HM Government

Scotland analysis: Assessment of a sterling currency union

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Executive summary

Scotland's economy in the United Kingdom

The United Kingdom (UK) is one of the most successful monetary, fiscal and political unions in history. It is a union that has brought economic benefits to all parts of the UK. As *Scotland analysis: Macroeconomic and fiscal performance* set out Scotland has performed well as part of the UK: over the last 50 years, growth in economic output per person has been slightly stronger in Scotland than in the UK averaging 2.2 per cent in Scotland and 1.9 per cent in the UK overall.

The UK is a successful union because taxation, spending, monetary policy and financial stability policy are co-ordinated across the whole UK. It means risks are pooled, there is a common insurance against uncertainty and no one area or sector of the larger economy is too exposed. This has helped all parts of the UK weather the recent global economic crisis. Governments that are able to borrow in their own currency, and make their own political and economic decisions, are able to borrow more cheaply. And with clear political accountability, a single government can quickly respond to a financial crisis.

The economy of an independent Scottish state

Scotland's economy would behave very differently as a separate state. The economy of an independent Scottish state would be more exposed to risks from the energy and finance sectors, which are volatile or at risk of large destabilising shocks. The Scottish economy would no longer be part of the UK's common fiscal policy which allows for risk-sharing, and pools exposure to risks and also would leave the UK's full banking union. And over time, the Scottish economy would be likely to diverge from the continuing UK due to differences in economic policy and the emergence of a 'border effect'.

Scotland's reliance on trade with the rest of the UK increases the benefits of exchange rate stability and lower transaction costs from joining a sterling currency union. But the experience of the global financial crisis suggests that countries with more flexible macroeconomic policy regimes, in particular with more direct control over their monetary policy, can be better equipped through periods of very severe economic stress. An independent Scottish state would also, under any currency arrangement, need to build credibility and establish a track record of monetary and fiscal competence.

There is no rule or principle in international law that would require the continuing UK to formally share its currency with an independent Scottish state. Independence means leaving the UK's monetary union and leaving the UK pound.

Economic adjustment in a sterling currency union

The UK shows all the characteristics of being an optimal currency area given the high degree of economic integration, convergence in its business cycles and levels of productivity, and a high degree of labour mobility. But there are limitations to the benefits of economic integration; successful currency unions also require fiscal integration which is an important source of stabilisation in times of economic difficulty. The US is an example of a highly successful, yet economically very diverse, currency union that is underpinned by fiscal and political union.

Without the same mechanisms of mutual insurance, the euro area has struggled to adjust to the effects of the financial crisis, and in response is taking steps towards further political and fiscal integration. Many of the difficulties that the euro area has experienced in trying to stabilise the economies of its Member States were identified by HM Treasury's 2003 *UK Membership of the single currency: An assessment of the five economic tests*. The economic modelling in the Assessment pointed to the difficulties of achieving successful economic adjustment in the euro currency union. The Treasury has developed the model used in that Assessment to illustrate the possible economic consequences of a formal sterling currency union.

The analysis shows that, in the event of independence, the loss of fiscal union with the rest of the UK worsens the ability of Scotland's economy to respond to Scotland-specific challenges. In a sterling currency union, an independent Scottish state's interest rates and exchange rate would be common to the currency union as a whole. Neither would fully adjust to address economic difficulties in Scotland that did not affect the rest of the UK. Instead the public finances of an independent Scottish state would need to do more to support the Scottish economy, through changes in tax and spending levels, without access to the continuing UK's fiscal resources. However, it is unlikely, as the euro area experience has shown, that an independent Scottish state would have the fiscal flexibility to offset large economic shocks, due to its fiscal position and the fiscal constraints imposed by a currency union and the financial markets.

The position of the public finances matters for the stability of a currency union because it reflects governments' fiscal space to respond to an economic shock. On current plans, both the UK and an independent Scottish state will be continuing to tighten fiscal policy following the financial crisis and recession. Substantial deficits and elevated debt levels in an independent Scottish state and the continuing UK would weigh strongly against agreeing to currency union because it would raise questions about the ability of the governments to sustain the currency union under stress. It is inconceivable that the government of an independent Scottish state could adjust its fiscal position sufficiently to enter currency union to the timetable the current Scottish Government have set for independence (and also start to save in an oil fund, as is its stated intention).

Currency unions also require strict fiscal constraints to be in place. These constraints would need to reflect the difference in economic size, and therefore exposure to fiscal and financial risk of the continuing UK and an independent Scottish state. Fiscal oversight would need to stretch beyond agreement on an appropriate set of fiscal rules. Regular monitoring of an independent Scottish state's fiscal position by the continuing UK would be required in a currency union, including some mechanism for intervention and correction if fiscal risks to the stability of the currency union were to arise. These constraints would limit a future Scottish government's ability to use fiscal policy to support the economy.

The financial markets would also constrain the fiscal policy of an independent Scottish state. An independent Scottish state would find it more expensive to borrow in financial markets as it would have: a less liquid debt market; a lack of an institutional track record and institutional uncertainty; higher economic and fiscal volatility; a larger future potential debt burden; a larger financial services sector, with larger contingent liabilities as a share of GDP; and reduced monetary policy flexibility to respond to external shocks. The National Institute of Economic and Social Research have estimated that in a sterling currency union the government of an independent Scottish state would pay an interest rate premium of between 0.72 and 1.65 per cent, relative to the price of UK Government funding.

The oil sector would comprise a much larger share of an independent Scottish economy than the UK's. This would leave it more exposed to variations in the global price for oil. A change in the price of oil is the most acute example of the problems that would arise from a currency union. The analysis in this paper estimates that a $20 fall in the oil price would cause an independent Scottish state's unemployment to peak half a percentage point higher than if Scotland were to remain a part of the UK. This is equivalent to around 11,000 Scottish jobs. Large changes in the oil price are not uncommon: in the summer of 2008 the oil price was over $130 a barrel, but by the end of the year it had fallen to less than $40 a barrel. In 2013, the oil price averaged $110 a barrel.

Scotland does not have to resolve these tensions as part of the UK as these risks and uncertainties are pooled across all of the economy and its taxpayers. Autumn Statement 2013 illustrated this benefit of the UK very clearly: the Office for Budget Responsibility cut its forecast for North Sea oil and gas revenues by almost £4 billion over the next three years – but instead of needing to cut spending, the Scottish Government saw its budget rise by more than £300 million. Under independence, the government of an independent Scottish state would have to cut public spending or raise taxes in response to such deterioration in projected oil and gas revenues.

Risks to the stability of a sterling currency union

The euro area experience has highlighted further requirements for currency unions and as set out by the Governor of the Bank of England, in a recent speech, "The Economics of Currency Unions",[1] the euro area crisis has established that an agreed set of fiscal rules are insufficient to ensure the stability of a currency union. The EU's Stability and Growth pact proved unable to prevent funding problems arising for smaller, and in many cases fiscally prudent, members of the euro area. These difficulties have also spilled over to other members of the currency union. In response to the crisis the euro area is currently moving towards further fiscal risk-sharing mechanisms and introducing the main elements of a banking union.

In particular, the euro area experience has shown the need for supranational currency unions to have adequate institutional structures and shared fiscal arrangements to manage economic imbalances across the union. The Governor of the Bank of England's speech focused on these requirements, including:

- Banking union, with coordinated supervision of the financial sector, and clear and responsive resolution mechanisms and guarantee schemes, and lines of accountability;
- Shared fiscal arrangements, both to underpin banking union and to manage the risk of default by one member country spilling over to affect the whole currency union.

[1] Speech at lunch hosted by the Scottish Council for Development and Industry (SCDI), Edinburgh, 29 January 2014, www.bankofengland.co.uk/publications/pages/speeches/2014/706.aspx

The UK is a full fiscal and banking union. The financial stability framework provides clear governance and political accountability that facilitates rapid crisis resolution decisions when the need arises. It makes clear that in a financial crisis, while the Bank of England continues to have operational responsibility, it is the Chancellor that is solely responsible for the commitment of public funds. This framework was tested in the global financial crisis and proved resilient. Effective coordination between HM Treasury, the Financial Services Authority and the Bank of England allowed the UK Government to extend unprecedented support to the Royal Bank of Scotland (RBS) over a single weekend, preventing catastrophic consequences for the financial system. The Treasury eventually provided £45 billion to recapitalise RBS and a commitment of a further £275 billion of state support in the form of guarantees and funding.

Recreating the institutional and political structure of the UK's banking union as part of a formal sterling currency union would be very difficult and complex. In particular the difference in economic size of the two countries would cause the continuing UK to become exposed to much greater fiscal and financial risk from an independent Scottish state. The continuing UK would be at risk of providing taxpayer support to the Scottish financial sector if the Bank of England were acting as a joint lender of last resort and, at the extreme, providing a joint fiscal back stop. An independent Scottish state would not face the same risk, as the smaller fiscal resources available to support the continuing UK would limit the practical exposure of Scottish taxpayers. It is also very unlikely that two governments could act as quickly and decisively as one in the face of a financial crisis.

Banking unions are therefore hard to separate from the fiscal risk-sharing arrangements in a currency union. It is in the interest of all countries to sever the link between banks and governments by ending the problem of banks that are 'too big to fail'. The UK is at the forefront of these efforts through the Financial Services (Banking Reform) Act 2013 and recently agreed European Bank Resolution and Recovery Directive. But it will not fully break the link as fiscal backstops are required to underpin deposit guarantee schemes and the operation of the central banks as the lender of last resort. A stable sterling currency union would therefore almost certainly involve some pooling of fiscal resources for crisis intervention measures and result in exposure for taxpayers in the continuing UK to banks in an independent Scotland. An agreed set of fiscal rules for an independent Scottish state and the continuing UK would not be sufficient to ensure the stability of the currency union.

The implicit commitment of public funds in a sterling currency union would require an underpinning political commitment. And the strength of the political commitment to a currency union is key to its durability. Currency unions may unwind if they are perceived to be only temporary and as the Scottish Government's White Paper points out, "it would, of course, be open to people in Scotland to choose a different arrangement in the future".[2] The euro area experience during the sovereign debt crisis illustrates the pressure that financial speculation can place on a government's funding costs when there is uncertainty as to the future of the currency union. If the political commitment to the currency union is thought to be lacking or temporary, financial speculation can become a self-fulfilling prophecy. Low market confidence in the political will to sustain the currency union can generate capital flight, reinforcing economic problems and the political pressure to exit. This was the case in the short-lived experience of the Czechoslovakian monetary union, which lasted 33 days following the separation of the Czech Republic and Slovakia.

[2] Scottish Government (2013) "*Scotland's Future: Your guide to an independent Scotland*"

Conclusion

The UK is a successful union because taxation, spending, monetary policy and financial stability policy are co-ordinated across the whole UK. It means risks are pooled, there is a common insurance against uncertainty and no one area or sector of the larger economy is too exposed.

Within a sterling currency union, an independent Scottish state would find it more difficult to adjust to the effects of economic challenges, such as a fall in the global oil price, than Scotland currently does as part of the UK. The continuing UK would become unilaterally exposed to much greater fiscal and financial risk from a separate state. Greater fiscal risk would come from UK taxpayers being asked to support the wider economy of another state and also financial risk were banks from that state to fail.

The conclusion of HM Treasury's Assessment of euro membership in 2003 was to advise the UK Government against joining Economic and Monetary Union. The subsequent experience of the euro area in the financial crisis has confirmed the economic reality of HM Treasury's Assessment. It has also highlighted additional challenges of creating a durable and effective currency union, illustrated by the very difficult economic adjustments required by some members and the financial risks that have been accepted by other members and their taxpayers.

On the basis of the scale of the challenges, and the Scottish Government's proposals for addressing them, HM Treasury would advise the UK Government against entering into a currency union. There is no evidence that adequate proposals or policy changes to enable the formation of a durable currency union could be devised, agreed and implemented by both governments.

Introduction

Scotland is an integral part of the UK and the UK economy. This would change in the event of independence, and Scotland would become a separate independent state. This would both fundamentally change Scotland's economic relationship with the continuing UK and the policy choices that an independent Scotland would face as a small economy.

The referendum on independence presents one of the most important decision points in Scotland's and the UK's history. It is important that the debate ahead of the referendum is informed by analysis, and that the facts that are crucial to considering Scotland's future are set out.

The objective of the UK Government's Scotland analysis programme is to provide comprehensive and detailed analysis of Scotland's place in the UK and how that would be affected by independence. The outputs of the analysis will provide sources of information and aim to enhance understanding on the key issues relating to the referendum. As such, the programme should be a major contribution to the independence debate.

This is the eleventh paper in the Scotland analysis series and draws on *Scotland analysis: Currency and monetary policy*, *Scotland analysis: Financial services and banking*, *Scotland analysis: Business and microeconomic framework* and *Scotland analysis: Macroeconomic and fiscal performance*. The paper will examine what independence would mean for Scotland's economy and how this would impact on Scotland's macroeconomic framework choices, including its choice of currency.

Structure of the paper

Chapter 1: An independent Scottish state would be a relatively small nation among developed nations. It would also be a different economic entity, with greater exposure to the energy and finance sectors. This chapter will explore what this means for an independent Scotland's economy and its policy choices. An independent Scotland would face different choices than it has as part of the UK. The different economic circumstances that an independent Scotland faces would influence its currency choice.

Chapter 2: Illustrates through the use of models how a formal sterling currency union would be different to the current arrangements with Scotland as part of the UK.

Chapter 3: Discusses the likely requirements of a formal sterling currency union to include significant fiscal risk-sharing mechanisms and elements of a banking union between an independent Scotland and the continuing UK. These mechanisms would need to replace the current durable and efficient banking union and would be challenging to negotiate.

Chapter 4: Concludes the analysis.

Chapter 1:
The economic characteristics of an independent Scottish state

Summary

The Scottish economy has performed well as part of the UK. In the event of independence, Scotland's economy would behave very differently as a separate state. This change would happen immediately upon independence. It would be a small country by international standards; similar in size to Denmark, Ireland, Finland, Greece or Portugal. Country size is not, in and of itself, an important driver of economic performance. But in order to overcome a smaller domestic market, small countries need to trade more externally. This leads to greater specialisation but also greater volatility. This can be offset in regions that are part of larger countries through fiscal transfers. But such fiscal transfers do not exist between separate, independent states.

An independent Scotland would become dependent on particularly volatile sectors: North Sea oil and gas, and a financial sector that would be, on current measures, more than ten times its GDP. This would likely add to an independent Scotland's volatility, as well as making a separate Scottish economy structurally different to the continuing UK. How economies adjust to changes in economic circumstances is important as it affects economic growth, inflation, unemployment and living standards. A more volatile adjustment process will result in worse outcomes.

Structural differences, the creation of a national border that would reduce trade flows, and different institutional frameworks and policy approaches would lead to economic divergence between an independent Scottish state and the continuing UK. In the event that a currency union could be agreed, this divergence would lead to Bank of England monetary policy becoming less well suited to an independent Scotland's economy. This is in contrast to the existing currency and monetary policy arrangements within the UK, which have served Scotland well for a sustained period.

1.1 The Scottish economy performs well as part of the UK. Scotland is the third most prosperous part of the UK after London and the South East. *Scotland analysis: Macroeconomic and fiscal performance* showed that integration is at the heart of the economic, fiscal and political union between Scotland and the rest of the UK and produces tangible benefits for Scotland's macroeconomic performance. Since 1963, growth in economic output per person has been slightly stronger in Scotland than in the UK, averaging 2.2 per cent in Scotland and 1.9 per cent in the UK overall.

1.2 Scotland's current economic performance as part of the UK is as strong as other comparable independent countries. Scotland had a higher employment rate in 2012 than Denmark, Finland and Portugal. In the period 2000 to 2012, Scottish output growth per head was superior to Denmark, Finland, Ireland, Luxembourg and Portugal, equal to Austria and behind Sweden. In the event of a vote for independence, Scotland would leave the UK, and an independent Scottish state would have to establish its own macroeconomic and institutional framework. Institutional and policy divergence between Scotland and the continuing UK would be likely to lead to a weakening of economic integration. Collectively these changes would be expected to trigger a 'border effect', which is likely to reduce the level of real income in the Scottish economy. Independence carries risks of diminishing Scotland's strong economic performance achieved as part of the UK and competitive economic performance in comparison to small European countries.

Country size and economic growth

1.3 An independent Scottish state would be a small country by international standards; among European countries, it would be about the size of Denmark, Ireland, Finland, Greece or Portugal, about half the size of Norway or Sweden and 15 times smaller than Germany.

1.4 Country size is not, in and of itself, an important driver of economic performance and success. There are a number of successful small countries. Small countries may, "because of their small size, be better equipped to adapt and find their own niche".[1] However, being small can pose challenges for countries' policy settings.

1.5 Empirical studies have examined the question whether country size has an impact on economic growth. There are individual studies which find evidence for both a positive and negative relationship.[2] Overall, the empirical evidence is ambiguous and there is no consensus that small countries perform systematically better or worse than large countries. There is therefore no evidence of an automatic 'growth dividend' for either small or large countries.

1.6 It is economic policy choices and institutional structures that seems to make the difference to small country economic performance. Small countries face different policy choices compared to large countries, and are generally required to set tighter and more prescribed policy frameworks in order to achieve the same growth performance.

1.7 Small countries have a smaller domestic market size which limits the ability of firms to take advantage of economies of scale. *Scotland analysis: Macroeconomic and fiscal performance* explained that access to a larger market can increase productivity. Smaller countries seek to compensate for the effects of a smaller domestic market by becoming more open to trade in international markets. This typically leads to higher levels of trade flows and increased specialisation in a smaller number of sectors.[3]

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1 Keating and Harvey (2014).

2 Alesina et al find a positive relationship between growth and country size, Alouini and Hubert (2010) a negative relation and Rose (2006) finds that country size has no impact on economic growth, income levels or wider measures of economic performance such as health and education outcomes.

3 Alesina et al (1997), Frankel and Romer (1999) and Frankel and Rose (2002) have shown that countries with higher levels of trade (both internal and external trade) are better able to specialise in goods and services in which they have a comparative advantage.

1.8 It has gradually become easier for small countries to trade externally as global trade has liberalised. The size of the domestic market has therefore become less of an advantage to larger countries. However, as shown in *Scotland analysis: Macroeconomic and fiscal performance*,[4] international borders still matter. They limit external trade between countries compared to internal trade within countries. In particular, Scotland is likely to see a reduction in trade with the continuing UK from the establishment of an international border and it is unclear whether Scotland would be able to replace this by increasing trade with other countries, even in the long term.[5]

1.9 The increase in specialisation is a common phenomenon. Examples include Finland and mobile phones, Singapore and finance and Ireland and pharmaceuticals, and can give small countries a productivity advantage, as they concentrate production in the goods and services that they can produce most efficiently. But the effect can be double-edged, as it can leave small countries more vulnerable to downturns in the individual industries in which they operate.[6]

Country size and economic volatility

1.10 Due to increased trade and specialisation, small countries tend to be inherently more volatile. This is supported by a number of empirical studies.[7]

1.11 An independent Scottish state might also be expected to exhibit even greater economic volatility than typical small countries, due to its specific exposure to the North Sea oil and gas and the financial sectors, discussed in turn below.

North Sea oil and gas

1.12 An independent Scottish state would also have an extra source of volatility due to North Sea oil and gas. Although the allocation of the UK's oil and gas reserves would be subject to negotiation, on the basis of a geographical share oil and gas would constitute a large part of both an independent Scotland's economy (15 per cent of output between 1998 and 2012) and fiscal revenues (16 per cent of revenues between 2007-08 to 2011-12). Moreover, oil and gas has fluctuated between 9 per cent and 18 per cent of Scottish output between 1998 and 2008 and 21 per cent and 12 per cent of revenues between 2007-08 and 2011-12.

1.13 The volatility of oil and gas revenues would be a challenge for an independent Scottish state. Even Norway, often cited as the model natural resource producing economy, had problems during the 1970s, 1980s and 1990s coping with the extra volatility from oil and gas before the right institutional structure was in place.[8] This is why *Scotland analysis: Macroeconomics and fiscal performance* concluded that there was an economic rationale for an independent Scottish state to establish an oil fund in order to smooth this volatility.

