INTERNATIONAL JOURNAL OF POLITICAL ECONOMY
2024, VOL. 53, NO. 4, 364–408
https://doi.org/10.1080/08911916.2024.2412977

Saving to Build Wealth? An Empirical Analysis of the High (and Increasing) Current Account Surplus in Denmark

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ABSTRACT

In the 2010s, Denmark registered sustained current account surpluses of an average of 8% of gross domestic product (GDP). In trying to explain the nature and causes of this extraordinary performance, recent studies have pointed to a temporary change in the private sector's financial behavior as the main driver. However, descriptive analysis of the balance of payments shows that the improvement of the current account in the 2010s has been driven by three main elements: (i) the increase in real net exports, (ii) the increase in terms of trade, and (iii) the improvement in the income account. This article explores how the current account balance and the net lending of the Danish private sector would have evolved under alternative scenarios for these three elements. This is done through an empirical quarterly structural macroeconomic model for the period 2005–20, which we use to make counterfactual analyses. We find that, although part of the increase in the current account is due to an increase in domestic savings, as recent studies suggest, the effect of factors specifically related to the external sector has also been significant. Hence, the findings of this article suggest that the high current account surplus of Denmark is more a structural phenomenon than a temporary one, as official reports have been claiming thus far.

KEYWORDS

Current account; Denmark; stock-flow consistent models

JEL CLASSIFICATIONS

E17; E66; F47

Introduction

Since the global financial crisis (GFC), Denmark has registered an "extraordinarily" high level of current account surpluses (Danmarks Nationalbank 2017), which has increased the national as well as the international focus on both the nature, causes, and the sustainability of this surplus (Danmarks Nationalbank 2017, 2019; IMF 2022, Statistics Denmark 2018).

Recent studies have pointed to a temporary change in the private sector's financial behavior as the main driver (IMF 2022; Danmarks Nationalbank 2017, 2019; Ministry of Business 2018). This behavioral shift has been decomposed into temporary and permanent components. The temporary is related to the consolidation among households and firms after the financial crisis due to the large accumulation of debt prior to the crisis. The permanent component is related to a wish among households to smooth out consumption over time by saving for retirement, which can have a strong effect in the context of the aging population in Denmark.

However, the large current account surpluses have not always been a feature of the Danish economy. Since the 1960s Denmark has suffered hard from internal and external imbalances (AE 2023).

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A combination of high growth in the golden years with budget deficits (to finance the Danish welfare state) created the foundations for persistent current account deficits, as well as an increase in both public debt and foreign debt. Since the 1970s and 1980s were decades with increasing interest rates, the debt burden on the public and the external debt increased strongly leading to large current account deficits partly explained by the deficit in the income account. In these years, economic policy in Denmark was strongly constrained by the current account deficit (Nationalbanken 2003; Statistics Denmark 2013). In the late 1980s several political reforms together with the increased production and export of oil and gas from the North Sea, as well as the development of specific industries (pharmaceuticals, maritime shipping, and energy industries), contributed to the increase in exports. In 1990, the current account turned into a surplus for the first time in decades, which except for one year, has been the situation for the Danish economy ever since.

The long period of current account surpluses has transformed Denmark into a net creditor country. The net wealth with respect to the rest of the world has increased strongly since 2010, due to the high current account surplus and the high capital gains on the financial assets. The higher net wealth position created, in turn, an increase in the income from capital to the private sector of the Danish economy, which further increased the current account surplus, also coinciding with the high level of private sector's saving.

The existing studies addressing the increase in the Danish current account balance (Danmarks Nationalbank 2017, 2019) consider a one-way causality from the private sector's saving decisions to the current account, thereby neglecting the possibility of causality going the other way around or, as is most likely, both ways. Furthermore, existing studies also seem to have overlooked the fact that higher savings in the present have positive dynamic implications on the current account through property income, such as interest earnings, which have also made a significant contribution to the improvement of the current account in the 2010s.

The aim of this article is therefore to contribute to the existing analyses, by including further explanations to the high level of current account surplus. A descriptive analysis shows that three main elements have driven the improvement of the current account since 2010: (i) the increase in real net exports, (ii) the increase in the terms of trade, and (iii) the improvement in the income account. This article explores how the current account balance and the net lending of the Danish private sector would have evolved under alternative scenarios for the three sources that, according to the descriptive analysis, explain their improvement in the 2010s. To do this, we use an empirical quarterly structural macroeconomic model for the period 2005–20 to make counterfactual analyses. The methodological approach consists of analyzing what would have been the performance of the current account when factors unrelated to the private sector's saving decisions, such as export competitiveness or the terms of trade, change. We find that even if part of the increase in the current account is due to an increase in domestic savings, the effect of factors specifically related to the external sector has also been significant. Besides shedding light on the nature of Denmark's high current account surplus, the article is useful to show the strengths of the consistent approach to analyzing macroeconomic problems from a dynamic and holistic perspective where multiple transmission channels interact.

The structure of the article is as follows. In "Current Account Balances—National Accounting," we present the different measures of the current account balances together with a literature review. "Current Account Imbalances in Denmark—An Overview" consists of a presentation of the current account for Denmark, focusing on the period 2005–20. In "Methodology: An Empirical Model for Denmark," we show the main behavioral equations (those that comprise the main transmission mechanisms) of the model used in the simulations. "Results and Analysis" presents the analysis together as a discussion of the results. "Conclusions" concludes the paper.

Current Account Balances—National Accounting

Before diving into our research question, it is useful to review how the current account is determined, both from an accounting and theoretical perspective. This will provide a framework for the discussion presented in the next sections.

Following the system of national accounts, the current account balance can be expressed in three alternative ways: i) as the sum of the trade balance of goods and services plus net primary income (interest and dividends) and net secondary income (current transfers, like remittances or foreign aid); ii) as the difference between national (both public and private) savings and investment; and iii) as the change in the net international investment position, excluded from the revaluation effects arising from capital gains/losses.

The (theoretical) consistency of the system of national accounts ensures that these three definitions are equivalent. Starting from the first definition, which is also the most widely used, the current account is written as:

$$CA = X - M + NIA \tag{1}$$

where X is total exports, M is total imports and NIA is the net primary and secondary income received from abroad. Conversely, GDP is defined from the demand side as:

$$GDP = C_P + I_P + I_G + C_G + X - M \tag{2}$$

where C_P is private consumption, I_P is private investment, I_G is public investment, and C_G is public consumption. If public investment and consumption are aggregated into a variable representing total public expenditures on final goods and services (which we call G), the equation can be written as:

$$GDP = C_P + I_P + G + X - M \tag{3}$$

This identity presents income (GDP) as defined by the goods and services accounts, which in turn is equal to the total value added derived from the production account. However, the income supporting the demand components presented on the right-hand side of the identity can stem from sources other than production, like the income accounts presented in the previous section. By taking net income and net transfers from abroad into account, the gross national income (GNI) can be expressed as:

$$GNI = GDP + NIA = C_P + I_P + G + X - M + NIA \tag{4}$$

In addition to the primary and secondary income transactions with the rest of the world, the domestic public and private sectors engage in several interactions such as taxes, social benefits, interest payments, and so forth. Aggregating all these transactions into a single variable NT expressing the net tax payments from private to the public sector net of transfers and subtracting it from both sides of the GNI identity, we obtain the three-sector balance or the three-gap model (where private saving S_P is equal to private disposable income, $GNI - NT$, minus private consumption C_P)

$$(S_P - I_P) + (NT - G) + (M - X - NIA) = 0 \tag{5}$$

While the first and second brackets express the private and public sectors' financial balances or net lending, respectively, the third bracket represents the net lending of the rest of the world. Recalling the first definition of the current account, it is evident that the sectoral balance of the rest of the world mirrors the current account. Combining both expressions, we obtain the second definition of the current account, where it is equal to the sum of the domestic sectors' saving-investment gaps:

$$CA = (S_P - I_P) + (NT - G) \tag{6}$$

Stock-flow consistency implies that sectors' net lending plus the capital gains (CG) match the changes in their net worth. Denoting W as the net worth of each sector, accounting consistency requires that $\Delta W_P = S_P - I_P$, $\Delta W_G = NT - G$. Hence, the current account can also be defined as[1]:

$$CA + CG = -\Delta W_{RoW} = \Delta NIIP \tag{7}$$

Thus, domestic financial surpluses imply that the economy is financing the rest of the world, thereby acquiring foreign assets (or, alternatively, reducing foreign liabilities). The aggregate net worth of domestic sectors with respect to the rest of the world is known as the net international investment position, $NIIP$, which consists of a wide range of financial assets. These assets, in turn, yield income flows that feed into the income account of the current account, NIA.

We have shown that the current account can be defined in three alternative ways, all of them being mutually coherent. The combination of these three definitions is useful to grasp the varying factors that can determine the sign and the value of the current account balance. However, since these definitions are derived from an accounting framework no causality can be established between the variables. In order to understand what drives the current account balance we need to look further into the literature exploring its dynamics, which we do next.

What Drives Current Account Imbalances?

Moving beyond the accounting identities, it is important to understand what drives the behavior behind current account balances. Based on the different strands of the macroeconomics literature that addressed this question we group them into three broad explanations: i) the current account as being driven by the trade balance and its structural determinants; ii) the current account as being driven by the financial account and its determinants (the global financial cycle, relative returns, cross-border financial flows regulations, etc.); and iii) the current account as being driven by the saving-investment gap. While, in the first explanation the current account is determined by inherent or direct factors, in the second and the third it is a residual of other processes in the economy that dominate over it. It is in that sense that we say that in those cases the current account is driven by indirect factors.

The explanations focusing on direct factors have fundamentally relied on analyzing the determinants of international trade flows. For instance, the elasticities approach originally focused on real exports and imports price elasticities. It was argued that provided that the Marshall-Lerner conditions are fulfilled (i.e., the sum of the price elasticities of exports and imports being larger than one) a nominal exchange rate depreciation would lead to an improvement in the trade balance and, in turn, in the current account. Therefore, if a country's trade flows are sensitive enough to relative prices, then the level of the real exchange rate could be a reason explaining the overall current account balance. In the mid-1950s there was an ongoing debate about how strong elasticities actually were—this led to the discussion between elasticities optimism and pessimism (summarized in Sohmen and Schneeweiss (1969)). However, one weakness of the analyses based on elasticities was its partial equilibrium approach. To overcome this, new models integrating not only price effects but also income (in the tradition of Harrod and Guillebaud's (1933) foreign trade multiplier) were proposed. For instance, Laursen and Metzler (1950) developed a framework where income and the current account are mutually dependent and where, in turn, relative prices play a role in the determination of exports and imports. The parameters defining both the level and the sensitivity of exports and imports to income and relative prices are given by the structural features of the economy. Thus, even if in its original presentation the elasticities approach focused on price effects, it can be broadened to include income effects.

[1]For the sake of simplicity, we keep capital gains out of the analysis. If these were included, they should enter subtracting from both $-\Delta W_{RoW}$ and $= \Delta NIIP$.

The importance of (income) elasticities gained even more relevance when the balance of payments constrained growth literature emerged (Thirlwall 1979). According to this theory a country's long-term economic growth rate is constrained by its balance of payments equilibrium, which in its simplest form is given by the ratio of the growth of exports to the income elasticity of demand for imports. In essence, if a country wishes to grow faster without running into balance of payments problems, it must either increase its export growth or reduce the income elasticity of demand for imports. More sophisticated versions of this theory expanding the analysis to include financial aspects were developed by Thirlwall and Hussain (1982), Moreno-Brid (1998), Barbosa-Filho (2001), and McCombie and Thirlwall (2004).

