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Modelling Overheating Risks in the Irish Economy

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Modelling Overheating Risks in the Irish Economy

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Abstract

The Irish economy has recovered at an impressive pace from the economic and financial crisis that began in 2008. In the absence of adverse shocks such as a disorderly Brexit, continued strong growth and further declines in the unemployment rate could result in the emergence of overheating pressures. In this paper, we explore overheating risks in the Irish economy using the Central Bank's macroeconomic models. We illustrate that rising wages in an upturn could lead to boom-bust dynamics if wages are not flexible downwards when the buoyant economic conditions dissipate. We demonstrate how migration can play an important role in mitigating overheating dynamics in the labour market, while at the same time creating higher demand and additional pressures in other parts of the economy. Although this presents policymakers with difficult tradeoffs, appropriate macroeconomic management can help navigate these challenges while keeping the economy on an even keel. In particular, in the event of continued net inward migration and further expansion in construction activity, fiscal policy can be used to manage excess demand in the economy. This can help ensure that the required level of housebuilding can be accommodated, without placing excessive strain on an economy already operating close to capacity.

[1] The authors work in the Irish Economic Analysis Division. The views expressed in this article are those of the authors only, and do not necessarily reflect the views of the Central Bank of Ireland. The authors would like to thank Tara McIndoe-Calder and Paul Reddan for helpful comments and suggestions.

1. Introduction

The Irish economy has continued to improve in recent years as the recovery from the economic and financial crisis has progressed. The latest data from the CSO show that the unemployment rate fell to below 5 per cent in the first quarter of 2019, the lowest rate since Q3 2008. Although an assessment of key economic indicators provides mixed evidence on the degree of overheating in the economy currently (Section 2), there are concerns that with the economy close to full employment further increases in demand may lead to overheating, which could ultimately damage competitiveness in the medium term.

The view that tighter labour market conditions can feed into higher wages is frequently represented in the literature in terms of a linear Phillips curve where there is a negative relationship between wage growth and unemployment. However, Phillips (1958) argued that the relationship between wage growth and unemployment is likely to be highly nonlinear. Many papers have examined this potential nonlinearity. For example, Fuhrer, Olivei, and Tootell (2012) model a nonlinear Phillips curve where the impact of a change in slack depends on the level of spare capacity.[2] In an Irish context, Linehan et al (2017) find that when unemployment is close to or below 5 per cent this will have a more pronounced effect on wage pressures than when the level of unemployment is higher. Recently, Byrne and Zekaite (2018) provide evidence of a non-linear relationship between the unemployment rate and wages in the euro area: at low levels of unemployment, reductions in the unemployment rate have a larger effect on wages than when the unemployment rate is high. Hence, a concern for policymakers is that while wage growth still seems moderate and is broadly in line with underlying productivity growth, as unemployment falls to very low levels, a threshold could be reached where wages begin to increase at a more rapid and potentially unsustainable rate.

One potential source of this nonlinearity is the possibility that wages are not downwardly flexible. Lane (2004) argues that in a booming economy, the two biggest risks are the extrapolation of the wage growth and a failure to incorporate contingencies in pay agreements that take into account the risk of major shifts in the external economic environment. Hence, one of the concerns in an overheating economy is that the labour market may lack the flexibility to adapt quickly to a worsening of external conditions leading to a loss of competitiveness of the domestic economy. This narrative goes

[2] Fisher and Koenig (2014), Kumar and Orrenius (2014), Donayre and Panovska (2016) and Detmeister and Babb (2017) all find steeper Phillips curve slopes at low levels of unemployment in the US.

back at least to the work of Keynes (1925) and Friedman (1953) who argue for the existence of downward nominal wage rigidities in the labour market.

Underlying this mechanism is the idea that in an overheating scenario where the economy is close to full employment, wages are highly flexible upwards, but they can be slow to adjust downward when the overheating phase is over. Using the Bank's DSGE model (ÉIRE Mod) we illustrate the impact of a positive external demand shock in the presence of downwardly rigid wages. Our simulations show that an increase in world demand can lead to overheating that can threaten competitiveness in the medium-term. This would arise if wages are slow to adjust downward as the external demand shock fades.

One of the features of the Irish economy since the foundation of the State has been the elasticity of labour supply, in part reflecting the free mobility of labour between Ireland and the UK. The link between emigration from Ireland to the UK has been modelled by a number of researchers including Honohan (1992) and FitzGerald and Kearney (1999) as an increasing function of the relative unemployment rates and wage rates between Ireland and the UK. However, in the 21st century, Ireland has witnessed major structural changes in terms of migration patterns with net migration becoming positive. Positive net migration has been a consequence of the rapid growth witnessed in the economy in the early to mid 2000s and also since 2016. The accession of ten eastern European countries to the EU in the early 2000s has also been a factor (see for example, Barrell, FitzGerald and Riley (2006)). Net inward migration at the tail end of the boom in mid 2000s was over 100,000 per annum. While net migration was negative during the financial crisis, it has returned to positive territory with improvements in the state of the economy. The latest CSO estimates for 2018 point to net inward of migration of 34,000 last year.[3]

The impact of net migration on wage growth has also been examined at length in the literature. Bentolila, Juan Dolado and Jimeno (2009), Razin and Binyamini (2007) and Engler (2007), show that higher migration flows can induce a flatter Phillips curve by changing both the aggregate labour supply and labour demand elasticities. Both FitzGerald and Kearney (1999) and Lozej (2018) make a similar point in an Irish context. The dramatic increase in net migration in the early 2000s moderated somewhat the wage increases witnessed at the height of the construction-led boom. However, it also facilitated the continuance of the boom with a further expansion in construction activity.

[3] Staunton and Smyth (2019) provide an overview of migration into Ireland currently.

Microeconometric studies have found that house prices can increase on foot of larger internal migration. Saiz, (2003,07) and Ottaviano and Peri, (2012) amongst others have found positive effects of immigration on both rents and prices. Rosa Sanchis-Guarner (2017) find elasticities are approximately 0.8 per cent for rents and 3.1 per cent for house prices. During the pre-2007 boom, Duffy, FitzGerald and Kearney (2005) highlighted that migration into Ireland in the face of rising house prices would be hindered as higher house prices (rents) decrease the benefits of relocating to Ireland. This, they argued, would have the effect of making labour supply less elastic ultimately leading to higher wages and making the Phillips curve less flat. They illustrate this effect by simulating a small model of the economy with a housing sector.

An additional effect of migration, has been highlighted by Howard (2017) who argues that migration can have an *accelerator effect* on aggregate demand in the face of a positive demand shock. In particular, he suggests that higher migration will have additional effects on aggregate demand by increasing demand for goods and services, increasing house prices and housing investment as migrants need shelter and higher house prices will also have a wealth effect which further increases consumption. Werning and Fahri (2014) also consider the importance of the demand effect of migrants on welfare considerations but from the perspective of the country they migrated from.

Using the Bank's structural econometric model (COSMO), we analyse the effect of a positive external demand shock and examine its propagation through the model under two scenarios (i) when the economy is operating below capacity and (ii) when the economy is operating at capacity with full employment. In COSMO, wages are a function of productivity, prices and unemployment. In this set up, the unemployment rate acts as a proxy for workers' bargaining power. The full employment scenario is implemented based on calibrating the wage response to unemployment as witnessed in the 2000-2007 period. This means in the full-employment scenario lower unemployment would result in a larger increase in wages, leading to a greater loss in competitiveness.

