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Spillovers in the Nordic Countries

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Abstract

Denmark, Finland, Norway, and Sweden form a tightly integrated region which has strong ties with the euro area as well as some exposure to Russia. Using the IMF's Global Integrated Monetary and Fiscal model (GIMF), we examine spillovers the region could face, focusing on possible scenarios from the rest of the euro area and Russia, and the fall in global oil prices. We show that the spillovers from these scenarios differ in magnitude and impact, regardless of the high degree of integration among the four Nordic economies. These differences are driven by the fact that Denmark and Finland have no independent monetary policy, and Denmark and Norway are net energy exporters while Finland and Sweden are energy importers. We infer lessons for policy from the outcomes.

Contents

I. INTRODUCTION

Denmark, Finland, Norway, and Sweden form a tightly integrated region which has strong ties with the euro area as well as some exposure to Russia. The four Nordic countries are small open economies with strong trade and investment links with each other, the euro area, and — mainly in the case of Finland — Russia. At the same time, financial sector integration is high only between the Nordic countries.

In this paper, we examine shocks that the region could face and related spillovers. Spillover effects would be expected in the event of an external shock originating in the rest of the euro area or Russia. Nevertheless, the spillovers from those shocks differ in magnitude and impact, regardless of the high integration and close trade, investment, and financial links between the four Nordic economies. These differences would be driven for example by the fact that monetary policy in Denmark and Finland is set in the euro area, and Denmark and Norway are net energy exporters while Finland and Sweden are energy importers.

To assess the real impact on the Nordic region from spillovers, we calibrate the IMF's Global Integrated Monetary and Fiscal model (GIMF) for the four Nordic countries, the euro area, Russia, and a bloc of the remaining countries. A DSGE model, such as the IMF's GIMF, is particularly well suited to estimate the effect of spillovers from shocks originating in the euro area and Russia since it is calibrated on current data and our understanding of the respective economies, and not constrained by historical data. In addition, by calibrating the economy around its long-run steady state, it gives us an insight into the effects of spillovers on the real economy. Financial sector contagion risks—while potentially important in the Nordic context given the highly integrated financial sector—are not captured in GIMF and are largely outside the scope of this paper.

The paper is structured as follows. Section II presents a few stylized facts. Section III describes GIMF and Section IV presents the results of the stylized scenario analyses. Section V concludes with a few lessons from the simulations and implications for economic policy.

II. STYLIZED FACTS

The Nordic countries form a tightly integrated region that is very open to the world economy. Trade openness and competitiveness, combined with a high degree of specialization play an important role for the Nordic countries. Each one of the four economies has benefited from globalization as well as free trade and managed to raise productivity and income. The countries have also taken advantage of the rapid technological progress and specialization, which is reflected in their strong export-led growth prior to the global financial crisis.

All Nordics trade extensively with each other and with other European countries. Intra-regional trade accounts for about 5.5 percent of GDP of the Nordic region. Meanwhile, exports to the rest of Europe account for an additional 13.7 percent of GDP of the region and imports for 11.5 percent of GDP. Trade with Russia accounts for less than 1 percent of GDP

both for imports and exports of the Nordic region and appears less significant for the Nordic countries as a group.

However, there are also significant differences in trade patterns across the four countries (Figure 1). Of the four Nordic countries, Norway exports the most to the rest of Europe, slightly above 20 percent of GDP, driven by oil and oil products (17 percent of GDP). Finland trades the least with the rest of Europe, 11 percent of GDP, driven by iron and steel products as well as paper products. At the same time, Denmark and Sweden import more from the rest of Europe (15 percent of GDP) compared to Finland and Norway (8 percent of GDP). Danish and Swedish imports from the rest of Europe are dominated by data processing machines, followed by electrical machinery equipment and vehicle parts and accessories. Exports to Russia are important for Finland, 3 percent of GDP, but account for only about 1 percent of GDP for each of its neighbors. Finland exports predominantly paper products as well as electrical machinery equipment to Russia. Imports from Russia are most significant for Norway and Finland — about 6 percent of GDP of transport related goods and 4 percent of GDP of fuels, respectively.

Figure 1. Nordic Trade

Sources: U.N. Comtrade, International Financial Statistics, and Fund staff calculations
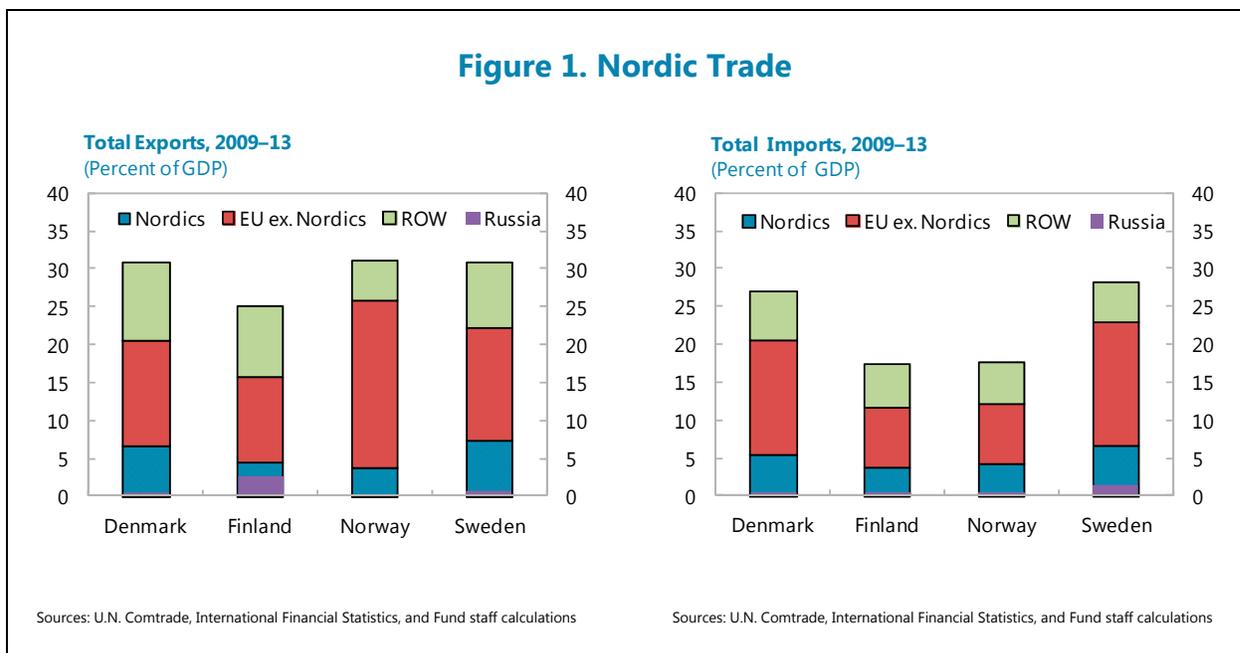
Foreign direct investment (FDI) links are strongest with the rest of Europe (Figure 2). Inward and outward FDI flows between the Nordic countries are relatively small, about half a percent of GDP. Only outward FDI flows from Finland to Sweden are slightly larger, about 1.5 percent of GDP. FDI outflows to the rest of Europe are more substantial, between 2 and 3 percent of GDP, but still small relative to the size of the Nordic economies. Investment links between the Nordic economies and Russia are generally weak.