Regarding the explanation of the current account as being driven by the savings-investment gap, it takes the accounting identity derived in the previous subsection as a starting point. According to this approach, the order of causation runs from the domestic sectors' net lending to the current account, which is only a residual. The focus of the analysis is, thus, the determinants of saving and investment in the private sector as well as the income and expenditure decisions of the public sector. Within the saving-investment approach the Twin Deficits Hypothesis has been investigated extensively (Salvatore (2006), Kim and Roubini (2008), and Giavazzi and Spaventa (2011)). This hypothesis states a clear link between current account deficits and negative net lending in the public sector. Underlying this relationship is the assumption of fully employed domestic resources and relative price adjustments. Therefore, stimulating domestic demand by public spending will translate directly into a decline in the current account balance since the additional income in the private sector will boost consumption and thereby imports—thus driving a simultaneous "twin deficit" in public balance and the current account. Another way of looking into this hypothesis is the so-called "New Cambridge" approach (Godley and Cripps 1983), which claims that since the private sector net lending (as a percentage of nominal income) tends to be positive and rather constant over time, public net lending and the current account end up mirroring each other. However, in the New Cambridge approach there is no need for the causality to run univocally from public deficits to current account deficits.

Another theoretical foundation for the saving-investment gap approach is the intertemporal optimization framework developed by Obstfeld and Rogoff (1996), which sees current account balances as a result of intertemporal saving and consumption decisions among households and investment decisions among firms. Current account balances express the tradeoff the private sector faces when deciding how much to consume and invest in the present and the future, given the intertemporal budget constraint. If the price signals lead current consumption and investment to exceed current income, a current account deficit will result (mainly driven by a trade deficit driven by higher imports). However, the fulfillment of the transversality condition implies that eventually the country will have to run current account surpluses. As argued by Danmarks Nationalbank (2019) the aging population of a given economy (Denmark in particular) might anticipate a future current account deficit. The optimal intertemporal response to this presumption is to increase national savings, thereby improving the current account.

Income distribution is also a crucial element defining the aggregate saving of the private sector and, therefore, the current account balance. As stated in Seccareccia and Lavoie (2016), different income groups tend to have different propensities to consume. Because the propensity to consume out of wages is, in general, found to be higher than the propensity to consume out of income on capital and wealth, increases in real wages (above labor productivity, thereby leading to a higher wage share) can be associated with increases in consumption and lower saving rates. In such contexts policies favoring a more equal income distribution can lead to a worsening in the current account. As pointed out by Baccaro and Pontusson (2016) in their discussion about growth regimes, higher household consumption, either if they are financed through higher real wages or rising household debt, tends to produce current account deficits. Conversely, by limiting the growth of real wages, export-led economies tend to achieve current account surpluses

(Baccaro and Pontusson (2016) refer to the case of Germany), sometimes compensating this through a rise of indebtedness to keep private consumption as an active growth driver (here the example shown by Baccaro and Pontusson (2016) is Sweden).

The saving-investment gap approach can also be seen from the more recent perspective on balance sheet recessions (Koo 2011; Seccareccia and Lavoie 2016). A balance sheet recession occurs when there is a significant decline in the net worth of businesses and households due to falling asset prices, leading to widespread efforts to reduce debt rather than invest or spend. This type of recession is characterized by a sharp contraction in private sector demand as entities focus on repairing their balance sheets by paying down debt and accumulating savings, even when interest rates are low. Hence, the increased savings can contribute to current account surpluses (via lower consumption and imports), as observed in Japan in the 1990s.

Finally, the Post Keynesian literature (presented, for instance, in Harvey (2009) and Raza et al. (2019)), shows that the dynamics of the financial account can drive current account balances. This framework integrates some features that give the models a higher degree of realism, such as money endogeneity, the predominance of financial flows over trade flows, the role of fundamental uncertainty and the decisive role that expectations play in determining economic outcomes. Unlike previous integrated approaches that already accounted for the role of financial flows (most notably the Mundell-Fleming model), in the Post Keynesian framework there are no automatic forces leading the current account to a balanced position. Situations of persistent interest rate differentials can lead capital inflows to finance systematic current account deficits. As long as expectations do not change, this situation can extend in time with no self-stabilizing mechanism. Eventually, currency crises can restore the current account equilibrium but there is no necessary smooth transition toward a balanced current account position in the long run.

The three drivers of the current account reviewed in this section alongside the various theoretical approaches explaining their underlying behaviors are naturally all consistent with the accounting identity defining the current account as being identical to the sum of public and private net lending. What differs is the order of causation given to the financial balances of the identity and, again, the underlying behaviors determining these balances. Most likely, however, the actual current account dynamics of a country will be the result of the interaction of the three said drivers, some of them dominating over the others depending on structural and institutional features, as well as the global context. In the next section, we review both the history of Denmark's current account and some of the explanations that were given to understand the surge observed in the 2010s.

Current Account Imbalances in Denmark—An Overview

Prior to ascertaining our research question, it is useful to provide some historical background. As can be seen from Figure 1, the history of the current account in Denmark takes a turn in 1989, when it passed from a persistent deficit to a permanent surplus. Moreover, in the surplus period two phases are clearly distinguished: the first one ending around the late 2000s when the current account ranged between 0% and 4% (with an average of 2.1%), and a second one ranging until the present, where it stayed systematically above 6%, even getting closer to 10% in some periods (with an average of 7.75% for the period from 2010).

In the 1950s, the current account fluctuated around zero and economic policy was regulated such that the current account did not depart from that balanced position. According to Statistics Denmark (2013), the high regulation on capital flows that characterized this period made it difficult to finance a deficit in the international financial markets. Hence the strong political focus on keeping the current account in check. Since the 1960s the Danish economy suffered hard from internal and external imbalances largely due to the unprecedented growth process initiated in the late 1950s, which marked an average growth rate of 5.9% between 1959 and 1969 (Penn World Table, AE 2023). During this period, high growth rates coincided with investment exceeding domestic saving, also conditioned by

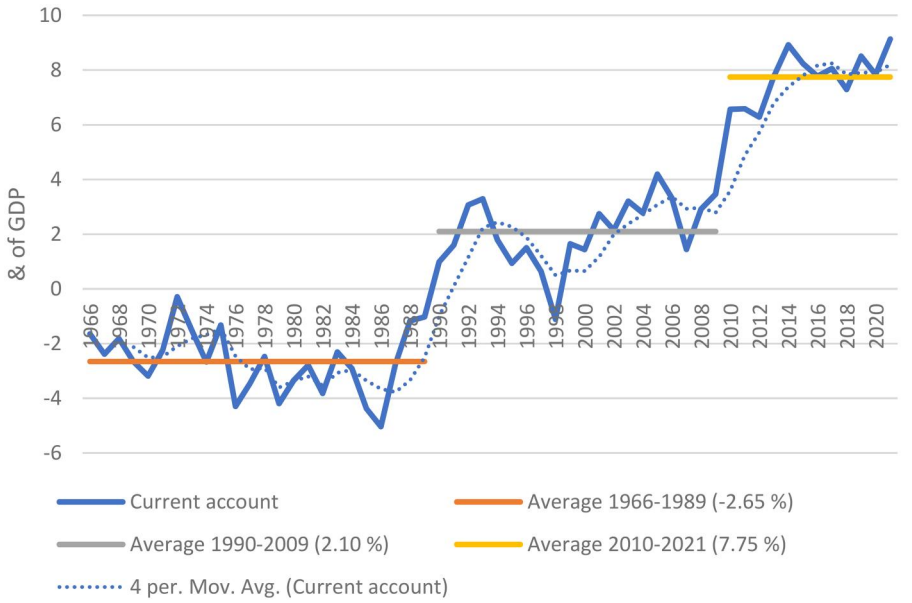

Figure 1. Current account 1966–2021 (as a percentage of gross domestic product [GDP]). Source: self-elaborated based on Statistics Denmark.

the regular budget deficits. Persistent current account deficits led to an increase in the stock of foreign debt, and since this was denominated in foreign currency, exchange rate fluctuations (mainly after the collapse of the Bretton Woods system) also increased the debt burden. With the liberalization of capital flows, financing these deficits became an easier task.

Alongside the external imbalance increasing the stock of external liabilities, the government's deficit accumulated public debt, the bulk of it held by the rest of the world. A net debtor position implied, in turn, a negative balance on the income account, which added to the current account deficit. This was particularly problematic in times of interest rate surges, which also increased the debt burden on both the public debt and the foreign debt.

The constraints the economy was subject to during the times the current account deficit lasted were widely discussed in the literature (see, e.g., Brink 1983; Godley and Zezza 1989; Danish Economic Council 1998; Statistics Denmark 2013). So important were these constraints that, in line with the balance of payments constrained growth literature, the current account deficit was phrased as the Achilles' heel of the Danish economy (Nationalbanken 2003; AE 2023).[2]

However, in the 1980s there were a series of reforms aimed at improving the competitiveness among Danish firms and thereby increasing the level of production and employment. The combination of higher income and lower levels of unemployment would help reduce the public deficit and secure repayment of the foreign debt. Finally, stabilizing inflation became an important goal, which in itself would improve international competitiveness and, thereby, the trade balance. The decision to fix the Danish Krone to the Deutsche mark in 1982 (and later to the euro[3]) aimed to

[2]Just before the turning point into a regime with current account surpluses in the late 1980s, a historically high deficit of 5.5% was seen in 1986, as a result of a boom in domestic demand (Statistics Denmark 2013) together with a high level of net interest on external debt reaching 4% of GDP during the 1980s (Danmarks Nationalbank 2013).

[3]Actually, Denmark is part of ERM II and has agreed on a central exchange rate of 746.038 kroner per 100 euro. Because of the high degree of convergence, Denmark has concluded an agreement with the ECB on a narrower ERM II fluctuation band of ±2.25% (while in ERM II the standard fluctuation band is +/− 15%). This means the krone can only fluctuate between 762.824 and 729.252 kroner per 100 euro. However, in practice, Danmarks Nationalbank stabilized the krone at a level much closer to the central rate. The exchange rate target is pursued through a combination of monetary policy and interventions in the foreign exchange market.

recreate trust in the Danish currency after many devaluations, with the destabilizing implications in terms of activity and inflation. In a fixed exchange rate regime, a low and stable inflation rate would not only strengthen the domestic sources of demand but also improve Danish firms' competitiveness, which would, in turn, lead to higher exports (and a possible substitution of imported goods and services).

In the first phase of the recovery plan, the stabilization of the inflation was handled through fiscal austerity together with strict control of wages. While the first phase focused on improving the trade balance through export-led strategies (improving competitiveness), the second phase of the plan focused more on improving the trade balance through a reduction in imports. Tax and labor market reforms were introduced with more constrained access to consumer loans to reduce private consumption (and imports), leading to increased private savings. At the same time, the development of specific industries (like agri-business, a traditional sector in Denmark, but also the pharmaceuticals, maritime shipping, and energy industries) contributed to the increase in exports. In this transition, the production of oil and gas from the North Sea played an important role, since Denmark changed its status from being an energy-importing into an energy-exporting economy.

This structural change in Denmark's exporting capacity enabled the balance of the external sector without the need to pursue contractionary policies. The effect of this structural change could be seen during the 1990s, when the current account continued to be in surplus (except in 1998) while the economy was booming, as pointed out by Danish Economic Council (1998) and Statistics Denmark (2013). The new situation with persistent current account surplus, allowed the Government to aim at eliminating the foreign debt before 2008. According to Danish Economic Council (1998) a significant proportion of the domestic saving was actually being used to repay foreign debt in the first half of the 1990s, but in the last half of the century, the saving-investment gap was reduced as a result of an increase in domestic investments, which led to a reduction in the current account surplus. Even during the economic boom prior to GFC, where the level of private consumption and investment was high, a high level of government saving, resulted in a situation, where domestic saving exceeded investment. As presented earlier, this saving-investment gap is consistent with a current account surplus.