We next examine Howard's migration accelerator mechanism in more detail to assess to what extent extra migration leads to higher output through higher demand for housing, increased demand for goods and services and higher consumption through a wealth effect. Critical to our discussion is the offsetting effects on increased wage pressures through the return of positive net migration. Such inward migration can mitigate unsustainable wage dynamics and provide a source of additional labour supply in the face of potential labour shortages. However, positive net migration also brings an extra boost to the domestic economy through

increased demand for goods and services in the non-traded sector, housing and spillover effects to the broader economy through a housing wealth channel.

The plan of the rest of the article is as following. In Section 2, we give an overview of indicators of current state of the economy, while in Section 3 we explore the impact of downward wage rigidity when the economy is overheating. In Section 4, we examine the impact of a positive external shock over the economic cycle and explore the role of migration. Section 5 provides a brief conclusion.

2. Background

To examine the cyclical position of the economy it is helpful to consider a number of indicators of potential imbalances. While the indicators approach ensures that different sources of imbalance are assessed, there are difficulties in determining the relative importance of each indicator. Nevertheless, it is useful to monitor these data to check for signs of imbalance in different parts of the economy.

A range of indicators of overheating are presented in Figure 1 (A-O). Overall, the indicators provide mixed evidence as to the extent of overheating pressures in the economy currently. Looking at the various labour market measures (panel A-G), the unemployment rate provides the most convincing evidence of potential overheating risks. As of Q1 2019 it stood at 5 per cent and is projected to fall to 4.7 per cent in 2019, similar to the rate in 2006. At the same time, there has been a pick-up in net inward migration which amounted to 1.4 per cent of the labour force in the year to April 2018. The non-employment index (NEI) weights the different groups of non-employed (that is, both the unemployed and people out of the labour force) according to their labour market attachment, or the likelihood that a non-employed person will transition back into the job market. The latest data indicate that the NEI had declined to close to its pre-crisis level, despite the employment rate being lower (Figure 1(D)). This suggests that inward migration will be a more important driver of future employment growth than an expansion in domestic labour supply. The issue of capacity constraints in the labour market is discussed in detail in another article in this Quarterly Bulletin by Byrne and McIndoe-Calder (2019).

To date, the tightening of the labour market has not been accompanied by significant evidence of strong overall wage or price pressures. Nominal compensation per employees measured 2.8 per cent in 2018. More detailed quarterly data point to some acceleration in sectors such as financial services and ICT, but overall wage pressures remain broadly contained.

A number of other measures provide little evidence of the existence of pronounced overheating pressures currently. In particular, the ratio of underlying investment to GNI* is currently low compared to historic averages (Figure 1 (I)) and, despite recent strong growth, is projected to be similar to its 1997 level in 2020. The household sector switched to a net lending position in 2009 and the latest Institutional Sector Accounts data shows that the sector remained a net lender in 2018. In terms of indicators of external imbalance, the adjusted current account of the balance of payments recorded a surplus of 6.5 per cent of GNI* in 2017. Looking at the net external debt of domestic banks (Galstyan and Herzberg, 2018), Ireland is well below the adjusted threshold of 17 per cent of GNI*.

The Bank's Business Cycle Indicator (Conefrey and Walsh, 2018) suggests that the economy moved into an expansionary phase around early 2013, after five years of below average growth.[4] The most recent data signal a continuation of strong growth, underpinned in particular by improvements in the labour market. This is similar to the position in the late 1990s and contrasts with the 2005-07 period when growth was driven by construction investment and accelerating house prices (Figure 1, graph O).

Lastly, the output gap is defined as the difference between an economy's actual level of output in a given year and what it could feasibly produce if all factors of production (land, labour and capital) were fully utilised. A positive output gap is a signal of potential overheating because excess demand in the economy could result in unsustainable increases in prices and wages. Estimates of the output gap published by the Department of Finance (2019) and IFAC (2019) suggest that the economy is operating at or slightly above capacity in 2019.

[4] See Conefrey and Walsh (2018) for a description of the Central Bank's Business Cycle Indicator.

