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Assessing the impact of two Belgian specificities on competitiveness and purchasing power when an energy shock hits[1]

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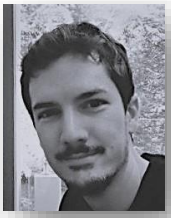

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ABSTRACT

When facing strong and persistent imported energy price shock, the Belgian economy is weakened by two structural features. First, the transmission of wholesale energy prices to the consumer is quicker and stronger than in the rest of the euro area, as measured by the energy subcomponent of the HICP. Second, Belgium is one of the three small economies of the euro area indexing automatically wages to price inflation. The latter characteristic is supposed to shield (at least partially) workers from the more pronounced loss in purchasing power induced by the first one. However, this is at the cost of a loss of competitiveness. We propose to disentangle the respective effects of each of these Belgian particularities by using a macroeconomic modelling of the Belgian economy within the euro area and proceeding to counterfactual analysis.

INTRODUCTION

The world economy has entered a new era of energy price instability. This volatility has been initially driven by the post-Covid recovery, and then re-enforced in Europe by the geo-political tensions with Russia, which accounted for 40% of EU natural gas supplies. Even though the peak of gas prices seems now in our back, energy markets will remain tensed and sensitive to any news and disequilibrium expectations in the near future. In the medium to long run, the transition towards a carbon light economy remains challenging and will most probably lead to energy price inflationary pressures.

The Belgian economy suffers from two structural features when facing such energy price shocks:

- an observed quicker and stronger transmission of wholesale energy prices to the end-users, as measured by the HICP-energy index;

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- the institutionalized automatic wage indexation mechanism which amplifies the wage-price spiral.[2]

These characteristics of the Belgian economy necessarily amplify the dynamic reaction of the nominal side of the economy, but their effect on real activity is more ambiguous as they exert potentially opposing effects on domestic and foreign demand. In the following pages, we present the outcome of a simulation of the recently observed unexpected hikes in energy prices with the multi-country macro model of the NBB, BEMGIE (Belgian Economy in a Macro General and International Equilibrium model)[3]. The exercise shows that each specificity is responsible for a downward amplification of the economic activity reaction (GDP) of the same magnitude, though through different channels:

- the first one weights more on the purchasing power of the households and on the domestic demand;
- the second affects more specifically competitiveness, both on domestic and foreign markets.

Finally, both features are self-reinforcing through second round effects. Acting on these identified structural weaknesses can only be beneficial for the Belgian economy if energy prices are expected to remain highly volatile in the near and further future.

1.DESCRIPTION OF THE RECENT ENERGY SHOCK

***The global economy has recently faced a strong energy shock which is quite different from the previous ones as it hits more the natural gas wholesale price than the oil price*.** Though the latter has also been on the rise, its cumulated increase since the first quarter of 2021 dwarfed by this of the gas price, which is closely followed by the electricity price given the marginal cost pricing scheme followed in the European Union (cf. Figure 1).

In the ensuing simulation exercise, we consider a shock starting in the second quarter of 2021 and for which the observed realisation of the oil, gas and electricity prices on the wholesale markets between March 2021 and June 2022 are interpreted as cumulated surprises to first order autoregressive processes of persistence 0.985. For each energy price, this persistence of 0.985 reflected the expectations of the financial markets materialized through the future prices.[4] A monthly persistence of 0.985 corresponds to a quarterly persistence of 0.95, which will be imposed to the quarterly BEMGIE macromodel in the ensuing sections.

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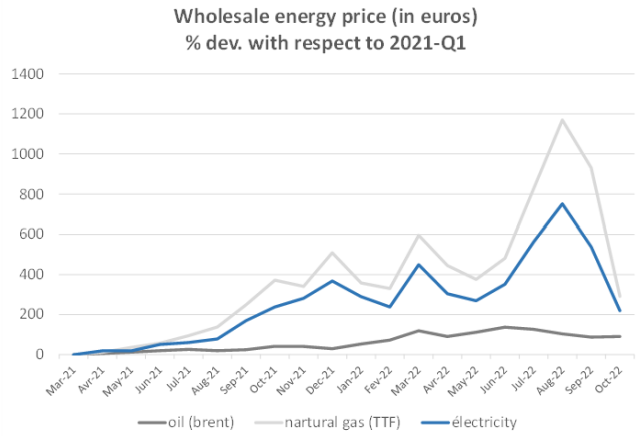
[2] Noteworthy, the macroeconomic theory unanimously concludes that automatic indexation acts as a stabiliser of the real activity in the case of a demand or monetary policy shock but that it amplifies the reaction of GDP after supply or terms of trade shocks, such as a shock on imported energy prices. On this topic, see Appendix 4 of the NBB's study of June 2012 on indexation.