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4 And in studies by McCallum (1995) and Anderson and van Wincoop (2003) amongst others.

5 *Scotland analysis: Macroeconomic and fiscal performance* estimated that trade between an independent Scotland and the continuing UK would be significantly lower as a result of the introduction of an international border, even if and independent Scotland and the continuing UK were able to form a sterling currency union.

6 See for example Rodrik (1998), Meilak (2008) and Giovanni and Levchenko (2007).

7 Easterly and Kraay (2000) find that smaller countries are more volatile, and that this result holds even when they allow for the effects of country location, the degree of economic development and the ownership of large oil reserves. Furceri and Karras (2007), who replicate the work of Rose (2006) but test for evidence of greater volatility. Alouini and Hubert (2010) also find that small countries are more volatile.

8 Olsen (2013) "Monetary Policy and wealth management in a small petroleum economy".

1.14 But establishing an oil fund would come at the price of higher taxes or lower current spending. Based on forecasts by the Centre for Public Policy for Regions,[9] for an independent Scottish state to start an oil fund in 2016-17 from a balanced budget, additional fiscal consolidation of 5.1 per cent of GDP would be needed. That implies spending cuts of 13 per cent from current levels, or onshore tax rises of 18 per cent. Even more fiscal consolidation would be required on top of that to begin contributing to the fund.

Financial services

1.15 Small countries with large financial services sectors can also be subject to greater volatility. Financial crises can have large negative effects on output. Small countries can be more vulnerable to this volatility as they have fewer resources to resolve financial stability problems. During the past twenty years, small countries as diverse as Norway, Finland, Hong Kong, Singapore and Ireland have suffered as a result of financial crises.

1.16 During the recent global financial crisis, the IMF[10] found three characteristics that left countries with large financial sectors vulnerable to crises. The characteristics were a significant cross-border dimension to their banks, limited fiscal resources and issuing a non-reserve currency or adopting a foreign reserve currency as its currency.

1.17 Small countries with large banking sectors are particularly vulnerable to having limited fiscal resources due to a smaller tax base. In order to accrue greater fiscal resources they have to run large fiscal and balance of payment surpluses to generate significant reserves without generating significant foreign liabilities. For example, both Singapore and Hong Kong generated large enough reserves that they were able to form a credible backstop for their financial sectors. This involved running an average fiscal surplus between 1991 and 2012 of 7.8 per cent in Singapore and 1.3 per cent in Hong Kong. This allowed both countries to better withstand the financial crisis. As is explained in Chapter 2 and Annex C, an independent Scottish state would need to significantly tighten fiscal policy to be in a position to generate significant reserves.

The welfare implications of economic volatility

1.18 The effect of volatility on growth can also have broader, 'hysteresis' effects.[11] Greater volatility can reduce the long term rate of growth and cause the unemployment rate to settle at a higher level, than otherwise. This effect can occur through a number of channels. For example, the long term unemployed can become detached from the labour market. This can happen through the gradual loss of skills as well as increased dissatisfaction with the labour market due to being unable to find a job. This means that workers can lose the opportunity to enter the labour force. In the extreme case, the unemployment rate can drift with no tendency to return to its original equilibrium. Unemployment quickly becomes permanent rather than temporary, with the result that the equilibrium unemployment rate tracks the actual unemployment rate.

1.19 This was most notable in the UK and Scotland in the 1980s when unemployment levels remained high for a number of years after the initial recession. Increased labour market flexibility and the ability of the labour market to match jobs to potential workers has contributed to reduced levels of unemployment during the recent recession compared to past recessions.

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9 Centre for Public Policy for Regions (2013), "Analysis of Scotland's Past and Future Fiscal Position".

10 IMF (2010) "Cross-Cutting Themes in Economies with large banking sectors".

11 First suggested by Phelps (1972) and supported by a number of different studies, including Ball (2009).

1.20 The extent of the recession in Scotland compared to comparable independent countries demonstrates the benefit being part of the UK provides Scotland in shielding it from the impacts of greater volatility.

Table 1.A

	Timing of the recession			Output impact of the recession		
	Quarter of peak	Quarter of trough	Duration (peak to trough)	Peak to trough	Trough to 2013Q3	Peak to 2013Q3
Austria	2008Q1	2009Q2	5	-5.6%	6.8%	0.8%
Denmark	2008Q2	2010Q1	7	-7.4%	3.8%	-3.9%
Finland	2007Q4	2009Q2	6	-11.2%	4.5%	-7.1%
Ireland	2007Q4	2009Q4	8	-11.5%	4.0%	-8.0%
Portugal	2008Q1	2013Q1	20	-5.8%	0.6%	-5.3%
Sweden	2007Q4	2009Q1	5	-7.6%	12.2%	3.7%
Luxembourg	2008Q1	2009Q1	4	-9.6%	7.6%	-2.8%
Median of comparable countries	2007Q4	2009Q2	6	-7.6%	4.5%	-3.9%
Scotland	2008Q2	2009Q3	5	-5.5%	4.9%	-0.9%

Source: Eurostat, Scottish Government, GDP statistical bulletin, (2013Q3)

Country size and fiscal policy

1.21 Mitigating the effects of greater volatility is not straightforward. Small countries can struggle because they are not able to receive automatic fiscal transfers that result from regional insurance within a larger country. As part of fiscal integration, when a negative economic shock affects a region there will be fiscal transfers from the rest of the country into the affected region.[12] But a smaller economic unit without other regions on which to draw loses this insurance.

1.22 Regional insurance within a large country could be replaced by a small country through inter-temporal insurance: saving cyclical fiscal surpluses and using this to fund future deficits. But the euro crisis showed the difficulty of doing this in small countries within a currency area.[13] Countries can also use financial markets to smooth volatility. But this is more difficult to achieve in small countries, as cross border financial markets are still incomplete. It is much harder to both hold assets and participate in capital markets across international borders, which limits the ability of small countries to use financial markets to smooth volatility.[14] This implies that, all else equal, small countries must run tighter fiscal policy than similar-sized regions of larger countries.

1.23 The extra challenges that small countries face place a constraint on small countries policy settings. Successful small countries such as Denmark, Norway and Sweden have demonstrated that overcoming these challenges involves establishing a long record of credible policy making. This credibility takes time to build and these economies have run prudent fiscal policy, including budget surpluses, for a number of years.

[12] Alesina and Spolaore (2003) "The Size of Nations".

[13] *Scotland analysis: Currency and monetary policy.*

[14] *Scotland analysis: Currency and monetary policy.*

Country size and monetary policy

1.24 Even successful small countries face a trade-off in their choice of currency. It can fix to a trading partner's currency (or the adoption of that currency in a currency union) that will help to lower transaction costs. Lowering transaction costs with other countries is important to small countries as a larger part of their economic output is trade. However, a currency peg or currency union leaves small countries with less monetary policy and exchange rate flexibility for supporting the domestic economy and adjusting to economic shocks. As analysis later in this paper will show, the loss of independent monetary policy and exchange rate flexibility further exacerbates the tight constraints placed on fiscal policy to adapt to economic shocks.

1.25 Scotland does not face this trade-off as part of the UK; benefitting from low transaction costs with its main trading partner as well as optimal monetary policy as part of a political, fiscal and banking union.

The UK's currency and monetary policy framework

1.26 The existing currency and monetary policy arrangements within the UK have served Scotland well for a sustained period. The UK is one of the most successful monetary, fiscal and political unions in history. It is a union that has brought economic benefits to all parts of the UK because taxation, spending, monetary policy and financial stability policy are coordinated across the whole of the UK. This has helped the UK to weather the recent global economic crisis because governments that are able to borrow in their own currency, and make their own political and economic decisions, are able to borrow more cheaply. And with clear political accountability, a government can quickly respond to a financial crisis.

1.27 In the event of a vote for independence, Scotland would leave the UK and its existing arrangements, and would need to establish its own macroeconomic and institutional framework. The existing currency arrangements would cease to apply to an independent Scotland and the status quo would not be an option. Annex A sets out a clear explanation of the legal position of the UK pound and the Bank of England in the event of Scottish independence. It concludes that there is no rule or principle in international law that would require the continuing UK to formally share its currency with an independent Scottish state. In the event of Scottish independence, the status quo would remain for the continuing UK; the UK pound would continue to be printed and the Bank of England would continue to fulfil its current functions as a continuing UK institution. However, the position would be quite different for an independent Scottish state. Independence means leaving the UK's monetary union and leaving the UK pound.

1.28 *Scotland analysis: Currency and monetary policy* concluded that all of the alternative arrangements to the current economic, fiscal and political union would be likely to be less economically suitable for both Scotland and the rest of the UK. The UK's macroeconomic framework provides for a full coordination of fiscal, monetary and financial stability policy. The recent global crisis has demonstrated the benefits of an integrated macroeconomic framework. This framework has enabled UK institutions to respond swiftly and flexibly to the crisis and to evolve to manage risks better in the future.

1.29 In its White Paper, *Scotland's Future: Your guide to an independent Scotland*,[15] the Scottish Government has proposed that an independent Scottish state would seek a formal sterling currency union with the continuing UK. The principles and terms of a formal sterling currency union would be subject to agreement with the continuing UK. A formal sterling currency union would only be possible if both an independent Scotland and the continuing UK could reach an agreement that satisfied both countries' economic interests.

1.30 In particular, *Scotland analysis: Devolution and the implications of Scottish independence*, set out that the UK's key national institutions – including the Bank of England – would operate on behalf of the continuing UK as before, but would have no power to act in or on behalf of an independent Scottish state, and no obligation to create the structures to do so. There is no rule or principle in international law that would require the continuing UK to share sterling with an independent Scottish state.

1.31 The rest of this chapter and document revisits the economic case for a formal sterling currency union that was analysed in *Scotland analysis: Currency and monetary policy*. It builds on the analytical and modelling framework that was used by the Treasury to assess the economic case for UK membership of the euro area in 2003.

[15] Scottish Government (2013) "Scotland's Future: Your guide to an independent Scotland".

Chapter 2:
Economic adjustment in a sterling currency union

The economic modelling in this chapter shows that an independent Scottish state in a sterling currency union would face a more difficult adjustment to adverse economic circumstances than Scotland currently does as part of the UK. In other words, a currency union would exacerbate economic volatility in an independent Scottish state leading to worse outcomes for Scottish economic growth, inflation and employment.

As the economies of the continuing UK and an independent Scotland diverge, the Scottish economy would be increasingly subject to Scotland-specific economic shocks. The economic adjustment process following a Scotland-specific shock in a sterling currency union is likely to be worse for three reasons. First, reduced economic integration between an independent Scottish state and the continuing UK would reduce the Scottish economy's ability to adjust to Scotland-specific shocks, for example through offsetting flows of labour, capital and trade. Secondly, without fiscal union, there would be no fiscal transfers from the continuing UK to alleviate economic difficulties. Finally, as part of a currency union, monetary policy would be less responsive to Scottish economic conditions placing more pressure on fiscal policy to respond to economic shocks. However, national fiscal policy in an independent Scottish state would be more constrained by the requirement for fiscal constraints in a currency union and a higher cost of government funding. NIESR estimate that an independent Scotland in a currency union would pay a premium of up to 1.65 percentage points relative to the UK's funding costs.

The economic adjustment problem is most readily illustrated by the effects of a fall in the global price of oil, which in a sterling currency union would be likely to warrant opposing interest rates responses in Scotland and the continuing UK but with a common interest rate. Economic modelling shows a $20 fall in the oil price raises the unemployment rate by 0.4 percentage points. This is equivalent to around 11,000 Scottish jobs.

Analytical framework for evaluating a currency union

2.1 The standard economic framework for assessing currency choices is the Optimum Currency Area approach.[1] This approach provides an analytical framework and a set of economic criteria by which to judge the appropriateness of different currency arrangements. It assesses the case for countries to share a common currency by weighing the benefits from lowering transactions costs against the costs of relinquishing an independent monetary policy.

2.2 Under current constitutional arrangements the UK, including Scotland, shows strong characteristics of an optimal currency area. The structure of the Scottish economy is very close to that of the UK as a whole and Scotland and the rest of the UK follow very similar business cycles. This ensures that monetary policy set by the Bank of England is on average well suited to the Scottish economy. And deep economic integration across the UK, including a high degree of labour mobility, helps the Scottish economy to adjust to Scotland-specific challenges.

2.3 Scottish independence would change this assessment. The current system of fiscal risk-sharing would end, and institutional and policy divergence between an independent Scottish state and the continuing UK would be likely to lead to a weakening of economic integration and the creation of a national border would reduce trade flows. These effects would cause monetary policy set by the Bank of England to become less appropriate over time for an independent Scottish state's economic conditions. Recreating a formal currency union under those circumstances would not serve the UK or an independent Scotland as well as the pound we have now.

2.4 The potential benefits for an independent Scottish state and the continuing UK of forming a formal sterling union are largely microeconomic in nature:

- **Lower transition costs**: if Scotland were to exit the UK, continuing to use the pound would minimise costs from redenomination;
- **Lower transaction costs** for future trade: Scotland is the rest of the UK's second largest trading partner after the United States, or third if the euro area is included as a bloc, and the rest of the UK is (by far) Scotland's largest export market.

2.5 The benefits of lower transaction costs would remain large only for as long as integration between the two countries remained strong. These benefits would be greater for an independent Scottish state than for the continuing UK, given the asymmetry of trade exposure.

2.6 However, independence could undermine the strength of this integration. *Scotland analysis: Macroeconomic and fiscal performance* established that, even if an independent Scottish state and the continuing UK were to enter a sterling currency union, a 'border effect' would still be likely to emerge which would reduce the level of real incomes in Scotland by 4 per cent after 30 years or £2,000 per Scottish household per year and £100 per UK household.

2.7 But there are also potentially large costs associated with giving up independent monetary policy and a flexible exchange rate that can help absorb economic shocks. This in turn can amplify fiscal stress, and increase both the risks and consequences of financial instability. The experience of small countries on the periphery of currency unions has been that monetary policy and the value of the currency can be unresponsive to their needs.

[1] The Optimum Currency Area was first developed in Mundell (1961), "A theory of Optimum Currency Areas", MacKinnon (1963), "Optimum Currency Areas", and Kenen (1969), "The Optimum Currency Area: An Eclectic View".

2.8 In the event of independence, the Scottish economy would be likely to be subject to more volatility than it is as present as part of the UK. The Scottish economy would become more exposed to different, Scotland-specific, economic shocks and there would be a different transmission of these shocks through the economy. An independent Scotland's economy would be likely to follow a more painful adjustment process for three reasons:

- a weakening in integration would reduce the efficiency of some of the Scottish economy's mechanisms of adjustment to Scotland-specific shocks.
- the end of fiscal union with the rest of the UK would eliminate the adjustment role of fiscal transfers from the rest of the UK;[2] and
- Scotland's fiscal position and interest rate premia would limit its ability to use fiscal policy to offset the impact of economic shocks.

2.9 The analysis and economic modelling presented in this chapter show that joining a currency union with the continuing UK would exacerbate this volatility as the policy tools, both monetary and fiscal, available to an independent Scottish state to support the required economic adjustment would be more limited.

2.10 Economic integration would be reduced, increasing the risk of Scotland-specific shocks, and the ability to mitigate them through offsetting trade, capital and labour flows. An independent Scotland would be heavily exposed to the energy and finance sectors, which are typically volatile or at risk of large destabilising shocks. Further, the Scottish and UK economies would be expected to diverge over time: independence and the introduction of different fiscal and economic policies would be likely to start a wider process of divergence that would lead to the Scottish economy becoming less synchronised with the UK average over time. Under these conditions, monetary policy set by the Bank of England to respond to economic developments across the currency union as a whole would be likely to become less well suited over time to Scottish conditions.

2.11 Economic integration also helps to mitigate the impact of country-specific economic shocks. Scotland has a high level of trade and labour integration with the rest of the UK. If one part of the union suffers an economic shock, high levels of trade and labour market opportunities in other parts of the union help to offset the impact of the shock. As set out in *Scotland analysis: macroeconomic and fiscal performance*, over time, trade and labour mobility between Scotland and the continuing UK would be expected to decline reducing the extent to which economic cycles are aligned and with which the impact of country specific shocks are offset.

2.12 Fiscal union also plays an important role in offsetting country-specific shocks. This means that in the event of Scotland-specific economic problems, the adverse effect on public finances of higher public spending and lower tax receipts in Scotland can be spread across the larger UK fiscal base. This avoids the fiscal tightening that would otherwise be required in an independent Scotland in order to bring the public finances back into balance. In effect, the UK can pool its exposure to economic risks in a manner that separate states or those with formal currency unions, like the euro area, have not been able to. This means that money can be spent across the UK, in the areas where it is needed most.

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[2] Armstrong and McLaren (2014) *"Scotland's economic performance and the fiscal implication of moving to independence."*

2.13 Finally, an independent Scottish state would have less fiscal policy flexibility to respond to economic shocks as it would face higher borrowing costs and more constrained financial market conditions relative to the continuing UK. An independent Scotland would be expected to have a number of characteristics that would lead to a higher risk premium than the UK: a less liquid debt market, a lack of an institutional track record and institutional uncertainty, higher economic and fiscal volatility, a larger future potential debt burden, a larger financial services sector, with larger contingent liabilities, as a share of GDP, and reduced monetary policy flexibility to respond to external shocks.

2.14 As set out in Annex B, Scotland's initial fiscal position would constrain the amount of fiscal space it would have to respond to economic shocks. Adjusting the Scottish Government's forecast of an independent Scottish state's deficit in 2016/17 for the Office for Budget Responsibility (OBR)'s latest forecast of North Sea oil and gas revenues gives an estimate of a Scottish deficit of 5.3 per cent of GDP in 2016/17. This estimate is close to the independent estimate by the Centre for Public Policy for the Regions (CPPR) which forecast a Scottish deficit of 5.1 per cent of GDP in 2016/17.[3]

Table 2.A: The fiscal position of the UK and Scotland in 2016/17

	2013/14	2014/15	2015/16	**2016/17**	2017/18	2018/19
Fiscal deficit, per cent of GDP						
UK						
OBR (December 2013)[1]	6.0	4.9	4.0	**2.6**	1.3	0.1
Continuing UK, with a population share of debt, based on OBR (December 2013)				**2.3**		
Scotland						
Scottish Government White Paper, with a population share of debt (November 2013)[2]				**3.2**		
Scottish Government White Paper, except using latest oil and gas receipts (December 2013)[3]				**5.3**		
Centre for Public Policy for Regions (CPPR) (March 2013)[4]	6.9	6.6	6.6	**5.1**	4.4	
Treaty debt, per cent of GDP[5]						
UK						
OBR (December 2013)	90.8	93.1	94.7	**93.9**	91.7	88.7
Continuing UK, population share of debt, based on OBR (December 2013)				**95.0**		
Scotland						
population share of debt, based on OBR (December 2013)				**84.0**		

[1] Public sector net borrowing – page 159, Office for Budget Responsibility, *Economic and fiscal outlook*, December 2013
[2] Net fiscal balance including population share of debt interest payments – page 75, *Scotland's future: your guide to an independent Scotland*, November 2013; Scottish Government
[3] As footnote 2, except using the OBR's forecast for North Sea oil and gas receipts in *Economic and fiscal outlook*, December 2013; OBR
[4] Balance including North Sea revenues – page 6, John McLaren and Jo Armstrong: *CPPR Briefing Paper: Analysis of Scotland's past and future fiscal position*; March 2013
[5] The most common and comparable international measure.

2.15 Further, as detailed in the *Scotland analysis: currency and monetary policy* paper, fiscal constraints would be required if an independent Scotland were to form a formal currency union with the continuing UK. These constraints could also limit the ability of an independent Scottish state to use fiscal policy in response to an economic shock and could tend to re-enforce the effects of an economic downturn. In particular, there would be likely to be an increased need for fiscal tightening in order to reduce interest premia

[3] McLaren and Armstrong (2013) *"Analysis of Scotland's past and future fiscal position"*, Centre for Public Policy for Regions

and maintain market confidence in response to a shock to public finances. As such, there would be greater pressure to bring debt back on to a sustainable path more quickly, which could mean fiscal policy exacerbates the economic shock.