Figure 1: Indicators of Irish economy's cyclical position

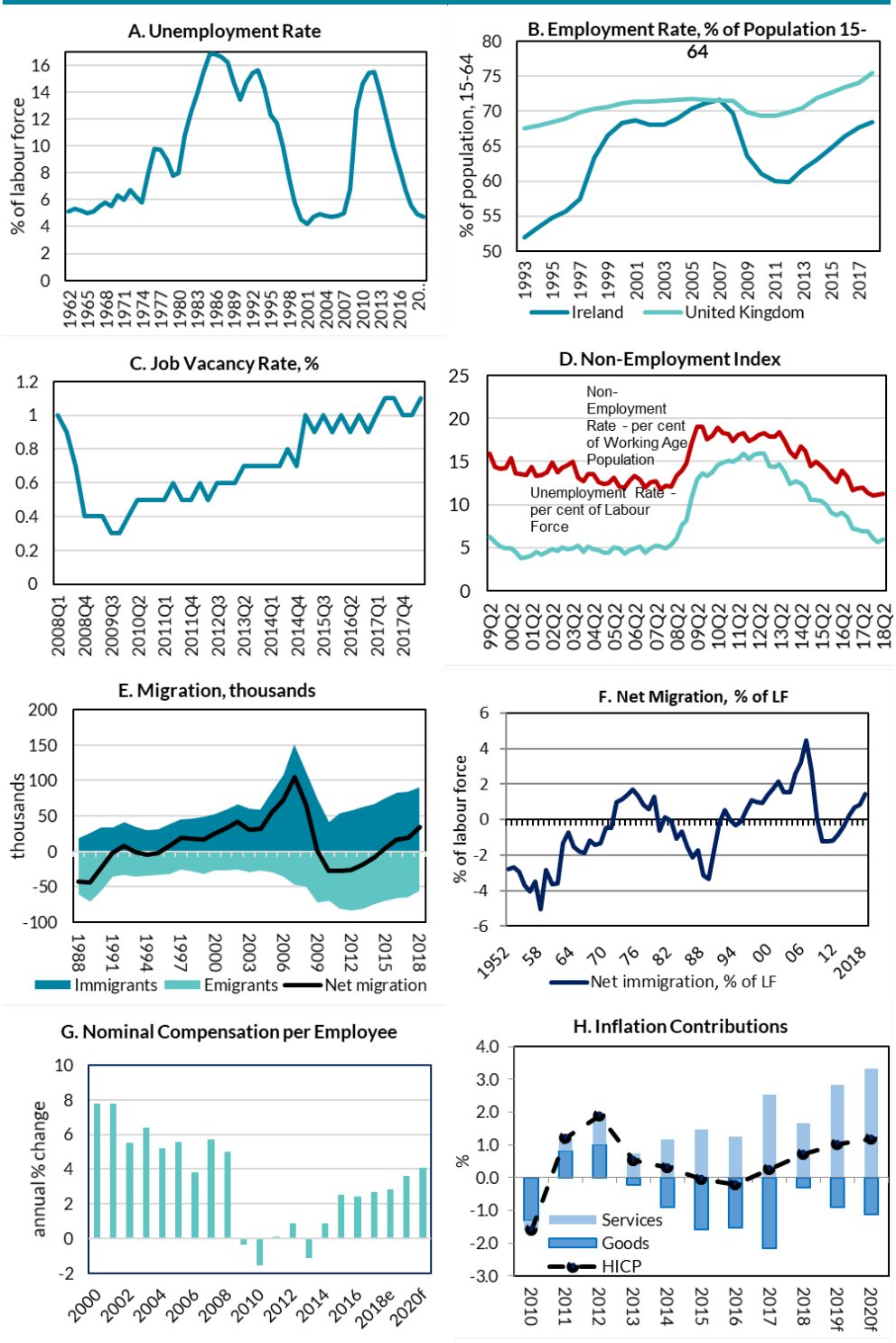
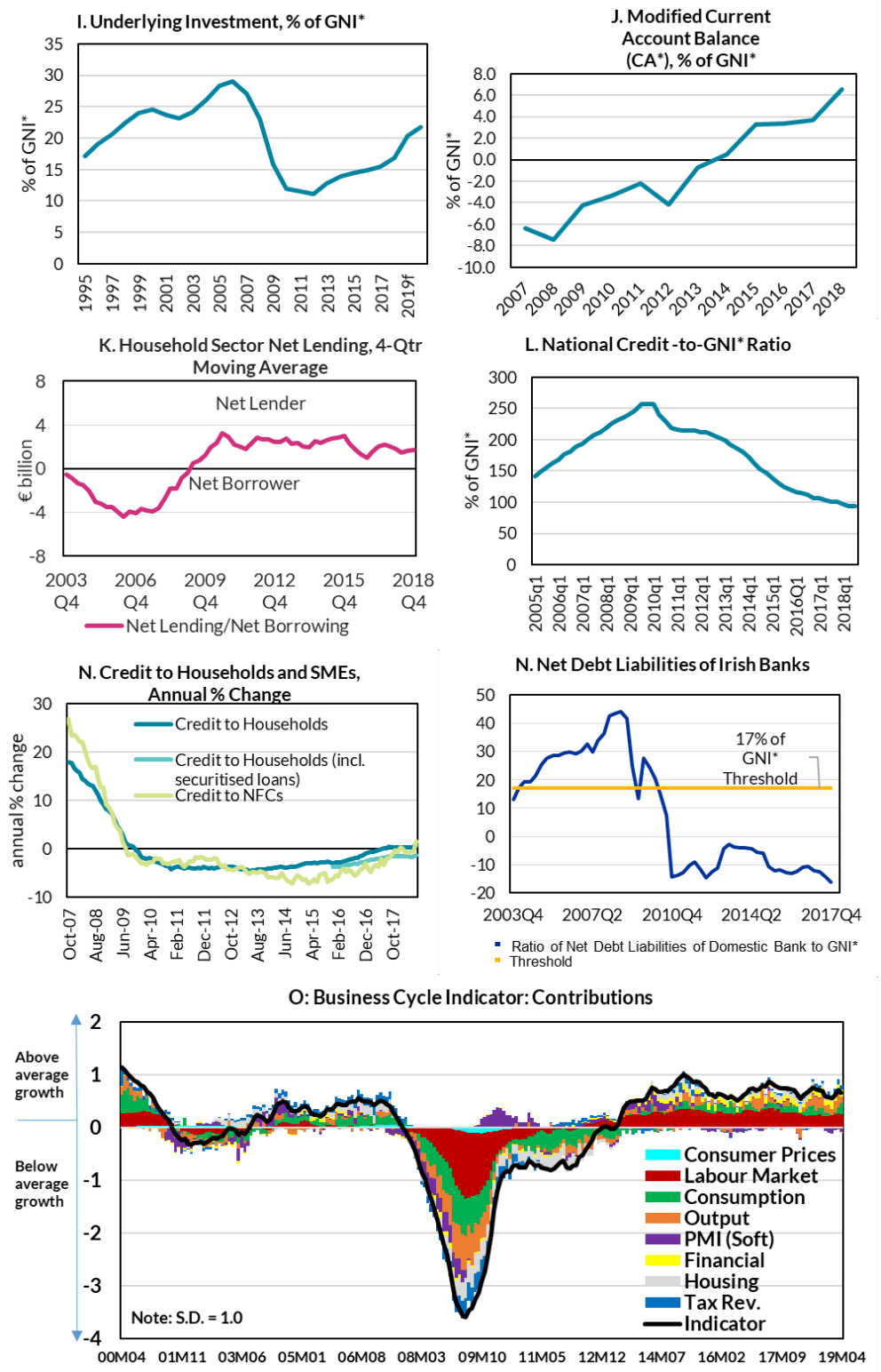


Figure 1 (Contd.): Indicators of Irish economy's cyclical position



Sources: CSO, Central Bank of Ireland.

3. Wage Flexibility and the Business Cycle

For this analysis, we extend the Bank's DSGE model of the Irish economy (ÉIRE Mod) (see Clancy and Merola 2015, 2017 and Lozej, Onorante and Rannenberg 2017) to account for the existence of downward nominal wage rigidities.[5] Our aim is to highlight the risks that an overheating scenario, associated with upward pressure on wages and prices, can affect competitiveness of the Irish economy in the medium term. The use of downward wage rigidities in DSGE models is not new. Schmitt-Grohe (2013, 2014, 2016) and Schmitt-Grohe and Uribe (2010, 2011, 2012), develop a small open economy with tradable and non-tradable sector, downward nominal wage rigidity and a fixed nominal exchange rate, and argue that the observed failure of nominal wages to adjust downward after 2008 despite sizable increases in unemployment suggests that downward nominal wage rigidity played an important role in the rise in unemployment during the financial crisis in the euro area. In particular, they show that the efficient adjustment to a negative external shock is a decline in real wages. However, downward nominal wage rigidity and a fixed exchange rate together imply that real wages measured in terms of tradable goods are downward rigid.

A number of studies have examined the degree of wage flexibility in Ireland during the 2008-2012 economic and financial crisis. Doris, O'Neill and Sweetman (2015) find evidence to suggest that wages are somewhat flexible in Ireland particularly after the onset of the financial crisis. They find that the degree of wage rigidity is low in international comparisons, based on analysing individual employee revenue data. However, at an aggregate economy-wide level there is evidence of the presence of wage rigidity. Surveys of Irish firms prior to the crisis by the Central Bank suggest that wage cuts are rare (see Keeney and Lawless (2010), Du Caju et al (2013) and Babecký et al. (2015)), while post crisis, Branten, Lamo, and Room (2018) find evidence of wage rigidity across European countries including Ireland. While there is evidence of downward wage flexibility in the face a large increase in unemployment, this flexibility was relatively small. Bergin, Kelly and McGuinness (2012) reach a similar conclusion.

[5] ÉIRE Mod is a two-sector New Keynesian small open economy model of Ireland within a monetary union. Firms produce non-traded goods and exports. Imported goods are sold on the domestic market as well as being used in the production of exports. The model allows for some degree of wage and price stickiness. There is also a banking sector which is funded by domestic deposits and wholesale funding from abroad. Agents in the model have forward-looking expectations.