[3] BEMGIE is a New-Keynesian DSGE estimated on data for Belgium, the euro area and the Rest of the World. The Belgian bloc is modelled as a small open economy inside a monetary union, sharing the same nominal exchange rate and monetary policy rule as (the rest of) the euro area. The model is fully described in a forthcoming (March 2023) NBB Working Paper.

[4] Noteworthy, market expectations display a much stronger persistence since the start of the Ukrainian war. Moreover, they display an obvious seasonal pattern corresponding for the higher energy demand in winter months, while the autoregressive process does not.

Figure 1 - Wholesale energy prices (in euro)
(% deviations with respect to 2021-Q1)



2. TRANSMISSION OF ENERGY PRICES TO CONSUMER PRICE INDEXES

It is striking that the energy sub-components of the HICP reacts much more quickly and strongly in Belgium than in the euro area to these common major energy wholesale prices shocks. This is highlighted on Figure 2 which reports the cumulated percentage deviation of the HICP-energy sub-indexes for Belgium and the euro area from 2021-Q1 on.

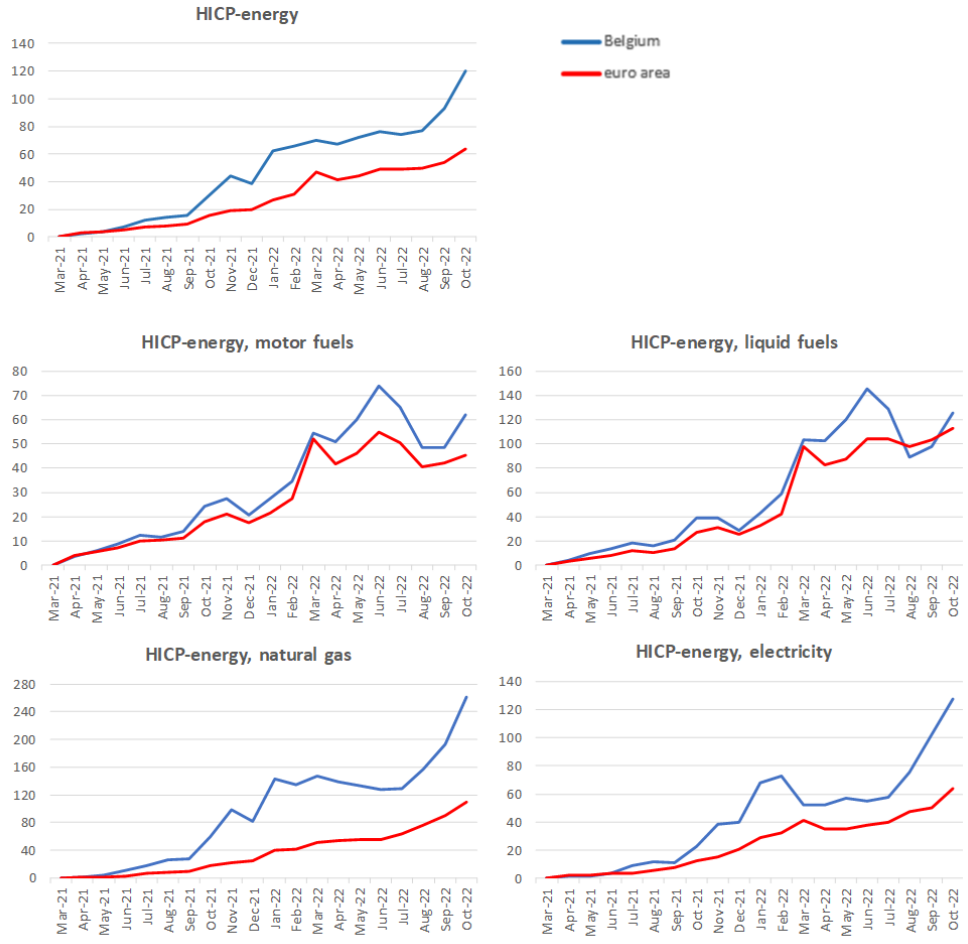
From the first panel of Figure 2, we observe that the Belgian HICP-energy subindex increase in reaction to the wholesale energy prices is about twice as large than this observed for the corresponding euro area index. The second panel displays that this stronger reaction is not due to the transmission of oil prices to motor fuels. Taxes weighing on this item are relatively harmonized throughout the euro area, and excises act as an oil price shock absorber for the consumers. This is a bit less true for the price of the liquid fuels (i.e. heating oil). The stronger and quicker reaction of this price for the end users in Belgium relatively to the euro area is partly due to the very low excises paid in Belgium on this item, amongst the lowest in Europe.[5] Finally, it clearly appears from the last two panels that the functioning of the gas and electricity markets in Belgium and the way the providers of these items transmit wholesale price variations to the end users is key to explain the huge differences in the reaction of the HICP-energy in Belgium and neighbouring countries.[6] For gas and electricity, the Belgian cumulated consumer price increase measured by the HICP is, in October above