2.16 Being part of a successful currency union requires market confidence in national public finances. The euro area experience during the sovereign debt crisis, discussed in Box 2.A, shows that in case of a very large fiscal response, for example following a financial crisis, markets can begin to speculate that the risk of default is very high or that the political will to sustain the currency union could fail. It illustrates the pressure on sovereign interest premia that can materialise when there is uncertainty as to the future of the currency union. If political commitment is lacking, the financial speculation can become a self-fulfilling prophecy. Low market confidence in the political commitment to the currency union may generate capital flight, reinforcing the economic divergence and the pressure to exit. This was the case in the short-lived experience of the Czechoslovakian monetary union following the separation of the Czech Republic and Slovakia, which lasted just 33 days.[4]

2.17 The euro area is taking steps to respond to the crisis with increased fiscal and political integration, including moves towards further political integration and elements of a banking union. These are discussed later in the chapter.

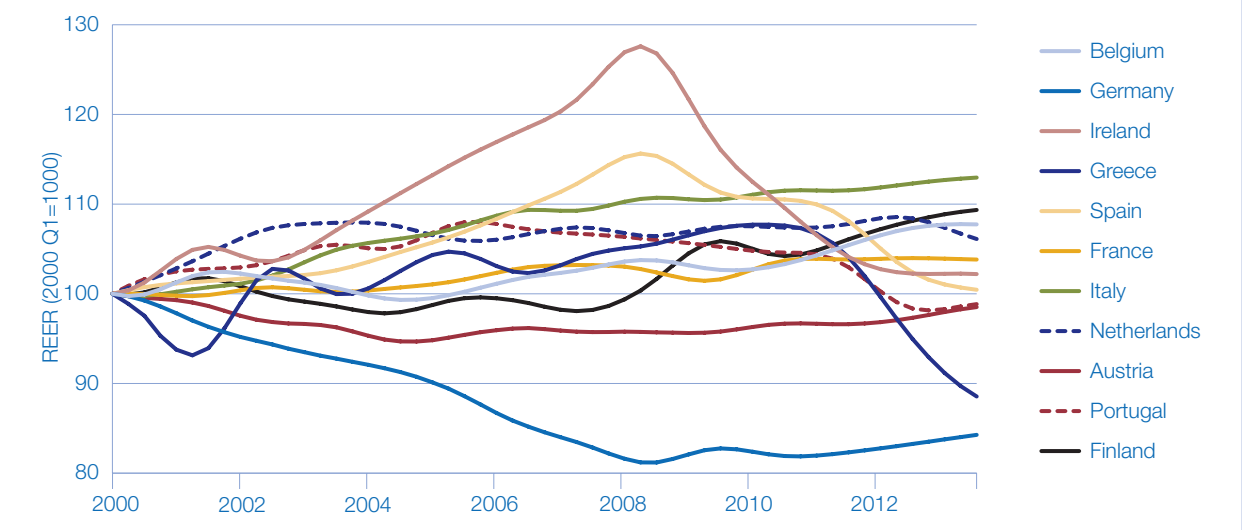
Box 2.A: Causes of the euro area sovereign debt crisis

There were a number of underlying, interrelated causes of the euro area sovereign debt crisis:

- **Banking sector.** There were high levels of unproductive lending in the periphery, often in the unproductive domestic-facing sectors such as construction. This put pressure on the banking system during the 2009 recession, which banks facing both liquidity and solvency problems. A number of Member States did not have the fiscal space to respond to solvency problems (e.g. recapitalisation of the banking sector) without also risking a sovereign debt crisis. This also generated macroeconomic imbalances within the periphery.
- **Macroeconomic imbalances.** Imbalances had accumulated in the euro area in the build up to the crisis, eroding competitiveness in the periphery. The loss of competitiveness meant that, in some countries, economic activity was focused on unproductive domestic facing industries, with countries less able to compete internationally. Sharing a currency meant that individual Member States could not regain competitiveness through adjustments in the nominal exchange rate. Instead competitiveness had to be regained through internal adjustment: reductions in prices and wages. This is a longer process that proved difficult to achieve during periods of low growth in the crisis. The macroeconomic imbalances procedure was introduced to both identify and tackle excessive imbalances.
- **High sovereign borrowing costs.** During the crisis there were constraints on how much individual Member States could use deficit financed fiscal policy both due to limited fiscal space and membership of a currency union. The size of the shock meant that countries were unable to undertake inter-temporal fiscal transfers to support the economy. Some euro area Member States with apparently sound public finances before the crisis found themselves facing very large interest rate risk premia.

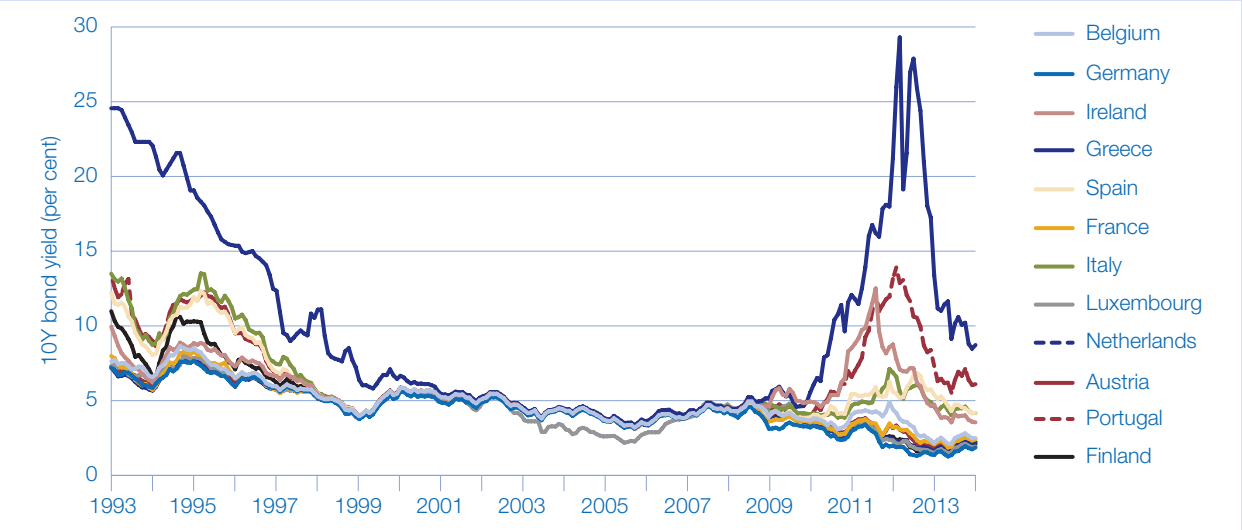
[4] See Fidrmur and Horvath (1998) “Stability of Monetary Unions: Lessons from the Break-up of Czechoslovakia”.

Real effective exchange rates (Deflated by unit labour costs, Q1 2000 =100)



Source: European Commission

Bond yields of euro area countries, 1993 to 2013



Source: Eurostat

The pressures placed on Member States' public finances necessitated the introduction of an initially temporary, now permanent, insurance mechanism to provide emergency financial assistance for euro area countries: the temporary European Financial Stability Facility (EFSF) and the permanent European Stability Mechanism (ESM).

The experience of the euro area has shown that market conditions and perceptions can greatly limit the ability of members of a currency union to access credit markets to use fiscal policy in response to a large shock, especially if there is no lender of last resort apparatus for sovereign debt. It has also highlighted that, acting individually, members of a currency union tend to provide less fiscal stimulus to their economy than they would with better fiscal coordination.

Modelling economic adjustment in a formal sterling union

2.18 The well-understood economic principles of a currency union and the practical difficulties experienced by the euro area give some guide to the likely consequences for the Scottish economy of leaving the UK and entering a monetary union. But to understand more fully how these principles and experiences might apply to the specific case of an independent Scottish state the Treasury has developed an economic model. The model illustrates how the Scottish economy might respond differently in a sterling currency union compared with its reaction as part of the UK. The model is a development of an earlier version,[5] which was used in HM Treasury's assessment of the five economic tests for euro membership in 2003.

2.19 A more detailed exposition of the model and its parameterisation can be found in Annex C, but broadly speaking the model has 4 'blocs' – Scotland, the rest of the UK, Europe and the rest of the world. Each bloc has an identical core which is akin to a standard open-economy New Keynesian model. The open-economy nature of the model allows for interactions between the blocs, and therefore captures an important channel which can materially impact on decisions over monetary policy.

2.20 As well as introducing Scotland as one of the blocs in the model, a variety of other developments have been incorporated which are designed to give a more detailed picture of how the Scottish economy might react to a specific shock. The details of these developments are set out below.

Oil price effects

2.21 The first of these developments is the introduction of an oil and gas sector. Including the oil and gas sector and the effect of global oil price shocks on the Scottish economy is important.

2.22 As set out in Chapter 1, North Sea oil and gas would constitute a large part of an independent Scottish state's economy. For a country that is a net importer of oil, an increase in the oil price worsens the economy's terms of trade: what the economy produces has become less valuable in terms of what it consumes. For a country that produces more oil than it consumes, such as an independent Scottish state, an increase in the oil price improves its terms of trade. A change in the price of oil would also be expected to have more of an effect on an independent Scottish economy through its effect on tax revenues and spillovers into the domestic economy, if part of the higher earnings is spent domestically. This implies that, all else equal, the appropriate monetary response for an independent Scottish state and the continuing UK would be opposite in direction.

2.23 In a sterling currency union, both countries would be sharing a common interest rate, which would result in monetary policy being sub-optimal for both countries. But given the much larger size of the continuing UK, it would be likely to have a greater influence over monetary policy in a currency union meaning the overall stance of monetary policy would be likely to exacerbate the effects of an oil price shock in an independent Scottish state rather than dampen it. This contrasts with the UK at present, where the pooling of fiscal resources and the transfer of those resources across the UK aid the process of adjustment.

[5] See HM Treasury (2003) "Modelling shocks and adjustment mechanisms in EMU"

Fiscal constraints and interest rate premia

2.24 The second development is the inclusion of a more detailed mapping of the public finances, including the introduction of channels through which movements in fiscal aggregates feed back onto the real economy. As discussed in Chapter 4, in the light of the euro area experience, it is clear that appropriate fiscal constraints would be needed in a formal currency union between an independent Scottish state and the continuing UK. The model therefore includes a 'fiscal policy reaction function' to return the debt stock to a sustainable level following a shock and a risk premium on both public and private interest rates that responds to the level of debt, when debt rises above a threshold.[6]

Labour market effects

2.25 The final addition to the modelling framework incorporates the labour market effect of the different shocks. This is done through the use of a well-known statistical relationship between unemployment and GDP known as Okun's law. The estimate[7] used in this paper implies that a 1 per cent increase in output leads to a 0.3 percentage points fall in the rate of unemployment.

Modelling the response of the Scottish economy to economic shocks

2.26 Using the model described above it is then possible to demonstrate how the Scottish economy might respond to a variety of different economic 'shocks' in two currency scenarios. To capture the different adjustment channels the response of the Scottish economy to three shocks is modelled:

- a temporary fall in Scottish demand;
- a permanent fall in non-oil Scottish supply; and
- a permanent fall in the world oil price.

2.27 Each shock is modelled in two scenarios. First, under the current arrangements, where Scotland is part of a full monetary, fiscal and political union within the UK. Second, for a scenario where an independent Scottish state might form a formal sterling union with the continuing UK and be fiscally independent but subject to fiscal constraints and interest rate premia as described above. Under both scenarios Scotland and the rest of the UK use sterling as their common currency (the Scotland/rest of UK nominal exchange rate is fixed) and the Bank of England considers conditions across the sterling area as a whole when setting monetary policy decisions.

[6] See Annex C for more detail.

[7] See Ball et al (2012) "Okun's Law: Fit at 50?".

A temporary 5 per cent fall in Scottish demand

Initial impact on an independent Scottish state

2.28 In the sterling currency union, a temporary fall in aggregate demand specific to the Scottish economy (i.e. leaving the rest of the UK economy unaffected) initially causes the level of economic activity (or GDP) in Scotland to fall below the level consistent with 'full employment'[8] in the economy. Depressed demand has three further effects; first, it raises the level of unemployment; second, it pushes inflation in Scotland below target and finally, it causes the debt-to-GDP ratio to rise. Higher debt induces a fiscal policy response and raises the risk premium attached to interest rates in Scotland both of which put further downward pressure on demand.

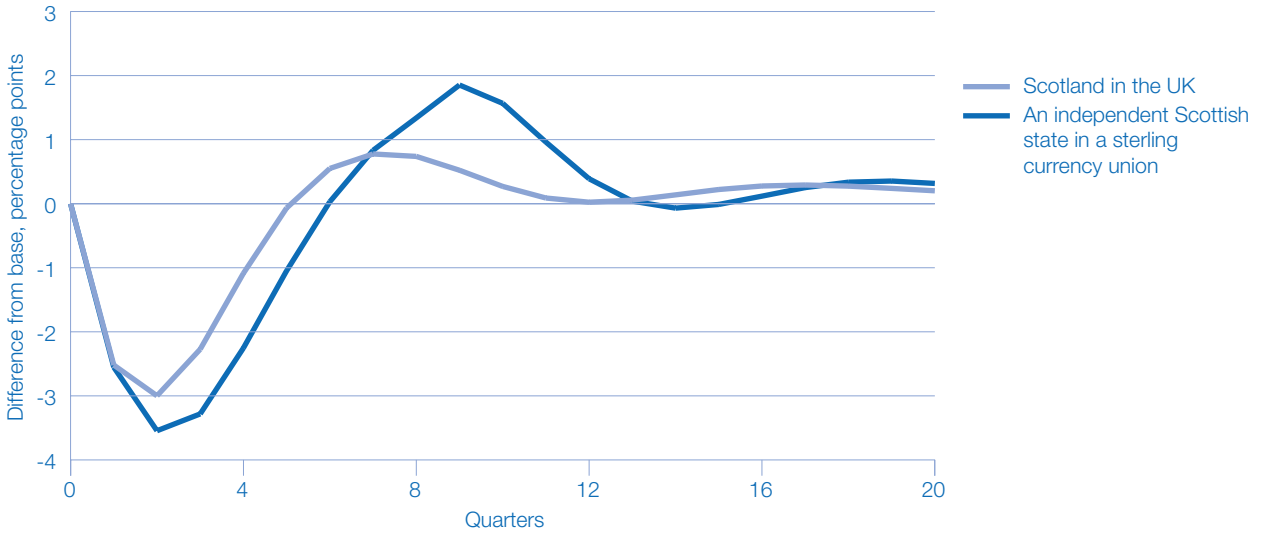
Path of economic adjustment

2.29 With overall demand in the monetary union depressed, the nominal sterling exchange rate depreciates. Combined with a lower price level in Scotland, this makes Scottish goods and services more competitive relative to goods elsewhere, raising demand for Scottish goods. However, the gains in competitiveness also mean that imported goods and services are now more expensive which puts upward pressure on inflation in the continuing UK. With the Bank of England considering average conditions across the sterling area as a whole, the response of monetary policy is not appropriate for Scottish economic conditions. The Bank only set interest rates consistent with conditions in Scotland when the effects of the shocks in the continuing UK subside. As part of that, inflation is brought back to target, and GDP reverts back to trend, allowing the initial boost to competitiveness required to stabilise demand in Scotland to unwind.

2.30 In qualitative terms, the paths of the variables are similar for both scenarios (Scotland as part of the UK and in a formal sterling currency union). However, the fall in demand in the monetary union is greater, induces a more volatile path of adjustment which is also more protracted for an independent Scotland in a currency union. Charts 2.A to 2.C show the effects of the negative demand shock on Scottish GDP, inflation and unemployment. In the case of the monetary union both inflation and GDP trough at a lower level and unemployment peaks at a higher level compared to the current arrangements. In the main, this is driven by Scotland having to run pro-cyclical fiscal policy – in other words, reducing spending and increasing taxation during a period of weak demand. This is reinforced further by the increase in the risk premium placed on Scottish interest rates as a result of the debt-to-GDP ratio rising.

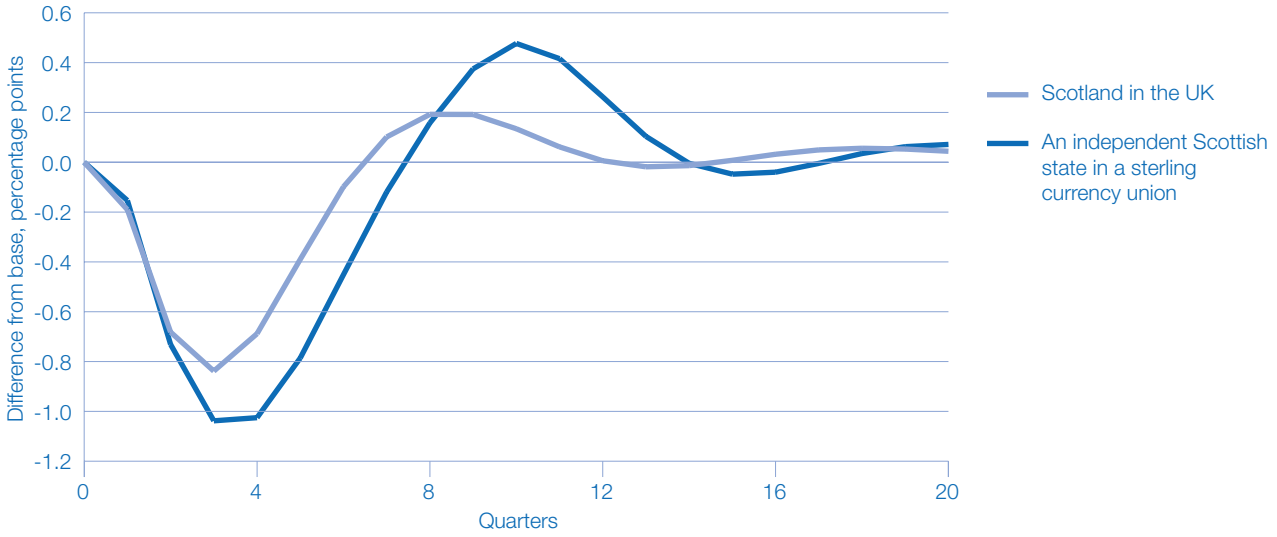
[8] This is a shorthand for what is known in technical terms as the potential output of the economy. The fall in demand causes a negative output gap to open up.