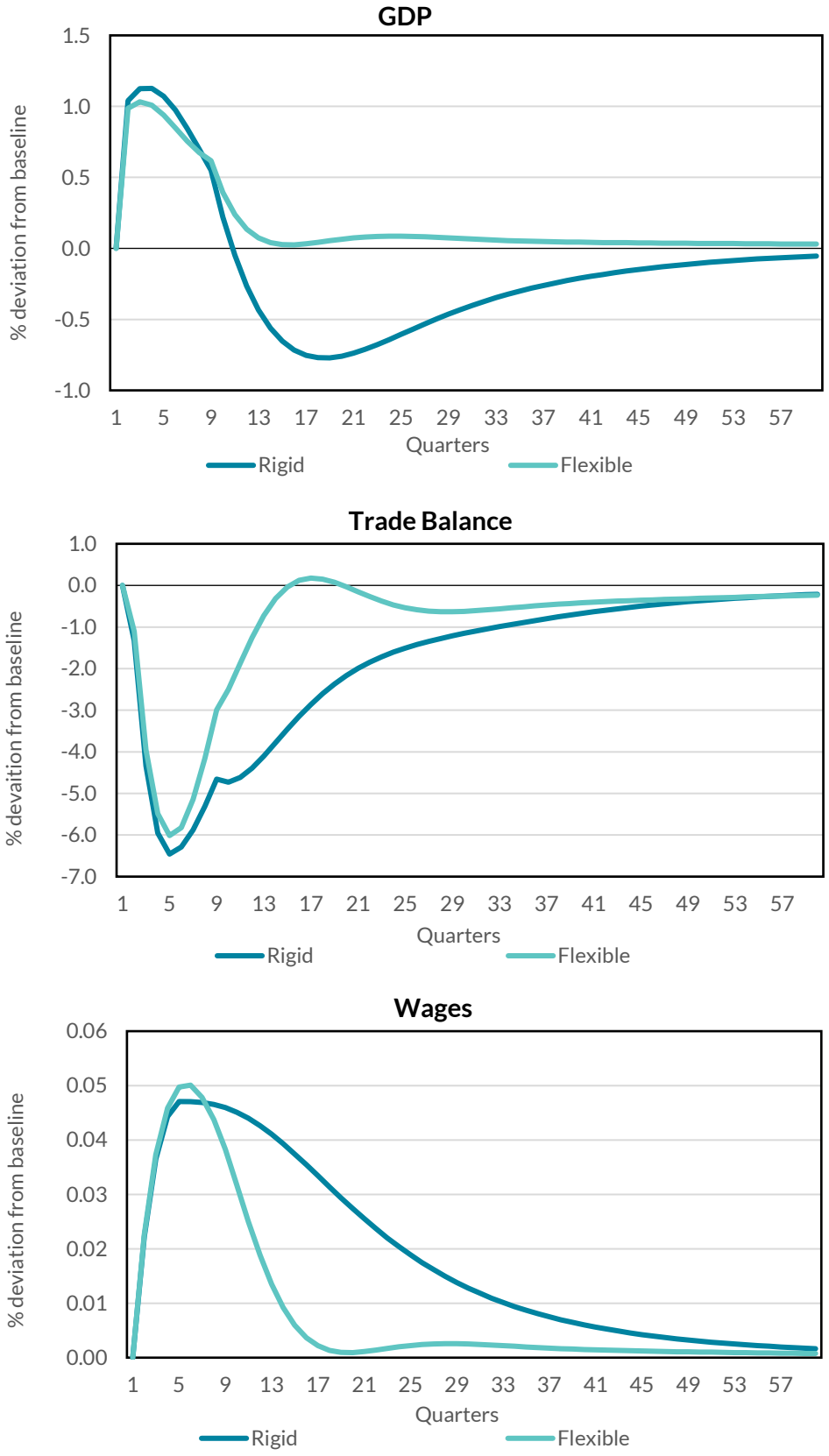
For this simulation, we have hard wired downwardly sticky wages into the model. The extent to which this is true is clearly an empirical issue that is the subject of ongoing research. The simulation we carry out is useful in order to illustrate the potential negative consequences of an overheating economy if wages are not downwardly flexible.

The point we wish to illustrate is that, due to the asymmetry in the wage response introduced by downward nominal wage rigidity, a positive shock which leads to an overheating scenario can threaten the competitiveness of the Irish economy in the medium run. The intuition is straightforward: if a booming economy leads to a sharp upswing in wages, and wages are slow to adjust downward, then, as the positive shock fades away, wages are unlikely to adjust quickly downwards and can give rise to a loss in competitiveness and a possible recession.

In this simulation we compare the response of the economy to an increase in external demand under two scenarios, (i) when wages are flexible and (ii) when wages are downwardly rigid. This is illustrated in Figure 2. A temporary increase in external demand increases wages and prices in the traded and non-traded sectors. At the same time, higher wages boost domestic demand which, in turn, stimulates production in the non-tradable sector and increases imports. The response of domestic demand puts additional pressure on wages causing overheating in the domestic economy, with wages increasing proportionally more than output.

In the medium term, the dynamic of the economy is very different depending on whether wages are flexible or downwardly rigid. If wages are flexible, as the demand fades, the wage level falls quickly allowing a smooth transition of the economy to the steady state. Notably, GDP reverts back to trend without experiencing any recessionary phase. On the contrary, if wages are slow to adjust, the domestic economy enters a prolonged recessionary phase. This is due to the loss of competitiveness caused by wages which do not fall quick enough to offset the decline in external demand. As a consequence, the level of wages is too high relative to the level compatible with full employment. The net effect is that the demand for labour in the tradable sector decreases, this reduces employment and domestic demand which in turn affects the non-traded sector. The deterioration in competitiveness leads to a fall in exports, while the reduction in domestic demand lowers imports. In our simulation, the decrease in export dominates and the trade balance deteriorates. Investment and consumption fall as well.

Figure 2: A positive external shock with downward wage rigidity



Sources: Authors' calculations based on ÉIRE Mod model.

4. External Demand Shocks, Migration and Overheating

Using the Bank's structural econometric model, COSMO, we examine a situation where a positive external shock in tandem with migration could feed through to the macroeconomy, leading to overheating. Howard (2017) suggested that migration could amplify an initial shock leading to what he called a *migration accelerator*.

COSMO is a detailed multisectoral structural econometric model of the Irish economy.[6] The model contains three sectors: traded, non-traded and government, with the sectors defined based on the input-output tables.[7] The long-run equilibrium in the model is driven by the supply side. The supply block consists of a 3-factor normalised nested constant elasticity of substitution (CES) production function with labour augmenting technical progress. The estimation approach for each sector follows that of Barrell and Pain (1997). The short-run dynamics in the model are determined by the error correction system. The long-run equilibrium in the model, based on the optimisation problems, ensures that the variables in the model eventually converge on their long-run path as specified by theory. This is achieved through the price-wage system whereby the prices of the factors of production adjust to guide the economy back to its long-run potential level when there are short-run deviations.[8]

To simulate this scenario in COSMO, we assume that there is an increase in demand for Irish exports leading to higher demand for labour and higher migration into the domestic economy. The latter will also increase the demand for housing which pushes up house prices. This is because migration increases the size of the key household formation age group, which enters the house price equation (housing demand equation) in the model. In COSMO, housing demand is modelled as a standard inverted demand equation where the real price of housing is positively related to income, and negatively related to user cost of capital, unemployment and the per capita housing stock. In the model, the per capita variable used for housing is the number of people aged between 25-34 as these are considered the cohort of individuals actively buying/renting property.