The long period of current account surpluses has gradually transformed Denmark from a net debtor to the rest of the world to a net creditor. Net foreign assets increased rapidly in the last decade due to a combination of capital gains and the extraordinarily large current account surpluses that we investigate in this article. In the same period, both exports and imports as a share of GDP increased, thereby increasing the openness of the Danish economy.

Jump in the Current Account Surplus: Alternative Interpretations

In "Current Account Balances—National Accounting" we showed that, broadly, the current account dynamics can be explained by direct and indirect forces. The direct forces are composed of the elements inherently related to the current account, such as foreign interest rates, terms of trade, trade elasticities, competitiveness, and so forth. Indirect factors originate in the private and public sector's economic and financial decisions leading to changes in their net lending, which end up affecting the current account endogenously. Among these indirect elements are saving rates, investment decisions, and tax policies, among others.

In order to address the nature of the increased current account surplus and whether it is a temporary or a permanent phenomenon it is first necessary to break it down into its main components and identify which elements contributed the most. Figure 2 decomposes the current account into its main components, expressing both the levels (to see the share of each component in the current account balance) and the variations (to see more clearly how each element changed over time). The first point that stands out is that the improvement in the current account has

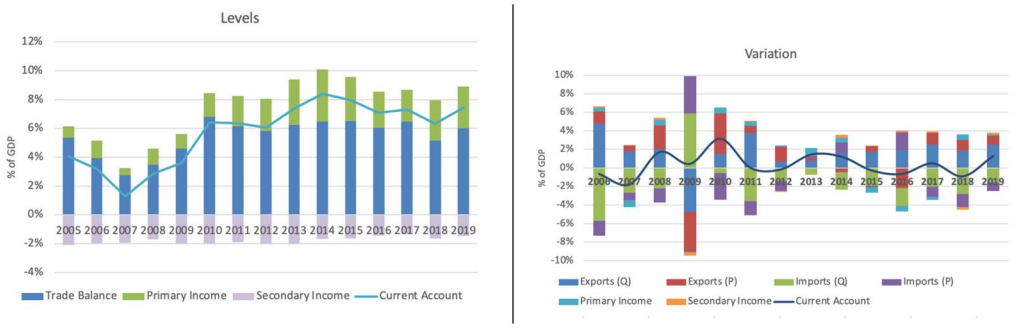

Figure 2. Current account decomposition (as a percentage of gross domestic product [GDP]). Source: self-elaborated based on Statistics Denmark.

been driven by the trade balance and primary income—comparing 2005–2008 to 2010–19 the current account balance increases from 2.9% to 7.6%, which is decomposed into a 2.7 p.p. increase in the trade balance, a 1.7 p.p. increase in primary income, and a 0.2 p.p. increase in secondary income. Moreover, a more detailed analysis of the trade balance increased surplus shows that it has been driven by both increased exported quantities and more favorable export and import prices (i.e., positive terms of trade shock). More specifically, export prices contributed positively to the increase in the current account in seven years, while contributing negatively in two. Import prices, conversely, contributed negatively in six periods, as expected, but there were two years in which they went down, thereby contributing positively to the current account. Even though changes in the exchange rate do affect both export prices and import prices (by 0.45%), the short-run effect of a change in the exchange rate on the trade balance is basically zero, as stated by the Danmarks Nationalbank (2019). In the long run however, the effect of a 1% appreciation is estimated to affect the trade balance negatively by 0.12% of GDP because the drop in exports slightly exceeds the fall in imports. Even if this result is in line with the (price) elasticities approach, the effect found is very small compared to the current account imbalance.

Several factors seem to have contributed to the increased trade balance. The first one is the positive terms of trade shock mentioned before. A second factor was pointed out by the International Monerary Fund (IMF (2022)), which finds that the bulk of the increased net exports is explained by merchanting and processing activities,[4] while the contribution of all other goods categories and services did not change significantly compared to the previous decade. As an illustrative example, while in 2005 the share of exports produced outside Denmark was less than 1% of GDP, in 2021 that figure had jumped to 5.1%, possibly reflecting the growing integration of Danish firms in global value chains (IMF 2022). In fact, Denmark has become a more open economy in the last years—while exports increased by 6.5 p.p of GDP, imports grew by 3.8 p.p. In this vein, Danmarks Nationalbank (2019) has found that since the imported content of domestic consumption and investment has not varied, the increased imports are largely related to the reexport activities, which is consistent with the IMF's findings. Regarding the discussion about the nature of the increased current account balance registered by Denmark in the 2010s, the elements described thus far seem to go in the direction of the direct factors.

There have also been some attempts to explain the increase in the primary income balance, though. By decomposing the income account into its different items, the IMF (2022) finds that the largest contributor to the primary income balance has been direct investment income, which "might be related to some large companies finding it easier to undertake FDI [foreign direct

[4]In the same report the IMF defines merchanting trade refers as "Danish firms' purchases and resales of goods abroad without processing, which may cover intercompany transactions such as sales of goods between parent and subsidiary firms". Processing trade is similar to merchanting, but goods are procured and processed abroad before being sold.

investment] and production abroad" (IMF 2022). This is also recognized by Statistics Denmark (2018), who states, that the value of export of goods "never crossing the Danish border" has doubled over the period from 2013 to 2018. If this is the case, it would be an additional direct factor underlying the improved performance of the current account—Danish companies would not only be gaining foreign markets (as reflected in the increased exports) but also establishing themselves in foreign territories, which dynamically improves the current account through profit repatriation.

Moreover, the IMF (2022) also points out that portfolio investment income flows (interest payments) have also started playing a larger role after the GFC. Part of this increase can be an endogenous result of the improvement in the current account balance—as Denmark accumulates current surpluses (be it due to extrinsic or intrinsic factors) net foreign assets increase, eventually leading to higher primary income. However, it has also been raised that underpinning this increase in primary income is the "search for yield" by Danish financial corporations, which instead of placing their liquidity in domestic financial assets seek higher returns abroad (IMF 2022). The changing behavior of the financial sector where funds are increasingly shifted from productive purposes into financial investments has been already documented, for example, by Seccareccia (2012) in the case of Canada.

Thus far, we have focused on the descriptive statistics of the current account, which allowed for the analysis of the intrinsic factors that might have played a role in its improved performance. There have also been explanations of the surge in the current account focused on extrinsic factors, that is, the dynamics of the savings-investment gaps in the private and public sectors. According to Danmarks Nationalbank (2017), the reason for these extraordinarily large surpluses of the current account should be found in the behavior of the private sector: "The temporary high current account surplus since 2010 reflects, in particular, consolidation among households and firms in the wake of the financial crisis. This means that the surplus is not a symptom of underlying problems" (Danmarks Nationalbank 2017). This claim is supported by the drop in the consumption-to-disposable income ratio which passed from being close to 1 in the decades before the GFC to taking a lower level after the crisis. In the same report, Danmarks Nationalbank states that households' increased savings could also be motivated by consumption smoothing to build up wealth for retirement.

What explains the focus on consolidation among the nonfinancial firms is that after the GFC they increased their saving, while reducing investment simultaneously. Since 2015 however, the net lending position among the firms has moved back to the level before the crisis. Financial firms, however, also increased both saving and net lending in the first years after the crisis, before returning to the pre-crisis level again. In a sense, the Central Bank follows the Balance sheet recession argument presented by, among others, Koo (2011) and Seccareccia and Lavoie (2016), where the decision to deleverage the debt burden among the households and firms was one of the main reasons for the rather slow recovery in the Danish economy after the GFC. Since the change in the savings behavior of the private sector, according to this argument, is tied up on the decision to reduce the debt, the Central bank claims the increase in the level of savings in the private sector (and thereby indirectly the surplus of the current account) not to be driven by any structural change in the Danish economy. In any case, the report is blunt when concluding that "the private sector drives the currently very large current account surplus, and secondly that this cannot be attributed to normal cyclical conditions" (Danmarks Nationalbank 2017). A central point in this argument is the fact, that while the net lending of the households has increased as a result of a lower consumption-to-disposable income ratio after the crisis, the net lending of the firms (both nonfinancial and financial) has returned to the same level as before the crisis. For this reason, we will focus on the households' savings behavior in the counterfactual analysis presented in the next section.

The emphasis of Danmarks Nationalbank on indirect factors, which defines the order of causation as going from higher private savings to increased current account surpluses is also addressed by the IMF. By breaking down the saving-investment gap of households, nonfinancial corporations and financial corporations, the IMF finds that while a higher gap is found for NFCs, no major differences are found in its size between the two decades (lying around 3.7% of GDP). It is the households and financial corporations saving-investment gaps that register an increase between the two decades. In the case of households, it passes from being negative (implying dissaving) to positive only in the mid-2010s, passively reflecting a combination of the efforts to clean their balance sheets pointed out by Danmarks Nationalbank, but also positive net pension contributions and, most importantly, lower investment in real estate (IMF 2022). Comparative analysis with similar countries has shown, however, that even if households' savings are higher than what fundamental variables would suggest, the "excess savings" are low compared to peer countries (IMF 2022). In the case of financial corporations, the IMF states that "higher savings were likely driven by deleveraging efforts and capital build-up following the GFC, which was appropriate from a financial stability perspective" (IMF 2022).

No matter whether the large private sector saving-investment gap is driven by consolidation or portfolio investment, the high level of current account surplus and the enormous net wealth position toward the remainder of the world, has dragged the current account position back in the debate, but this time as a luxury problem: should the surplus be exchanged for higher consumption or domestic investments that can provide higher growth and productivity, as asked by AE (2023). Although the net fixed capital formation of nonfinancial corporations is positive (implying that the stock of capital has been growing) it is being pointed out that the level of investment in general is too low given the existing macroeconomic conditions.

While the analyses from both IMF and Danmarks Nationalbank focus on the relationship between the behavior of the private sector and the current account, other analyses point to the relationship between the public sector and the current account. While acknowledging the consolidating behavior of the private sector as being important, Vastrup (2014), Jespersen (2017), and Byrialsen, Raza, et al. (2022) all argue, that the tightening of the fiscal policy in the last decade has reduced the domestic demand (and thereby created "excess savings"), which has contributed to the high level of the current account surplus.

Hence, there is a varying range of hypotheses explaining the nature of the increased current account surplus of Denmark. Descriptive statistics show that the bulk of this improved performance comes from the trade balance and the income account, but there is no consensus about the causes determining them. In the remainder of the article, we perform a series of counterfactual analyses aiming to shed light on the question of the nature and likely length of this phenomenon.

Methodology: An Empirical Model for Denmark

Since the aim of this article is to investigate the reasons underlying the high current account surplus in the Danish economy since GFC, we are not providing a formal presentation of the model used in this article. Therefore, the presentation will be kept at a very general level focusing on the main mechanisms relevant to understanding the result of the later analysis. The model as a whole, along with the description of the variables is presented in the Appendices.[5]

Following the sectoral national accounts, the model consists of the five institutional sectors: households, nonfinancial corporations, financial corporations, public sector, and the remiander of the world.

[5]A full description of the model, including a discussion of the main assumptions together with the creation of the databank can be found in Byrialsen, Smith, and Olesen (2022).