Chart 2.A: The response of Scottish output to a temporary fall in demand



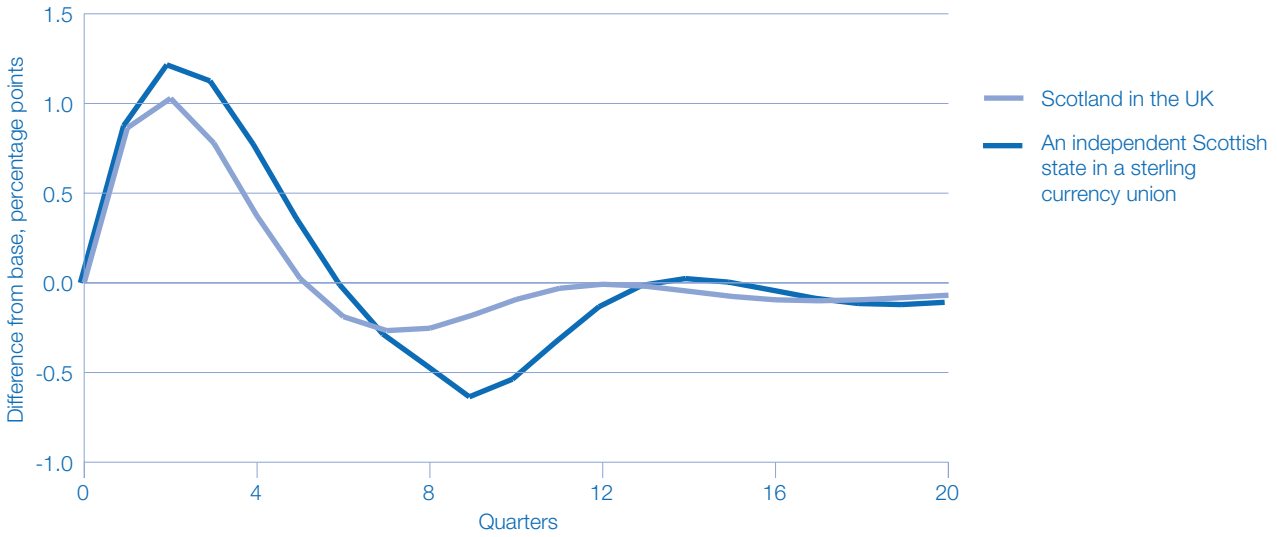
Source: HM Treasury

Chart 2.B: The response of Scottish inflation to a temporary fall in demand



Source: HM Treasury

Chart 2.C: The response of Scottish unemployment to a temporary fall in demand



Source: HM Treasury

A permanent one per cent fall in non-oil Scottish supply

Initial impact on an independent Scottish state

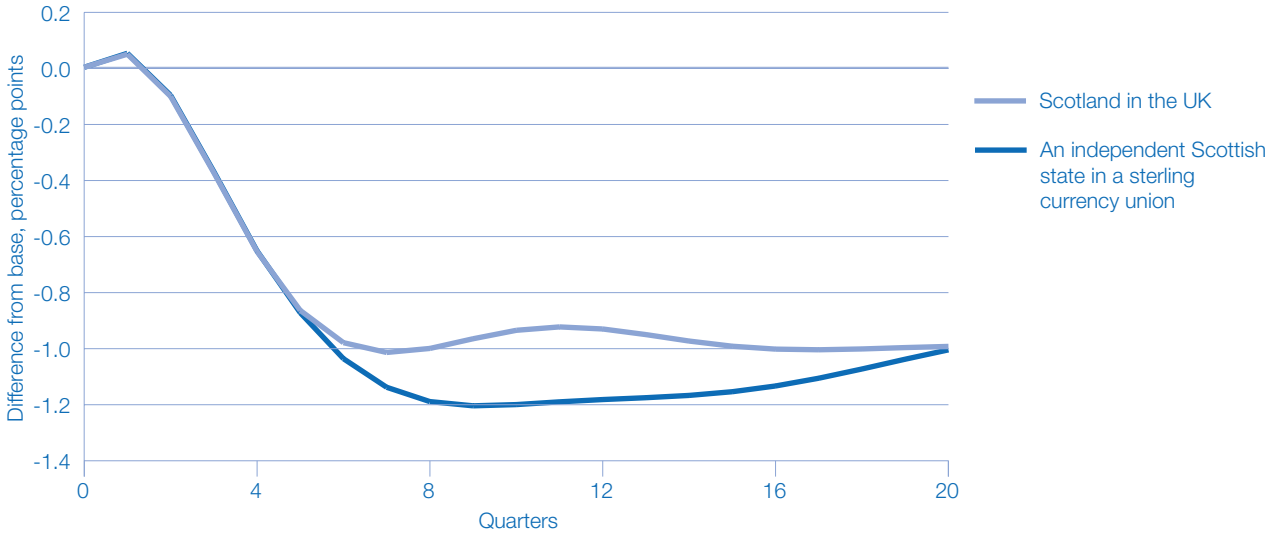
2.31 A shock to the non-oil supply in the economy is equivalent to an immediate reduction in the level of output that is consistent with full employment – in other words the shock implies the economy is permanently worse off. It follows that the fiscal position is immediately worse, putting upward pressure on the debt-to-GDP ratio. Higher debt induces a fiscal policy response and raises the risk premium attached to interest rates in Scotland. With demand in the economy higher than supply, inflation begins to rise.

Path of economic adjustment

2.32 With demand outstripping supply in the currency union, the nominal sterling exchange rate appreciates, which combined with a higher inflation, reduces the competitiveness of Scottish goods relative to others. This has the effect of dampening demand in the Scottish economy. However, less competitive domestically produced goods mean foreign goods are now relatively cheaper for the monetary union as a whole. This has a dampening effect on inflation which impacts on the continuing UK. With the Bank of England considering average conditions across the sterling area as a whole, the response of monetary policy is not appropriate for Scottish economic conditions. The Bank only set interest rates consistent with conditions in Scotland when the effect of the shock in the continuing UK subsides. Unlike in the case of the temporary shock, a permanent shift in the amount the economy can produce in the long run whilst keeping inflation stable at target requires a permanent shift in demand in order to align it with supply. This happens through a permanent deterioration in the competitiveness of the Scottish economy with the consequence that unemployment is permanently higher.

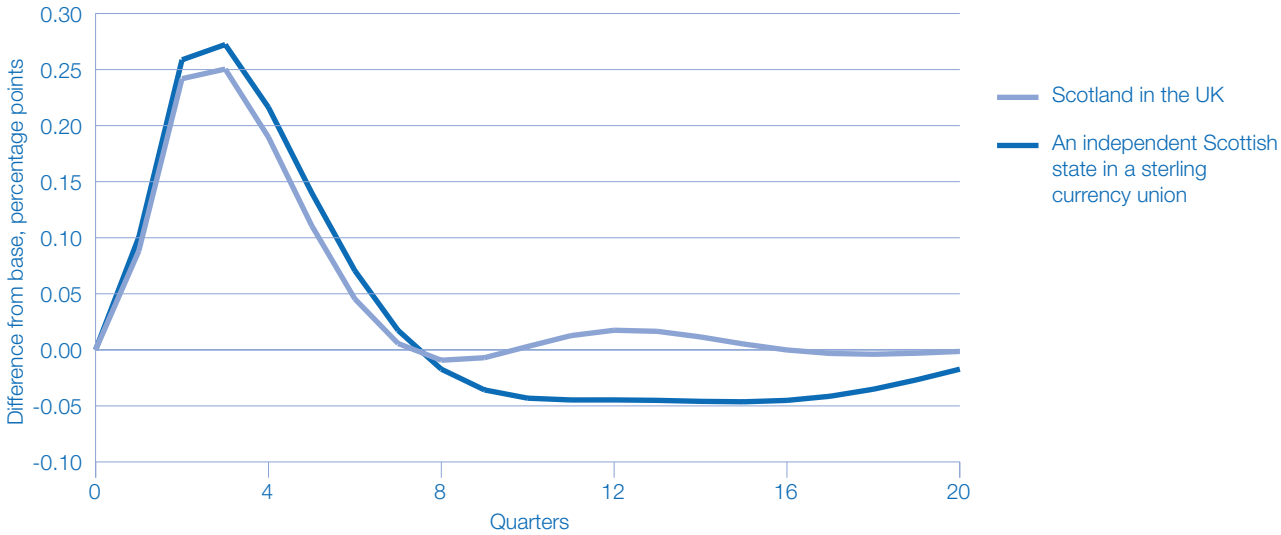
2.33 As with the demand shock, the paths of the variables are similar for both scenarios (Scotland as part of the UK and in a formal sterling currency union). But also, akin to the demand shock, the path of GDP is more volatile and the path of adjustment is more protracted in the case of the monetary union. This can be seen in Charts 2.D to 2.F which plot the effects of the permanent supply shock on Scottish GDP, inflation and unemployment. The more pronounced movements in each are driven by the fact that, in a monetary union, a shock of this nature would cause Scotland's fiscal position to deteriorate. This raises the risk premium attached to Scottish debt, affecting interest rates in the economy and would also require Scotland to undertake a tightening of fiscal policy.

Chart 2.D: The response of Scottish output to a permanent reduction in supply



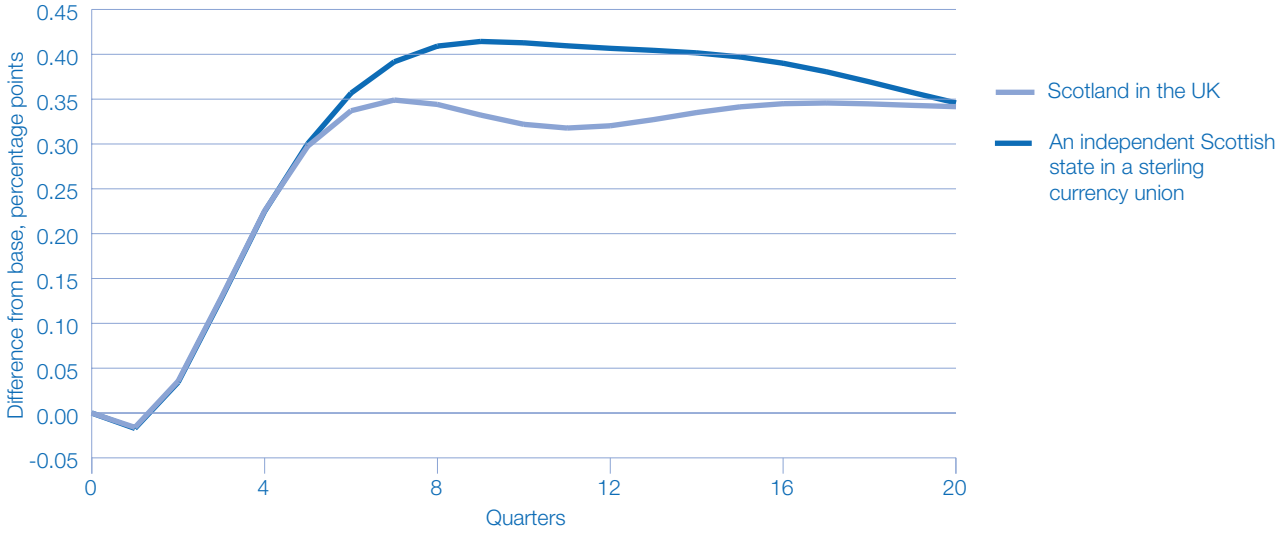
Source: HM Treasury

Chart 2:E: The response of Scottish inflation to a permanent reduction in supply



Source: HM Treasury

Chart 2.F: The response of Scottish unemployment to a permanent reduction in supply



Source: HM Treasury

A permanent 10 per cent fall in the global oil price

Initial impact on an independent Scottish state

2.34 As noted previously, the effect of an oil price shock is likely to create tensions for monetary policy in a monetary union. The initial effect on demand in Scotland is marginally positive – while the oil sector in Scotland loses from a negative terms of trade shock, it is more than offset by the increased competitiveness of the non-oil sector brought about by the lower price of oil. However, the oil shock also brings about a large deterioration in the tax revenue stream from oil. This immediately puts the debt-to-GDP ratio on an upward path, which both increases the risk premium attached to interest rates in Scotland and induces a tightening of fiscal policy, putting downward pressure on demand in the economy to the extent that it falls below the level consistent with full employment. Using the methodology for the labour market impact described earlier, comparing the unemployment peak in monetary union with the position of unemployment at the same stage under the current arrangements implies a $20 fall in the oil price raises the unemployment rate by 0.4 percentage points.[9] This is equivalent to around 11,000 Scottish jobs.

Path of economic adjustment

2.35 The effect of the shock in the continuing UK is different to an independent Scottish state; here the negative oil price shock has a positive impact on the terms of trade which boosts demand. With the Bank of England considering average conditions across the sterling area as a whole, the response of monetary policy is inappropriate for Scottish economic conditions (see Box 2.B), putting further downward pressure on demand rather than cushioning the impact of fiscal tightening. As a result, the real exchange rate – the measure of relative competitiveness between the 4 blocs – is required to make a large adjustment to stabilise demand. In the long-run, as with the non-oil supply shock, the real exchange rate bears the full burden of adjustment in order to re-align supply and demand.

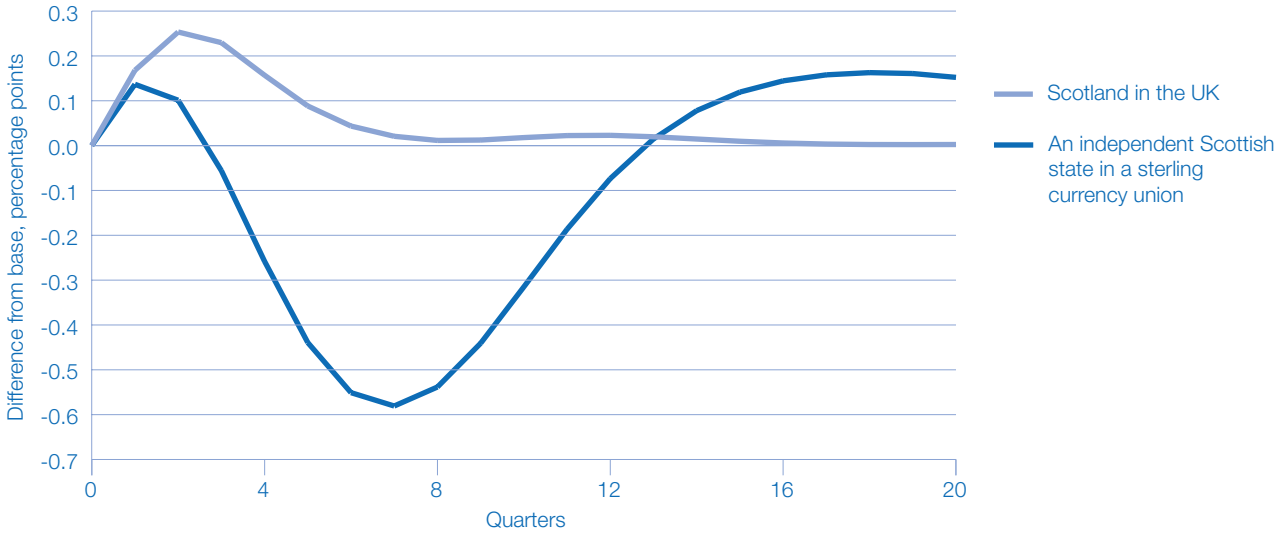
2.36 Charts 2.G to 2.I illustrate that unlike the demand and supply shocks, the paths of the variables under the current arrangements are very different compared to a formal sterling currency union. Indeed the effect of the lower oil price on the exchange rate is the dominant force under current arrangements meaning there is a positive effect on output from the shock.[10] This highlights the benefits of sharing the risks to fiscal sustainability in the current arrangements as it allows for a more appropriate stance of monetary policy, reducing the need for large movements in the real exchange rate.

2.37 Autumn Statement 2013 illustrated this benefit of the UK very clearly: the Office for Budget Responsibility cut its forecast for North Sea oil and gas revenues by almost £4 billion over the next three years – but instead of needing to cut spending, the Scottish Government saw its budget rise by more than £300m. Under independence, the government of an independent Scottish state would have to cut public spending or raise taxes in response to such a deterioration in oil and gas revenues.

[9] Assuming an oil price of $100 (the average Brent spot price between 2010 and 2013, US Energy Information Administration) a $20 fall is equivalent to a 20 per cent fall in the price.

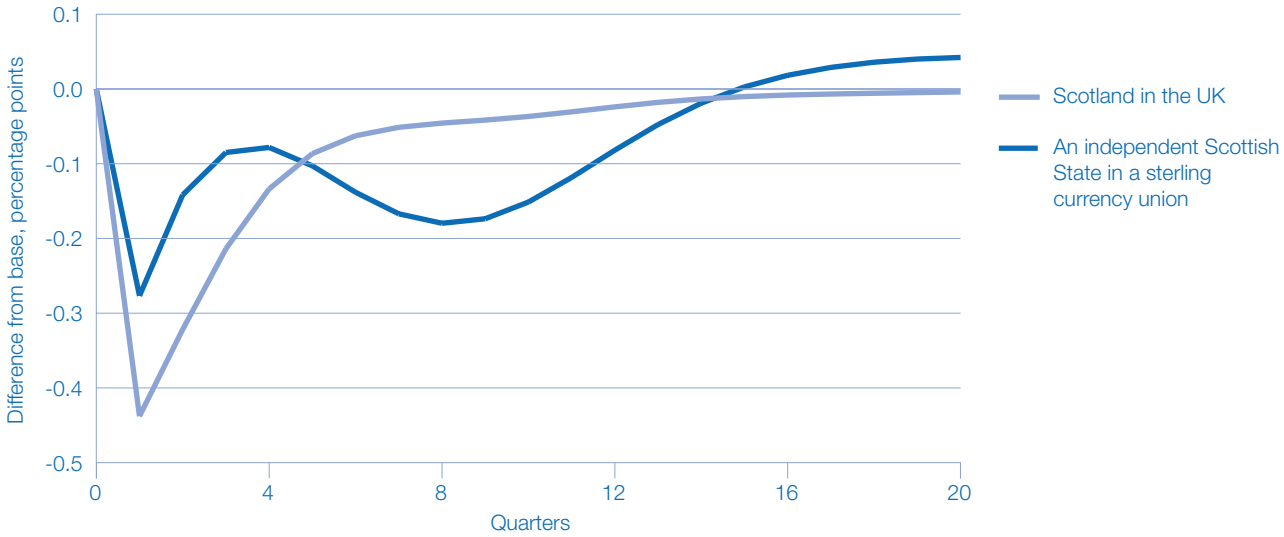
[10] This is equivalent to a negative form of Dutch Disease. See Box 2.B and Glossary for more detail.

Chart 2.G: The response of Scottish output to a permanent fall in the global oil price



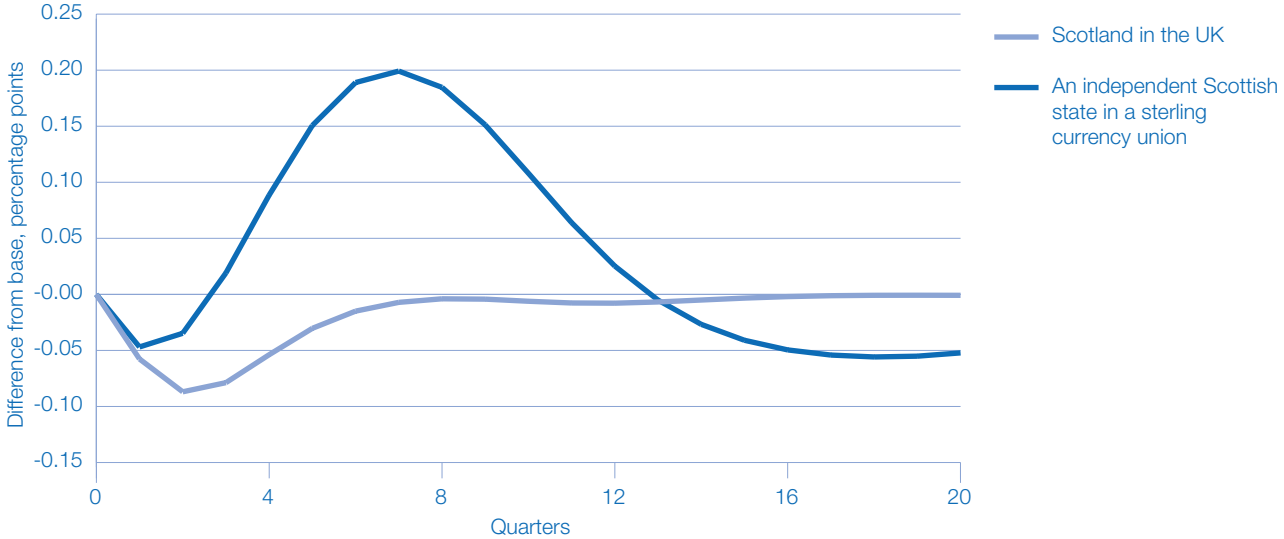
Source: HM Treasury

Chart 2.H: The response of Scottish inflation to a permanent fall in the global oil price



Source: HM Treasury

Chart 2.I: The response of Scottish unemployment to a permanent fall in the global oil price



Source: HM Treasury

Box 2.B: A closer look at the adjustment mechanisms

The discussion of the adjustment paths the Scottish economy might take in the face of any of the shocks highlight two main channels of adjustment:

- The real interest rate; and
- The real exchange rate.

The real interest rate

While Scotland currently does not have the ability to change its own nominal interest rate, the high level of integration between Scotland and the rest of the UK means that shocks tend to be symmetric in nature meaning the Bank of England can target a real rate of interest – the rate of interest net of inflation – which brings the whole of the UK economy back to its equilibrium path. If an independent Scottish state were to form a currency union with the rest of the UK, the breaking of economic union would likely lead to a divergence between the economies, increasing the probability of country-specific shocks. With the Bank of England considering conditions across the sterling area as a whole when setting monetary policy, and economic conditions in the continuing UK having a much larger weight in average conditions due to differences in scale, it is possible that monetary policy for an independent Scotland might become sub-optimal and exacerbate the shock rather than dampen it.