[6] More details on the model can be found in Bergin et al (2017) and Conefrey, O'Reilly and Walsh (2018).
[7] The traded sector is defined as those sectors of which at least 50% of total final uses is exported. The government sector consists of those sectors of which at least 50% of total final uses is used in government consumption. The non-traded sector is defined as the remainder of output.
[8] For more details on the structure of COSMO, see Conefrey, O'Reilly and Walsh, (2018). Available at: https://www.niesr.ac.uk/publications/modelling-external-shocks-small-open-economy-case-ireland

Models which use a similar specification in an Irish context include Murphy (1998), Duffy et al (2005), and Kennedy and McQuinn (2012).

$$house\ prices = f\begin{pmatrix} per\ capita\ housing\ stock, disposable\ income, mortgage\ interest\ rate, \\ unemployment\ rate, credit\ conditions \end{pmatrix}$$

In the case of a positive external demand shock, the increase in house prices would further increase consumption through a housing wealth effect. Hence, an initial demand shock which affects migration leads to further increases in aggregate demand through both residential investment and consumption. As we will see, the effects of such a shock in the presence of migration will be dependent on where we are in the economic cycle.

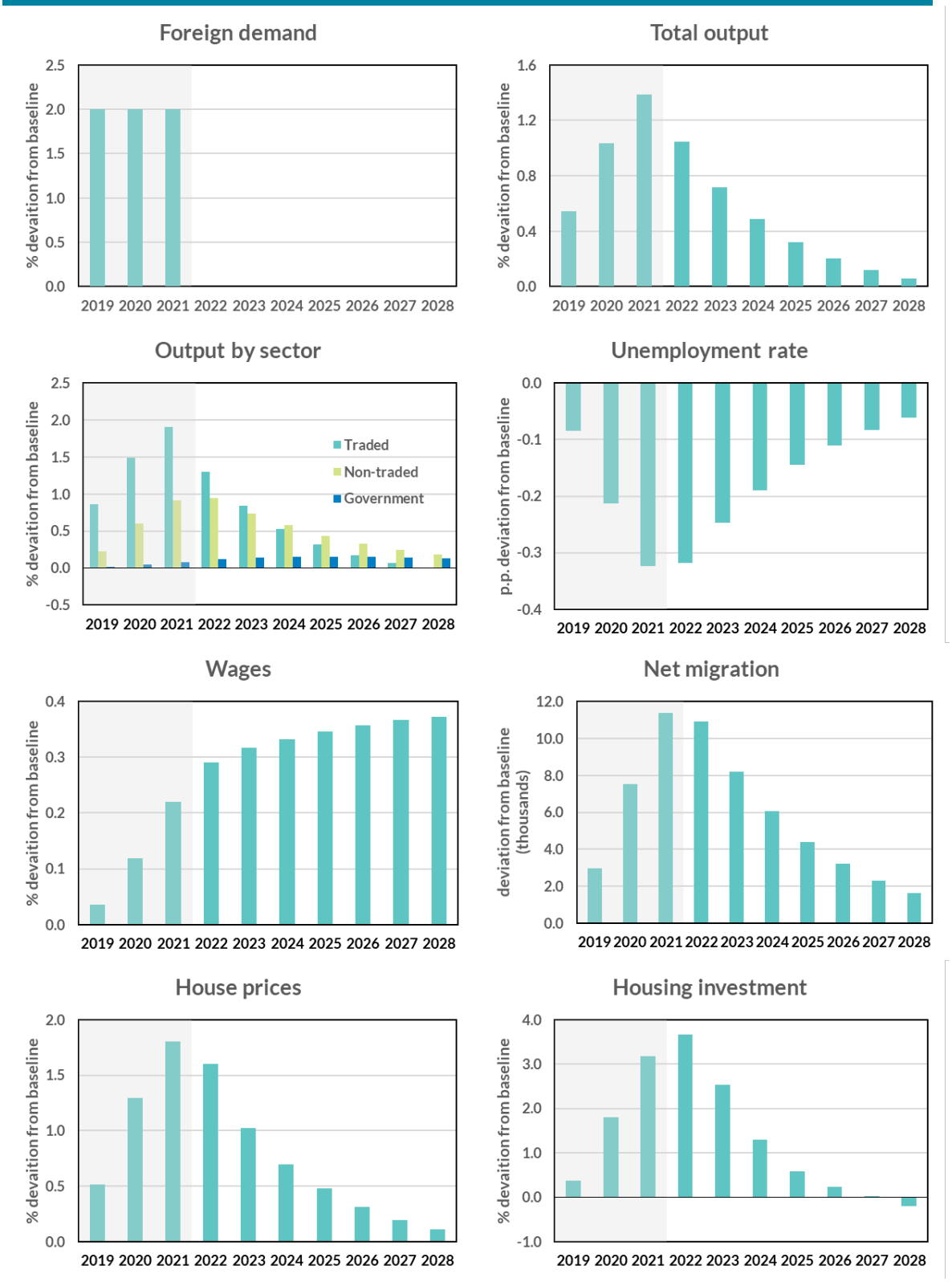
We examine this mechanism when there is a temporary (three-year) increase in external demand for Irish output under two scenarios (i) the economy is operating below capacity and (ii) the economy is operating at capacity. In Figure 3, we illustrate the effects on the economy when external demand increases by 2 per cent for three years and the economy is not at full employment. The shock can be interpreted as a general pick-up in activity in Ireland's key trading partners. Higher foreign demand increases output in the traded sector by close to 2 per cent by year 3 and results in a rise in exports. To facilitate increased production in the traded sector, investment also rises above the baseline. With higher growth in Ireland's trading partners and a more favourable international economy, investment in the traded sector in Ireland would also be boosted by higher FDI inflows. To meet the extra demand, both employment and wages increase in the traded sector and this positive effect spills over to the non-traded sector as domestic demand and imports rise.

Higher activity in both the traded and non-traded sectors increases the demand for labour which is filled by increased employment both by domestic residents as well as higher migration from abroad. This further leads to higher demand for nontraded goods and services. Higher migration, however, also increases the demand for housing putting upward pressure on house prices. The spillover effect of higher house prices generates a further increase in consumption due to the housing wealth effect. Figure 4 shows the boost to consumption from this channel. In COSMO, consumption is a positive function of real disposable income, net financial and housing wealth. The elasticity of consumption is estimated to be 11 per cent which is similar to estimates by for Ireland by McCarthy and McQuinn (2014) and Clancy et al. (2014) and in line with international evidence such as Berger et al (2017) and Mian and Sufi (2012).