Figure 2. Nordic FDI Flows

Denmark FDI Flows, end 2012
(Percent of GDP)
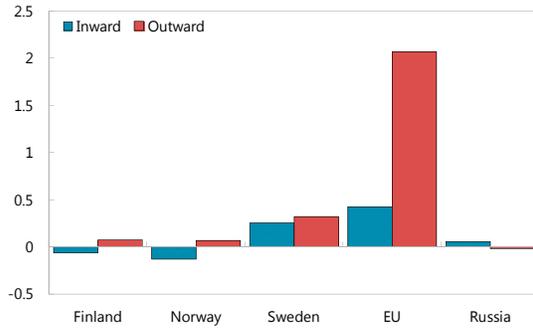
Sources: UNCTAD, Danmarks Nationalbank, and Fund staff calculations

Finland FDI Flows, end-2012
(Percent of GDP)
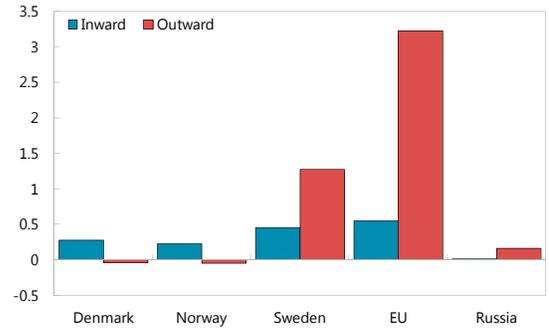
Sources: UNCTAD, Bank of Finland, Statistics Finland, and Fund staff calculations

Norway FDI Flows, end-2010
(Percent of GDP)
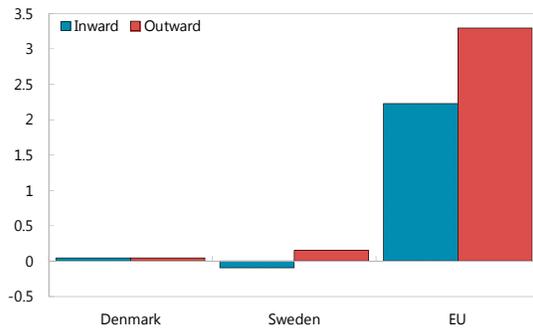
Sources: UNCTAD, Statistics Norway, and Fund staff calculations

Sweden FDI Flows, end-2012
(Percent of GDP)

Sources: UNCTAD, Statistics Sweden, and Fund staff calculations

The Nordic region is also characterized by financial openness and integration.[2] The banking sector is heavily concentrated and highly integrated. Roughly 90 percent of all assets of the region's publicly listed banks are concentrated in the six largest banks in the Nordic countries. In addition, roughly 85 percent of both credit and deposits of these banks come from the four Nordic countries. Driven by natural limits for domestic growth, the largest Nordic financial institutions have established extensive cross-border operations in the region. For example, the subsidiaries of Nordea in Finland and Norway are larger than Nordea Sweden.

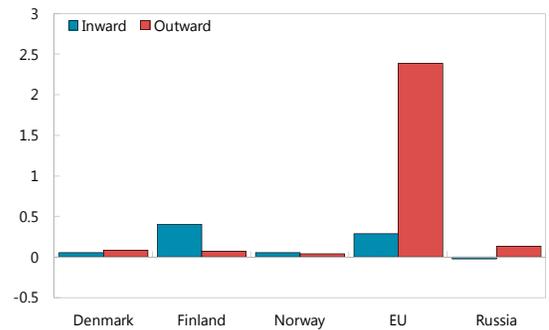This financial sector openness and integration presents common challenges and shared risks for the Nordic economies. For example, spillovers from a pan-Nordic banking crisis could be substantial and the large size of the system implies that the impact of a crisis in this sector could be severe. Furthermore, the high reliance of Nordic banks on wholesale funding means banks are vulnerable to sharp reversals in safe-haven flows. Also, liquidity costs and eventual losses to the sovereign due to the failure of a regionally-systemic bank could be substantial. The financial sector contagion risks are discussed in detail in IMF Country Report No 13/274 (IMF, 2013) and are not modeled in the simulations presented in this paper.

III. DESCRIPTION OF THE GLOBAL INTEGRATED MONETARY AND FISCAL MODEL (GIMF)

The IMF's Global Integrated Monetary and Fiscal model (GIMF) is a multi-region micro-founded dynamic stochastic general equilibrium (DSGE) model.[3] The version used in this analysis has seven regions: the 4 Nordic countries (Denmark, Finland, Norway and Sweden) and three additional regions (the euro area, Russia, and a remaining countries bloc). Trade relationships are calibrated to be indicative of 2012 data, while levels of government debt are based on the figures published in the IMF's World Economic Outlook.

GIMF features optimizing behavior by households and firms and full intertemporal stock-flow accounting. Firms are divided between tradable and nontradable sectors. Frictions in the form of sticky prices and wages, real adjustment costs, liquidity-constrained households that cannot save, and households with finite planning horizons that can save give the model certain key properties — notably, an important role for both fiscal and monetary policy.

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[2] See the Nordic Regional Report (IMF, 2013).

[3] More details on the structure of the model may be found in Kumhof and others (2010) and further details on its responses to various shocks to the economy can be found in Anderson and others (2013).

Firms produce tradable and nontradable intermediate goods. They are combined with imported tradable intermediate goods to product final goods for consumption and investment, both private (which are also traded) and public. These goods are all produced by firms which are monopolistically competitive. Therefore firms charge markups over their marginal costs, which are higher in mainland Europe, including Scandinavia (generally) than other advanced economies.

For fiscal policy, GIMF uses an overlapping generations model. Specifically, households are modeled following the Blanchard-Weil-Yaari model, which leads to a significant break in Ricardian equivalence.[4] These households — referred to as overlapping generations (OLG) households — have a finite planning horizon and therefore do not expect to face future tax liabilities to repay debt incurred by the government. We assume the planning horizon is 20 years in length. OLG households can save their labor income and income they receive from firm ownership and previous savings, and choose to hold government debt, which is important for permanent fiscal reforms. They can also borrow to smooth consumption, particularly in the face of long-run shocks (such as the reforms in this paper). The intertemporal elasticity of substitution, which governs their ability to smooth, is set to 0.5 for all economies. Reforms in large countries or regions (such as the euro area), owing to their impact on the global savings-investment balance, have a long-run effect on the global real interest rate.