This argument can be illustrated using the 'Taylor Rule' for modelling the Bank of England's response in the face of a symmetric shock. Here, the conventional assumption is that nominal interest rates would fall by 1.5 percentage points for every 1 per cent that UK inflation falls below target, so real interest rates would also fall by 0.5 per cent.[1] This monetary loosening helps to boost demand, directly via its effect on investments and savings decisions, and indirectly via its effect on the real exchange rate. Both these effects will offset the initial fall in inflation.

In the case of an asymmetric shock, the nominal interest rate will fall but only to the extent that Scottish inflation impinges on overall inflation across the currency union. In the stylised model, it is assumed that Scotland has a weight of one tenth in the currency union aggregates, so now, every 1 percentage point fall in inflation in Scotland will cause the UK nominal interest rate to fall by only 0.15 percentage points (i.e. 1.5*0.1). So the direct effect of the 1 percentage point fall in Scottish inflation would be to cause Scottish real interest rates to rise by 0.85 percentage points, thus causing a monetary tightening from this channel.

The real exchange rate

The shocks also highlight that the other main channel through which the economy adjusts is through movements in the real exchange rate, (i.e. the nominal exchange rate adjusted for differences in inflation) which is a measure of competitiveness. In the short run, the real exchange rate moves to offset the initial effect of the shock and in the long run, it will bear all the burden of adjustment in response to permanent shocks.[2]

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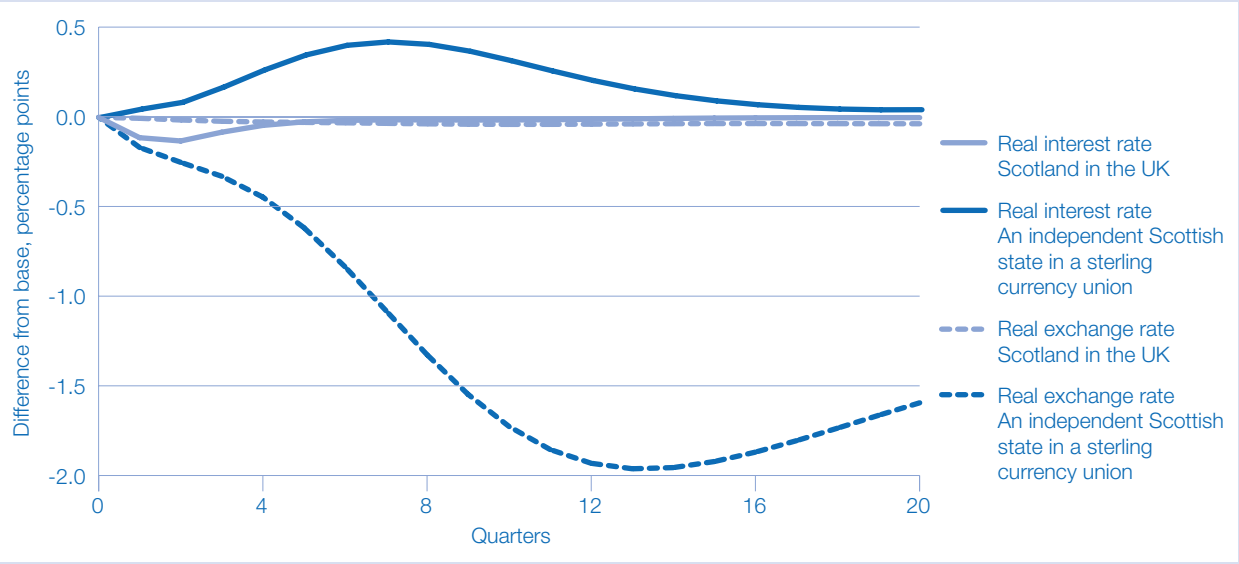
[1] This stylised example abstracts from interest rate inertia which is included in the Taylor Rule for each of the 'blocs'. The impact of inertia is likely to magnify rather than dampen the issue described.

[2] This is consistent with standard macroeconomic theory and other small, open economy models of this nature. See Gali and Monacelli (2005).

The essential point to note is that despite a fixed nominal exchange rate between the rest of the UK and Scotland, the real exchange rate still plays a stabilising role, especially given the rest of the UK is currently Scotland's main trading partner. Indeed, if real interest movements are destabilising, and this destabilisation is reinforced by the fiscal policy reaction in the case of a currency union, the real exchange rate becomes the key stabilising channel. This is why in the face of all the shocks described above, the real exchange rate 'jumps' considerably to stabilise the economy.

The reliance on this channel to make any adjustment gives rise to the oscillatory nature of adjustment. Without a nominal exchange rate between an independent Scottish state and the continuing UK – which, if present, would bear some of the burden of adjustment – the only way in which a competitive advantage can be gained is through shifts in relative price levels which result from movements in inflation. For example, in the face of a shock that has a negative initial effect on inflation in an independent Scottish state, Scottish inflation must subsequently move above the inflation target for a period in order to claw back the 'price level slippage' and restore the relative price level between Scotland and the continuing UK. Inflation must then fall back to target (though the price level will continue to rise), requiring a period when output is below its full employment potential again. This explains the inherently cyclical response to the asymmetric shock for the Scottish economy.

Focus on the oil price shock



As noted previously, the response of monetary policy is inappropriate for an independent Scotland in a currency union. With inflation remaining below target through a combination of a negative cost shock and depressed demand from tighter fiscal policy, a consistently positive real interest rate implies a procyclical stance of monetary policy for Scotland. There are three broad reasons for this:

i. A large depreciation in the Scotland/continuing UK real exchange rate from Scotland's perspective is an equally large appreciation from the perspective of the continuing UK. This dampens the inflation effect of the fall in the oil price in the continuing UK, reducing the initial downward movement required in the nominal interest rate. With inflation lower, the movements in demand in the continuing UK, driven by the positive terms of trade shock, dominate the Bank of England's reaction and nominal rates rise, creating an inappropriate interest rate for Scotland.

ii. With debt moving higher as a result of falling oil revenue, a higher premium is attached to the interest rates faced by the Scottish economy, reinforcing the positive movements in the nominal interest rate.

iii. These two effects are then compounded by the fall in inflation in Scotland which places upward pressure on the real interest rate.

Given the movements in monetary policy and fiscal policy, the real exchange rate is required to undergo a large initial depreciation in order to stabilise the economy. This movement then needs to be unwound by creating positive inflation to shift the price level upwards, creating further volatility as the Scottish economy adjusts. In the long run, the real exchange rate bears the full burden of adjustment.

Chapter 3:
Risks to the stability of a sterling currency union

The financial crisis, and particularly the euro area sovereign debt crisis, has demonstrated the requirements of a successful and durable currency union, beyond those analysed in Chapter 2.

A banking union is a fundamental tenet of a successful currency union. It involves a single financial sector supervisor, a lender of last resort, common resolution mechanisms and a credible deposit guarantee scheme. The UK currently has a durable and credible banking union. Recreating it between the continuing UK and an independent Scotland would be very challenging. Under EU law the Bank of England could not be a supranational common supervisor, an independent Scotland would require its own supervisor.

Negotiating a banking union as part of a formal sterling currency union would be difficult and complex. The difference in economic size of the two countries would cause the continuing UK to become exposed to much greater fiscal and financial risk from a an independent Scottish state. The continuing UK would be at risk of providing taxpayer support to the Scottish financial sector if the Bank of England were acting as a joint lender of last resort and, at the extreme, providing a joint fiscal back stop. An independent Scottish state would not face the same risk, as the smaller fiscal resources available to support the continuing UK would limit the practical exposure of Scottish taxpayers.

A currency union requires shared fiscal arrangements. There are two reasons for fiscal risk sharing. The first is smoothing shocks across the currency union. The UK's fiscal model is characterised by a high degree of pooling of tax revenues combined with substantial devolution of spending powers. The experience of the euro area has demonstrated that, at times of severe economic stress, the national budgets of members of a currency union can be unable to fully support their economies.

The second is that problems in one country are very likely to spill over into other members of the currency union. Fiscal rules and no-bailout clauses have been tried to limit these spill-over problems. However, the euro area clearly demonstrates the need for fiscal risk-sharing mechanisms beyond what is implied by fiscal rules alone.

The tensions in the euro area would be even more acute in a sterling currency union, given the asymmetry in the exposure to risk between the continuing UK and an independent Scotland. It would mean that the degree of fiscal oversight would need to stretch beyond the agreement on an appropriate set of fiscal rules. Regular monitoring of an independent Scotland's fiscal position by the continuing UK would be required, including some mechanism for intervention and correction if fiscal risks to the stability of the currency union were to arise.

3.1 As set out by the Governor of the Bank of England, Mark Carney,[1] the euro area experience has demonstrated the importance of further considerations to apply when looking at currency union proposals:

- the importance of the **institutional structure** – economic and political – particularly when it is required to overcome asymmetries in the union and the regional imbalances that may result;
- the requirement for **some significant degree of fiscal federalism** – more significant than a simple fiscal pact with deficit and debt prescriptions; and
- the importance of a **resilient financial system** with coordinated supervision and clear and responsive resolution mechanisms and lines of accountability.

3.2 The economic modelling in Chapter 2 highlights some of the key problems of economic adjustment inside a currency union, which were also indentified in the Treasury's assessment of the five economic tests for euro membership in 2003.[2] The recent experience of the euro area has confirmed the economic reality of these problems. However the financial crisis – in particular the euro area sovereign debt crisis – has also demonstrated additional features of successful and durable currency union to those analysed in Chapter 2. These features are reflected in the steps currently being undertaken by the euro area to introduce elements of a banking union and to increase the degree of 'fiscal risk-sharing', so as to mitigate the risks of instability and the stress in sovereign debt markets recurring. However, no mechanisms have yet been developed to fully manage all of this risk and an independent Scottish state would already be expected to pay a premium in sovereign debt markets placing it at additional risk.

The need for banking union

3.3 Banking union is an important tenet of a successful, stable currency union. The current institutional arrangements for banking union in the UK have, as stated by the Governor of the Bank of England, Mark Carney,[3] "proved durable and efficient". The problems during the euro area crisis demonstrated the challenge of currency union without banking union, and for supranational currency union separated from sovereign national government. The main tenets of a banking union include:

- a common supervisor;
- access to central bank liquidity and lender of last resort facilities;
- common resolution mechanisms; and
- a credible deposit guarantee scheme.

UK banking union arrangements

3.4 The current UK banking union has all of these features. The Bank of England is the common micro-prudential authority, through the Financial Policy Committee (FPC). Prudential Regulation is focused at the Prudential Regulatory Authority (PRA), a subsidiary of the Bank of England and conduct regulation is focused at the Financial Conduct Authority (FCA). The FPC has powers of direction over both the PRA and FCA. The Bank of England is also lender of last resort to the banking system, backed by HM Treasury. The Bank of England is the resolution authority, acting as the Treasury's agent. The Treasury

[1] Carney (2014), "The Economics of currency unions".

[2] HM Treasury (2003) "UK Membership of the single currency: An assessment of the five economic tests".

[3] Carney (2014), "The economics of currency unions".

retains a key interest in the outcome of resolution (as it could have fiscal implications) and takes an active part in resolution planning. The respective responsibilities of the authorities in financial crises were formalised in the Financial Services Act 2013, which puts in place a formal requirement for the Governor to notify the Chancellor when there are public funds at risk, and gives the Chancellor a power of direction over the Bank of England where the Governor has made this notification. Deposits of up to £85,000 are guaranteed by the Financial Services Compensation Scheme (FSCS) and ultimately backed by the UK Government and UK taxpayers.

3.5 The current tenets of banking union in the UK would end with Scottish independence and would need to be recreated in some form to create a stable currency union. This would be a complex and difficult process subject to negotiation.

3.6 It is not clear how the current arrangements would evolve if the Bank of England were to become the central bank for two independent countries. In particular, if the Bank of England were to act as a lender of last resort in response to a solvency crisis in both jurisdictions, this would involve an implicit commitment of public funds. This would require a set of negotiated terms between the continuing UK and an independent Scottish state regarding the conditions of interventions by the Bank of England, and any indemnifications for them.

3.7 The Bank of England's interventions and the governance and political accountability behind crisis resolution procedures would have to be clearly defined and agreed between an independent Scottish state and the continuing UK, to limit the risks of fiscal spillovers from lender of last resort operations. It is clear that the coordination of crisis resolution procedures would be a lot more complex with two governments and one central bank than under the current system.

Common supervisor

3.8 The common financial supervisor is directed at crisis prevention. The UK macroeconomic framework has continued to evolve in response to the challenges posed by the financial crisis, with the desire to end 'too big to fail', the perception that very large firms were too important to be allowed to fail. Box 1B in the *Scotland analysis: Financial services and banking* paper sets out the reforms the UK Government has undertaken to address the issue.

3.9 Under European law, an independent Scottish state would be required to establish its own competent authority to regulate and supervise financial services. It might theoretically be possible for an independent Scottish state, with the agreement of the continuing UK, to appoint the Prudential Regulation Authority (PRA) and Financial Conduct Authority (FCA) as its regulators, but this would not allow the FCA and PRA to regulate Scottish firms on a UK wide basis.

3.10 Whether an independent Scottish state could share common supervisory regulations would be subject to negotiation. The Scottish Government's Fiscal Commission Working Group suggested that prudential regulation would be carried out on "a consistent basis across the sterling zone" (i.e. across the continuing UK and an independent Scotland), whereas conduct regulation would be subject to a different set of standards imposed by Scottish authorities. Box 2A in *Scotland analysis: Financial services and banking* set out some of the problems with this arrangement. There would be problems of political accountability and government oversight, including who would be responsible for making appointments and giving directions in certain circumstances. Such proposals also do not take into account the degree to which the FCA is integrated with the PRA and that this relationship is formalised under legislation. Even if the continuing UK agreed to share

regulators, there would be difficulties with two separate fiscal authorities. These proposals would fall well short of the simplicity and clear accountability that the UK currently has by having one common supervisor.

3.11 Even with strong bank regulation, crisis resolution mechanisms are still a very important part of banking union. Governor Carney gave three reasons why ending the problem of 'too big to fail' would not end the link between sovereigns and banks:

- banks hold sovereign debt (and domestic banks hold disproportionately large amounts of their national sovereign debt);
- confidence in deposit guarantee schemes dependent on the fiscal resources supporting the scheme; and
- schemes depend on the central bank as lender of last resort requires backing from the fiscal authorities.

3.12 The current macroeconomic framework provides clear governance and political accountability that facilities rapid crisis resolution.

Access to central bank liquidity and lender of last resort facilities

3.13 *Scotland analysis: Currency and monetary policy* set out (in Box 2B of that paper) what the lender of last resort function is. Traditionally it refers to a central bank providing temporary liquidity assistance to an otherwise solvent institution, at a penal rate and secured against high quality assets. More generally it can be thought of as the provision of general liquidity to the financial system. It is a traditional function of the central bank because the central bank is able to 'print' money, meaning it is not subject to liquidity risk, and can provide funds in the event of a liquidity crisis. In this way it can help prevent bank runs and maintain the stability of the financial sector. Traditional lender of last resort operations were undertaken in the case of Northern Rock.

3.14 The financial crisis demonstrated that other extraordinary measures can be required in addition to orthodox lender of last resort operations. It requires close cooperation between the central bank, resolution authority and fiscal authority. As Governor Carney said, "under the current governance arrangements in the UK, these operations require an indemnity from, and the approval of, the Chancellor, because they would put substantial public funds at risk."

3.15 Effective coordination between HM Treasury, the Financial Services Authority and the Bank of England allowed the Government's Royal Bank of Scotland (RBS) interventions to be arranged over a single weekend, preventing catastrophic consequences for the financial system. The Treasury eventually provided £45 billion to recapitalise RBS and a commitment of a further £275 billion of state support in the form of guarantees and funding.[4] This combined support from the UK Government to RBS was equivalent to 211 per cent of Scottish GDP in 2008.[5]

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[4] Alistair Darling, on his experience of the recapitalisation of RBS as the Chancellor of the Exchequer, evidence to the House of Lords Economic Affairs Committee (24 October 2012): "All I can tell you is that, on the night of 7 [October] 2008, no one at all anywhere in the world rushed to chip in to bail out RBS, despite the fact that it had a very large trading arm in the United States and many of the losses that it made were there. Obviously the US Fed was immensely helpful in terms of liquidity support and tiding over; it kept RBS going for a whole afternoon when it got into trouble on that Tuesday. When it came to recapitalisation, though – I think that the recapitalisation figure is about 30 per cent of Scottish GDP – there was no one queuing up to do it. As Mervyn King said, these banks are global in life but national in death."

[5] HM Government, *Scotland analysis: Financial services and banking*, April 2013, page 7.

3.16 It is in the interest of all countries to sever the link between banks and sovereigns by ensuring no bank is 'too big to fail'. The UK is at the forefront of these efforts through the Financial Services (Banking Reform) Act 2013 and recently agreed European Bank Recovery and Resolution Directive. But it will not fully break the link as fiscal backstops are required to underpin deposit guarantee schemes and the operation of the central banks as lender of last resort.

3.17 Strong international integration of financial markets has resulted in a number of traditional lender of last resort operations having cross-border effects. In particular, large operations aimed at the provision of general liquidity to the financial system were often extended to financial institutions registered abroad. For example, during the financial crisis, non US-registered banks were able to access emergency loans from the US Federal Reserve and non-euro area registered banks were able to access the ECB's long-term refinancing operations.

3.18 However, the financial crisis has shown that such international cooperation is typically limited to liquidity based interventions. When questions are raised about the solvency of domestically-domiciled institutions, it is national governments that can be required to commit public funds to these financial institutions in order to stabilise the wider financial system. Ultimately, banking unions are hard to separate from fiscal arrangements through expectations of sovereign support to the financial sector.

Common resolution mechanisms

3.19 Under the current arrangements, the fiscal impact of these interventions is pooled across the whole of the UK. This arrangement would end with Scottish independence. Although it is not clear how these arrangements would work if the Bank of England was the lender of last resort for two different states, there would be two potential options for crisis resolution interventions when public funds were at stake, as set out in *Scotland analysis: Currency and monetary policy*.

3.20 An independent Scottish state could be responsible for its own crisis resolution interventions. This would involve self-insuring its financial sector by running fiscal and balance of payment surpluses to generate the required reserves to pre-fund the risk. As set out in Annex B, Scotland is estimated to still be running a significant deficit in 2016/17, which would make it difficult to generate the required reserves to achieve this.

3.21 Alternatively the current arrangements of shared fiscal risks could be recreated between the continuing UK and an independent Scottish state. Governor Carney suggested that this would be required for a successful currency union. This would be very difficult for a number of reasons. Given the asymmetry in size between the two states, this would involve a much higher risk to public funds for the continuing UK. It would therefore be an important part of negotiations to what degree the continuing UK would be willing to pool public funds with an independent Scottish state. However, without agreement it would have the potential to leave the currency union unstable, as observed in the euro area.

3.22 There would be a much more complex system of political accountability with crisis resolution being undertaken between two states. It would require clearly defined governance and political accountability procedures and would have to be agreed between an independent Scottish state and the continuing UK. Any process that involved consulting two different states would reduce the speed with which crisis resolution could be undertaken.

Credible deposit guarantee scheme

3.23 The costs of the UK's deposit guarantee scheme – the Financial Services Compensation Scheme (FSCS) – are shared across the whole of the UK. It is funded by a levy on the financial services sector but can be lent money by the Government in order to fund large compensation payments. The UK Government lent around £20 billion to the FSCS during the financial crisis. Ultimately, as set out by Governor Carney, the underlying strength of the deposit guarantee scheme is dependent on the strength of the fiscal authority/backstop.

3.24 An independent Scotland would be required to have a separate deposit guarantee scheme by EU law and could not share the continuing UK's scheme. *Scotland analysis: Financial services and banking* showed that 'Scottish' firms currently account for 19.8 per cent of FSCS eligible deposits. Any kind of mutualised deposit guarantee scheme would involve significant fiscal risks for the continuing UK.