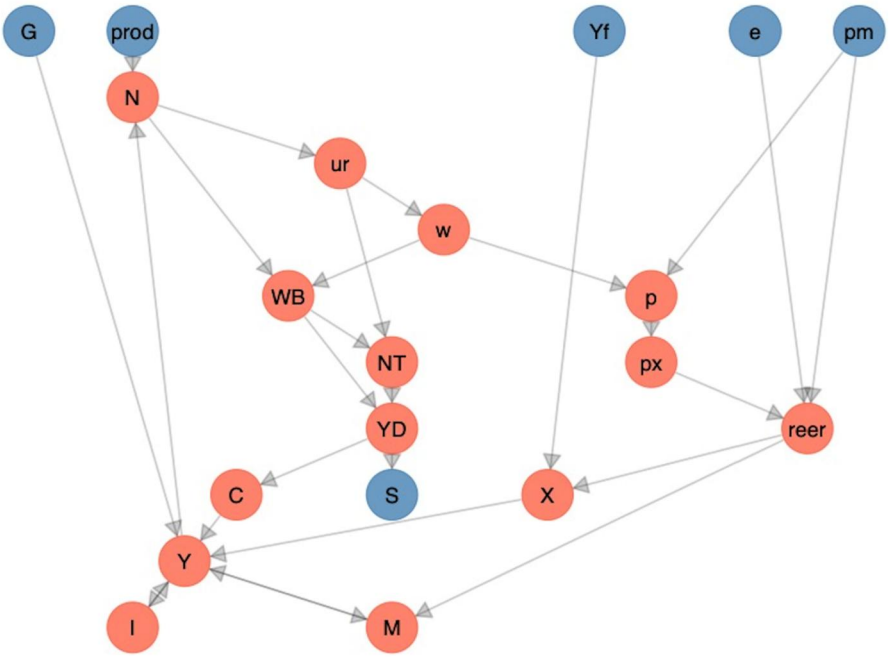

Figure 3. Main interactions captured in the model. Source: self-elaborated based on Statistics Denmark.

All domestic production is assumed to take place in the sector of nonfinancial corporations, as illustrated in the directed acyclic graph presented in Figure 3, which highlights the main transactions in the model. The blue dots represent either exogenous variables or leakages (in the case of households' savings, S), while the red dots represent endogenous cyclical variables. The total aggregate demand determines the level of production of the economy. Production, in turn, is together with (exogenous) productivity the main determinant of the level of employment, which simultaneously affects the wage-setting in the model. Nominal wages and (exogenous) import prices, in turn, determine price dynamics in the model.

Since one of the focus points of the analysis is to investigate a change in the savings-investment gap in the private sector, we briefly explain this part in more detail. The decision to invest by the nonfinancial corporations is in line with Keynesian theory determined by the capacity utilization, Tobin's q and the profit share. Investment is financed by either retained earnings, or in the financial markets by issuing equities or demanding loans from the financial institutions.

The disposable income of the households (YD) consists of wages, distributed profits from nonfinancial corporations, Net taxes (NT) - social transfers minus taxes on income, and income on capital,[6] while their use of funds consist of consumption, investment in housing, and the net acquisition of financial assets (illustrated as savings (S) in the figure). Taxes are defined as a fixed rate of income. Both the consumption function and investment follow standard Keynesian theory, consumption depending on disposable income[7] and wealth, while investment is determined by disposable income, the house prices-to-construction price ratio and also a leverage ratio. Net lending, that is, the difference between disposable income, consumption and investment, takes the form of financial wealth.

[6]To keep the figure simple, we do not include gross operating surplus and income on capital in the figure.
[7]We split disposable income in two groups: i) wages and social transfers, and ii) income on capital and gross operating surplus on production, which allows us two different propensities to consume out of income.

Regarding the public sector, both income and expenditures depend on economic activity. Direct and indirect tax rates on production and income together with the rate of unemployment benefits are time-varying exogenous variables, and the level of activity determines the total flow of funds involved in the transactions comprising the government (for instance, given the unemployment benefit, if output goes down and unemployment goes up, then the total flow of transfers from the government to households increases). Public investment and consumption are assumed to be exogenous in this model.

Being a small open economy, and considering the research question of this article, the interaction with the remainder of the world plays a relevant role in the model. Since Denmark has a fixed exchange rate with respect to the euro, we define a fixed nominal exchange rate closure. Hence, the real exchange rate is only affected by changes in the relative prices between Denmark and the rest of the world. The export function is modeled following a standard Armington model, where exports are a function of the real exchange rate and the economic activity among the trading partners, which is determined exogenously in the model. Imports are modeled as a function of the real exchange rate and the domestic economic activity. Denmark and the rest of the world exchange financial assets as well, which are accumulated on the basis of their current account balances but can also exhibit autonomous dynamics.

Finally, the financial sector is the provider of credit to the different sectors of the economy. Since none of the explanations about the increased current account deficit in Denmark has found a relevant role in the financial sector, its role in the model is rather passive, meaning that banks' behavior in the context of financialization is not represented. Here we want to emphasize that despite the fact that we do not specifically represent financialization and its potential effects on the current account surplus in Denmark (for instance, Danish banks' increase in foreign financial investments to the detriment of domestic productive investment) we do not rule out these explanations as potential alternatives to the ones we address in this article.

Econometrics

While standard Keynesian theory provides guidance for the specification of the behavioral equations, data determines the actual determinant of the individual equations. The structural parameters are estimated using quarterly data for Denmark for the period 2005–20.[8] Based on the different explanations for the increased current account surplus in Denmark, both those more theoretically-driven and those grounded in data, we focus on the behavioral equations most directly related to international trade and households saving.

Starting with the trade balance, real exports is estimated as an error-correction model, where a short-run relationship between real export (x), real economic activity among the trading partners (y_row), global trade ($wtrade$), and the real exchange rate ($reer$) can be found. Furthermore, a long-run relationship can be found between exports, economic activity abroad, world trade, and domestic activity (y). While the relationship between exports, economic activity in the remainder of the world, global trade and the real exchange rate is usually found in the literature, including domestic GDP is less common. Following the findings of Kastrup and Kronborg (2021), who identify that "the extensive margin is the primary factor in the long run and thus explains 70% of the variation in exports after five years," we include real GDP as a proxy of the supply-side effects that explains part of the observed increase in Danish exports (see next section for more details).

$$\begin{aligned}\Delta\log(x_t) = {} & -7.93 + 1.95\Delta\log(y_{row_{t-4}}) - 0.46\Delta\log(rer) - 0.15\Delta\log(wtrade_{t-4}) - 1.24\log(x_{t-1}) \\ & + 0.5\log(y_{row_{t-1}}) - 0.07\ \log(wtrade_{t-1}) + 1.2\log(y_{t-1})\end{aligned} \tag{8}$$

[8]All the output of the econometric analysis can be seen in Appendix B.

Imports are also estimated as an error correction model, with a long-run relationship between real imports (m), domestic economic activity (m), and global trade. In the short-run a relationship between import, the real exchange rate, and domestic economic activity can be found.

$$\Delta\log(m_t) = -8.48 - 0.1\Delta\log(m_{t-1}) + 0.34\Delta\log(rer_{t-1}) + 1.64\Delta\log(y_t) - 0.54\log(m_{t-1}) + 1.12\log(y_{t-1}) + 0.13\log(wtrade_{t-1}) \quad (9)$$

Turning to the terms of trade, import prices are kept exogenous in this analysis. Export prices (at producer prices) are a function of the domestic unit labor costs and import prices (to consider the effect that part of exports are made of imported inputs). Both the long-run and short-run relationship are found relevant.

$$\Delta\ln\left(P_t^{X^{pc}}\right) = 0.08 + 0.29 * \Delta\ln\left(\frac{W_t}{a_t}\right) + 0.87 * \Delta\ln\left(P_t^M\right) + 0.17 * \Delta\ln\left(P_{t-1}^{X^{pc}}\right) - 0.52 * \ln\left(P_{t-1}^{X^{pc}}\right) + 0.24 * \ln\left(\frac{W_{t-1}}{a_{t-1}}\right) + 0.46 * \ln\left(P_{t-1}^M\right) \quad (10)$$

Finally, households saving is determined by the decision to consume. Real consumption is modeled as an error-correction model, where a long-run relationship between real consumption, real disposable income (both from wages and social transfers ($yd1$), as well as income from gross operating surplus and income from capital ($yd2$a and ($yd2$ b)) and real financial wealth is established. The short-run relationship is found between real consumption and the different types of disposable income.

$$\Delta ln(c_t) = 1.58 - 0.33 * ln(c_{t-1}) + 0.11 * ln\left(yd_{t-1}^1\right) + 0.06 * ln\left(yd_{t-1}^2\right) + 0.03 * ln\left(fnw_{t-1}\right) + 0.06 * \Delta ln\left(yd_t^1\right) + 0.06 * \Delta ln\left(yd_{t-2}^1\right) + 0.09 * \Delta ln\left(yd_t^2\right) \quad (11)$$

After this presentation of the main dynamic of the model together with the estimation result of some of the most important behavioral equations in the model, we now turn to the analysis.

Results and Analysis

In this section, we explore how the current account balance and the net lending of the Danish private sector would have evolved under alternative scenarios for the three sources that, according to the descriptive analysis and the studies presented in the previous section, explain their improvement in the 2010s. The use of counterfactual analysis is justified by the fact that if under different, less favorable, conditions for the exogenous variables the financial balances under study worsen, then it could be considered that these forces would have driven at least part of the improvement in the Danish current account.[9] Consequently, the question around the transitory or permanent nature of the increased current account balance registered in the 2010s would boil down to whether these driving forces have temporarily changed in favor of the Danish external

[9]The use of counterfactual analysis in macroeconometric models has been criticized since Robert Lucas' critique of the use of fixed parameters in behavioral equations when policies or exogenous conditions change. Actually, the pioneers of structural macroeconometric models were well-aware of these problems (Marschak 1953; Tinbergen 1956; Klein 1985). However, they also claimed that very few changes in economic policies could have the strength to modify the behavioral parameters representing agents' fundamental decisions. More recently, econometricians testing the instability of behavioral parameters to policy changes have concluded that the scope of the Lucas critique is limited (Sergi 2017). Hence, with the caution the Lucas critique requires but also considering that evidence suggesting models' parameters relative invariance to policy changes, we opt to use counterfactual analysis as a way of indirectly measuring the contribution of different elements to the improved current account surplus in Denmark.

sector, or on the other hand constitute a new state of nature that will make Denmark better off indefinitely.

Based on the evidence presented in the previous section the following three scenarios are explored:

1. A slower growth rate of the quantities exported and imported in the period 2010–19, such that the average real trade balance-to-GDP ratio stays at 5.5%, the value registered in the period 2005–2008.
2. A less favorable evolution of export prices, such that they remain constant at the level taken after recovering from the shock of the Great Financial Crisis of 2008–2009.
3. A reduction in households' saving rate in 2010–19, such that the consumption-to-disposable income ratio reaches 1, which is equal to the historical norm for the period 1995–2020.

After examining the effect of these scenarios in isolation, we test their overall impact by activating them altogether. This is relevant because feedback effects might also play out and explain part of the results obtained. For instance, under the worse external conditions that the first two scenarios imply, the private sector's net acquisition of foreign assets will be lower, thereby leading to also lower income account receipts in the subsequent periods.

Prior to presenting the scenarios, one final caveat is worth making. The counterfactual scenarios used in the analysis are just a heuristic tool—by no means should they be interpreted as a description of a likely trajectory of Danish macroeconomic variables to which the economy could eventually converge. In all cases, we introduce some variations in the scenarios to nuance the results and test for their robustness.