Over time, the positive impact of the temporary external demand shock dissipates. Higher wages negatively impact the competitiveness of Irish

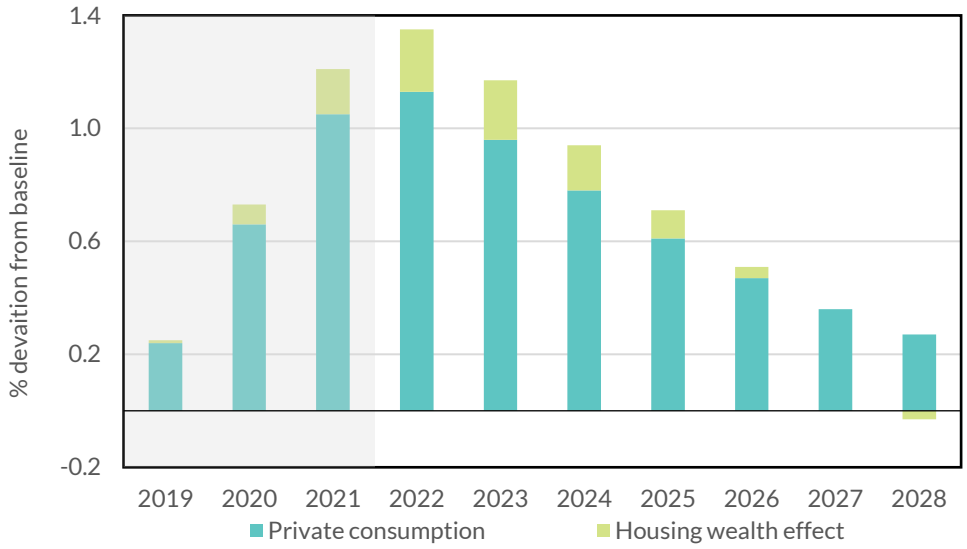
exporting firms, although the net effect on exports is still positive after 10 years. Overall, higher external demand from Ireland's trading partners produces a positive effect on the Irish economy, with the traded sector leading an expansion that stimulates the rest of the economy.

Figure 3: External demand shock with economy below capacity



Sources: Authors' calculations based on the COSMO model.

Figure 4: Foreign demand shock, impact on consumption



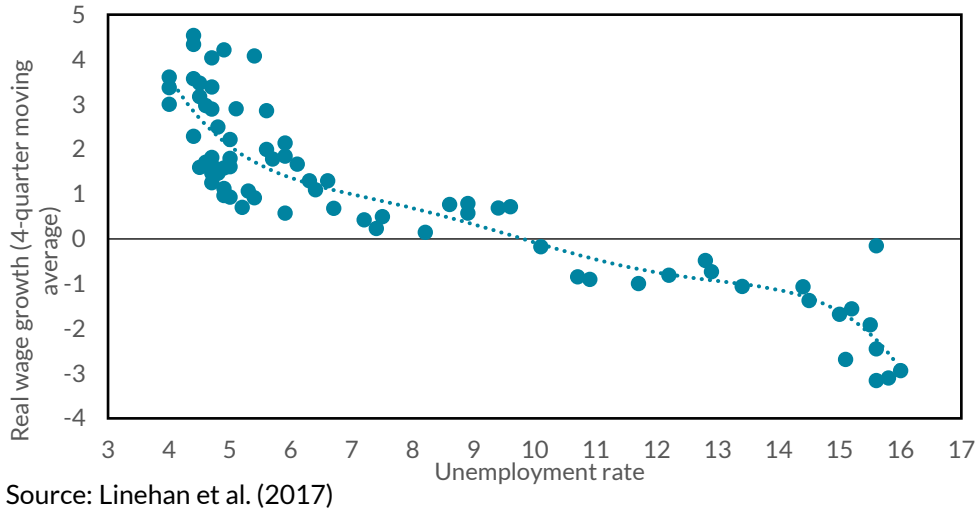
Sources: Authors' calculations based on the COSMO model.

4.1 Higher External Demand when Economy is at Capacity

We repeat the simulation in the previous section but now we assume the economy is operating at capacity. We model this full employment scenario by increasing the responsiveness of real wages to the unemployment rate. Linehan et al. (2017) present evidence of a non-linear relationship between wage growth and unemployment in Ireland, whereby the degree of sensitivity of wages is greater during periods of low or high unemployment (Figure 5). To calibrate the non-linear effect of unemployment on wages we estimate the wage equation in COSMO over the period 2000-2007 when the Irish economy was at full employment and the unemployment rate was below 5 per cent. The estimation results are in line with the evidence in Linehan et al. (2017) and indicate a higher sensitivity of wages to changes in the unemployment rate during this period of full employment. To examine the consequences of a positive external demand shock in a full-employment economy, we replace the coefficient on unemployment in the wage equation in the standard model with the coefficient estimated over the 2000-2007 period.

It is important to note that this calibration is implemented for illustrative purposes to show the potential effects on the economy of a positive external shock when the labour market is tight. The precise sensitivity of wages to reductions in the unemployment rate during the current cyclical upswing is uncertain and may be higher or lower than observed during the 2000-2007 period. Nevertheless this episode of overheating acts as a useful benchmark with which to consider the implications for the economy if there is an increase in demand and the response of wages is similar to that observed during a previous full employment period in Ireland.

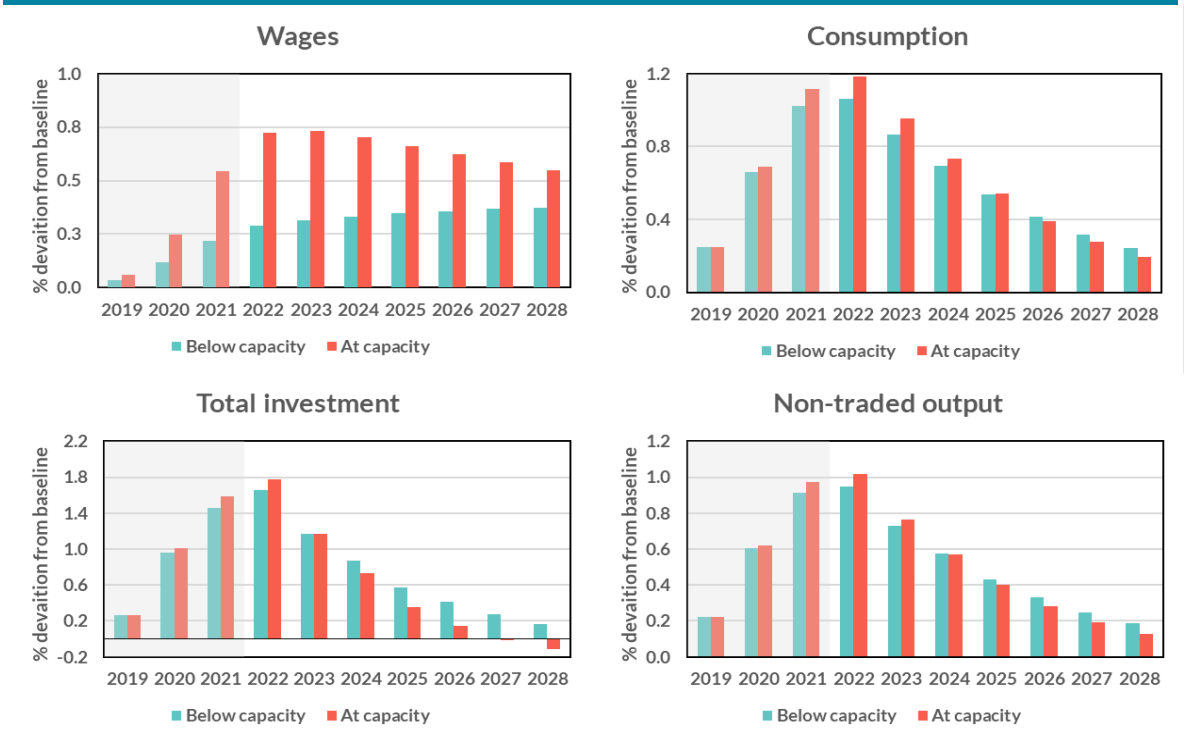
Figure 5: Non-linear response of wages to unemployment



Source: Linehan et al. (2017)

The same three-year external demand shock is implemented in this full-employment version of the model. Figure 6 shows the impact of the external demand shock on key variables when the economy is below capacity (green columns) and at capacity with full employment (red columns). In the latter case, increased world demand now leads to a higher increase in wages than in the former scenario. Initially, higher wages boost personal income and consumption. Investment and output in the non-traded sector are also higher in the short-run, supported by increased inward migration.