[5] For these tax on fuel aspects, see Cornille, Schoonackers, Stinglhamber and Van Parys (NBB Economic Review, 2021), page 8.

[6] It also seems that the methodology used for each country to compute these indexes is not fully harmonized. Belgium and the Netherlands for example consider only new flexible price contracts while other countries, like Germany, take into account an average of existing contracts, of which a substantial share might be fixed price. For electricity, the maximum price policy imposed by France certainly also plays an important role for the euro area aggregate. Methodological questions behind the measure of inflation are addressed in a recent NBB blog post

the double of its euro era counterpart. For memory, gas and electricity account for 58% of the HICP-energy index in Belgium (versus 50% in the euro area) and for about 6.3% of the overall HICP (versus 5%). The composition of the end user gas and electricity bills certainly deserves a deeper analysis, together with a comparison of the way these markets are organized and regulated in Belgium and its neighbouring countries/trade partners.

Figure 2 - HICP-energy and subcomponents for Belgium and the euro area
(% deviations with respect to 2021-Q1)



The quicker and stronger reactions in HICP-energy observed above for Belgium are directly transmitted to the overall consumption price deflator via its substantial share in the overall HICP (about 10%). This could be particularly detrimental to the Belgian households in terms of purchasing power. However, the latter are shielded against inflationary surprises by the so-called automatic indexation scheme, which adapts the wage of all the sectors (though with different timings) to the recent variations of the overall price index. Though, the reference for this automatic indexation is not the overall HICP, but an alternative price measure labelled the Health Index (HI hereafter). The Health

Index excludes some items like alcohol and cigarettes. More importantly for our purpose here, the content of the energy basket is also modified compared to the HICP. Motor fuels are excluded, and the path of the heating fuel index is a weighted average of past values for its HICP counterpart. The initial purpose of these adaptations of the HI-energy compared to the HICP-energy was to somehow temper the dynamics of the reference for the automatic indexation in the presence of energy shocks. Obviously, for the currently observed energy shock, hitting mostly gas and electricity, this reference to the HI misses this original objective. ***Excluding motor fuels from the Health Index magnifies the weights of gas and electricity which represent together about 80% of the HI-energy (vs 58% in standard HICP-energy). The strong increase observed for the gas and electricity subcomponents of the Belgian consumer price are therefore strongly reflected in the HI for the current energy shock, such that the HI evolves much closer to the HICP than for traditional, oil price driven, energy shocks.***