The non-Ricardian nature of the OLG households is complemented by the presence of liquidity-constrained (LIQ) households that cannot save. They consume all their wage income every period, as well as any transfers they receive from the government. Their presence imparts higher short-run volatility to shocks that affect labor supply or indirect taxes. LIQ households are calibrated as 25 percent of households for the Nordic economies and the euro area, 35 percent in Russia, and 40 percent in the remaining countries bloc.

Governments are assumed to conduct fiscal policy based on a deficit-to-GDP target. In the long-run, the assumed specific deficit target for each of the regions stabilizes the debt-to-GDP ratio. In the short run, the deficit target is complemented by automatic stabilizers: following the calibrations of Girouard and André (2005), fiscal authorities adjust transfers to households in a countercyclical manner.

Monetary policy is assumed to be consistent with an inflation-targeting regime in all regions except Denmark. The standard monetary policy rule is a CPI-inflation-forecast-based interest rate reaction function with a 2 percent inflation target and a flexible exchange rate regime. For the euro area and Finland, monetary policy is governed by the same interest rate reaction

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[4] See Blanchard (1985).

function, based on euro-area-wide inflation. Denmark effectively pegs its nominal exchange rate to the euro, and therefore has no independent monetary policy. Russia's pursuit of inflation stability is assumed to be less aggressive than that of the European blocs.

The model includes a global energy market. This includes both oil and natural gas. Natural gas is important to Russia as an energy producer, and the euro area and some Nordics as energy consumers. In GIMF, regions produce energy, which is then priced in a global market and redistributed to each region. Denmark, Norway, Russia and the remaining countries block are net exporters of energy, while Finland, Sweden, and the euro area are net importers. Energy is a factor of production in tradable goods, and less so in nontradable goods. Energy directly enters the household's consumption bundle (approximately 3 percent of consumption), allowing for the measurement of headline CPI inflation (all consumption goods) and core CPI inflation (any consumption good other than energy). Monetary policy targets core inflation, not headline.

Energy royalties can be a source of revenues for governments and are calibrated based on an estimate of state-ownership in the oil sector. For regions with little energy, or private ownership, such as Denmark, Finland, Sweden, and the rest of the euro area, we assume energy royalties of only 5 percent of energy income (revenues less production costs), and are a minor source of tax revenue for their respective governments. In contrast, for Norway, where most energy resources are owned and operated by Statoil, we assume oil royalties are 95 percent of energy income, implying that the government collects the revenues from oil in full, for either general revenues or for its sovereign wealth fund. Russia has a more complex structure, with official private ownership, but large inflows of oil revenues to the federal government. Therefore we assume energy royalties of 50 percent. The same approach is followed for the remaining countries bloc, which is a mix of private ownership with lower tax regimes (for example, Canada and the United States), and outright public ownership (many OPEC members).

Sovereign wealth funds play roles of varying importance. In the model, countries can have a "sovereign wealth fund" (SWF) that smoothes oil revenues over time. For instance, in line with its actual practices, Norway is assumed to accumulate all its government-owned energy revenues in such a fund and to spend only the return it receives each year on the entire SWF (assumed to be equal to 4 percent of the fund, on average). The fund itself is calibrated initially at about 175 percent of GDP.[5] Similarly, as Denmark has shown a prudent use of its oil revenues, we use the sovereign wealth fund feature for Denmark even though it does not technically have such a fund. However, in the case of Denmark the effect is small since we assume that oil royalties are low and there is little revenue accumulating to the government.

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[5] See Norway's IMF Country Report No. 14/259 (IMF, 2014).

In Russia, which also has a sovereign wealth fund, in practice the government has not followed a strict policy over time with regards to accumulation or spending of the fund. For the purposes of using GIMF, we find therefore that not using a sovereign wealth fund for Russia better approximates the policies that Russia has historically pursued during times of large oil price shifts.

Real GDP for Norway reflects "mainland GDP" only. Norway keeps the tracking of its oil sector separate as an offshore entity, and therefore usually only considers "mainland GDP."[6] The oil sector has little direct impact on most of the economy, particularly since most of the oil sector is state-owned, and causes fewer wealth effects because of its sovereign wealth fund. We follow that convention in this paper, by removing the movements of net oil exports from real GDP. The oil sector's largest effects can be through movements of the real exchange rate, and possibly through its contributions to government spending, although that is well-governed by the fiscal rule discussed above.

IV. SPILLOVERS IN THE NORDIC COUNTRIES

We analyze the spillover dynamics of the Nordic countries in four scenarios:

- A decrease in aggregate demand in the euro area;

- A "grand bargain" scenario in the euro area of structural reform, shored up with short-run fiscal stimulus;

- A rebalancing in the global energy market driven by higher supply and contracting emerging market demand, resulting in a further energy price drop; and

- An adverse Russia scenario with escalating sanctions and cuts in energy supplies to Europe.

The four scenarios are presented as percent deviations from a baseline and share a few key assumptions. That baseline scenario is consistent with the October 2014 World Economic Outlook. Also, in order to be consistent with the WEO baseline, the euro area is assumed to be at the zero interest rate floor (ZIF) for the next 5 years when facing disinflationary events. Therefore, the monetary authority can adjust the nominal policy rate moderately downward relative to the baseline only from the 6th year onward. It is also assumed that no quantitative easing would be taking place in the euro area. At the same time, Sweden is assumed to be at

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[6] See Norway's IMF Country Report No. 14/259 (IMF, 2014).

the ZIF for the next two years in face of disinflationary events. In addition, in the model it is assumed that all governments respect their budgetary rules, protecting deficit targets and adjusting general lumpsum transfers to households as needed, unless explicitly stated otherwise (such as in the "Grand Bargain" scenario).

A. Decrease in Aggregate Demand in the Euro Area

The recession in Europe persists (Figure 3). It is assumed that the euro area suffers a continued decrease in domestic demand relative to the baseline for two more years. As a result, real GDP in Europe drops by about 2.5 percent relative to the baseline at its trough in the third year, driven by lower consumption and investment. Inflation is decelerating but owing to the ZIF the monetary authority cannot adjust the nominal policy rate in response. Therefore, the real interest rate increases, which exerts downward pressure on the demand for investment goods by increasing the cost of capital. The higher real interest rate also affects the intertemporal consumption decision of households, encouraging them to reduce consumption and temporarily increase saving. It draws in foreign currency and the real exchange rate appreciates through the uncovered interest parity condition. Even though the appreciation reduces competitiveness and lowers the price of euro area imports, the decreased demand for consumption and investment outweighs this effect, resulting in an improvement of the trade balance. A long-run stagnation scenario would have similar dynamics.

