory on household consumption decisions. This suggests that private consumption should fluctuate less than income and GDP.

4. Data on the division of private consumption into sub-categories are obtained from Statistics Iceland and extend back to 1990. The share of durables in private consumption fluctuates widely, as the standard deviation is large. It peaks at 17% in Q2/2005 and is lowest at 3% in Q1/2009.

5. Information was not available on all sub-components of private consumption for all countries; for example, information was unavailable on service expense in Canada and Sweden, semi-durables in the US, and non-durables and semi-durables in France. Data begin in 1997 for the US and in 1995 for Sweden. Information on sub-components of private consumption was not available for other countries.

### Reasons for wider fluctuations in private consumption in Iceland

There could be a variety of reasons for the volatility in private consumption in Iceland. Fluctuations in consumption could reflect the overall volatility of the economy, which could stem from the small size and the structure of Iceland's economy (see, for example, Pétursson, 2010). Small countries tend to have a less diversified industrial base, with relatively few industries that can have a disproportionately large effect on overall economic performance. The small size also makes it more difficult to undertake large scale investment projects. Furthermore, it is likely that smaller countries have less developed financial systems with a narrower range of financial products, thus making financial risk diversification more difficult than in larger countries where risk can be spread over a larger group of individuals. As a result, households have more difficulty smoothing fluctuations in consumption.

Table 2 Composition of foreign trade for 2006

	<i>The weight of manufacturing products in exports</i>	<i>The weight of commodities and food exports</i>
Australia	18%	75%
Denmark	65%	32%
Finland	81%	18%
Greece	51%	46%
Iceland	19%	80%
Ireland	84%	12%
Korea	89%	11%
Mexico	76%	24%
New Zealand	30%	67%
Norway	16%	81%
Spain	76%	23%
Sweden	77%	17%
Turkey	41%	9%
UK	75%	20%
OECD countries	69%	26%

Source: Database of the United Nations.

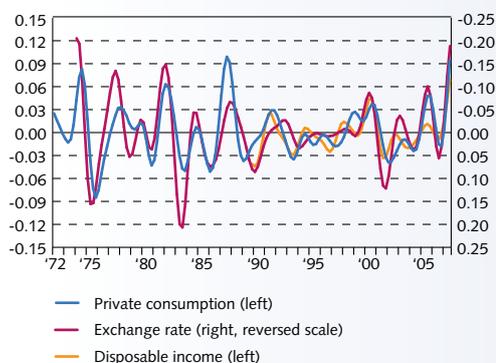
Because of the structure of its economy, external shocks probably make the Icelandic economy more volatile than other OECD countries. Natural resources and commodities weigh more heavily in Icelandic exports than in most OECD countries. For example, commodities and food products accounted for 80% of Iceland's 2006 product exports, while the OECD average was 27%. Similarly, manufacturing exports were only 19% in Iceland, as opposed to 69% in the OECD, which makes Iceland dependent on imports of such products. The Icelandic economy is therefore vulnerable to changes in commodity prices, which have a tendency to fluctuate widely. This appears in greater volatility in terms of trade, but also in fluctuations that can be attributed to variations in the fish catch.<sup>6</sup>

The volatile environment in which Icelandic firms operate does not tell the whole story, however. In this context, it is also important to consider the effect of economic fluctuations on households' earnings and resilience to such fluctuations (see, for example, Loayza *et al.*, 2007). In Iceland, fluctuations in real wages are the highest in the OECD, while saving has generally been very limited among

6. See, for example, the paper by Gudmundsson, Sighvatsson, and Pétursson (2000), which shows that a large proportion of Iceland's economic volatility can be traced to fluctuations in terms of trade and fish catches.

Chart 5

Business cycle fluctuations in private consumption, disposable income and exchange rate<sup>1</sup>

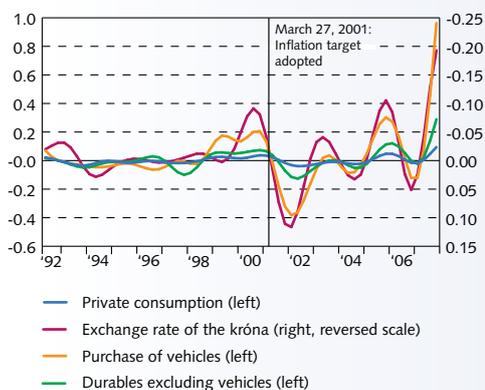


1. Data are seasonally adjusted and fitted with the Baxter-King bandpass filter.  
Sources: Statistics Iceland, Central Bank of Iceland.

Chart 6

Business cycle fluctuations in the exchange rate, domestic private consumption and its components

Q1/1992 - Q3/2007<sup>1</sup>



1. Data are seasonally adjusted and fitted with the Baxter-King bandpass filter.  
Sources: Statistics Iceland, Central Bank of Iceland.

Icelandic households. This is offset by a strong pension fund system that nonetheless is only utilised to a limited extent to smooth consumption, as pension savings are tied for long periods and are more or less inaccessible at any given time.