Weaker Performance of the Real Trade Balance

In order to examine how much the observed improvement in the Danish current account balance in the period 2010–19 might have come from a better performance of real exports, we design a scenario where instead of growing at their actual rate, both real exports and imports evolve such that the average trade balance of the decade is 5.5%, i.e., the same observed in the period 2005–2008.[10] Phrased differently, this scenario aims at testing what would have been the trajectory of the current account in 2010–19 if the performance of real international trade flows had remained unchanged compared to the one observed in 2005–2008.[11] The green lines in Figure 4 present a graphical visualization of the trajectories imposed on real exports and imports. To check the dependency of the results on the arbitrary proposed scenario, we also present two alternative situations: one where exports and imports evolve such that the average trade balance in 2010–19 is in between the actual balances registered in 2005–2008 and 2010–19 (this is represented by the orange lines in Figure 4), and another one where we simply impose that the growth rate of trade flows between ends that is half the one actually observed (this is represented by the purple lines in Figure 4, which almost overlap with the baseline simulation). In all three situations, we build the alternative trajectories of exports and imports by modifying the series' trend and keeping the cyclical behavior unaffected.

[10]To create this scenario where we impose a trade surplus equal to 5.5% of GDP, we make exports and imports exogenous. While doing this breaks any feedback effect from the evolution of their structural determinants (such as income and the real exchange rate) this is harmless to our scenario because we are aiming precisely at testing what would have been the implications of the trade balance being constant over our period of analysis.

[11]To empirically ground this scenario, we conducted breakpoint tests on both real exports and imports. For real exports, the Quandt-Andrews test suggests a breakpoint in the first quarter of 2009. When using the Chow test the results are confirmed. In the case of real imports, the Quandt-Andrews test finds a breakpoint in the second quarter of 2011, which is again ratified when using the Chow test. As a middle-ground for designing our scenarios, we chose to assume a breakpoint in the first quarter of 2010. The Chow test finds evidence of a breakpoint in this period for both real exports and imports.

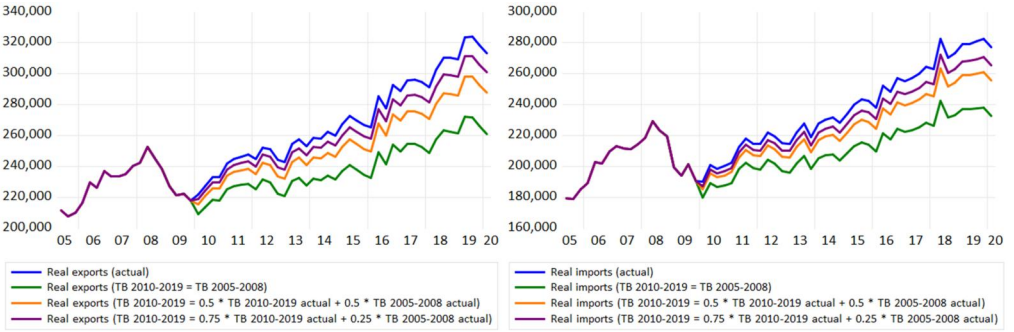

Figure 4. Real exports and imports, alternative trajectories for 2010–19. Source: self-elaborated.

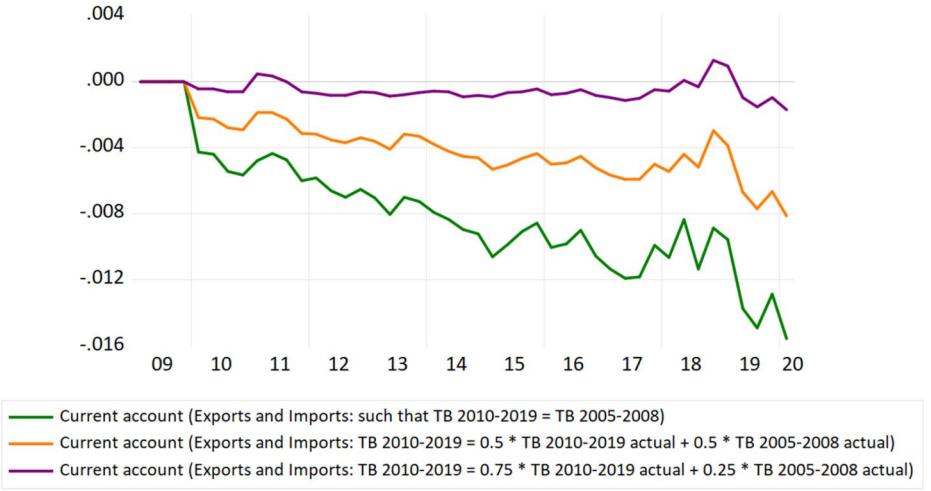

Figure 5. Current account, alternative trajectories for 2010–19. Source: self-elaborated.
Scenarios are presented as the difference to the actual current account to gross domestic product (GDP) ratio.

The effect of this less favorable scenario on the Danish economy's current account is observed in Figure 5. First, and not surprisingly, reducing the trade balance leads to a worsening of the current account. This result is straightforward, thereby suggesting that had it not been for the actual trade balance improvement observed in 2010–19, the Danish current account would have been lower than observed. Hence, there seems to be evidence supporting the hypothesis claiming that at least part of the improved current account balance is due to the performance of the external sector (or the private sector's connection to the rest of the world through exports and imports dynamics). In this first counterfactual scenario, the current account balance is on average 0.8 percentage points (of GDP) below its actual level. Second, this result seems to be robust to other scenarios where the trade balance is kept below its actual trajectory, as shown in the orange and purple lines. Depending on how closer the trajectories of exports and imports get to their actuals, the closer the current account gets to its actual trajectory as well. Trivial as these results may seem, they exhibit a source of improvement in the Danish current account balance that was not considered in previous analyses.

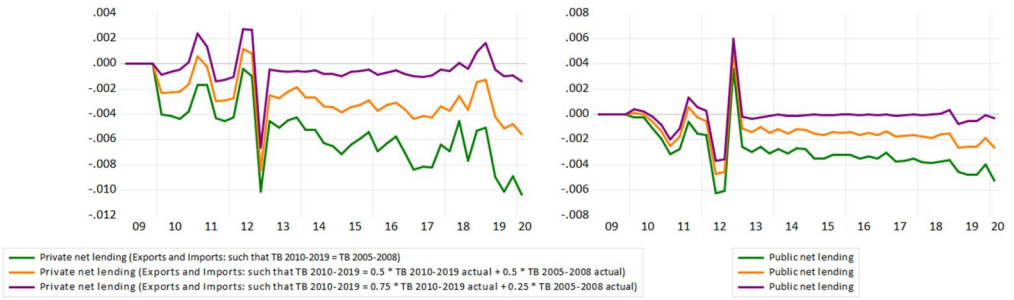

Figure 6. Public and private sector net lending, alternative trajectories for 2010–19. Source: self-elaborated.
Scenarios are presented as the difference to the actual public and private net lending to gross domestic product (GDP) ratios.

From the national accounts it is derived that the current account balance is equal to the sum of domestic private and public net lending. If there are exogenous forces leading to a lower trade balance that, in turn, results in a reduced current account balance, then domestic net lending will be inevitably affected. Figure 6 shows the impact of each of the three scenarios on both private and public net lending. First, it is worth noting that the consistency of the model ensures the fulfillment of this accounting condition. Take, for instance, the green line in Figure 6 where toward the end of the sample the current account is 1.5 percentage points below its actual value; this result is coincident with the 1.0 percentage point decrease in the private net lending plus the 0.5 percentage point decrease in the public net lending observed toward the end of the sample in Figure 6. Second, results suggest a higher reaction of the private than public net lending to an exogenous shock affecting the trade balance. The reason explaining this result is that the bulk of the income generated out of net exports is appropriated by the private sector, while the public sector benefits indirectly through the collection of both direct and indirect taxes.

Even if the observed increase in private net lending from 2005 to 2008 to the high levels registered in the 2010s can be explained to a large extent by autonomous decisions of the private sector (as has been suggested in previous studies and we examine later on) our results show that part of this improvement also came from the better performance of net exports, which registered a larger surplus than in 2005–2008. Note that since the simulations presented in this subsection assume that this better net exports performance is fully exogenous (i.e., not driven by a decision of the domestic private sector to increase savings), the causality is unambiguously going from the current account to the domestic net lending, and not the other way around as suggested in previous studies. Whether this order of causality was at least partially observed in the actual relationships between financial balances depends on whether at least part of the improvement in net exports resulted from factors other than the private sector's saving decisions (for instance, improvements in exports competitiveness, higher growth of trading partners, import substitution, etc.).

Weaker Performance of Export Prices

As shown in "Current Account Balances—National Accounting," in the 2010s export prices grew faster than in the years prior to the Great Financial Crisis (GFC). In this second scenario we examine the performance of the Danish current account if export prices would have remained constant at the value they took after the recovery from the GFC. As Figure 7 shows, this level is higher than the average of the 2005–2008 period, but lower than the average of the 2010–19 interval.[12] By making this counterfactual analysis, we assess how much the increase in export

[12]Using the Quandt-Andrews breakpoint test, we find evidence of a structural change in export prices in the first quarter of 2010. Results from the Chow test led to the same conclusion.

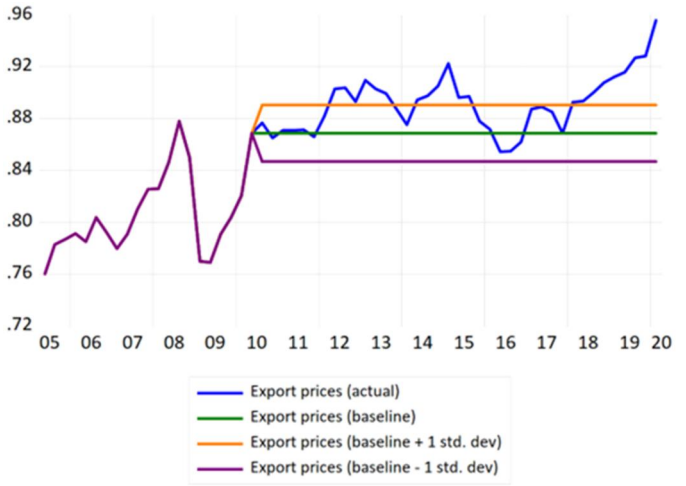

Figure 7. Export prices, alternative trajectories for 2010–19. Source: self-elaborated.

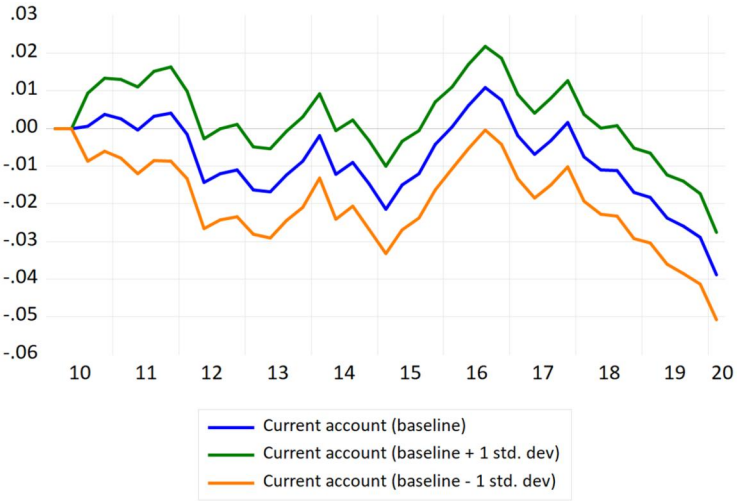

Figure 8. Current account, alternative trajectories for 2010–19. Source: self-elaborated.

prices (compared to the alternative scenarios we propose) contributed to improving the current account balance. In addition to the baseline scenario we also run two additional ones, the first one with export prices one standard deviation above the baseline, and the second one, one standard deviation below. To generate these scenarios, we make export prices exogenous, implying that there are no feedback mechanisms from their structural determinants.