Spillovers to Denmark and Finland are stronger than for the other two countries (Figure 4). Real GDP drops by about 2 percent relative to the baseline in both economies, driven by lower exports to the euro area. In Denmark exports decline by about 2 percent relative to the baseline as a result of the decrease in demand while imports are affected as well but to a lesser extent, about half a percent. The balance of payments impact in Finland is similar, although somewhat more muted owing to its lower trade share with the euro area. With lower demand for their goods, both Denmark and Finland see a fall in the demand for labor and capital to produce goods. Lower labor demand reduces labor income and hence consumption for liquidity-constrained households, while lower demand for capital is a drag on investment. As Finland is part of the euro area and Denmark pegs its currency to the euro, the two economies cannot use monetary policy to counteract the effect of decreased demand in the euro area. Subsequently, the spillovers are larger than those faced by Norway and Sweden.

In Norway and Sweden, the monetary policy response cushions the effects of lower external demand (Figure 5). Exports in Norway and Sweden decrease by less than half a percent relative to the baseline. Even though the two economies trade considerably with the euro area and this trade is affected by the decrease in demand, they can use monetary policy to counteract the negative effect that leads to lower inflation, although Sweden's response is delayed by 2 years, because of the ZIF. Owing to the delay in policy response, real GDP troughs around -0.5 percent in Sweden, while mainland real GDP falls only -0.2 percent in Norway despite its larger trade share with the EU. As the two economies rebalance external and domestic demand, the real exchange rate depreciates, which boosts exports to other partners and fuels investment.

B. Grand Bargain Scenario

Structural reforms take place in the euro area, combined with short-run fiscal stimulus to increase aggregate demand (Figure 6). In this scenario, the euro area is assumed to implement deep structural reforms – such as improvements in the functioning of labor markets, reductions in entry and exit costs for firms, and cutbacks in regulations in service sector pricing – that raise the level of GDP over time and allow the economy to react more flexibly to shocks. As the reforms initially have a negative effect on growth, the fiscal sector runs a deficit—in particular as a result of increases in general government and infrastructure spending by 1.5 percent and 0.5 percent of GDP per year, respectively—for two consecutive years. This is the "grand bargain" scenario where households and firms accept structural reform in return for higher government spending that mitigates the short-run costs of reforms. The structural reforms—which are perceived as fully credible—raise productivity and boost investment. If structural reforms are perceived as fully credible, demand for goods will rise already in the short-term as households smooth their consumption over time. If reforms are not initially seen as credible, however, their positive effects may be delayed (see, for example, Lusinyan and Muir, 2013 and Anderson and others, 2014). Demand for labor also increases, resulting in higher wages and increasing consumption. As a result of these effects combined with the fiscal stimulus, real GDP rises by almost 3 percent relative to the baseline (1.8 percent of which owing fiscal spending) while inflation rises about half a percent. As the higher inflation leads to a real appreciation of the euro, the trade balance of the euro area deteriorates.

Spillovers from the "the grand bargain" are positive for all four Nordic economies. The main channel of transmission for the positive spillovers is through exports which experience a boost in all four countries because of the higher demand in the euro area. The increase in foreign demand also increases inflation in all four countries. As before, however, the role of monetary policy causes some differences in impact when comparing Denmark and Finland versus Norway and Sweden.

Real GDP rises by almost 1 percent relative to the baseline in Denmark and Finland (Figure 7). A large part of these positive spillovers are attributable to trade. However, there is a strong contribution from monetary policy as well. Denmark and Finland cannot offset the increasing pressure on inflation from higher aggregate demand, as their monetary policy is effectively determined by the ECB. This leads to lower real interest rates than there would be under independent monetary policy regimes, stimulating investment and the domestic economy further.

By contrast, the peak spillovers relative to baseline are only about 0.5 percent of real GDP in Sweden, and 0.4 percent of mainland real GDP in Norway (Figure 8). Much of the aggregate demand pressures in Norway and Sweden on inflation are offset as they tighten their monetary policy. Consequently, there is rebalancing between external demand from the euro area and domestic demand.

C. Drop in the Global Energy Price

The global energy price drops, reflecting both demand and supply factors. An increase in oil supply from OPEC and the increasing supply of shale oil and gas from the United States leads to a rebalancing in the global energy market. This is combined with a contracting demand for energy in emerging market economies only the global price of energy drops by almost 30 percent in the short run, tapering down to a permanent decline of 10 percent. 80 percent of the short run effect on the oil price is attributable to the boost in supply, and only 20 percent to the fall in demand. Over the medium term, the demand share of the oil price decrease falls to zero. This boosts real GDP in the rest of the world.

The euro area benefits positively from a drop in the global energy price (Figure 9). Real GDP in the euro area rises about 0.4 percent relative to the baseline. The drop in the world energy price is beneficial to the euro area because of the transfer of wealth from energy exporters to energy importers. The lower energy price boosts domestic energy demand and consumption which also translates into higher overall imports and a positive trade balance. The exchange rate appreciates because of the currency depreciation of energy exporters.

Following a short-lived negative impact, spillover effects on Denmark and Finland are positive in the medium term (Figure 10). In Denmark, there is an initial small decrease in aggregate demand and real GDP (less than 0.2 percent) in the first year owing to the negative impact on its energy export receipts. However, as future gains are anticipated from lower domestic energy prices and higher exports to the euro area, consumption and investment are being adjusted upwards from the second year. The spillover effect in the medium term is therefore positive with real GDP rising to about half a percent relative to the baseline from the third year on. In Finland, the initial negative effect is related to its strong trade ties with Russia, which suffers negatively from the shock. As in Denmark, however, this initial effect is small and short lived, and overtaken from the second year by the positive wealth effects of the fall in energy prices. The scale of these effects is also similar, with Finnish GDP rising about 0.4 percent from the baseline by the third year.

In Norway, mainland GDP increases immediately and more strongly than in the other Nordic countries (Figure 11). As an oil exporter with a flexible exchange rate, Norway's real exchange rate depreciates because of the fall in the energy price. The depreciation boosts exports of other goods, as does the fall in the oil price, because of its role as a factor of production. At the same time, the depreciation of the exchange rate puts upward pressure on the price of imported goods and inflation. In response, the monetary authority adjusts the policy rate upwards. Although the sovereign wealth fund buffers household wealth from temporary negative shocks, the (partly) permanent reduction in oil prices means structurally lower revenues for the sovereign wealth fund and commensurately lower income flows for the government. The latter therefore cuts transfers to households in order to meet its budget rules. The resulting negative wealth shock makes households consume less, reducing import demand. Nonetheless, the overall impact of the lower oil prices on mainland Norwegian GDP remains firmly positive owing to the rebalancing of external and domestic demand that results from the large permanent depreciation, with GDP rising by about 0.8 percent from the

baseline by the fourth year. This result, of course, is specific to the mainland GDP concept as the impact of an oil price decline on Norway's large off-shore sector would be predominantly negative.