In addition, Iceland's tax system and social welfare benefits have a tendency to encourage debt accumulation and the allocation of a relatively large share of savings towards housing, which makes it even more difficult to smooth consumption. A relatively undeveloped domestic financial system also reduces Icelandic households' ability to smooth consumption, making it more likely that a rather large share of Icelandic households are limited to their current income when making consumption decisions.

Another important explanation of Iceland's high consumption volatility is probably that domestic economic policy has not been successful in reducing business cycle fluctuations. In that context, fiscal policy has generally been procyclical rather than countercyclical. Neither has domestic monetary policy been successful in anchoring inflation and inflation expectations, and as a result, it has not been able to ensure the price stability that is one of the foundations of long-term economic stability.

Finally, it is worth asking whether volatility in private consumption can be attributed to large and frequent changes in the exchange rate of the króna. As has been stated previously, the domestic manufacturing sector is small; therefore, most manufacturing goods and durable and non-durable consumer goods are imported. Large exchange rate fluctuations can thus have a significant impact on private consumption by changing the relative prices of domestic and imported goods. The effects can also be indirect, through changes in inflation and labour income. These effects can be expected to be even more pronounced the more procyclical the exchange rate is, a tendency more evident for the Icelandic króna than the currencies of most other countries (Pétursson, 2010). This can be seen in Chart 5 and Table 3, which show that cyclical fluctuations in private consumption closely follow the exchange rate of the króna and the purchasing power of disposable income. On the other hand, fluctuations in private consumption do not appear to move closely with fluctuations in private sector wealth due to share price movements, at least not by more than is reflected in households' disposable income. The fluctuations follow movements in real estate prices more closely, in line with the experience in other countries, and it appears that fluctuations in private consumption are led by movements in house prices.

Table 3 Correlation to private consumption lagged by  $k$  quarters for the period Q1/1985 - Q3/2007<sup>1</sup>

	$k = -2$	$k = -1$	$k = 0$	$k = 1$	$k = 2$
Exchange rate index	-0,36	-0,56	-0,69	-0,60	-0,35
Disposable income	0,29	0,55	0,76	0,76	0,61
Housing price	0,65	0,64	0,49	0,23	-0,08
Equity price	0,14	0,28	0,48	0,50	0,48

1. Data are seasonally adjusted and fitted with Baxter-King bandpass filter.

Sources: Iceland Stock Exchange, Statistics Iceland, Central Bank of Iceland.

Chart 6 illustrates this more clearly, as it shows developments in the exchange rate and in the main sub-categories of private consumption. As can be seen, the purchase of durables, such as automobiles, is particularly dependent on exchange rate movements, and volatility in these expense items has increased with increased

exchange rate volatility. This can also be seen in Table 1, which compares Iceland's fixed exchange rate period (until 2001) with the period after 2001, when the króna was floated. As can be seen, fluctuations in spending on durables have increased substantially during this period.

Consequently, it is important to ask how much fluctuations in private consumption can be attributed directly to Iceland's having an independently floating currency. A growing number of studies indicate that exchange rates fluctuate more than can be explained by changes in economic fundamentals, and that exchange rate volatility can be a source of shocks instead of a shock absorber (see, for example, Artis and Ehrmann, 2006). The results in Pétursson (2009) indicate that this "excess" volatility of the Icelandic króna is greater, on average, than in other OECD countries, and that the shock-generating behaviour could therefore be stronger than in other developed countries.

### References

- Artis, M., and M. Ehrmann (2006). The exchange rate – A shock-absorber or source of shocks? A study of four open economies. *Journal of International Money and Finance*, 25, 874-893.
- Danielsson, Á., (2008). The great moderation Icelandic style. Central Bank of Iceland, *Working Paper*, no. 38.
- Friedman, M., (1957). *A Theory of the Consumption Function*. Princeton, NJ: Princeton University Press.
- Gudmundsson, M., A. Sighvatsson and T. G. Pétursson (2000). Optimal exchange rate policy: The case of Iceland. In the book *Macroeconomic Policy: Small Open Economies in an Era of Global Integration*, eds. Gylfi Zoëga, Már Gudmundsson and Tryggvi Th. Herbertsson. Reykjavík: Háskólaútgáfan [University Press], 2000.
- Loayza, N.V., R. Rancière, L. Servén, and J. Ventura (2007). Macroeconomic volatility and welfare in developing countries: An introduction. *World Bank Economic Review* 21, 343-357.
- Modigliani, F., and R. Brumberg (1954). Utility analyses and the consumption function: An interpretation of cross-section data. In the book *Post Keynesian Economics*, ed. K. K. Kurihara. New Brunswick, NJ: Rutgers University Press.
- Pétursson, T. G., (2009). Does inflation targeting lead to excessive exchange rate volatility? Central Bank of Iceland, *Working Paper*, no. 43.
- Pétursson, T. G., (2010). Inflation control around the world. Why are some countries more successful than others? In the book *Inflation Targeting Twenty Years On: Past Lessons and Future Prospects*, eds. D. Cobham, Ø. Eitrheim, S. Gerlach and J. F. Qvigstad. Cambridge: Cambridge University Press.
- Sveinsdóttir, R. B., S. J. Haraldsdóttir and T. G. Pétursson (2010), „Business cycle fluctuations in Iceland“, Central Bank of Iceland, *Working Papers*, forthcoming.