3. THE TRANSMISSION CHANNELS OF AN ENERGY PRICE SHOCK IN BEMGIE

BEMGIE (Belgian Economy in a Macro General and International Equilibrium model) is a three-country model, featuring Belgium as a member of the euro monetary union and trading with both euro area partners and the Rest of the World.[7] Relevant for the purpose of this analysis, the model considers energy among the production factors of domestic non-energy firms, together with labour, capital and foreign intermediate inputs. Energy goods also enter directly in the consumption basket. An increase in wholesale energy prices thus affects final consumption prices through two channels. First, an increase in energy prices for production purposes, generates a rise in the marginal costs of non-energy domestic firms. The pass-through of higher marginal costs to firms' prices depends on real and nominal rigidities, which are estimated to be significant in the three regions of BEMGIE. This is the indirect channel whose persistence (on top of the shock persistence) is directly related to the slope of the firms' price Phillips curve. Second, higher wholesale energy prices raise the energy invoice of consumers, as reflected by the HICP-energy subcomponent discussed in the previous section. This is the direct, non-persistent channel.

In the absence of relevant information regarding the energy costs actually faced by firms, it is assumed that Belgian and European producers are confronted with the same energy costs, computed as an averaging of wholesale oil and gas prices. Regarding energy prices at the consumer level, it is obvious from the first panel of Figure 2 that they are measured to have increased more and quicker over the last two years in Belgium than in the rest of the euro area.

As in standard New-Keynesian DSGE models, BEMGIE is also equipped with wage indexation to past nominal developments. In all regions, wage renegotiations are allowed during the simulation period. In euro area and US blocs, we follow the DSGE literature where wages that are not renegotiated are partially indexed based on the consumer price inflation rate of the previous quarter (for the complement, indexation is based on trend inflation). The magnitude of this partial dynamic indexation is estimated to be relatively low in the model.[8] In Belgium, the model features a complete indexation to a weighted average of the Health Index inflation rate of the three previous quarters.

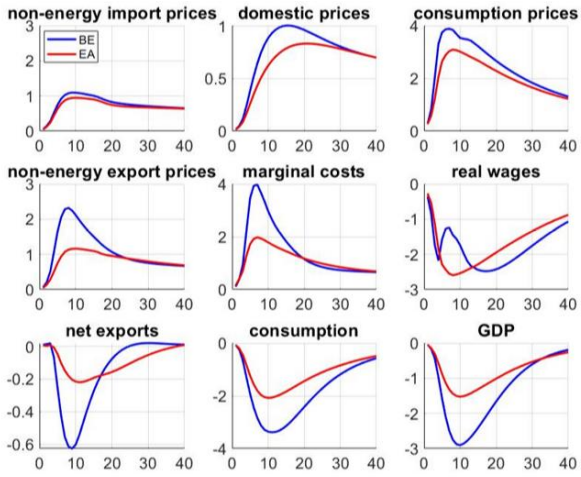
[7] The BEMGIE model is fully described in a forthcoming (March 2023) NBB Working Paper.
[8] The indexation parameter is estimated around 0.2 and 0.4 in the euro area and in the US, respectively.

The weighted average helps to account for the aggregation of different indexation mechanisms and timings across economic sectors, which generates a complete though somewhat delayed indexation. In the meantime, the aggregate purchasing power of workers can be severely depressed.[9] Finally, for each simulation involving automatic indexation, its institutional counterpart, i.e. the 1996 Competitiveness Act, is also activated. This is done by assuming an absence of wage increases above indexation for a period of three years from the initial shock. .

4. A BASELINE SIMULATION

In the proposed simulation, wholesale energy prices evolve exogenously in accordance with the dynamics observed between the first quarter of 2021 and the second quarter of 2022. They subsequently return to their long-term level by dropping by 5% per quarter, in line with the dynamics of these prices on the futures markets. The HICP-energy indices in Belgium and the euro area evolve exogenously as well, as observed until the second quarter of 2022. Afterwards, they evolve each according to their own estimated relationship with the assumed path for wholesale prices dynamics. Given this initial impulse, BEMGIE computes the deviations from steady state for each endogenous variables, of which a sub-selection is displayed on Figure 3 for both Belgium and the euro area.