In Sweden, the oil price drop has an immediate and positive effect (Figure 11). The Swedish economy is affected positively immediately as consumption and domestic demand benefit positively from the lower energy price. Real GDP rises by about 0.5 percent relative to the baseline in the first two years.

D. Russia Sanctions Scenario

In this scenario, Russia experiences further EU sanctions while energy supplies to Europe are reduced. A new bout of sanctions on Russia lowers available financing and consumer and business confidence, resulting in lower growth in Russia. We also assume that Russia cuts its energy supply to Europe (primarily natural gas) permanently by 25 percent, causing energy prices for the euro area to rise. We have introduced a special mechanism in our analysis using GIMF to allow for the Russian energy supply cut to affect the price of energy in the Nordics and the euro area, but have minimal impact on the price elsewhere.

Predictably, effects of this scenario on Russia are negative (Figure 12). Real GDP drops by almost 2 percent relative to the baseline in the first 2 years. It is assumed that the Russian government respects its budget rule and cuts general lumpsum transfers to households. This results in falling consumption and lower demand for domestic goods, with attendant negative effects on investment. Falls in consumption and investment are exacerbated by real exchange rate depreciation that is triggered by the drop in oil export volumes and the additional sanctions, at the backdrop of a loosening of monetary policy to counteract disinflationary pressures from weak demand. Exports improve, despite the higher energy price, while imports are falling from both the depreciation and weak domestic demand. As a result, the trade balance strengthens, cushioning some of the losses from the fall in domestic demand.

The euro area is also affected negatively, as are the Nordics. The higher energy price affects energy demand and consumption in the euro area negatively and raises production costs, discouraging investment. These effects lower real GDP in the euro area. Given the ZIF, the ability to counter the lower demand with a relaxation of monetary policy is constrained. The negative spillovers to the euro area further spill over to the Nordics, exacerbating the negative effect from the rising oil price there.

In Denmark, real GDP falls by over 0.8 percent relative to the baseline. The higher energy price puts downward pressure on consumption and investment (Figure 13). Since Denmark is an energy exporter the real exchange rate appreciates initially and this temporary wealth effect mitigates some of the negative impact on investment and consumption. Its spillovers are still large, because of the negative impact from the ZIF in the euro area.

Finland has the largest losses, around 1.5 percent of real GDP (Figure 13). As Finland is an energy importer, consumption and investment are affected negatively along the same lines as

in the euro area. However, declines in the domestic economy are stronger because Finland is particularly dependent on Russia for its energy supply. This is exacerbated by the negative impact rapidly declining exports of goods and services to Russia, making the overall impact on Finland more severe than for its Nordic peers.

Sweden's real GDP troughs at 0.4 percent, the mildest impact among its peers (Figure 14). As an energy importer, Sweden's real exchange rate depreciates. Nonetheless, exports are weighed down by the higher cost of energy inputs. The negative wealth effects from higher oil prices, which reduce domestic demand, also imply lower imports. With few extra negative spillovers from Russia, however, Sweden's real GDP loss is the smallest of the Nordics countries.

Norway's mainland real GDP troughs at 0.6 percent on impact, falling almost 0.4 percent in the long run (Figure 14). As much of its energy is supplied to the rest of Europe, we assume that the Norwegian energy price increases as Russian energy withdraws from the European market. Accordingly, Norway experiences a real exchange rate appreciation. Consumption is boosted by cheaper imports. Investment is still dampened, as investment demand is dependent more on the depressing effect of the energy price on production in the economy. On net, the real appreciation leads to lower mainland real GDP through the trade balance, despite stronger consumption.

V. LESSONS AND POLICY IMPLICATIONS

External shocks can have sizable effects on the Nordics, though their impact on individual countries varies significantly. The analysis suggests that a negative shock to aggregate demand in the euro area that lowers its GDP by 2.5 percent from the baseline would have the largest impact on the Nordics, with the GDP reductions in this scenario reaching close to 2 percent in Denmark and Finland. Similarly, a positive shock to the euro area, as explored in the grand bargain scenario, could bring large positive spillovers to the Nordics. The impact of escalating sanctions surrounding Russia and a related 25 percent energy supply reduction would be particularly large for Finland — with GDP falling some 1.5 percent below the baseline – but also significant for the other Nordics. A fall in oil prices appears more manageable by comparison, with the positive impact of a 30 percent temporary and 10 percent permanent decline in energy prices generally not exceeding 0.5 percent of GDP for each of the Nordics, although the effects could be more substantial (and negative) for Norway's offshore sector, which was not included in the analysis.

The differences in impact across countries illustrate the importance of macroeconomic policies. While the variation in impact emanates in part from differences in bilateral trade links and countries' position as a net importer or net exporter of oil, it also point to the various degrees to which macroeconomic policies (can) respond.

Monetary policy is a key shock absorber for those countries that set their policy independently. This analysis illustrates in particular that the spillover effects from negative shocks to Norway and Sweden are mitigated by the independent use of monetary policy. As a

result, the downward effects on real GDP are considerably smaller. In contrast, Finland and Denmark depend on the actions of the ECB even though their economies often react in ways that are asynchronous with the rest of the euro area, leading to larger spillover effects.

Fiscal policy would also be an important tool, in particular for the countries that cannot use monetary policy. This analysis assumes the operation of automatic stabilizers around an otherwise steady fiscal policy anchored on medium-term debt levels. While this limits the scope for stabilizing shocks, the results suggest that automatic stabilizers matter. In general, provided that adequate fiscal space exists, a more active use of fiscal policy could help further absorb shocks. GIMF suggests a ranking of fiscal instruments consistent with the fiscal literature.[7] In general, the effects of spending- instruments are larger compared to revenue-related ones when fiscal measures are temporary, but revenue-related instruments have larger effects under permanent fiscal adjustment as they are a larger source of distortions in the economy in the long run. On the spending side, investment has the highest short-term effect on real GDP, followed by government consumption (wages and government purchases) and transfers to liquidity-constrained households. General transfers to all households, however, have the lowest output impact among spending instruments. On the revenue side, the ranking of tax instruments reflects their distortionary effects, with corporate and labor income taxes having the largest effects on real GDP. Consumption taxes and lump sum taxes (such as property taxes) seem to be the most growth-friendly revenue instruments. While beyond the scope of this paper, a possible extension of our analysis could involve using GIMF to assess the impact of alternative fiscal policies in response to the external shocks.