Box 3.A: Banking union developments in the euro area in response to the crisis

The euro area during the crisis demonstrated how Member States could be adversely affected by an incomplete banking union. As *Scotland analysis: Currency and monetary policy* explained, clear rules under which the central bank would be required to act as lender of last resort were not enough to adequately support some Member States. If the relevant fiscal authority does not have the fiscal space or tools to respond to the solvency problems (e.g. recapitalisation of the banking sector) this is likely to increase the risks of joint banking and sovereign crises. This can result in the emergence of a vicious circle between banks and sovereign debt.

These problems were particularly apparent in Ireland. The IMF at the first programme review in 2011[1] identified that the banking sector was large relative to the size of the economy and had significant vulnerable assets. Although the eurosystem was able to provide emergency liquidity support to the Irish banks, solvency issues with the banking system were for the Irish Government alone rather than a shared euro area fiscal risk. Direct bank recapitalisation costs amounted to €46.3 billion (30 per cent of GDP) over 2009/10. This large cost proved unsustainable and weighed on both the sovereign and the economy, causing the fiscal and economic situation to deteriorate, ultimately leading to Ireland losing financial market access.

This, as well as the ongoing adjustment to macroeconomic imbalances, caused a further deep recession in Ireland, with unemployment rising to 14.7 per cent in 2012 and gross debt forecast to rise to 124 per cent of GDP in 2013.[2]

Banking union within the euro area is being developed to address the problems the crisis, have demonstrated with the institutional structure of the euro area. *Scotland analysis: Financial services and banking* set out the three pillars needed for a successful banking union:

- Supervisory Mechanism – in the euro area, this will give the ECB direct supervision of banks and banking groups in euro area countries and any other countries which choose to participate;
- Resolution Mechanism – this will permit the managing down of non-viable banks in such a way as to protect taxpayers and minimise the impact on markets and the wider economy; and
- Depositor Guarantee Scheme – this will provide the compensation safety net to consumers in the event that a bank fails.

Banking union would start to address the problems that Governor Carney identified in his January 2014 speech. However it illustrates how currency unions require significant fiscal risk sharing.

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1 IMF (2011), "Ireland: First and Second Reviews under the extended arrangement".

2 Eurostat and European Commission Autumn 2013 forecast.

The need for fiscal risk-sharing

3.25 A currency union requires shared fiscal arrangements. The arguments were set out in full in *Scotland analysis: Currency and monetary policy* but there are three primary justifications set out below.

Smoothing economic shocks

3.26 The first is that deeper fiscal integration can smooth economic shocks across the union, by recreating similar fiscal transfers to those in a nation state. These fiscal transfers are then able to smooth the volatility of shocks that only affect one member of the currency union, for example an independent Scottish state in the case of currency union with the larger continuing UK.

3.27 As already set out, fiscal transfers are an important feature of the success of the current UK arrangement, which is underplayed by the analysis of economic adjustment mechanisms in Chapter 2. The UK's fiscal model is characterised by a high degree of pooling of tax revenues combined with substantial devolution of spending powers. While this model continues to evolve, notably through the devolution of tax and borrowing powers in the recent Scotland Act 2012, it aims to balance the benefits of devolved decision-making against ensuring sufficient fiscal risk-sharing to support all parts of the UK.

3.28 There is no explicit channel for this effect included in the model used in Chapter 2. The model assumes that an independent Scottish state's national fiscal policy would always be able to compensate for the loss of fiscal transfers from the rest of the UK, even if less efficiently. However the experience of the euro area has demonstrated that, at times of severe economic stress, the national budgets of members of a currency union can be unable to fully support their economies.

Spillover effects and moral hazard

3.29 The second reason is that problems in one country are very likely to spill over into other members of the currency union. This creates a 'moral hazard' problem, where there are incentives for members of the currency union to alter their behaviour because they are not fully exposed to the consequences of their actions, which will also affect other members of the union. This is a problem with currency unions that has been acknowledged for a long period of time. The initial design of the euro was intended to limit moral hazard through the Stability and Growth Pact. However, it has become clear that the European Treaty provisions proved inadequate to ensure appropriate fiscal discipline and efficient market discrimination between the different Member States in the run-up to the crisis.

3.30 There is a clear tension between the need for fiscal rules to prevent moral hazard, but allowing flexibility for fiscal policy to stabilise economic shocks. The euro area has sought to ease this tension by taking steps to increase the degree of fiscal risk-sharing, through the provision of inter-regional fiscal support at the euro area level – the European Stability Mechanism (ESM). A greater mutualisation of fiscal risks has also reinforced the need for stronger fiscal controls and more rigorous oversight. The rigour of the fiscal framework, through the Fiscal Compact, has been strengthened and access to an ESM programme involves a large degree of policy conditionality.

3.31 The euro area clearly demonstrates the need for fiscal risk-sharing mechanisms beyond what is implied by fiscal rules alone. As Governor Carney[6] has remarked: "*European monetary union, which has so far relied on fiscal rules, will not be complete until it builds mechanisms to share fiscal sovereignty*". Simply relying on a negotiated set of fiscal rules for a sterling currency union would therefore be unlikely to be sufficient.

Asymmetry of risk

3.32 The tensions visible in the euro area would be even more acute in the case of a formal sterling currency union between the continuing UK and an independent Scottish state. The fundamental difficulty would be the difference in economic size, and therefore exposure to fiscal and financial risk, of the two members of the currency union. As *Scotland analysis: Currency and monetary policy* concluded, the asymmetry in the exposure to risk would mean that the degree of fiscal oversight would need to stretch beyond the agreement on an appropriate set of fiscal rules. Regular monitoring of Scotland's fiscal position by the continuing UK would be required, including some mechanism for intervention and correction if fiscal risks to the stability of the currency union were to arise.

3.33 The final lesson of the euro area experience during the financial crisis is the requirement for some form of 'fiscal backstop' for the financial sector, which implies some form of banking union is required. The size of the Scottish and UK financial sectors (relative to GDP) means that this is a critical issue.

[6] Carney (2014), "The economics of currency unions".

Chapter 4: Conclusion

4.1 The UK is a successful union because taxation, spending, monetary policy and financial stability policy are co-ordinated across the whole UK. It means risks are pooled, there is a common insurance against uncertainty and no one area or sector of the larger economy is too exposed.

4.2 Within a sterling currency union, an independent Scottish state would find it more difficult to adjust to the effects of economic challenges, such as a fall in the global oil price, than Scotland currently does as part of the UK. The continuing UK would become unilaterally exposed to much greater fiscal and financial risk from a separate state. Greater fiscal risk would come from UK taxpayers being asked to support the wider economy of another state and also financial risk were banks from that state to fail.

4.3 The conclusion of HM Treasury's Assessment of euro membership in 2003 was to advise the UK Government against joining Economic and Monetary Union. The subsequent experience of the euro area in the financial crisis has confirmed the economic reality of HM Treasury's Assessment. It has also highlighted additional challenges of creating a durable and effective currency union, illustrated by the very difficult economic adjustments required by some members and the financial risks that have been accepted by other members and their taxpayers.

4.4 On the basis of the scale of the challenges, and the Scottish Government's proposals for addressing them, HM Treasury would advise the UK Government against entering into a currency union. There is no evidence that adequate proposals or policy changes to enable the formation of a durable currency union could be devised, agreed and implemented by both governments.

Annex A:
The legal position of the UK pound

The Scottish Government's position on the UK pound and the Bank of England

A.1 The Scottish Government's White Paper, *Scotland's Future: Your guide to an independent Scotland*, states that "the pound is Scotland's currency just as much as it is the rest of the UK's".[1] The Scottish Government's Fiscal Commission proposed that an independent Scotland seek to retain the UK pound as part of a formal monetary union with the rest of the UK.[2] The Cabinet Secretary for Finance in the Scottish Government, John Swinney MSP, has argued that the Bank of England is "as much our bank as it is anybody else's".[3]

A.2 These assertions are premised on a misunderstanding of the nature of a system of currency and a flawed analysis of the legal position of the UK pound and the Bank of England. Members of the Scottish Government, have in their public statements, continually conflated the UK pound as a currency with the issue of assets and liabilities, even suggesting that an independent Scottish state would refuse to take its share of liabilities if the continuing UK did not agree to share the UK pound as part of a currency union.[4]

A.3 It is right to say that the international law principle of equitable division applies to certain UK assets and liabilities and that this principle would be important in any negotiation should Scotland vote for independence. However it is wrong to say that an independent Scotland would be entitled to share the continuing UK's currency, the UK pound, as part of a formal currency union. There is no rule or principle in international law that would require the continuing UK to share its currency with an independent Scottish state. The system of currency used by a country is not part of its assets, as is explained below.

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1 *Scotland's Future: Your guide to an independent Scotland,* Scottish Government, November 2013.

2 *Fiscal Commission Working Group – First Report – Macroeconomic Framework*, Scottish Government, February 2013.

3 Finance Minister John Swinney in oral evidence to the House of Lords Economic Affairs Committee on 11 December 2012, http://www.parliament.uk/documents/lords-committees/economic-affairs/ScottishIndependence/OnlineEvidenceVolume2New.pdf

4 First Minister Alec Salmond, quoted in 'Meet our terms on currency or we won't pay a share of UK debt' in The Times, November 2013, www.thetimes.co.uk/tto/news/uk/scotland/article3926719.ece and Deputy First Minister Nicola Sturgeon, quoted in 'Scotland could refuse to accept UK liabilities if currency union is blocked' in The Guardian, November 2013, www.theguardian.com/politics/2013/nov/26/scotland-share-uk-liabilities-currency-union-independence.

Legal position

A.4 In the event of Scottish independence, the UK (without Scotland) would be the continuing state in international law. A detailed legal opinion from world-leading experts Professor James Crawford and Professor Alan Boyle was published with *Scotland analysis: Devolution and the implications of Scottish independence*, which set out at length a number of consequences that would arise from this position.

A.5 As a continuing state the UK's laws and institutional framework would continue uninterrupted by Scottish independence. National institutions currently serving the people of the UK, such as the Bank of England and central government departments, would continue to carry out functions in the continuing UK and deliver services to the people of the continuing UK as before. Such institutions would have no jurisdiction in Scotland and no power or obligation to act on behalf of an independent Scottish state. This means the Bank of England, as a UK institution, would remain the central bank for the continuing UK but not a new Scottish state. So it would only issue currency and set interest rates for the continuing UK and not for Scotland.

A.6 The position is quite different in relation to the UK's assets and liabilities. The relevant assets and liabilities would, according to international law principles, fall to be equitably divided between the continuing UK and an independent Scottish state. The apportionment of the UK's assets and liabilities would likely constitute a large part of the separation negotiations that would necessarily follow a vote for independence.

What this means for the UK pound as a currency

A.7 It is important to be clear what the UK pound as a currency is and why it is not an asset. A currency is a system of exchange, a unit of purchasing power that works when others recognise it as having value. Currency does not have to be the coins or bills which are used by most states; it could be anything that people agree represents value. The UK pound is underpinned by a legal, institutional and administrative framework which enables it to function as a medium of exchange, a store of value, a unit of account and a medium for deferred payment.

A.8 In the UK, as in most cases where a sovereign state has its own currency, the central bank has a monopoly right to issue money for its own area of circulation, including regulating the issuance of Scottish and Northern Irish bank notes by retail banks. The production of currency is regulated through legislation passed by the UK Parliament and monetary policy set by the Bank of England. Therefore, the currency of a state is inherently linked to the institution of the central bank and the particular monetary policy in that state – and the UK, the UK pound and the Bank of England are no different in this respect.

A.9 The sorts of assets that may be subject to negotiation in the event of a vote for Scottish independence are the cash, currency or gold reserves held by the UK state. These assets are very different from the system of currency itself; the particular currency used by a state is not an asset on the state's balance sheet which can be divided up like the money in a bank account. An individual pound is an asset, as is a collection of pounds in a bank account. The pound as a system of currency is not.

A.10 The Scottish Government has itself identified the UK Government's Whole of Government Accounts[5] as the basis of assets for which an independent Scottish State would seek to negotiate. Whole of Government Accounts does not include the UK pound.[6]

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[5] HM Treasury, *Whole of Government Accounts 2011-2012*, 31 October 2013.

[6] Scottish Government, *Scotland's Future: Your guide to an independent Scotland*, November 2013, page 341 and footnote 374.

A.11 Because the UK pound is so inherently linked to the functions of the Bank of England which, as has already been established, will remain with the continuing UK, there is no legal basis for asserting "a share" in the UK pound – or the Bank of England – if Scotland voted for independence. It is akin to saying that Scotland is entitled to a share in the functions and services of other UK institutions, such as UK government departments, or the UK Parliament at Westminster, whereas the international law position is clear that these will continue to serve the continuing UK only.

A.12 The functions of the Bank of England are underpinned by various pieces of UK legislation:

- the Currency Act 1983 enables the Bank of England to issue paper money, within limits set by the Treasury;[7]
- the Currency and Bank Notes Act 1928 imposes a duty upon the Bank to hold "securities of an amount in value sufficient to cover the fiduciary note issue for the time being";[8]
- the Currency Act 1982 establishes the denominations of sterling;
- the Currency and Bank Notes Act 1954, enables the holder of sterling notes to exchange them for notes of lower denomination; and,
- the Coinage Act 1971 sets standards for coin content, and codifies powers to regulate coinage issue by Royal Proclamation.

A.13 The requirement in section 3(1) of the Currency and Bank Notes Act 1928 for backing of the currency with securities does not confer any rights on the holders of sterling banknotes, but is rather the equivalent of an administrative direction to the Bank of England for the purpose of the proper management of the currency.[9] The above legislation would continue to apply to the Bank in the same way as it does now in the event of Scottish independence, but this legislation would no longer apply in Scotland and the authorisation for the Bank of Scotland, Clydesdale Bank and the Royal Bank of Scotland to issue sterling banknotes would also cease.

A.14 It is clear that the assets held as backing for a currency are not the same as, or equivalent to, the currency itself. The assets form one aspect of the administration of a currency – its credibility. But such credibility also depends on broader economic and political factors in the state that issues the currency.

A.15 The Bank of England's operations are inherently linked to UK Government policy decisions, for example, stable prices are defined by the UK Government's inflation target, which the Bank seeks to meet through the authority delegated to the Monetary Policy Committee. In fulfilling its two core purposes of achieving monetary and financial stability the Bank works closely with UK government departments, such as HM Treasury and UK regulatory bodies, such as the Financial Conduct Authority, and will continue to do so in the event of Scottish independence.

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7 The Bank of Scotland plc, Clydesdale Bank plc and the Royal Bank of Scotland plc are authorised to issue sterling banknotes in Scotland, subject to the supervision of the Bank of England under Part 6 of the Banking Act 2009. Similarly, the Bank of Ireland plc, First Trust Bank plc, Danske Bank (formerly Northern Bank) and Ulster Bank plc are authorised to issue sterling banknotes in Northern Ireland. These banks are required to hold sufficient ring-fenced assets to support their note issues.

8 Section 3(1) of that Act.

9 Mann on the Legal Aspect of Money, 6th ed 2005 pp63-64, citing *Marshall v Grinbaum* (1921) 37 TLR 913 (which held that even a currency backed by gold does not necessarily entitle individual note holders to redeem their notes in gold. Such a right could of course be created by legislation, and one was in effect when the pound was backed by gold up to 1914 (Bank of England Act 1833, section 6).

A.16 The only way in which a formal currency union could arise between an independent Scottish state and the continuing UK is if the continuing UK were to agree to establish one. This would be a matter for the continuing UK, and would depend on what would be in the best interests of the continuing UK and its population in future.

A.17 If the continuing UK state were not to agree to a formal currency union, an independent Scottish state could still use the UK pound through so-called "currency substitution". This occurs where a state chooses to use a foreign currency in parallel to or instead of a domestic currency, good examples being Panama's use of the US dollar or Montenegro's use of the euro. However, importantly for Scotland, the state choosing to use this foreign currency relinquishes control over its monetary policy and interest rates and no longer has access to the central bank as lender of last resort to its financial sector.[10] Panama has no influence over US economic, fiscal or monetary policy and Montenegro has no representation or influence at the European Central Bank and its economic circumstances are not taken into account in the ECB's setting of monetary policy for the euro area.

A.18 It is clear that, in the absence of an agreement between the governments of the continuing UK and an independent Scottish state, should Scotland choose to use the UK pound, it would have no automatic legal right to the future services provided by the Bank of England, including the setting of interest rates and provision of lender of last resort facilities.

B.19 The UK pound is not an asset subject to division and an independent Scottish state would have no legal right to decide on or benefit from the functions of the Bank of England (as an institution of the continuing UK). The equitable division of the UK's assets and liabilities is a completely separate issue. There is no basis for an independent Scottish state to refuse to take its share of liabilities simply because the continuing UK did not agree to form a currency union.

Conclusion

A.20 As Professor Adam Tomkins has made clear in evidence to the Scottish Affairs Committee, the UK pound is Scotland's currency now precisely because Scotland is currently part of the UK.[11] Although certain UK assets could become subject to negotiation between the continuing UK and an independent Scottish state, there is no rule or principle in international law that would require the continuing UK to formally share its currency with an independent Scottish state.

A.21 The status quo would remain for the continuing UK; the UK pound would continue to be printed and the Bank of England would continue to fulfil its current functions as a continuing UK institution. However, the position would be quite different for an independent Scottish state. Independence means leaving the UK's monetary union and leaving the UK pound.

[10] *Scotland analysis: Currency and monetary policy*, HM Government, April 2013.

[11] Professor Adam Tomkins, John Millar Chair of Public Law, University of Glasgow, in oral evidence to the Scottish Affairs Committee, 15 January 2014, www.publications.parliament.uk/pa/cm201314/cmselect/cmscotaf/uc140-xiii/uc140xiii.pdf

Annex B: The public finances and interest rates in an independent Scottish state

The Scottish and UK public finances in 2016/17

B.1 If adequate fiscal risk-sharing arrangements to make a supranational currency union durable could be devised and could be agreed, these arrangements could only ever be as strong as the fiscal authorities standing behind them. One further consideration for whether the UK Government and an independent Scottish state would enter into a currency union is the specific timetable envisaged for Scottish independence[1] and forecasts for the state of both Scotland's and the UK's public finances over that period.

B.2 The position of the public finances matters for the stability of a currency union because it reflects governments' fiscal space to respond to an economic shock. In particular, at the point of entering a currency union it is necessary to have the fiscal resources to immediately fund the required fiscal back stops. On an ongoing basis it is necessary to have the fiscal space and credibility to respond to a shock with fiscal policy due to the absence of a flexible exchange rate and independent monetary policy. Doubts about the ability of member states to use fiscal policy, and then adjust fiscal policy accordingly, would raise speculation about the long-term prospects of the currency union.

B.3 Currently, the UK is tightening fiscal policy following the financial crisis and recession. Public sector net borrowing for the whole UK is forecast to be falling to 2.6 per cent of GDP in 2016/17 and treaty debt[2] is forecast to be falling to 93.9 per cent of GDP.

B.4 In the event of independence, and on the basis of a population split of the national debt, the continuing UK is projected on current estimates to have a fiscal deficit of 2.3 per cent of GDP and treaty debt of 95 per cent of GDP.

[1] 24 March 2016, as set out in Scottish Government, *Scotland's Future: Your guide to an independent Scotland*, 26 November 2013, page 51.

[2] The most common and comparable international measure and broadly equivalent to the Whole of Government Accounts figures the Scottish Government has said will form the basis of the assets for negotiation in the event of independence.

B.5 On current estimates an independent Scotland would inherit debt of 84 per cent of GDP in the case of a population-based split of the national debt. There are different forecasts for the deficit of an independent Scottish state at the point of independence:

B.5.1 In its White Paper, the Scottish Government forecast a Scottish deficit of 3.2 per cent of GDP in 2016/17. This was based on a population split of the national debt and inheriting a geographical share of North Sea oil and gas revenues. But this single year forecast was based on more optimistic forecasts of North Sea oil and gas revenues[3] than projected by the OBR and on Scotland continuing to pay the same debt interest rates as the continuing UK;

B.5.2 Adjusting the Scottish Government's forecast for the OBR's latest forecast of North Sea oil and gas revenues,[4] this analysis estimates a Scottish deficit of 5.3 per cent of GDP in 2016/17. This estimate is much closer to the independent estimate by the Centre for Public Policy for the Regions (CPPR) which forecast a Scottish deficit of 5.1 per cent of GDP in 2016/17.[5]

B.6 A substantial deficit and elevated level of debt weigh strongly against agreeing to or entering a currency union because it would raise questions about the ability of the a government to converge with macroeconomic policies of other members of the currency union and have sufficient fiscal resources to sustain the currency union under stress.