Unsurprisingly, the impact of lower export price growth worsens the current account balance, as shown in Figure 8. The main driver of this result is that for every unit exported the economy earns less. While a lower export price could lead to higher price competitiveness leading to also higher exported quantities, the results presented in Equation 8 show that the real exchange rate is only relevant in the short-run and its impact is lower than the other determinants. The only periods where the current account goes above the actual values occur when the fluctuation of the actual export prices take them below the alternative trajectories. On average, the baseline scenario yields a current account 2 percentage points below the actual value. This figure is quite large, not only compared the overall increase in the current account balance (which is 8 percentage point from 2005–2008 to

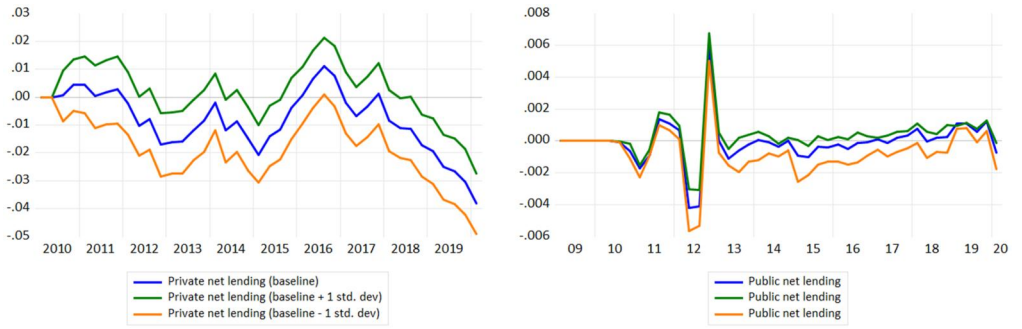

Figure 9. Public and private sector net lending, alternative trajectories for 2010–19. Source: self-elaborated.
Scenarios are presented as the difference to the actual public and private net lending to gross domestic product (GDP) ratios.

2010–19) but also to the effect that the performance of real trade flows had, as analyzed in the previous scenario. A more intermediate scenario like the one consisting of the baseline plus one standard deviation yields a current account 0.5 percentage points lower than the actual value. In any case, it seems clear that export prices (or terms of trade in more general terms) have a significant effect on the current account balance—consequently, it seems reasonable to claim that part of the increase in the current account registered in the 2010s is due to the better export prices faced by the Danish economy. Whether this is a temporary or a permanent situation will define the temporary or permanent nature of this driver of the current account improvement.

As analyzed in the previous section, the worsening in the current account described in the counterfactual scenario may have non-neutral effects on the net lending of the domestic public and private sectors. Figure 9 shows the trajectories of these two variables in the proposed scenarios. Unlike the shock on real exports and imports, which had negative implications on both public and private net lending (although being higher in the latter), when the shock affecting the current account comes from lower export prices it is fundamentally private net lending that is affected. The reason why private net lending is reduced is straightforward: lower export prices reduce nominal sales and, in turn, disposable income, which is one of the primary components of saving and net lending. But why is not the government net lending affected in this case (in addition to the small fluctuations observed in the right panel of Figure 9)? The answer is found when analyzing how the shock is transmitted into the model, and especially to taxes. While both taxes on households and firms fall when real net exports fall, only taxes on firms decrease when what falls is export prices. Considering that taxes on households explain around 90% of direct taxes this explain why only in the scenario where real trade flows are lower public net lending is affected (through lower tax collection).

However, what explains that taxes on households are not significantly affected when export prices are reduced, while they are when real net exports fall? The reason is that while the shock on net exports has direct real implications, the consequences of the price shock on the real side are indirect and less persistent. The shock affecting real net exports produces a negative impact on real output, which in turn reduces employment, households labor income and, ultimately, government revenue. Conversely, the shock affecting export prices does not affect real output to the same extent, thereby leaving employment, labor income and income taxes on households relatively unaffected. What is affected is the nominal value of firms' sales to the rest of the world, which are impacted negatively. This, in turn, reduces firms' profits and income taxes paid to the government. But since this explains less than 10% of government revenue the implication for government finances ends up being minor compared to the ones found in the previous scenario.

As concluded from the first scenario, this second counterfactual analysis shows that the improvement in the current account balance of Denmark in the 2010s was driven by sources originating beyond the private sector's financial decisions. The two isolated baseline scenarios

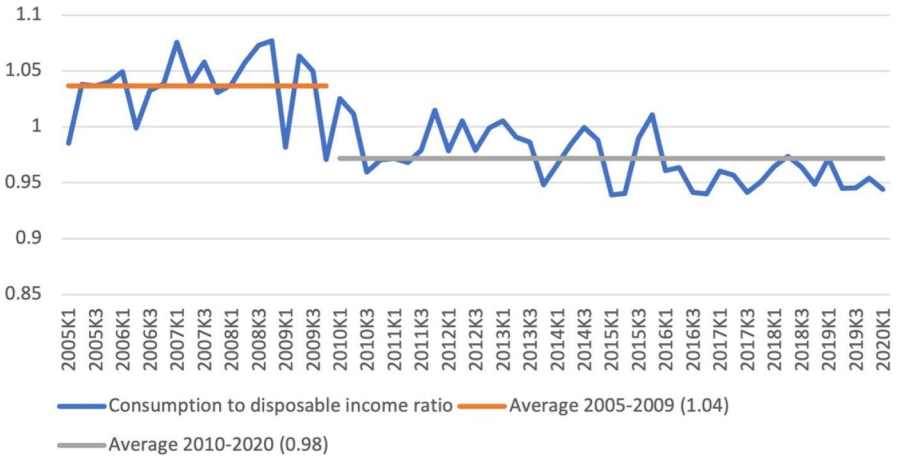

Figure 10. Consumption to disposable income ratio 2005–20. Source: self-elaborated.

analyzed thus far showed that on average 3.5 percentage points of the improvement of the current account registered in 2010–19 can be attributed to sources specific to the trade balance; in which case, the order of causation would go from a better current account performance to a higher private net lending position. Even if the numerical value of this improvement depends on the specification of the baseline scenario (as shown in the previous figures' plotted alternative scenarios), the relevant conclusion is that since both real exports and export prices exhibited a better performance compared to the 2005–2008 period, there is a relevant share of the increased current account balance that cannot be considered an endogenous result of the private sector's financial behavior. Consequently, as long as the conditions that led real exports and export prices to be higher in 2010–19 than they were in 2005–2008 prevail, it is expected that the current account balance will also remain higher.

Lower Saving Rate among the Households

As pointed out by the Danmarks Nationalbank (2017, 2019) the extraordinarily large current account surplus since 2010 reflects consolidation after the crisis among not only households but also firms.[13] To investigate this argument, this scenario examines the effect of a lower savings rate among the households, reflected by a higher consumption-to-disposable income ratio. The average ratio for the period 1995–2020 is equal to 1, while the ratio after the crisis is significantly lower, as can be seen in Figure 10.

In order to increase the average ratio to equal 1 for the period 2005–20, we increase the autonomous component of households' consumption after 2010. To test the sensitivity of the results to the shock, we perform two additional scenarios where the size of the increase in the autonomous component is such that the consumption-to-disposable income ratio is, on average, 1.05 and 0.95.

Figure 11 shows the development in the real consumption for the three shocks can be compared to the actual development in consumption. As seen from this figure, the slow recovery in consumption after the GFC was a major reason for the sluggish recovery of the Danish economy from 2010 to 2015. Neither real consumption nor real GDP (not shown in the figure) exceeded

[13]In addition to the reduction in the savings rate of the households, we have also examined the effects of an increase in the level of investment among the firms. The effect of the increase in investment among the firms have the same effect on net lending for both the private sector as a whole, the public sector and the current account as illustrated in this scenario. We therefore take this result into account when evaluating the reasons for the high level of current account surplus, but we would not show the scenario in isolation.

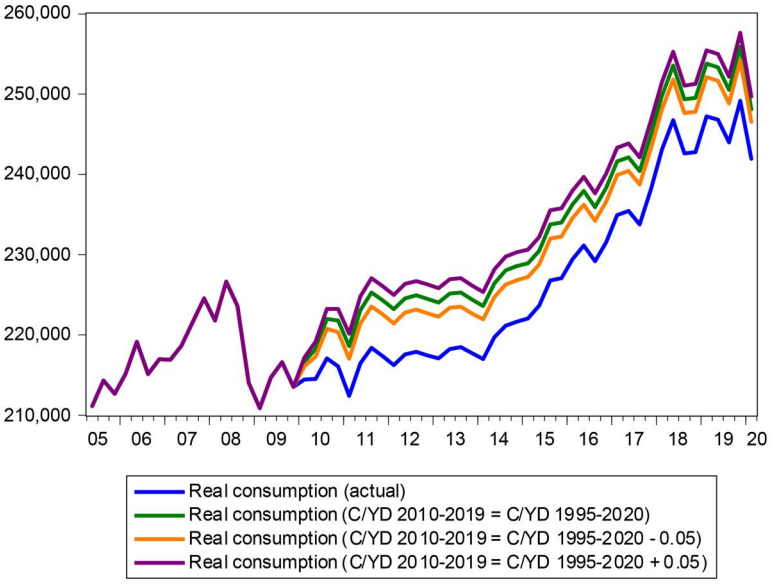

Figure 11. Real consumption, alternative trajectories for 2010–19. Source: self-elaborated.

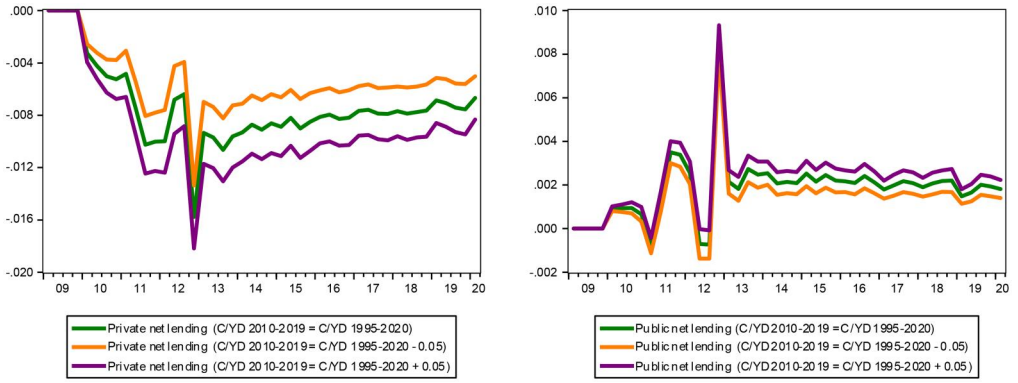

Figure 12. Public and private sector net lending, alternative trajectories for 2010–19. Source: self-elaborated.
Scenarios are presented as the difference to the actual public and private net lending to gross domestic product (GDP) ratios.

the pre-crisis level before 2015, when both variables returned to their trend. Unsurprisingly, the increase in the autonomous component of consumption results in a higher level of real private consumption, which would have led to a speedier recovery of the Danish economy after GFC.

This increase in households' consumption is expected to reduce its savings, thereby contributing to the reduction of private net lending. In addition to the direct effect of an increase in consumption on output, there are also indirect impacts set in motion through the multiplier effect. For instance, higher output leads to both higher disposable income and also higher capacity utilization, thereby increasing both households' and firms' investment. As seen in the left part of Figure 12, the overall effect on private net lending is negative in all three scenarios. The higher level of economic activity, conversely, improves the balance of the public sector due to the high level of automatic stabilizers in the Danish fiscal system—while government tax-related revenue increases as a result of higher income, public spending drops in line with the lower transfers to the private sector (for instance, as a result of lower unemployment).