The analysis also confirms that structural reform in the euro area could have strong positive effects, with positive spillovers to the Nordic economies. Structural reforms can increase the competitiveness and flexibility of the economy, improve productivity, and augment labor market participation. Along similar lines, there may also be the possibility for reform within the Nordic economies, but this is outside the scope of this paper.

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[7] See, for example, Coenen and others (2012) and Muir and Weber (2013).

Figure 3: Decline in Euro Area Demand
Euro Area

Real GDP
(% Difference)

Trade ___, Current Account - -
(%pt Baseline GDP Difference)

Consumption ___, Investment - -
(% Difference)

Real Exports ___ and Imports - -
(% Difference)

Core Inflation
(%pt Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Global Price of Energy
(% Difference; in US$)

Net Energy Exports
(%pt Baseline GDP Difference)

Nominal Effective Exchange Rate
(% Difference; + = Depreciation)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Source: Authors' calculations.

Figure 4: Decline in Euro Area Demand

Source: Authors' calculations.

Figure 5: Decline in Euro Area Demand

Norway

Sweden

Mainland Real GDP
(% Difference)

Real GDP
(% Difference)

Consumption ___, Investment - -
(% Difference)

Consumption ___, Investment - -
(% Difference)

Net Energy Exports __, Current Account - -
(%pt Baseline GDP Difference)

Trade __, Current Account - -
(%pt Baseline GDP Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Source: Authors' calculations.

Figure 6: The Euro Area 'Grand Bargain'
Euro Area

Real GDP
(% Difference)

Trade ___, Current Account - -
(%pt Baseline GDP Difference)

Consumption ___, Investment - -
(% Difference)

Real Exports ___ and Imports - -
(% Difference)

Core Inflation
(%pt Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Global Price of Energy
(% Difference; in US$)

Net Energy Exports
(%pt Baseline GDP Difference)

Nominal Effective Exchange Rate
(% Difference; + = Depreciation)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Source: Authors' calculations.

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Figure 7: The Euro Area 'Grand Bargain'

Denmark

Real GDP
(% Difference)

Consumption ___, Investment - -
(% Difference)

Net Energy Exports ___, Current Account - -
(%pt Baseline GDP Difference)

Nominal ___ and Real - - Interest Rates
(% Difference)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Finland

Real GDP
(% Difference)

Consumption ___, Investment - -
(% Difference)

Trade ___, Current Account - -
(%pt Baseline GDP Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Source: Authors' calculations.

Figure 8: The Euro Area 'Grand Bargain'

Norway

Sweden

Mainland Real GDP
(% Difference)

Real GDP
(% Difference)

Consumption ___, Investment - -
(% Difference)

Consumption ___, Investment - -
(% Difference)

Net Energy Exports ___, Current Account - -
(%pt Baseline GDP Difference)

Trade ___, Current Account - -
(%pt Baseline GDP Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Source: Authors' calculations.