B.7 Sustainable public finances are one of the Maastricht Convergence criteria required of EU Member States in order to join the euro. As a simple illustration of the requirements that might be expected of the continuing UK and an independent Scottish state for entering currency union and having sufficiently sustainable public finances to manage the risks that such an arrangement would create for the public finances, the Maastricht criteria would appear to be a bare minimum. These require the government deficit to be less than 3 per cent of GDP and government debt to be less than 60 per cent of GDP. In 2016/17, the continuing UK would only meet one of these criteria and an independent Scotland would miss both by a considerable margin.

B.8 In the case of an independent Scotland, it would be seeking to enter a currency union with high levels of debt and deficit. The asymmetry of risk sharing with the continuing UK would require an independent Scotland to build fiscal space from a challenging starting position. The policy announcements of the Scottish Government in its White Paper – including the £1.6bn unfunded pledges for childcare, and corporation tax and air passenger duty cuts[6] – suggest Scottish fiscal policy will be the opposite to that required. The Scottish Government have stated their intention to start an oil revenues fund, so it is hard to see how it could cut spending or raise taxes, and adjust its fiscal policy sufficiently to meet all its policy objectives and correct its fiscal position to the likely requirements of a currency union.

B.9 The continuing UK, entering a currency union with a budget deficit and elevated debt levels, would almost certainly incur a small debt interest premium.

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[3] See Box 1B, HM Government, *Scotland analysis: Macroeconomic and fiscal performance*, September 2013.

[4] This does not take into account of any additional debt interest premium an independent Scottish state would have to pay.

[5] McClaren and Armstrong (2013) *Analysis of Scotland's past and future fiscal position,* Centre for Public Policy for Regions.

[6] HM Treasury press notice; *Treasury analysis shows £1.6 billion funding gap in Scottish independence White Paper;* 18 December 2013

Interest rates in an independent Scotland

B.10 It is likely that an independent Scottish state would face higher borrowing costs and face more constrained market conditions relative to the continuing UK. The size of the spread between interest rates on government bonds issued by an independent Scottish state and those issued by the continuing UK would primarily be determined by the risk premium attached to Scottish debt by financial investors (and the underlying nominal risk-free interest rate).[7] An independent Scotland would be expected to have a number of characteristics that would lead to a higher risk premium than the UK:

- a less liquid debt market;
- a lack of an institutional track record and institutional uncertainty;
- higher economic and fiscal volatility;
- a larger future potential debt burden;
- a larger financial services sector, with larger contingent liabilities, as a share of GDP; and
- reduced monetary policy flexibility to respond to external shocks.

A less liquid debt market

B.11 Liquidity refers to the ability of investors to transact at times and in volumes of their choosing without incurring significant costs. If liquidity is very low, then small transactions can have a large impact on the price of a country's debt. Liquidity is typically positively related with market size due to the larger volume and greater frequency of transactions. Investors can be expected to demand higher interest – a liquidity premium – if they anticipate incurring additional transaction costs. A less liquid debt stock therefore translates into higher interest rates on debt issuance.

B.12 As a large economy, the UK bond market is one of the most liquid bond markets in the world. Even with the same level of debt or deficit per head, an independent Scotland would have a much smaller debt market and would pay a much larger liquidity premium, which would raise an independent Scotland's overall cost of borrowing.

Institutional uncertainty

B.13 An independent Scottish state would have a much shorter track record of economic policymaking and crisis management. This would, at least initially, reduce the predictability of future governance and policy choices, including the perceived risk of an independent Scottish state meeting its debt obligations. While the perceived strength of an independent Scottish state's institutions would be crucial in determining its overall creditworthiness, its institutions would remain untested until an independent Scottish state had demonstrated its ability to respond to an economic shock. In contrast, the UK has demonstrated its strong institutional framework and fiscal flexibility on a number of occasions. The OECD have said that "A strong institutional framework and credibility earned by reaching fiscal objectives so far have fostered confidence in UK fiscal policymaking and the medium-term fiscal consolidation path."[8]

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[7] Nominal risk-free interest rates could also diverge due to different expectations on inflation and exchange rate movements in an independent Scotland the rest of the UK.

[8] OECD UK Economic Survey, 6 Feb 2013.

B.14 Scotland's lack of an institutional track record could be compounded in the near term by further uncertainty about an independent Scottish state's future institutional and constitutional arrangements, not least the sustainability of any currency choice. Currency unions require significant political commitment and may unwind if they are perceived to be only temporary. As the Scottish Government's White Paper points out "it would, of course, be open to people in Scotland to choose a different arrangement in the future". If the sustainability of the currency arrangement is called into question, the market would price in a premium for redenomination of the national currency.

Economic and fiscal volatility

B.15 In the event of independence, the Scottish economy would be more reliant on the oil and gas industry and would, at least initially, be more exposed to financial sector shocks, which would reduce its economic resilience. In contrast, all three major credit rating agencies identify the UK's large, wealthy and diversified economy as one of its key strengths. Credit premia can increase if countries have a very volatile or concentrated economy resulting, for instance, from the country's significant exposure to a single cyclical industry.

B.16 In addition, the greater economic volatility and openness that small countries tend to experience requires higher levels of fiscal reserves to stabilise the economy. The OECD finds that "fiscal safety margins need to be significantly larger to assist stabilisation in a small, open economy".[9] An independent Scottish state's public finances would be expected to be highly reliant on tax revenues from financial services and North Sea oil and gas production, as set out in the *Scotland analysis: Macroeconomic and fiscal performance* paper.

Larger potential debt burden and financial sector as a share of GDP

B.17 As identified by the Institute for Fiscal Studies[10], without radical policy action, an independent Scotland would face a large and rising debt burden in decades to come, above and beyond that of the UK, driven mainly from demographic pressures and declining tax revenues from North Sea oil and gas extraction. It would also face a larger contingent liability (relative to the size of its economy) from its financial services industry. Investors are likely to price these factors into the interest rates charged for an independent Scottish government's debt.

Less monetary policy flexibility to respond to adverse shocks

B.18 The *Scotland analysis: Currency and monetary policy* paper and the economic modelling in this paper have established that an independent Scottish state would have less scope than the UK to set interest rates to domestic conditions under any currency arrangement it entered into under independence. It would therefore be less able to respond to adverse shocks that hit the Scottish economy.'

9 OECD (2010) "Counter-cyclical economic policy".

10 IFS (2013) "Fiscal sustainability of an independent Scotland".

B.19 Investors would likely factor in this limited monetary policy flexibility into the premium they demand for buying Scottish debt. Analysis of credit ratings assigned by Fitch to the fifty wealthiest countries confirms local currency credit ratings have typically been one or two notches higher than their respective foreign currency ratings, though there are exceptions (e.g. Japan). On the other hand, where countries have their own currency, credit rating agencies have argued there is little or no default risk, since they are able to print money in the same currency in which debt is denominated. This is consistent with the recent historically low bond yields for all large economies with monetary independence, including the UK, despite some very large fiscal deficits (e.g. the US and Japan).

How large would the interest rate premium be?

B.20 There is a great deal of uncertainty over how large an independent Scotland's interest rate premium might be. It is likely to comprise both higher credit risk and a liquidity premium. Some of the determinants of the interest rate premium are easier to analyse than others, for example the impact of liquidity or Scotland's fiscal position. Other factors are more uncertain, for example the financial market's perceptions of an independent Scotland's fiscal credibility given the lack of credit history.

B.21 The National Institute of Economic and Social Research (NIESR) have estimated the size of an independent Scotland's interest rate premium taking into account Scotland's expected debt and deficit to GDP levels, tax volatility and expected liquidity of the Scottish bond market. Importantly, the analysis assumes that an independent Scotland is able to negotiate a formal sterling currency union with the continuing UK, and receives a geographic share of oil and a population share of debt. On this basis, NIESR calculate that an independent Scotland would pay an interest rate premium of between 0.72 and 1.65 per cent on top of the long run average for UK 10 year bonds of 4.1 per cent. However, this estimate does not include all of the credit risk factors that are identified above; especially the lack of credit history and institutional uncertainty that would be expected to increase an independent Scotland's borrowing costs, at least initially.

B.22 There are a number of examples of similar analyses which reach very similar conclusions. For example, Professor Charles Goodhart[11] finds that an independent Scotland could easily pay an interest premium over the UK rate of above 1 per cent "even if economic events went quite well, potentially spiking far higher, as seen in the eurozone, if economic developments should deteriorate". The global investment firm Jefferies International suggest that the premium on independent Scottish bonds over UK gilts could be 100 basis points (or 1 percentage point), but that "in a default scenario they could easily trade 500 basis points or more over."

Impact of higher interest rates on an independent Scotland's public finances

B.23 An independent Scotland would, at some point, need to issue debt to the financial markets. Projections by the Scottish Government and the CPPR suggest that an independent Scotland would be expected to be running a budget deficit at the point of independence[12] and would therefore need to access capital from the financial markets.

[11] C. Goodhart (2013), "Scottish financial structure" in Goudie, A. (ed.) (2013)

[12] Scottish Government (2013), "Scotland's Future: Your guide to an independent Scotland" and McLaren and Armstrong (2013), "Analysis of Scotland's past and future fiscal position".

B.24 The higher interest rates that would be charged for this debt would increase debt interest payments for an independent Scotland, relative to the implicit share of Scottish borrowing that is currently financed by the UK government. All else equal, these higher costs would then need to be offset in the public finances by tax rises or spending cuts. The effect of higher borrowing rates of the sovereign would not be restricted to the public finances; it could also increase the rates of borrowing faced by Scottish mortgage-holders and businesses.

Annex C: Technical annex on the '4 Blocs' model

C.1 This annex presents the set of equations included in each 'bloc' of the model. All the variables are set to 0 in the first period, representing the steady state, except from the debt-to-GDP ratio, set to 60%.[1] The steady-state debt-to-GDP ratio value is arbitrary. A positive value is simply required in order for the model to solve, it does not represent any 'trigger points' for fiscal policy.

C.2 The key equations for each country bloc in the model are as follows:

- a fixed level of potential output;
- an IS curve where aggregate demand depends negatively on the real interest rate; negatively on the respective bilateral real exchange rates, positively with respect to foreign demand pressures. The equation also includes a term for fiscal policy – the primary balance excluding the oil balance and a term for the real oil price. The sign of the coefficient on the latter depends on whether the 'bloc' is a net importer or exporter of oil;
- a Phillips curve where changes in inflation are driven by the output gap (i.e. the gap between aggregate demand and supply) with additional dynamics from the real exchange rate and real oil price.
- bilateral exchange rates between pairs of countries driven by the relevant UIP condition, itself driven by the relevant interest rate differential; and
- a policy rule for nominal interest rates of the 'Taylor' form, specifying a positive response to deviations in inflation from target and to the output gap.

[1] The model is coded in Winsolve (see Pierse, 2007). It is solved using a Gauss-Newton solution method. All forward-looking expectations in the model are solved using a stacked Newton method under the assumption of model consistent expectations with conventional terminal conditions.

C.3 In more detail:

1. Aggregate Supply

$$Ys_A = Ys_A^{-1} + ysshock_A$$

Where:

Ys_A is aggregate supply

$ysshock_A$ is an aggregate supply shock

2. The IS Curve

$$Y_A = lagY_A.Y_A^{-1} + (1 - lagY_A).(\alpha_1.r_A + \alpha_2.er_{AB} + \alpha_3.er_{AC} + \alpha_4.er_{AD} + \alpha_5.Y_B + \alpha_6.Y_C + \alpha_7.Y_D + \alpha_8.opr_A + \lambda.PB_A^{exc.oil} + Yd_A$$

Where:

Y_A is the total output in country A;

Yd_A is an exogenous demand shock in country A;

r_A is the real interest rate in A;

er_{AB} is the real exchange rate between A and B (an increase in er_{AB} is equivalent to an appreciation in A);

opr_A is the oil price in the currency of country A;

λ is the fiscal multiplier;

$PB_A^{exc.oil}$ is the primary balance of A, excluding revenues from the oil&gas sector.

3. The Phillips Curve

$$\pi_A = \beta_1.E_t(\pi_A^{+1}) + (1 - \beta_1).\pi_A^{-1} + \beta_2.(E_t(er_{AB}^{+1}) - er_{AB}) + \beta_3.(er_{AB} - er_{AB}^{-1}) + \beta_4.(E_t(er_{AC}^{+1}) - er_{AC}) + \beta_5.(er_{AD} - er_{AD}^{-1}) + \beta_6.(E_t(er_{AD}^{+1}) - er_{AD}) + \beta_7.(er_{AD} - er_{AD}^{-1}) + \beta_8.(og_A + og_A^{-1}) + \beta_9.(opr_A - opr_A^{-1})$$

Where:

πa is the rate of inflation in A;

opr_A is the oil price in the currency of country A;

og_A is the output gap in country A;

er_{AB} is the real exchange rate between A and B.

4. Forward-looking UIP equation for the real exchange rate

Where there is a floating nominal exchange rate between two countries, the real exchange rate is specified as

$$er_{BC} = E_t(er_{BC}^{+1}) + r_B - r_C - risk_B + risk_C$$

Where:

er_{BC} is the real exchange rate between country B and C.

r_b is the oil price in the currency of country B;

$risk_B$ is an exogenous risk specific to the currency of country A.

er_{AB} is the real exchange rate between A and B.

In the case of a monetary union with no nominal exchange rate the real exchange rate is just equal to the price differential between A and B:

$$er_{AB} = p_A - p_B$$

5. The Taylor Rule

In the case of Scotland, the equation is:

$$i_A = i_B + risk_{Debt_{Aq}} + \text{ishock}_A$$

Where i_B is nominal interest rate set in the rest of the UK and is set as a function of the average inflation and output gap in the UK:

$$i_B = \mu_1 . i_B^{-1} + (1 - \mu_1).(\mu_2.(\pi_{AB} - \pi_{AB}^*) + \mu_3 . og_{AB}) + \text{ishock}_B$$

Where:

π_{AB} is weighted inflation between the rest of the UK and Scotland

og_{AB} is the weighted output gap between Scotland and the rest of the UK

π^*_A is the inflation target, set to 0.

$risk_{Debt_{Aq}}$ is the risk premium placed on Scottish interest rates

For the other 'blocs':

$$i_C = \mu_1 . i_C^{-1} + (1 - \mu_1).(\mu_2.(\pi_C - \pi_C^*) + \mu_3 . og_C) + \text{ishock}_C$$

Where:

π_C is inflation in Country C

og_C is the output gap in Country C

π^*_C is the inflation target, set to 0.

6. The public finances

The structural fiscal balance

$$SB_A = \gamma_1.\frac{(Ys_A + Ys_A^{-1} + Ys_A^{-2} + Ys_A^{-3})}{4} + \gamma_2.\frac{(Ys_A^{-4} + Ys_A^{-5} + Ys_A^{-6} + Ys_A^{-7})}{4} + \text{fshock}_A + \text{frule}_A$$

Where:

$fshock_A$ represents an exogeneous fiscal policy shock.

Ys_A is the aggregate supply in country A.

The cyclical fiscal balance

$$CB_A = \eta_1.\frac{(og_A + og_A^{-1} + og_A^{-2} + og_A^{-3})}{4} + \eta_2.\frac{(og_A^{-4} + og_A^{-5} + og_A^{-6} + og_A^{-7})}{4}$$

The oil fiscal balance

$$OB_A = \gamma_3.op_A$$

The government interest rate

$$ig_A = \frac{(-PB_A + QR_A).i_A + (Debt_{Aq}^{-1} - QR_A).ig_A^{-1}}{Debt_{Aq}^{-1} - PB_A}$$

QR_A is the quantum of refinancing part of the debt stock at each quarter:

$$QR_A = \frac{1}{AM_A}.Debt_{Aq}^{-1}$$

And AM_A is the average maturity of the government bonds, expressed in quarters (and set to 3 years here, which is lower than the average maturity of the UK debt, around 15 years).

The primary balance

$$PB_A = CB_A + SB_A + OB_A$$

The total budget balance

$$bb_A = PB_A - \frac{ig_A}{100}.Debt_{Aq}^{-1}$$

The fiscal rule for Scotland

$$frule_A = 1_{Debt_{Aq}^{-1}>240}.[1/2.\ \frac{(Debt_{Aq}-240)}{4} + 1/6.\ frule_A^{-1} + 1/6.\ frule_A^{-2} + 1/6.\ frule_A^{-3}]$$

The debt accumulation equation

Quarterly debt (debt stock as a percentage of quarterly GDP) – set to 240% in the first period:

$$Debt_{Aq} = \frac{(100 + ig_A)}{100 + \pi_A + (Y_A - Y_A^{-1})}.Debt_{Aq}^{-1} - PB_A$$

Annual debt:

$$Debt_{Aa} = \frac{Debt_{Aq}}{4}$$

Risk premium on the interest rate for Scotland

On the quarterly debt level:

$$risk_{Debt_{Aq}} = 1_{Debt_{Aq}^{-1}>240}.\mathrm{rsk}_1.(Debt_{Aq}^{-1} - 240)$$

Parameter calibration

The reference year for the data used to calibrate the parameters is 2011. If that data was unavailable, 2010 was used.

The IS Curve

Parameter	Definition	Value for Scotland	Value for the rest of the UK	Value for the Euro Area	Value for the rest of the world	Calibration
lagYa	Degree of inertia in total output	0.5	0.5	0.5	0.5	Based on the 3 Bears model calibration.
α1	Interest rate sensitivity of total output	-1.2	-1.2	-1.2	-1.2	Based on evidence from Batini and Haldane (1999), Nelson and Nikolov (2002) and Murray (2012).
Sensitivity of output to real e/r						Coefficients depending on the degree of openness of the country, the proportion of its trade with the partner considered, the exchange rate elasticity and negatively on the degree of pricing to market. **Sources:** Scottish national accounts (2012), the IMF World economic outlook (2012), and Eurostat.
α2	/Country 1	-0.71 *(/rUK)*	-0.08 *(/SC)*	0.0 (/SC)	0.0 *(/SC)*	
α3	/Country 2	-0.19 *(/EA)*	-0.3 *(EA)*	-0.06 (/rUK)	-0.02 *(/rUK)*	
α4	/Country 3	-0.26 *(/ROW)*	-0.43 *(/ROW)*	-0.37 (/ROW)	-0.09 *(/EA)*	
Coefficients on foreign demand and real oil price						Coefficients depending on the degree of openness (measured as Imports+Exports/2xGDP), and the proportion of exports of the country with the partner considered. **Sources:** Scottish national accounts (SNA), IMF, Eurostat.
α5	/Country 1	0.31 *(/rUK)*	0.04 *(/SC)*	0.0 *(/SC)*	0.0 *(/SC)*	
α6	/Country 2	0.08 *(/EA)*	0.13 *(/EA)*	0.03 *(/rUK)*	0.01 *(/rUK)*	
α7	/Country 3	0.12 *(/ROW)*	0.19 *(/ROW)*	0.17 *(/ROW)*	0.04 *(/EA)*	
α8	Coefficient on oil price	0.002	-0.02	-0.03	-0.01	coefficient depending on the degree of 'home bias' of post-tax labour and capital income, positively on the oil intensity of domestic final consumption, and decreasing in the elasticity of the domestic demand for oil. **Sources:** SNA, ONS
λ	Fiscal multiplier	-1	-1	-1	-1	In line with the OBR estimate used for the 2010 budget.