Figure 12 shows the drop in the private sector net lending is larger than the increase in the public sector net lending in all three shocks. From the accounting identities presented in

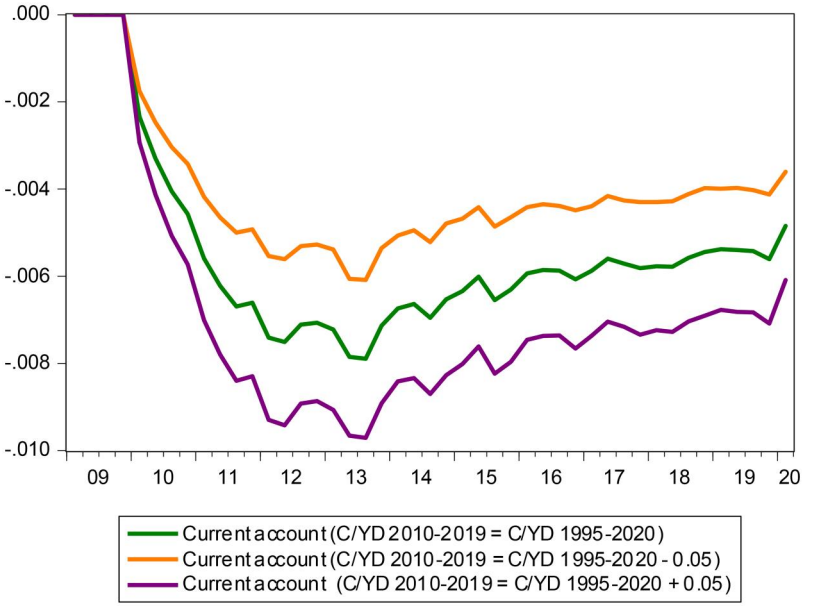

Figure 13. Current account, alternative trajectories for 2010–19. Source: self-elaborated.
Scenarios are presented as the difference to the actual current account to gross domestic product (GDP) ratio.

"Current Account Balances—National Accounting," we can thereby deduct that the effect in the current account must be equal to the difference in net lending between the private sector and the public sector. This presumption is confirmed in Figure 13, which shows that the current account is affected negatively in all three shocks.

The obtained result shows that an increase in domestic demand deteriorates the trade balance and thereby the current account, which is fully in line with standard literature and the point made by both the Danmarks Nationalbank (2017, 2019) and the IMF (2022). More relevant in this analysis is the size of the effect on the current account, where the impact on the current account is lower than 1 percentage point. This result enables us to evaluate the effect of a reduction in the households' savings rate after GFC. If the savings rate was reduced in the period 2010–19 such that the historical norm between consumption and disposable income for the period 1995–2020 is reestablished, the current account surplus would be reduced by between 0.6 and 1 percentage point after 2010.

While the analyses by Danmarks Nationalbank (2017, 2019) and IMF (2022) coincide in many aspects, there are differences in their hypotheses regarding the role played by the households. While the analysis from the Central Bank points to an increase in the savings rate after GFC as the main driver of the higher current account surplus, the analysis from the IMF puts less emphasis on this cause. An important difference between the two analyses is the point of departure regarding households' net lending. In the analysis from the IMF (2022) it is argued that the saving-investment gap of households is almost closed, in which case (the low) excess saving in this sector would be insufficient to explain the significant increase in the current account balance. In the analysis of Danmarks Nationalbank (2017, 2019), however, the focus is not made on the level of the saving-investment gap, but on the change in the level, moving from a negative saving-investment gap in the decades before GFC to a more balanced position after the crisis. From the perspective of the central bank, the change in households' behavior thereby contributed to the high current account surplus, since the "norm" in the previous decades was negative net lending and therefore it did "help" reduce the overall domestic saving-investment gap, ultimately increasing the current account surplus. The motivation behind our counterfactual analysis is, therefore,

more in line with the perspective of the Central Bank, since we consider the effect of the household continuing the behavior of the previous decades. Based on our analysis, we can argue that a reduction in the savings rate to reestablish a consumption-to-disposable income rate of 1 for the entire period up until 2020, does reduce the current account surplus, but only by 0.6–1.0 percentage points, leaving space for other main drivers of the reasons for the extraordinary high level of current account surplus the last decade.

In the analysis by Danmarks Nationalbank (2017), it is argued that financial as well as nonfinancial corporations especially for the period 2010–15 contributed to the large increase in the net lending position of the private sector. While this argument in isolation seems to be well motivated in their report, it raises another concern: The Central Bank of Denmark claims the high level of the current account to be temporary and driven by increased net lending of the private sector compared to the situation before the GFC. The net lending positions among the financial and nonfinancial corporations have, however, returned to the level before GFC, while the high level of current account surplus has remained at the "historically high" level for more than a decade now.

As identified in this analysis, explaining the reasons for the persistently high current account surplus in the Danish economy since the GFC is like a puzzle. Multiple factors of both structural and behavioral characters add pieces to the overall picture. Pointing at one factor in isolation as the main driver would leave out many important elements of the story.

Conclusions

After decades of persistent current account deficits, in the late 1980s Denmark managed to overcome this structural limitation and became a net lender to the rest of the world. In the 2010s, the current account surplus exhibited a surge that brought it close to 10% of GDP. This extraordinary situation has raised questions not only about its desirability (or utility), but also about the forces underlying these high surpluses. In a series of reports analyzing this phenomenon, Danmarks Nationalbank stated that the extraordinarily high current account surpluses would likely be temporary, as they were mostly driven by the private sector's (mostly households) rebalancing behavior after the high debt levels reached before the Global Financial Crisis. Hence, once the deleveraging process was over, the current account balance would go back to the pre-crisis levels. It was also suggested that part of the current account surplus could also be driven by households' decisions, but in this case not for deleveraging reasons by households for intertemporal optimization purposes (mostly to increase savings for retirement). While in this second explanation it is less clear that the increase in the current account surplus can be considered a temporary phenomenon, in both cases the order of causation determining the increase in the current account surpluses is assumed to go from the private sector's financial behavior to the current account, the latter being just a residual reflecting the implications of domestic economy dynamics in the rest of the world's accounts.

However, recent research from the IMF has pointed out that the main driving force of Denmark's increased current account surplus is the better performance of its international trade flows. Apart from being in line with the data, which shows that the trade balance has been the main contributor to the increase in the current account surplus, the claim made by the IMF is consistent with the new developments in Denmark's multinational corporation practices (mainly the growth in merchanting and processing activities). From this perspective, an important part of the increased current account surplus is not only explained by sources inherently related to it (intrinsic sources), like trade flows are, but it is also possible that this situation is more permanent than temporary, as it reflects a structural feature of the economy. Hence, the order of causation between the private sector's net lending and the current account would be reversed, now going from the latter to the former.

Based on these different perspectives, in this article, we addressed the question about the nature of the Danish extraordinarily high current account surplus in the 2010s using an empirical stock-flow consistent model. As has been claimed by many authors and is now gradually being

acknowledged by central banks and international organizations, the holistic analysis that this modeling approach provides combined with the rigor in the treatment of economic variables (and the relationships they represent) makes it a suitable tool to shed light on this relevant issue on which contending perspectives have emerged. Relying on three counterfactual analyses (one focusing on real trade flows, a second one on terms of trade and the third one on households' saving decisions) we try to represent the causes identified by both the Danmarks Nationalbank and the IMF to examine what would have been the behavior of the current account in the absence of those forces. Our findings suggest that even if Danmarks Nationalbank's hypotheses are plausible and could explain part of the increased current account surplus observed in the 2010s, they are not enough to explain the better performance of real exports and the terms of trade. This leads us to the conclusion that it is very likely that the higher current account surplus bears structural features that will make it more a permanent than a temporary phenomenon. This, in turn, is leaving the private sector with more room to increase its saving, which according to Danmarks Nationalbank's contentions would not be an undesired by-product of the higher current account but completely consistent with it. In the end, based on our results, we consider that to provide a final answer to the nature of the increased current account surplus in Denmark and its permanent or temporary temporality, it would be fruitful to understand the most recent developments in the international trade-related undertaken by Danish companies. As a final note, we highlight that complementary to our explanations of the increased current account in Denmark, there could be others more related to the changing behavior of firms and the financial sector in the context of financialization, which should also be explored in future research.

Acknowledgments

We are grateful to Peter Skott for his valuable comments on a previous manuscript version, which helped improve our description and analysis. All remaining errors are ours.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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Appendix A: List of Equations of the Full Model and Related Symbols

In the following system of equations, capital letters denote nominal variables and lower-case letters denote real variables.

Nonfinancial Corporations

$$Y_t = C_t + I_t + G_t + X_t - M_t \tag{A1}$$

$$y_t = c_t + i_t + g_t + x_t - m_t \tag{A2}$$

$$P_t^y = \frac{Y_t}{y_t} \tag{A3}$$

$$I_t = I_{BD_t}^N + I_{BD_t}^H + I_{BD_t}^G + I_{BD_t}^F + I_{E_t}^N + I_{E_t}^H + I_{E_t}^G + I_{E_t}^F \tag{A4}$$

$$i_t = i_{BD_t}^N + i_{BD_t}^H + i_{BD_t}^G + i_{BD_t}^F + i_{E_t}^N + i_{E_t}^H + i_{E_t}^G + i_{E_t}^F \tag{A5}$$

$$\Delta P_t^C = -0.18 * \Delta P_{t-1}^C - 0.19 * \Delta P_{t-2}^C + 0.45 * \Delta P_{t-4}^C + 0.14 * \Delta\left(\frac{wage_t}{a_t} + pm_t\right) - 0.03 * P_{t-1}^C + 0.02 * \Delta\left(\frac{wage_{t-1}}{a_{t-1}} + pm_{t-1}\right) \tag{A6}$$

$$\Delta \ln\left(P_t^{C^{pc}}\right) = 0.04 + 0.29 * \Delta \ln\left(P_t^{C^e}\right) + 0.23 * \Delta \ln\left(\frac{W_t}{a_t}\right) + 0.17 * \Delta ln\left(P_t^M\right) - 0.42 * \ln\left(P_{t-1}^{C^{pc}}\right) + 0.08 * \ln\left(P_{t-1}^M\right) + 0.25 * \ln\left(P_{t-1}^{C^e}\right) + 0.15 * \ln\left(\frac{W_{t-1}}{a_{t-1}}\right) \tag{A7}$$

$$\sigma_t = \frac{P_t^{C^{pc}}}{a_l\left(\frac{W_t}{A_t}\right) + a_m P_t^M} \tag{A8}$$

$$\Delta \ln\left(P_t^{G^{pc}}\right) = -4.06 + 0.41 * \Delta \ln\left(G_t\right) - 0.52 * \ln\left(P_{t-1}^{G^{pc}}\right) - 0.09 * \ln\left(W_{t-1}\right) + 0.37 * \ln(G_{t-1}) \tag{A9}$$

$$\Delta \ln\left(P_t^{X^{pc}}\right) = 0.08 + 0.29 * \Delta \ln\left(\frac{W_t}{a_t}\right) + 0.87 * \Delta \ln\left(P_t^M\right) + 0.17 * \Delta \ln\left(P_{t-1}^{X^{pc}}\right) - 0.52 * \ln\left(P_{t-1}^{X^{pc}}\right) + 0.24 * \ln\left(\frac{W_{t-1}}{a_{t-1}}\right) + 0.46 * \ln\left(P_{t-1}^M\right) \tag{A10}$$

$$\ln\left(P_t^{BD^{pc}}\right) = -0.14 + 0.43 * \Delta\ln\left(\frac{W_t}{a_t}\right) + 0.35 * \Delta\ln\left(P_t^M\right) - 0.24 * \ln\left(P_{t-1}^{BD^{pc}}\right) + 0.03 * \ln\left(P_{t-1}^{EQ^{pc}}\right) + 0.13 * \ln\left(P_{t-1}^M\right) + 0.09 * \Delta\ln\left(\frac{W_{t-1}}{a_{t-1}}\right) \tag{A11}$$