Figure 3 - Baseline simulation of the energy price shock described in Figures 1 and 2
(% deviation from steady-state for selected macro-variables)



Note: the simulation starts from 2021-Q1 and the time unit on the horizontal axis is a quarter.

The stronger reaction to wholesale energy prices of the Belgian HICP-energy documented in Figure 2 leads to a stronger consumer price inflation via the above discussed direct channel. This direct channel is then reinforced in Belgium by the wage indexation mechanism described in Section 3, which is illustrated by the bump in the response of Belgian hourly real wages emerging after four

[9] This is exactly what is observed in Belgium between 2020-Q4 and 2022-Q1, where the hourly real wage has actually dropped by more than in the neighboring economies, despite the automatic indexation mechanism.

quarters. This stronger evolution of labor costs relative to the rest of the euro area feed the firms' marginal costs together with the energy prices for production. These costs are partially and temporarily absorbed by the firms in their margins, but a part of it is nevertheless transmitted to the Belgian prices' firms set on both domestic and foreign markets, enhancing the initial consumption price reaction and hindering competitiveness with respect to European firms.

The more vigorous reaction of Belgian firms' prices ends up in a competitiveness handicap both on the domestic and foreign markets and net exports are more impacted than in the euro area. The larger loss of purchasing power by the Belgian households implied by the consumption price inflation yields a larger drop in consumption. All in all, the GDP decrease with respect to the steady path, at the trough, is twice as large in Belgium than in the euro area.[10]

The combination of the stronger pass-through of wholesale energy prices to consumption energy prices with the automatic wage indexation scheme is key to obtain this result. Let us now analyse the respective role of each of these two specificities of the Belgian economy.

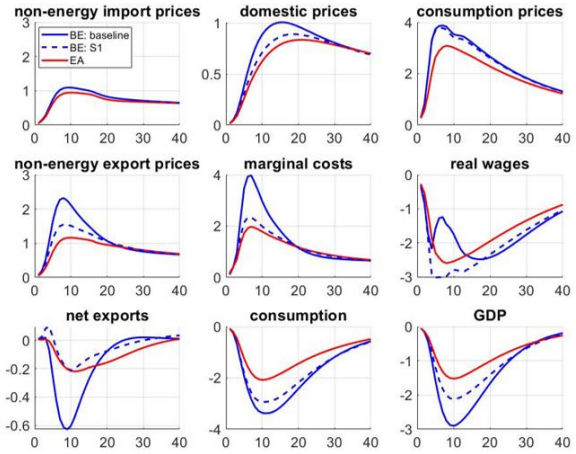
5. COUNTERFACTUAL SIMULATIONS BASED ON THE WAGE FORMATION PROCESS

We first focus on the automatic wage indexation. For this we simulate the same shock in a counterfactual version of BEMGIE where the major parameters of the wage Phillips curve are set in Belgium to the same values as estimated for the euro area. Furthermore, the wage negotiation is no longer blocked.

As a result, the strong wage indexation shield of Belgian real wages disappears and the magnitude of the reaction of the Belgian firms' marginal cost gets much closer to this of their European competitors, together with the prices they set on domestic and foreign markets. The competitiveness handicap highlighted in the baseline simulation has disappeared. The implied smaller reaction of domestic prices has also an impact on consumption prices and the drop in consumption is also attenuated. Overall, the gap between the troughs of the reaction of GDP in Belgium and euro area is halved compared to the baseline simulation.

[10] Note that with a steady growth path of about 1.5% a year, the simulated GDP growth remains positive over the full horizon.

Figure 4 - Counterfactual simulation focusing on the Belgian wage formation process
(% deviation from steady-state for selected macro-variables)

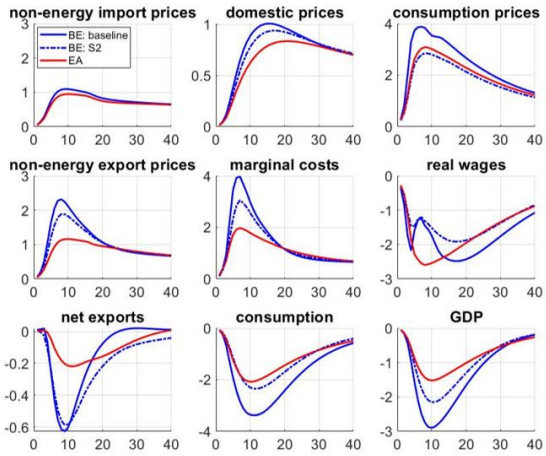


Note: the simulation starts from 2021-Q1 and the time unit on the horizontal axis is a quarter.