Figure 6: External demand shock with economy at capacity

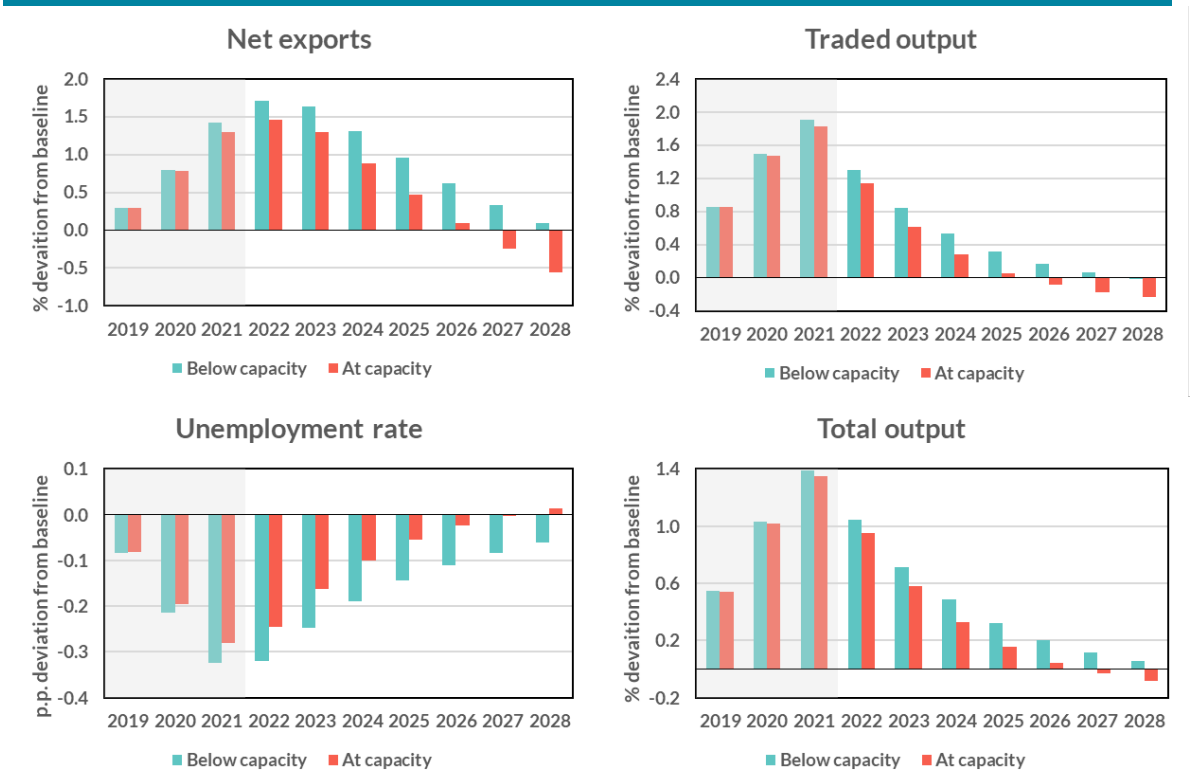


Sources: Authors' calculations based on the COSMO model.

In the long run, the additional boost to wages and domestic demand when the foreign demand shock occurs in the full-employment scenario has negative spillover effects on other parts of the economy as resources are drawn away from the traded sector (Figure 7). In particular, the more pronounced upward pressure on wages and prices means that the traded sector suffers a more severe loss of competitiveness compared to the case where the economy is operating below capacity (Figure 3). This crowding out of the traded sector is reflected in significantly lower net exports in the full-employment case. Once the world demand shock has dissipated, the loss in competitiveness ensures that overall real output declines and there is a marginal increase in the unemployment rate. This contrasts with the results in Figure 3 which showed a positive long-run effect on the economy when the external demand stimulus occurs and the economy is not at full employment.

To summarise, an external demand shock occurring when the economy is at full employment results in higher domestic demand than observed when the economy is below capacity. While higher activity in the non-traded sector initially boosts output, this comes at the cost of lower overall output in the long run as increases in prices and wages undermine competitiveness and result in a loss of output in the traded sector.

Figure 7: External demand shock with economy at capacity

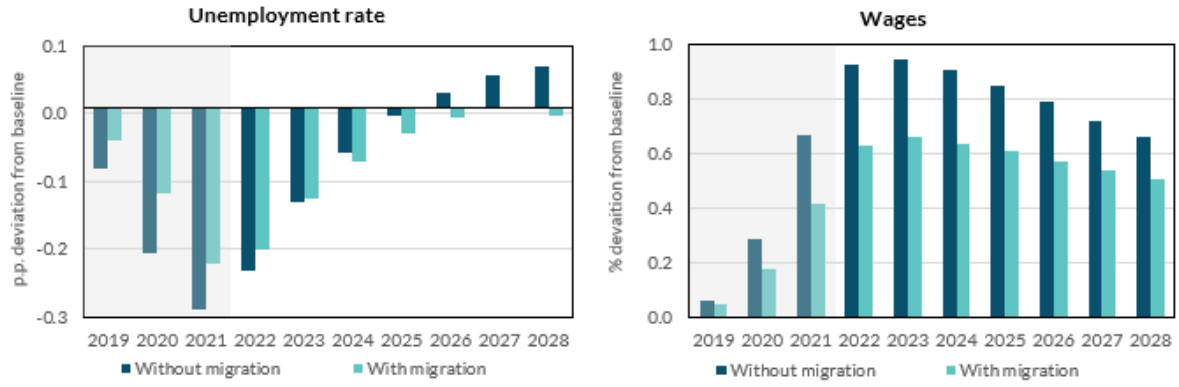


Sources: Authors' calculations based on the COSMO model.

4.2 The Migration Channel

The elasticity of Irish labour supply through migration is an important characteristic of the Irish labour market. Highly elastic labour supply means that, even with full employment, overheating in the labour market in response to a positive demand shock could be mitigated if labour supply is boosted by an increase in inward migration. To illustrate this channel, we run two versions of the external demand shock described in the previous section (the full-employment scenario): one with the migration channel switched on – this replicates the results above – and one where migration is switched off, i.e. net migration remains unchanged at its level observed prior to the world demand shock. The results are shown in Figure 8a and Figure 8b.