The Phillips curve

Parameter	Definition	Value for Scotland	Value for rUK	Value for Euro Area	Value for ROW	Calibration
β1	Degree of forward lookingness in inflation	0.2	0.2	0.2	0.2	Based on evidence from Batini and Haldane (1999), Nelson and Nikolov (2002) and Murray (2012).
Sensitivity of inflation to real exchange rate and real oil price						
β2	/Country 1 (t+1)	0.20 *(/rUK)*	0.02 *(/SC)*	0.001 *(/SC)*	0.00 *(/SC)*	Coefficients depend on , the proportion of exports of the country with the partner considered, and a combination of the domestic content of CPI and the degree of pricing to market in trade. **Sources:** SNA, IMF, Eurostat.
β3	/Country 1 (t)	-0.60 *(/rUK)*	-0.06 *(/SC)*	-0.002 *(/SC)*	-0.001 *(/SC)*	
β4	/Country 2 (t+1)	0.05 *(/EA)*	0.07 *(EA)*	0.01 *(/rUK)*	0.01 *(/rUK)*	
β5	/Country 2 (t)	-0.16 *(/EA)*	-0.20 *(EA)*	-0.03 *(/rUK)*	-0.02 *(/rUK)*	
β6	/Country 3 (t+1)	0.07 *(/ROW)*	0.10 *(/ROW)*	0.07 *(/ROW)*	0.03 *(/EA)*	
β7	/Country 3 (t)	-0.22 *(/ROW)*	-0.29 *(/ROW)*	-0.21 *(/ROW)*	-0.10 *(/EA)*	
β8	Output sensitivity of inflation	0.2	0.2	0.2	0.2	Based on evidence from Batini and Haldane (1999), Nelson and Nikolov (2002) and Murray (2012).
β9	Coefficient on change in the oil price	0.04	0.04	0.04	0.04	Coefficients depends on the oil intensity of domestic final consumption. **Source:** SNA, Eurostat, IMF

The Taylor rule

Parameter	Definition	Value for Scotland	Value for rUK	Value for Euro Area	Value for ROW	Calibration
μ1	Interest rate smoothing parameter	0.2	0.2	0.2	0.2	Based on evidence from Murray (2012) and the Three Bears model calibration.
μ2	Weight of inflation in the TR	0.5	0.5	0.5	0.5	
μ3	Weight of output in the TR	0.5	0.5	0.5	0.5	

The public finances

Parameter	Definition	Value for Scotland	Value for rUK	Value for Euro Area	Value for ROW	Calibration
$\gamma 1$	Sensitivity of structural fiscal balance to supply shocks	-0.5	-0.5	-0.5	-0.5	Assumption based on OBR (2012)
$\gamma 2$	Sensitivity of structural fiscal balance to supply shocks (y – 1)	-0.2	-0.2	-0.2	-0.2	
$\eta 1$	Cyclical adjustment parameter (1y lag)	0.5	0.5	0.5	0.5	Assumption based on OBR (2012)
$\eta 2$	Cyclical adjustment parameter (2y lag)	0.2	0.2	0.2	0.2	
$\gamma 3$	Coefficient on oil price in the oil fiscal balance	0.14	0.0016	0.00	0.012	Coefficient depending on the size of the oil and gas sector relative to the non-oil economy, and the tax receipts on labour and capital income in the oil sector. **Source:** ONS
rsk1	Sensitivity of the interest rate to the debt-to-GDP ratio	0.02	0.02	0.02	0.02	Based on evidence from Baldacci and Kumar (2010), and Engen and Hubbard (2004).

Annex D: Bibliography

Alesina, A, Spolaore, E, and Wacziarg, R. (1997) "Economic integration and political disintegration", *(No. w6163). National Bureau of Economic Research.*

Alesina, A. (2003) "The size of countries: Does it matter?", *Journal of the European Economic Association 1, No. 2-3. 301-316*

Alesina, A, and Spolaore, E. (1997). "On the number and size of nations", *The Quarterly Journal of Economics, 112(4), 1027-1056*

Alesina, A, and Wacziarg, R. (1998). "Openness, country size and government", *Journal of Public Economics, 69(3), 305-321*

Alouini, O, and Hubert, P. (2010) "Country Size, Growth and Volatility", *Document de Travail de l'OFCE, (2010-18)*

Anderson, J. E. and E. van Wincoop, (2003) "Gravity with Gravitas: A Solution to the Border Puzzle", *The American Economic Review 93 (1), 170-192*

Armstrong, A. (2013) "Independence and economic issues" *NIESR*

Armstrong, A and Ebell, M. (2013) "Scotland's currency options" *NIESR*

Baldacci, E and Kumar, M (2010) "Fiscal Deficits, Public Debt, and Sovereign Bond Yields", *IMF working paper No. 10/184*

Ball, L. M. (1997) "Disinflation and the NAIRU", *In Reducing Inflation: Motivation and Strategy (pp. 167-194). University of Chicago Press.*

Ball, L. M. (2009) "Hysteresis in unemployment: old and new evidence", *(No. w14818). National Bureau of Economic Research.*

Ball, L. Leigh, D. and Loungani, P. (2012) "Okun's Law: Fit at 50?", *Paper presented at the 13th Jacques Polak Annual Research Conference, hosted by the IMF*

Batini, N. Jackson, B. and Nickell, S. (2005) "An open-economy new Keynesian Phillips curve for the U.K", *Journal of Monetary Economics, Vol. 52, No. 6, pp 1061–1071.*

Batini, N. and Haldane, A. (1999) 'Forward-looking rules for monetary policy' Bank of England Working Paper No. 91.

Blake, A. and Westaway, P. (1996) "Credibility and the effectiveness of inflation targeting regimes", *Manchester School 64 (Supp), pp. 28-50*

Blanchard, O. J, and Summers, L. H. (1986) "Hysteresis and the European unemployment problem" *NBER Macroeconomics Annual, Volume 1. Mit Press, 1986. 15-90*

Blanchard, O. J., & Summers, L. H. (1989). "Hysteresis in unemployment" *European Economic Review, 31(1), 288-295*

Carlin, W. and Soskice, D., (2010) "A New Keynesian open economy model for policy analysis", *CEPR Discussion Paper No. 7979*

Carney, M. (2014) "The economics of currency unions", speech at *Scottish Council for Development and Industry*

Centre for Public Policy for Regions (2013a) "Analysis of Scotland's Past and Future Fiscal Position"

Centre for Public Policy for Regions (2013b) "Measuring an independent Scotland's economic performance"

Centre for Public Policy for Regions (2013c) "Reflections on the latest Oil and Gas related analysis by the Scottish Government and the Office for Budget Responsibility"

Clarida, R. and Gali, J. (1994) "Sources of Real Exchange Rate Fluctuations. How Important are Nominal Shocks", *Carnegie Rochester Series of Public Policy 41, pp. 1-56.*

Clarida, R, Gali, J. and Gertler, M. (1999) "The Science of Monetary Policy: A New Keynesian Perspective", *Journal of Economic Literature 37(2), pp. 1661-1707*

Clarida, R, Gali, J. and Gertler, M. (2001), "Optional Monetary Policy in Open versus Closed Economics, An integrated approach", *American Economic Review 91(2), pp. 248-252*

Easterly, W, and Kraay, A. (2000) "Small states, small problems? Income, growth, and volatility in small states", *World development, 28(11), 2013-2027*

Engen, E, and Hubbard, G (2004), "Federal Government Debt and Interest Rates" *NBER Working Paper No. 1068*

Fidrmur, J, and Horvath J. (1998) "Stability of Monetary Unions: Lessons from the Break-up of Czechoslovakia", *Tilburg University, Center for Economic Research*

Frankel, J, and Rose, A. (2002) "An Estimate of the Effect of Common Currencies on Trade and Income", *The Quarterly Journal of Economics, May 2002*

Frankel. J and Romer, D. (1999) "Does Trade Cause Growth?", *The American Economic Review, June 1999*

Fuhrer, J.C, and Moore, G. (1995) "Inflation Persistence", *Quarterly Journal of Economics 110(1) pp. 127-159.*

Furceri, D. and Karras, G. (2008) "Business cycle volatility and country size: evidence for a sample of OECD countries", *Economics Bulletin, Vol. 5, No. 3 pp. 1-7*

Furceri, D., and Karras, G. (2007) "Country size and business cycle volatility: scale really matters", *Journal of the Japanese and International Economies,21(4), 424-434*

Gali, J, and Monacelli, T. (2005) "Monetary policy and exchange rate volatility in a small open economy" *Review of Economic Studies Vol. 72, pp 707-734*

Giovanni, J. D, & Levchenko, A, A. (2009) "Trade openness and volatility" *The Review of Economics and Statistics, 91(3), 558-585*

Goodhart, C. (2013) "Scottish financial structure" *in Goudie, A. (ed.) Scotland's Future – The economics of constitutional change*

Goudie, A. (ed) (2013) "Scotland's Future: The Economics of Constitutional Change", *Dundee University Press Ltd*

Helgadottir, T. Chamberlin, G. Dhami, P. Farrington, S. and Robins, J., (2012) "Cyclically adjusting the public finances" *OBR Working Paper No. 3*

HM Government (2013a) "Scotland analysis: Business and microeconomic framework"

HM Government (2013b) "Scotland analysis: Currency and monetary policy"

HM Government (2013c) "Scotland analysis: Devolution and the implications of Scottish independence"

HM Government (2013d) "Scotland analysis: Financial Services and banking"

HM Government (2013e) "Scotland analysis: Macroeconomic and fiscal performance"

HM Treasury (2003a) "UK Membership of the single currency: An assessment of the five economic tests"

HM Treasury (2003b) "EMU and labour market flexibility" *EMU Study*

HM Treasury (2003c) "EMU and trade" *EMU Study*

HM Treasury (2003d) "Fiscal stabilisation and EMU – a discussion paper", *EMU study*

HM Treasury (2003e) "Modelling shocks and adjustment mechanisms in EMU" *EMU Study*

HM Treasury (2003f) "The exchange rate and macroeconomic adjustment", *EMU study*

HM Treasury (2003g) "The Five Tests Framework", *EMU study*

HM Treasury (2003h) "The United States as a monetary union" *EMU Study*

Jefferies (2013) "Scottish Independence: Straw man or something to worry about?"

IFS (2013) "Fiscal sustainability of an independent Scotland"

Keating, M and Harvey, M. (2014) "The political economy of small European states: and lessons for Scotland" *in National Institute Economic Review No. 227 February 2014*

Kenen, P.B. (1969), "The Optimum Currency Area: An Eclectic View", *in Mundell and Swoboda (eds.) Monetary Problems of the International Economy, Chicago: University of Chicago Press*

McLaren, J and Armstrong, J. (2014) "Scotland's economic performance and the fiscal implications of moving to independence", *in National Institute Economic Review No. 227 February 2014*

McKinnon, R.I. (1963) "Optimum Currency Areas," *American Economic Review, vol. 52, pp. 717-725*

Mundell R.A. (1961) "A theory of optimum currency areas," *The American Economic Review, vol.51, no.4, pp.657-665*

Murray, J., (2012) "A small model of the UK economy" *OBR Working Paper No. 3*

IMF (2010) “Cross-Cutting Themes in Economies with Large Banking Systems”, *IMF Policy Paper*

IMF (2011) “Ireland: First and Second Reviews Under the Extended Arrangement and Request for Rephasing of the Arrangement—Staff Report; Letter of Intent; Memorandum of Economic and Financial Policies; Technical Memorandum of Understanding; Letter of Intent and Memorandum of Understanding on Specific Economic Policy Conditionality (College of Commissioners); Staff Supplement; and Press Release on the Executive Board Discussion.”, *IMF Country Report No. 11/109*

IMF (2013) “Ireland: Twelfth Review Under the Extended Arrangement and Proposal for Post-Program Monitoring”, *IMF Country Report No. 13/366*

McCallum, J, (1995) “National borders matter: Canada-US regional trade patterns”, *The American Economic Review 85 (3), 615-623.*

Meilak, C. (2008) “Measuring export concentration: the implications for small states” *Bank of Valletta Review, 37, 35-48.*

Nelson, E. and Nikolov, K. (2002) “Monetary policy and stagflation in the UK” *Bank of England Working Paper No. 155*

Olsen, O (2013) “Monetary policy and wealth management in a small petroleum economy”, speech at *Harvard Kennedy School, Cambridge*

OECD (2010) “Counter-cyclical economic policy”, *OECD Economics Department Policy Notes, No. 1, May 2010*

OECD (2013) “Economic Survey of the United Kingdom”, *OECD Economic Surveys*

Phelps, E. (1972) “Inflation Theory and Unemployment Policy”. *Norton*

Pierse, R. (2007) “Winsolve Version 4: An Introductory Guide”, *University of Surrey, Department of Economics mimeo, <http://winsolve.surrey.ac.uk/>*

Rodrik, D. (1996) “Why do more open economies have bigger governments?”, *(No. w5537). National Bureau of Economic Research*

Rose, A. (2006) “Size really doesn’t matter: In search of a national scale effect”, *Journal of the Japanese and International Economies, 20(4), 482-507.*

Rose, A. (2006) “Well-Being in the Small and in the Large”, *Institute for Monetary and Economic Studies, Bank of Japan.*

Svensson, L. E. O. (2000), “Open-Economy Inflation Targeting”, *Journal of International Economics, 50 (1).*

The Scottish Government (2013a) “Fiscal Commission Working Group, First Report, Macroeconomic Framework”

The Scottish Government (2013b) “Government Expenditure & Revenue Scotland 2011-12”

The Scottish Government (2013c) “Scottish National Accounts Project”

The Scottish Government (2013d) “Scotland’s Future: Your guide to an independent Scotland”

Tomkins, A (2014), *oral evidence to the Scottish Affairs Committee, 15 January 2014, www.publications.parliament.uk/pa/cm201314/cmselect/cmscotaf/uc140-xiii/uc140xiii*.pdf

Glossary

Adjustment mechanisms – The ways in which an economy responds to changing economic circumstances.

Anchor currency – The foreign currency used to fix the exchange rate of a domestic currency in a fixed exchange rate regime.

Asymmetric shock – An economic shock whose impact is significantly stronger in one state than in others.

Automatic stabilisers – Elements of the tax and spending regime that automatically act to stabilise the economy. For example, during a downturn, unemployment benefit payments will tend to rise and tax receipts to fall, dampening the economic cycle.

Bank run – When a large number of a bank or another financial institution's customers withdraw their deposits simultaneously.

Balance of payments – A record of the economic transaction between a country and the rest of the world. It includes the difference between a country's exports and imports as well as financial transactions.

Business cycle – The fluctuation in the level of national output around its trend. The business cycle is a well-observed economic phenomenon, though it has a variable time span.

Capital – Money or assets put to economic use.

Capital controls – Government imposed restrictions on the ability to move capital in and out of the country.

Capital flight – When capital rapidly leaves a country.

Central Bank –The most common kind of monetary authority within an economy, it is responsible for the implementation of monetary policy. Central banks are often also given remits over financial stability.

Collateral – Property provided by one party to a loan or other financial transaction to the other to provide protection against default. If the party providing collateral does default, the other party retains the collateral.

Consumer Price Index (CPI) – A measure of the price level observed on a representative basket of goods.

Credit rating – An evaluation of the relative credit risk of a country or company.

Credit risk – The risk that a borrower will default on debt repayments.

Currency board – A fixed exchange rate regime where the domestic currency has a fixed exchange rate and full convertibility with a foreign currency and is fully backed by foreign currency reserves; the monetary authority responsible for managing the exchange rate regime.

Currency peg – A fixed exchange rate regime. The value of the exchange rate is fixed/ pegged against a foreign currency or basket of currencies.

Debt management – Actions taken by a government to manage its borrowing and stock of debt in order to minimise costs and risks.

Endogenous convergence – Convergence that occurs over time as a result of being part of a currency union.

Euro area – Collective term for the 17 states that have formally adopted the euro as their common currency and the European Central Bank as their central bank: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Spain.

Exchange rate – The price at which one currency can be converted into another.

Financial regulation – Laws and rules that govern the financial sector. Covers both micro-prudential regulation (that aims to ensure the soundness of individual financial institution) and macro-prudential regulation (that focuses on the stability of the financial system as a whole against systemic risk).

Financial sector – The sector of the economy that provides financial services to the rest of the economy. Includes commercial banks and other financial institutions (e.g. insurance companies, investment funds).

Financial stability – A measure of the stability of the financial sector.

Financial stability framework – The set of institutions and policies that seek to preserve financial stability. This includes a crisis prevention arm (covers mostly financial regulation) and a crisis management arm (in particular the role of lender of last resort to the financial sector).

Fiscal authority – A governmental institution that oversees fiscal policy. The institution will therefore have the power to raise taxes and engage in government spending.

Fiscal policy – Government economic policy in which changes in taxation, spending on welfare payments, public services and capital, and government borrowing are used to influence the economy.

Floating exchange rate – An exchange rate regime where the value of the exchange rate is allowed to move freely depending on the supply and demand of the currency.

Formal currency union – Where two or more states agree to formally share a single currency, with the attached common institutions and policy setting.

Gross Domestic Product (GDP) – A measure of the total flow of goods and services produced by an economy – known as 'output' – over a specified time period, normally a year. It is equal to GVA at basic prices plus taxes (less subsidies) on products.

Gross National Income (GNI) – A measure of the income received by residents of a country. It is equal to GDP minus income sent abroad plus income received from abroad.

Gross Value Added (GVA) – A measure of the total flow of goods and services produced by an economy – known as 'output' – over a specified time period, normally a year. It is a measure of GDP in basic prices, before taking account of taxes and subsidies on products.

Indemnity – A guarantee to repay a loss to a third party should the original party be unable to do so in the future.

Inflation – The rate at which the prices are rising within an economy (generally measured as an annual growth rate in the CPI).

Interest rate – The price at which money is lent. Traditionally, this is the key variable through which monetary policy is transmitted.

Lender of last resort – An institution willing to extend credit when no other institution would. See Box 2B for more detail on the role of lender of last resort to the financial sector.

Liquidity – A measure of how readily an asset, or a portfolio of assets, can be bought or sold in the market without affecting its price. Liquidity in a market is characterised by a high level of trading activity. Assets that can be easily bought or sold are known as liquid assets.

Macroeconomic framework – The framework within which macroeconomic policy is set. This includes both the policies and the institutions the government uses to influence the economy. It comprises monetary policy, fiscal policy and financial stability.

Macroeconomic stability – A situation where key macroeconomic variables are stable and free from any unexpected shocks or are able to respond quickly and effectively to such shocks.

Macroeconomy – A description of the economy taken as a whole.

Managed exchange rate – An exchange rate regime where the value of the exchange rate is pegged or set within a band against a foreign currency or basket of currencies.

Monetary authority – The institution responsible for the implementation of monetary policy. The most common form of monetary authority is a central bank.

Monetary policy – Process through which the monetary authority controls the supply of money in order to reach its policy objectives (which often include objectives for price stability and wider objectives for economic stability and growth). The main policy instrument is generally a target interest rate.

Monetary stability – Maintaining both price stability and confidence in the currency.

Monetary transmission mechanism – The process by which the changes in monetary policy affect the economy.

Moral hazard – 'Moral hazard' arises when a party has incentives to alter its behaviour because it is not fully exposed to the consequences of its actions, which will also affect another party.

Nominal exchange rate – The exchange rate as quoted on financial markets, expressing the value of a currency in another currency in value terms (rather than real, inflation-adjusted, terms).

Price stability – When prices are kept stable or rise at a low, expected rate. This is a stated objective of most central banks.

Productivity – The relationship between the output of goods and services and the inputs of resources used to produce them. Higher productivity enables higher output from the same quantity of inputs.

Real exchange rate – Nominal exchange rate adjusted for differentials in price levels or costs levels in each country.

Seigniorage – Revenues gained from the issuance of banknotes, where banknotes cost less to produce and distribute than the interests earned on the assets used to back the value of the banknotes.

Shock – An event which has an impact on an economy, in either a positive or negative way. Shocks may come from a source inside or outside the economy.

Sterlingisation – The unilateral adoption of sterling; using sterling without a formal agreement with the UK.

Transaction costs – The costs associated with buying and selling, particularly in financial transactions. An example is the fee charged for foreign exchange trade between sterling and euro transactions.

Transition Costs – One-off costs to the economy of moving to a new policy framework.

Unemployment – The proportion of the working age population actively seeking work but unable to obtain a suitable job.

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