6. A COUNTERFACTUAL SIMULATION BASED ON THE CONSUMER ENERGY PRICE FORMATION PROCESS

Let us now reset the wage formation mechanism in Belgium and euro area as it was in the baseline simulation. Instead, we impose that the HICP-energy reacts in the same way to wholesale energy prices in Belgium as in the rest of the euro area.

Figure 5 - Counterfactual simulation focusing on the pass-through of energy prices to the end user
(% deviation from steady-state for selected macro-variables)



Note: the simulation starts from 2021-Q1 and the time unit on the horizontal axis is a quarter.

The direct channel of the hike in energy prices to consumption prices is strongly attenuated compared to the baseline simulation and the drop in hourly real wage is less severe. This is particularly beneficial to private consumption whose fall is now quite in line with this obtained for the euro area. The gap between the troughs of the reaction of GDP in Belgium and euro area is halved compared to the baseline. That magnitude is comparable to the first counterfactual simulation presented in Figure 4. However, the mechanism is very much different as it is the purchasing power of the households which benefits from this alignment of consumer energy prices. The weaker increase in consumption prices somewhat alleviates wage indexation pressures on marginal costs and Belgian firms' prices on domestic and foreign markets. However, this second round effect remains limited and the firms' competitiveness handicap is not strongly modified with respect to the baseline. According to this experiment, it appears that, given the model's underlying assumptions, automatic indexation does not support consumption after a price shock on the international energy markets; the gain to households in terms of hourly wages is lost in terms of hours worked and expected future dividends.

7. CONCLUSIONS

We identify two structural characteristics of the Belgian economy that handicap its reaction to large and persistent energy shocks:

- the observed *quicker and stronger transmission of wholesale energy prices* to the consumers;
- the a*utomatic wage indexation* mechanism amplifies the wage-price spiral.

Using the open economy New Keynesian macromodel BEMGIE, where energy prices affect both directly and indirectly the consumption prices via the energy expenditures and the marginal costs of non-energy firms, we disentangle the respective macroeconomic consequences of each of these Belgian specificities to assess their respective role on inflation and competitiveness by a counterfactual analysis.

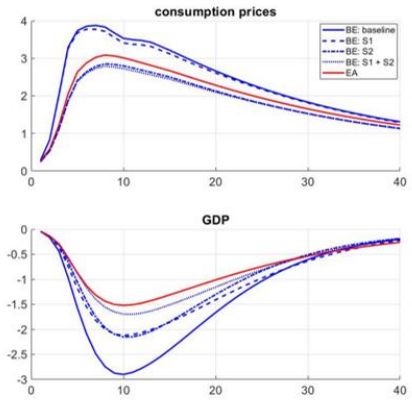
We conclude that both characteristics weigh almost equally on economic activity when taken separately, though through different channels.

- the stronger transmission of wholesale energy prices to consumers harms the households purchasing power and domestic demand;
- automatic indexation is detrimental for the firms' competitiveness on both domestic and foreign markets.

Furthermore, they reinforce each other through second round effects when taken together, as displayed on this very last Figure. Any action to attenuate one or the other of the two identified structural drawbacks would be highly welcome at the start of a new era of potentially high and volatile energy prices. Finally, we draw the attention to the fact that we have been quite conservative in our assumption regarding the transmission of energy prices to producers. If ever the transmission of wholesale energy prices to energy prices for the producers of non-energy goods happened to be stronger in Belgium compared to trading economies, as observed for consumers energy prices, this

could potentially generate a competitiveness issue equivalent to that the one related to the wage indexation.

Figure 6 - Combining counterfactual simulations
(% deviation from steady-state for selected macro-variables)



Note: the simulation starts from 2021-Q1 and the time unit on the horizontal axis is a quarter.