Figure 9: Global Energy Price Collapse
Euro Area
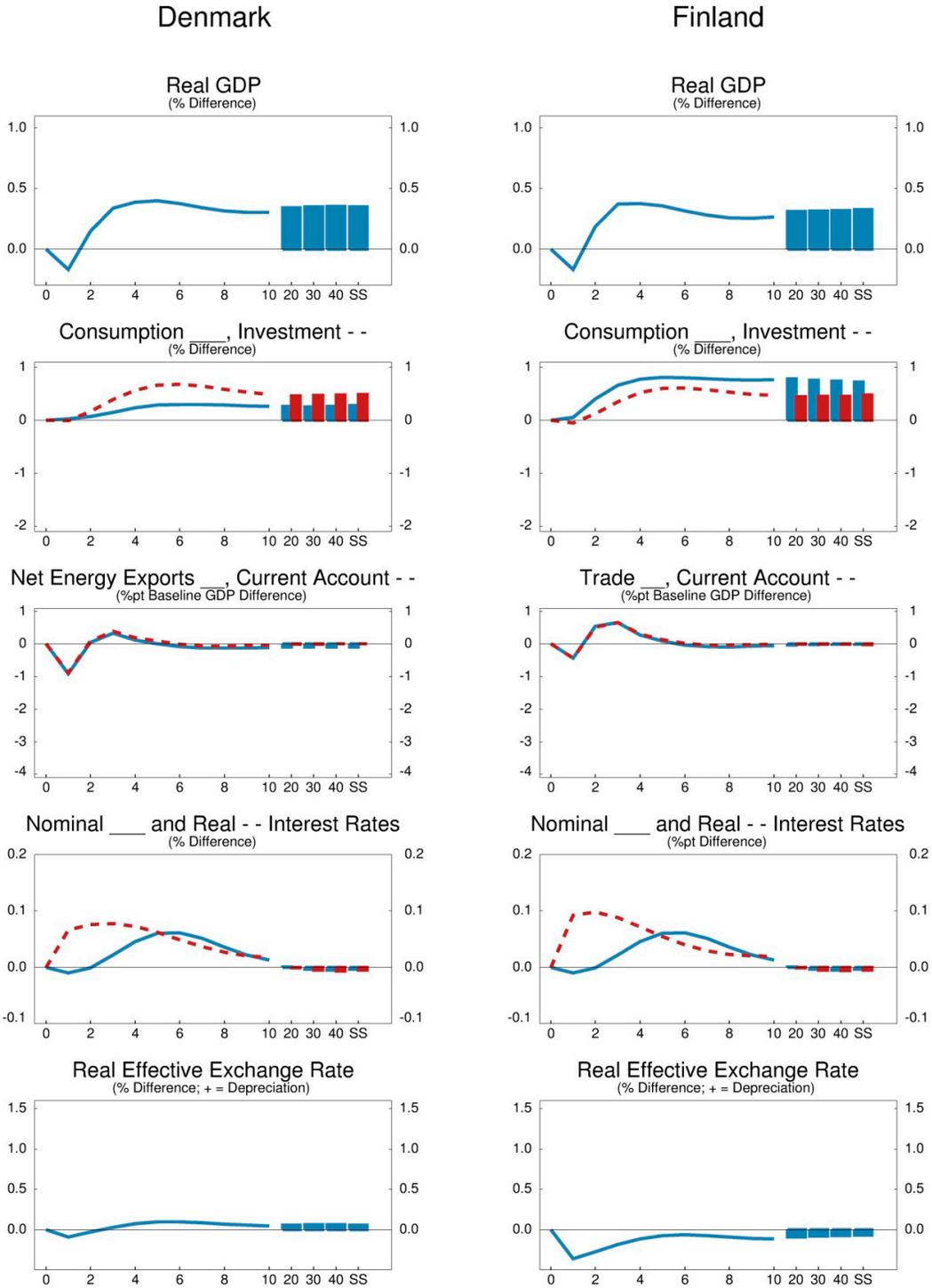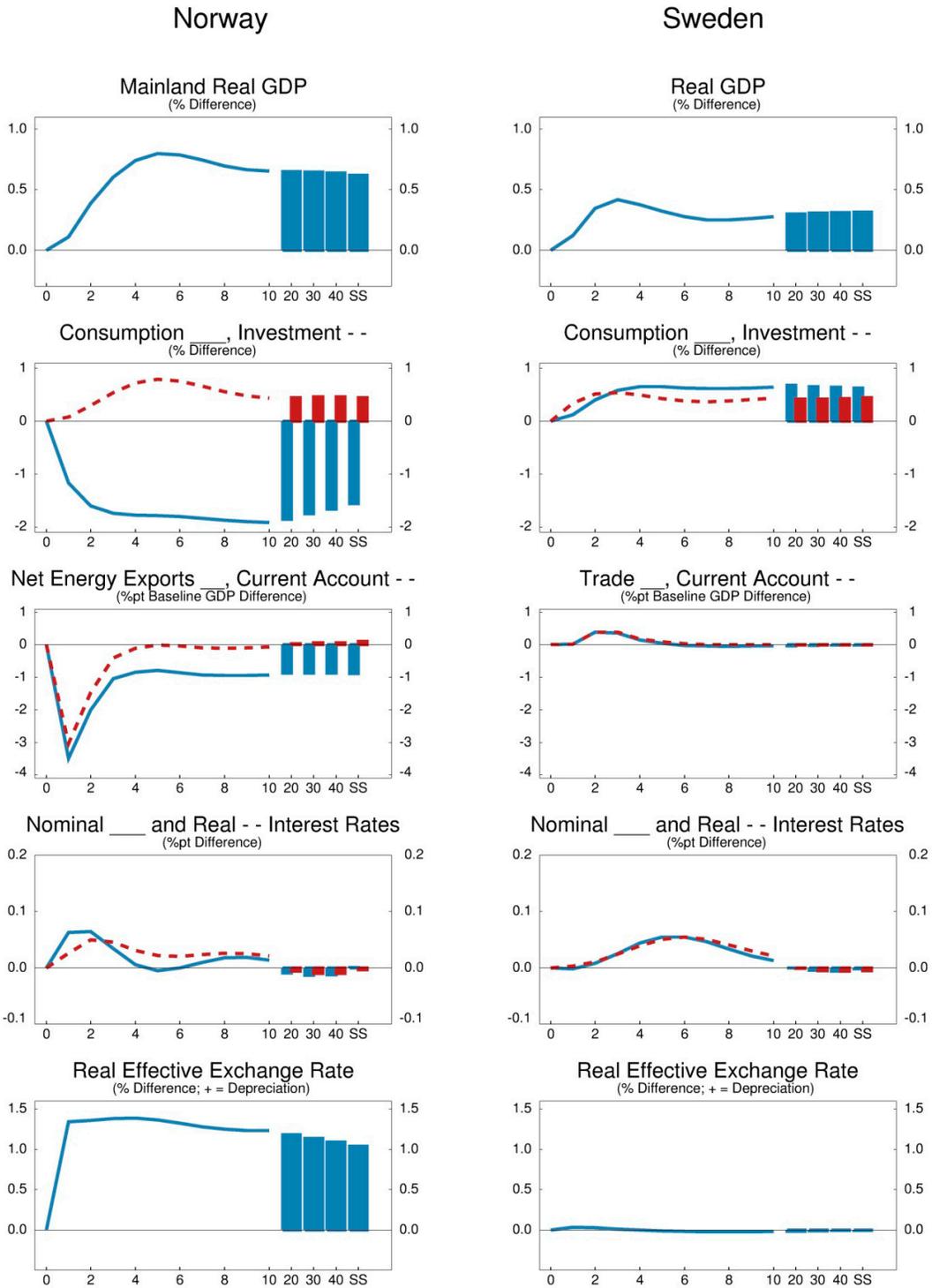
Source: Authors' calculations.

Figure 10: Global Energy Price Collapse

Denmark

Finland

Real GDP
(% Difference)

Real GDP
(% Difference)

Consumption ___, Investment - -
(% Difference)

Consumption ___, Investment - -
(% Difference)

Net Energy Exports __, Current Account - -
(%pt Baseline GDP Difference)

Trade __, Current Account - -
(%pt Baseline GDP Difference)

Nominal ___ and Real - - Interest Rates
(% Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Real Effective Exchange Rate
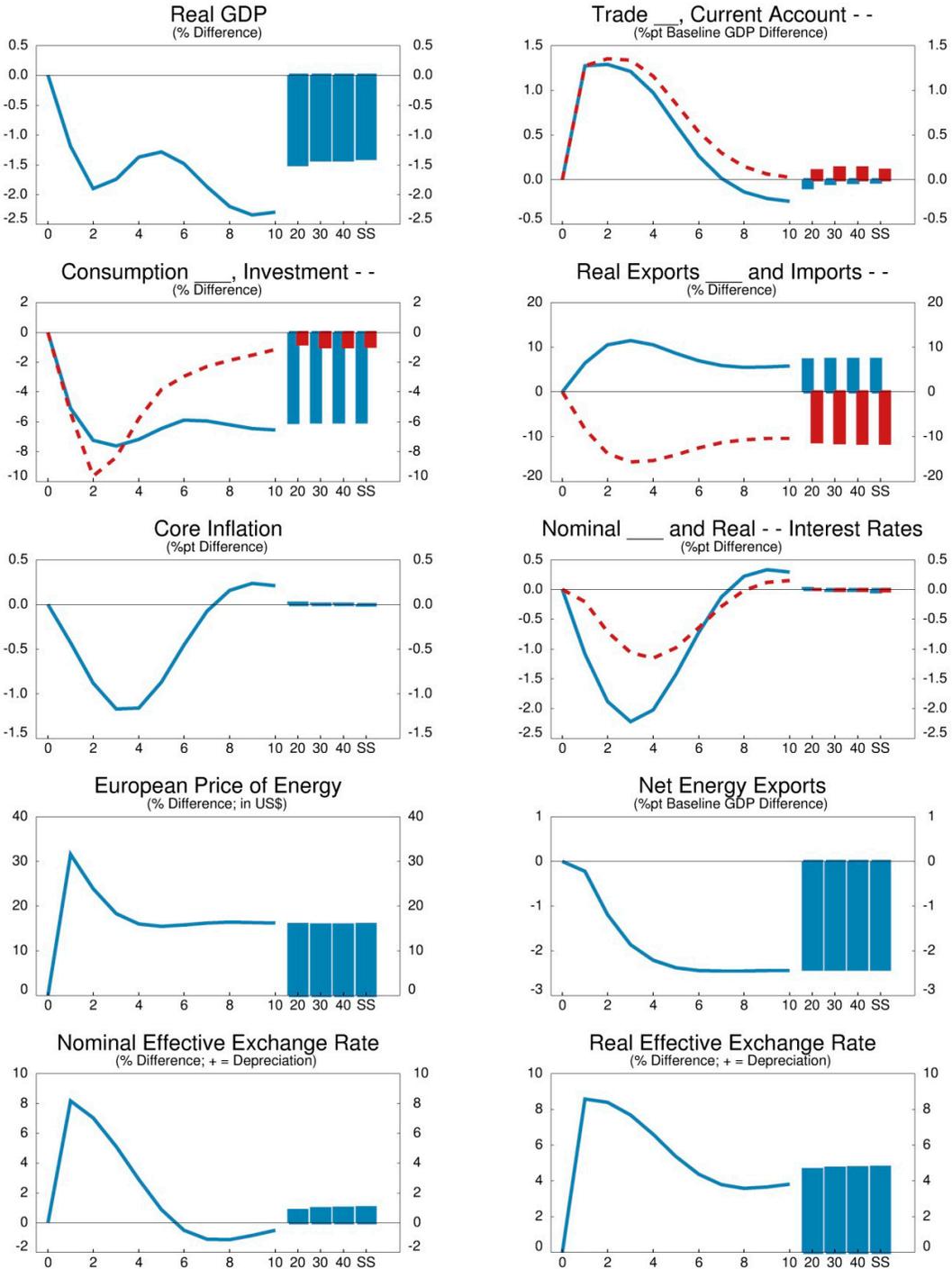(% Difference; + = Depreciation)