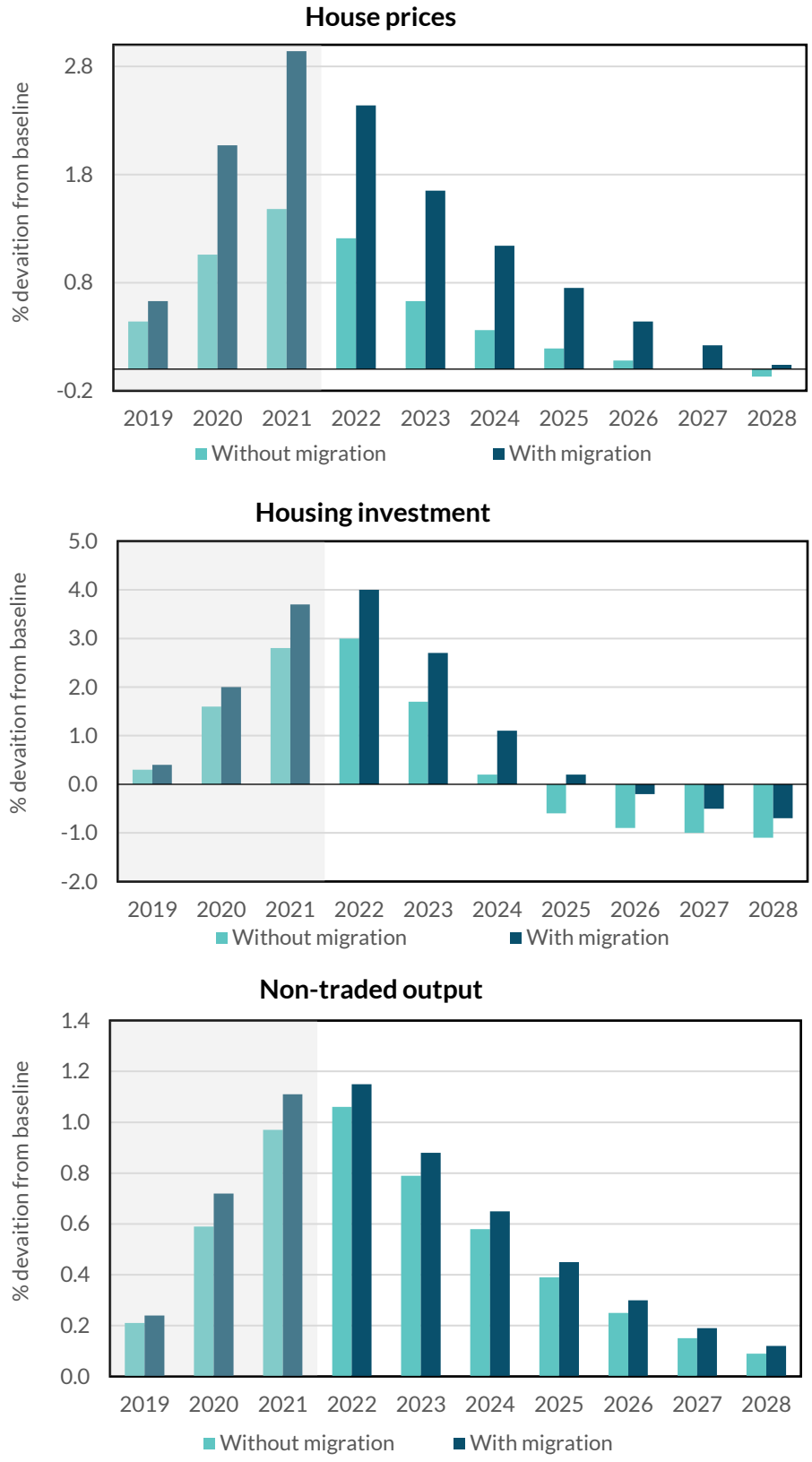
Figure 8a: External demand shock with and without migration: effect on labour market



Sources: Authors' calculations based on the COSMO model.

In the no additional migration case (labelled 'without migration'), the positive external demand shock would result in a larger decline in the unemployment rate compared to the case where there is an additional inflow of migration above the baseline (labelled 'with migration'). In the latter case, net inward migration increases by around 11,000 above the baseline. Actual net inward migration in 2018 amounted to 34,000 and so this corresponds to an increase in the observed inflow of around one third. This significant migration response moderates the decline in unemployment compared to the without migration scenario (Figure 8a). By leading to a smaller fall in unemployment, inward migration also results in a less pronounced rise in wages in the scenario with migration compared to the without migration variant. As a result, in terms of the effect on the labour market, the migration channel can help to ease overheating pressures by lowering the effect on wages of a positive external shock in a full-employment economy.

Figure 8b: External demand shock with and without migration: effect on domestic economy



Sources: Authors' calculations based on the COSMO model.

However, while easing overheating pressures in the labour market, the simulation results show that the increase in inward migration creates pressures in other parts of the economy. By increasing the size of the key household formation age group, migration puts upward pressure on house prices. One of the variables which determines housing investment in COSMO is Tobin's Q, a measure of the profitability of housing construction, defined as the ratio of house prices to building costs which reflects the value of housing relative to its replacement cost. With higher migration and house prices, housing investment rises which also leads to higher consumption.

$$residential\ investment = f\begin{pmatrix} house\ prices, building\ costs, loans\ to\ construction\ sector, \\ interest\ rate, unemployment\ rate, insolvencies \end{pmatrix}$$

As shown in Figure 8b above, housing investment and overall non-traded output are higher in the presence of migration relative to the case where there is no additional migration. Overall, the gains from migration in terms of reducing overheating in the labour market are largely offset by the additional overheating pressures created in the domestic economy, leaving the overall effect on output broadly similar in the with and without migration cases.

5. Conclusions

In this paper, we examine overheating risks in the economy through the lens of the Bank's macroeconomic models and assess the potential propagation mechanisms of an external demand shock in terms of wages and output when the economy is close to full employment.

With the economy near full employment, a positive external shock could lead to a rapid increase in wages. If wages are flexible, as the demand fades, the wage level falls allowing a smooth adjustment of the economy. If instead wages are downwardly rigid, this can lead to a loss of competitiveness and fall in output. The analysis highlights the importance of nominal wage flexibility in smoothing the adjustment of the economy to shocks.

We next examined the effects of a positive external demand shock when the economy is operating below capacity and when the economy is at full employment. Our results show that when the economy is operating at full employment, the benefits of a positive external shock are lower than when the economy is operating below capacity. This is because the external stimulus puts upward pressure on wages and leads to a loss of competitiveness and lower traded sector output in the long run. Our results demonstrate how migration can help ease overheating pressures in the

labour market but at the same time can create higher demand in other parts of the economy.

Taking these results at face value, it would appear that policymakers face a difficult dilemma: addressing overheating pressures in the labour market via higher migration amplifies capacity constraints in another part of the economy. Appropriate macroeconomic management can help navigate these challenges while keeping the economy on an even keel. Ireland is likely to require significant inflows of workers from abroad over the coming years provided the economy remains on a favourable growth trajectory. A continued focus on addressing housing supply shortages can help ensure that Ireland remains an attractive location for the migrants who will be needed to fill vacancies in the labour market (see Byrne and McIndoe Calder, 2019).

To help ensure that the economy has scope to accommodate the required increase in housebuilding while minimising overheating pressures, fiscal policy can play an important role in managing excess demand in the economy (see FitzGerald et al. (2000) and FitzGerald et al. (2010)). The analysis in Conefrey, O'Reilly and Walsh (2019) illustrates that if budgetary policy is excessively expansionary at a time when the economy is operating close to capacity limits, this has the potential to crowd out the tradable sector and could move the economy onto an unsustainable growth path.

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