Source: Authors' calculations.
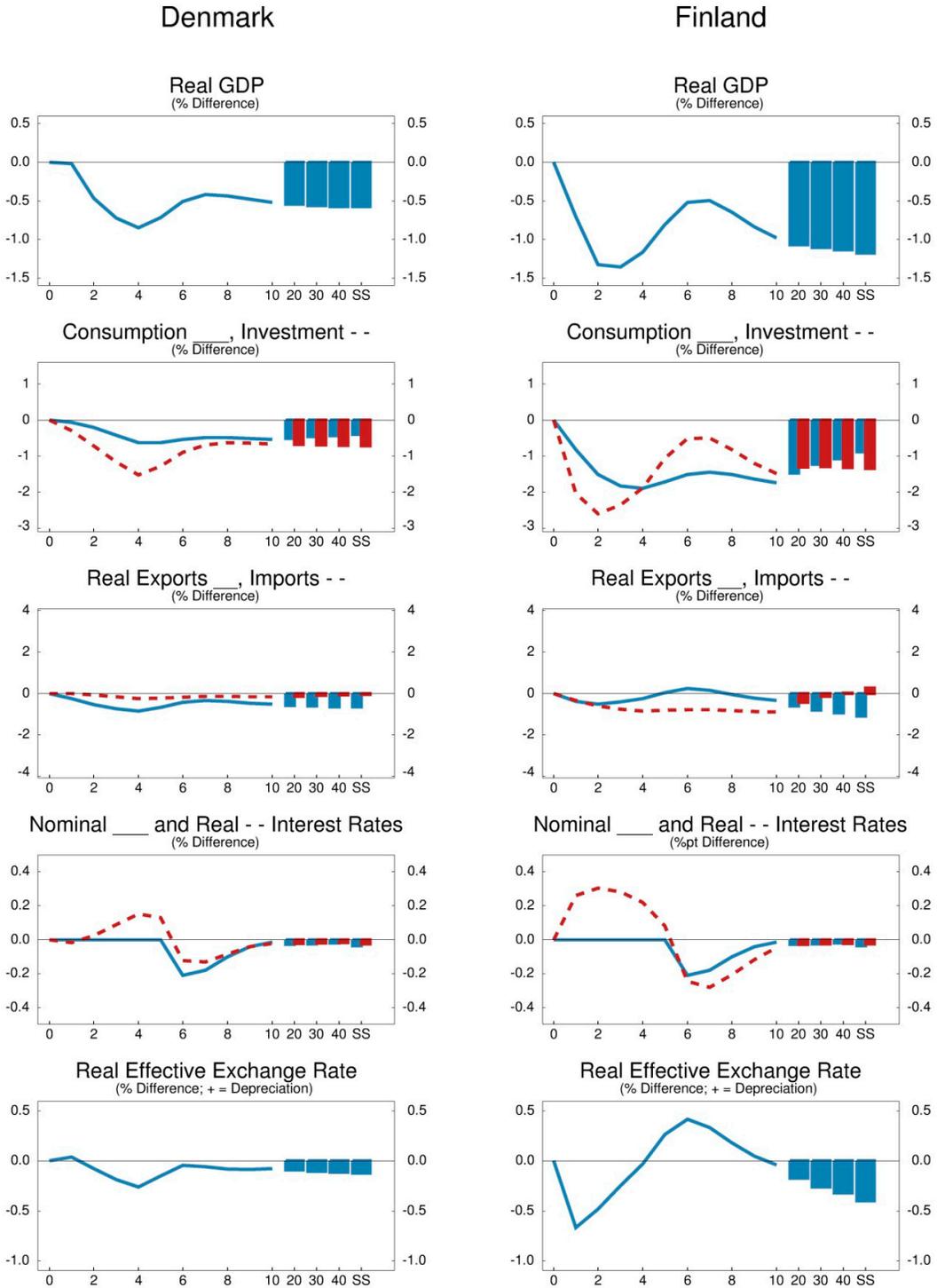
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Figure 11: Global Energy Price Collapse

Source: Authors' calculations.

Figure 12: Russian Sanctions with Russian Energy Supply Cut

Source: Authors' calculations.

Figure 13: Russian Sanctions with Russian Energy Supply Cut

Denmark

Real GDP
(% Difference)

Consumption ___, Investment - -
(% Difference)

Real Exports __, Imports - -
(% Difference)

Nominal ___ and Real - - Interest Rates
(% Difference)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Finland

Real GDP
(% Difference)

Consumption ___, Investment - -
(% Difference)

Real Exports __, Imports - -
(% Difference)

Nominal ___ and Real - - Interest Rates
(%pt Difference)

Real Effective Exchange Rate
(% Difference; + = Depreciation)

Source: Authors' calculations.

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