$$\ln\left(P_t^{EQUIP^{pc}}\right) = 0.09 + 0.46 * \Delta\ln\left(\frac{W_t}{a_t}\right) - 0.6 * \ln\left(P_{t-1}^{EQUIP^{pc}}\right) + 0.26 * \ln\left(\frac{W_{t-1}}{a_{t-1}}\right) \tag{A12}$$

$$\Delta\ln\left(P_t^{G^{pc}}\right) = -4.01 + 0.40 * \Delta\ln\left(G_t\right) - 0.51 * \ln\left(P_{t-1}^{G^{pc}}\right) - 0.09 * \ln\left(W_{t-1}\right) + 0.37 * \ln(G_{t-1}) \tag{A13}$$

$$P_t^C = P_t^{C^{pc}}(1 + \theta^{NY}) \tag{A14}$$

$$P_t^G = P_t^{G^{pc}}(1 + \theta^{NY}) \tag{A15}$$

$$P_t^X = P_t^{X^{pc}}(1 + \theta^{NY}) \tag{A16}$$

$$P_t^{BD} = P_t^{BD^{pc}}(1 + \theta^{NY}) \tag{A17}$$

$$P_t^{EQUIP} = P_t^{EQUIP^{pc}}(1 + \theta^{NY}) \tag{A18}$$

$$P_t^M = P_t^{M^{pc}}(1 + \theta^{NM}) \tag{A19}$$

$$S_t^N = Y_t - WB_t - B2_t^H - B2_t^G - B2_t^F + NIA_t^N + NII_t^N + ND_t^N - NIT_t^N - DT_t^N - OCT_t^N \tag{A20}$$

$$WB_t^N = wage_t * N_t^N \tag{A21}$$

$$T_t^{NY} = \theta^{NY} * YF_t \tag{A22}$$

$$T_t^{NM} = \theta^{NM} * M_t \tag{A23}$$

$$N_t = \frac{y_t}{a} \tag{A24}$$

$$NIT_t^N = \theta^{Y,N} * Y_t \tag{A25}$$

$$NIA_t^N = i_{t-1}^D IBA_{t-1}^N + i_{t-1}^S SEC_{t-1}^N + i_{t-1}^L L_{t-1}^N \tag{A26}$$

$$NII_t^N = i_{t-1}^I INS_{t-1}^N \tag{A27}$$

$$ND_t^N = div_t EQ_{t-1}^N \tag{A28}$$

$$DT_t^N = \theta^N * Y_t \tag{A29}$$

$$B2_t = YF_t - WB_t^N \tag{A30}$$

$$\Pi_t = \frac{B2_t}{YF_t} \tag{A31}$$

$$\Delta ln\left(\frac{i_{BD,t}^N}{bd_{t-1}^N}\right) = 0.40 - 0.49 * \Delta ln\left(\frac{i_{BD_{t-1}}^N}{bd_{t-2}^N}\right) - 0.09 * \Delta ln(\Pi_t) + 0.72 * \Delta ln\ (u_t) + 0.01 * \Delta ln\ (q_t) - 0.40 * ln\left(\frac{i_{BD_{t-1}}^N}{bd_{t-2}^N}\right) + 0.40 * \Delta ln(\Pi_{t-1}) + 1.04 * \Delta ln\ (u_{t-1}) + 0.09 * \Delta ln\ (q_{t-1}) \tag{A32}$$

$$\Delta ln\left(\frac{i^N_{E,t}}{e^N_{t-1}}\right) = -0.01 - 0.17 * \Delta ln\left(\frac{i^N_{E_{t-1}}}{e^{NFC}_{t-2}}\right) + 0.01 * \Delta ln(\Pi_t) + 0.32 * \Delta ln\ (u_t) - 0.24 * \Delta ln\ (q_t)$$
$$- 0.41 * ln\left(\frac{i^N_{E_{t-1}}}{e^N_{t-2}}\right) + 0.44 * ln(\Pi_{t-1}) + 0.49 * ln(u_{t-1}) + 0.06 * ln(q_{t-1}) \tag{A33}$$

$$u_t = y_t/_{\left(bd^N_{t-1}+e^N_{t-1}\right)} \tag{A34}$$

$$q_t = \frac{EQ^N_{s,t}}{BD^N_t + E^N_t} \tag{A35}$$

$$I^N_{BD_t} = i^N_{BD_t} * p^{BD}_t \tag{A36}$$

$$I^N_{E_t} = i^N_{E_t} * p^E_t \tag{A37}$$

$$i^N_t = i^N_{BD_t} + i^N_{E_t} \tag{A38}$$

$$I^N_t = I^N_{BD_t} + I^N_{E_t} \tag{A39}$$

$$BD^N_t = BD^N_{t-1} + I^N_{BD_t} - \delta_{BD} BD^N_{t-1} + BD^N_{t-1}\Delta p^{BD}_t \tag{A40}$$

$$E^N_t = E^N_{t-1} + I^N_{E_t} - \delta_E E^N_{t-1} + E^N_{t-1}\Delta p^E_t \tag{A41}$$

$$e^N_t = \frac{E^N_t}{p^E_t} \tag{A42}$$

$$bd^N_t = \frac{BD^N_t}{p^{BD}_t} \tag{A43}$$

$$NL^N_t = S^N_t - I^N_{BD_t} - I^N_{E_t} - I_{INV_t} - NP^N_t + KT^N_t \tag{A44}$$

$$EQTR^N_t = EQTR^N_{d,t} - EQTR^N_{s,t} \tag{A45}$$

$$EQTR^N_{s,t} = EQTR^{H,N}_{d,t} + EQTR^{F,N}_{d,t} + EQTR^{G,N}_{d,t} + EQTR^{W,N}_{d,t} \tag{A46}$$

$$EQ^N_{s,t} = EQ^{H,N}_{d,t} + EQ^{F,N}_{d,t} + EQ^{G,N}_{d,t} + EQ^{W,N}_{d,t} \tag{A47}$$

$$EQ^N_t = EQ^N_{t-1} + EQTR^N_t + EQ^N_{CG_t} \tag{A48}$$

$$IBA^N_t = IBA^N_{t-1} + IBATR^N_t + IBA^N_{CG_t} \tag{A49}$$

$$IBATR^N_t = NL^N_t + EQTR^N_t + LTR^N_t + SECTR^N_t - INSTR^N_t \tag{A50}$$

$$FNW^N_t = IBA^N_t - EQ^N_t - SEC^N_t - L^N_t + INS^N_t \tag{A51}$$

$$NW^N_t = FNW^N_t + BD^N_t + E^N_t + INV^N_t \tag{A52}$$

Households

$$YD^{H,1}_t = (1 - \theta^{H,1})[NIA^H_t + NII^H_t + ND^H_t + B^H_{2_t}] \tag{A53}$$

$$YD^{H,2}_t = (1 - \theta^{H,2})[WB^H_t + SB^H_t - SC^H_t + OCT^H_t] \tag{A54}$$

$$YD^H_t = YD^{H,1}_t + YD^{H,2}_t \tag{A55}$$

$$WB_t^H = wage \cdot N_t^H \tag{A56}$$

$$NIA_t^H = i_{t-1}^D IBA_{t-1}^H + i_{t-1}^S SEC_{t-1}^H + i_{t-1}^L L_{t-1}^H \tag{A57}$$

$$NII_t^H = i_{t-1}^I INS_{t-1}^H \tag{A58}$$

$$ND_t^H = div_t EQ_{t-1}^H \tag{A59}$$

$$NSBEN_t^H = NBEN_t^H - NPEN_t^H \tag{A60}$$

$$\Delta ln(NPEN_t^H) = 0.092 * \Delta ln(NPEN_{t-1}^H) + 0.269 * \Delta ln\left(WB_t^H\right) - 46.166 * \Delta ln\left(\frac{Ret_{t-1}}{Pop_{t-1}}\right) - 0.609 * ln\left(NPEN_{t-1}^H\right) + 0.363 * ln\left(WB_{t-1}^H\right) - 0.954 * ln\left(\frac{Ret_{t-1}}{Pop_{t-1}}\right) \tag{A61}$$

$$\Delta ln\left(NBEN_t^H\right) = -28.18 + 1.65 * \Delta ln(POP_t - LF_t) + 0.001 * \Delta(UN_t) + 0.0005 * (UN_{t-1}) - 0.77 * ln\left(NBEN_{t-1}^H\right) + 0.0004 * (UN_{t-1}) + 2.48 * ln(POP_{t-1} - LF_{t-1}) \tag{A62}$$

$$yd_t^1 = \frac{YD_t^{H,1}}{P_t^c} \tag{A63}$$

$$yd_t^2 = \frac{YD_t^{H,2}}{P_t^c} \tag{A64}$$

$$\Delta ln(c_t) = 1.58 - 0.33 * ln(c_{t-1}) + 0.11 * ln\left(yd_{t-1}^1\right) + 0.06 * ln\left(yd_{t-1}^2\right) + 0.03 * ln\left(fnw_{t-1}\right) + 0.06 * \Delta ln\left(yd_t^1\right) + 0.06 * \Delta ln\left(yd_{t-2}^1\right) + 0.09 * \Delta ln\left(yd_t^2\right) \tag{A65}$$

$$C_t = c_t \cdot P_t^c \tag{A66}$$

$$\Delta \ln(wage_t) = -1.04 + \begin{cases} 1.10 * \Delta \ln\left(P_t^{C^e}\right) + 0.52 * \Delta \ln(a_t) & if\ \ ur_{-2} < 0.0737 \\ 0.62 * \Delta \ln(a_t) & if\ \ ur_{-2} \geq 0.0737 \end{cases} + \begin{cases} -0.45 * \ln(wage_{t-1}) + 0.63 * \ln(a_{t-1}) - 4.04 * ur_{-3} + 0.65 * \ln\left(P_{t-1}^{C^e}\right) & if\ \ ur_{-2} < 0.0496 \\ -0.88 * \ln(wage_{t-1}) + 0.99 * \ln(a_{t-1}) - 0.90 * ur_{-3} + 0.25 * \ln\left(P_{t-1}^{C^e}\right) & if\ \ ur_{-2} \geq 0.0496 \end{cases} \tag{A67}$$

$$P_t^{C^e} = P_{t-4}^C(1 + \pi_{t-4}^e) \tag{A68}$$

$$\Delta\pi_t^e = \begin{cases} 0.36 * \Delta\pi_{-1} - 0.03 * \Delta\pi_{t-1}^e - 0.36 * \pi_{t-1}^e + 0.25 * \pi_{-1} & if\ \ \pi_{-1} < 0.025 \\ 0.48 * \Delta\pi_{-1} + 0.77 * \Delta\pi_{t-1}^e - 0.23 * \pi_{t-1}^e + 0.00 * \pi_{-1} & if\ \ \pi_{-1} \geq 0.025 \end{cases} \tag{A69}$$

$$\Delta ln\left(\frac{i^H_{BD_t}}{bd^H_{t-1}}\right) = 0.45 - 0.39 * \Delta ln\left(\frac{i^H_{BD_{t-1}}}{bd^H_{t-2}}\right) - 0.43 * \Delta ln\left(\frac{i^H_{BD_{t-3}}}{bd^H_{t-4}}\right) + 0.62 * \Delta ln\left(\frac{P^{BD}_{t-1}}{P^I_{t-1}}\right) + 0.65 * \Delta ln\left(\frac{P^{BD}_{t-2}}{P^I_{t-2}}\right) + 0.21 * \Delta ln\left(\frac{yd^H_{t-2}}{bd^H_{t-3}}\right) - 0.68 * \Delta ln\left(\frac{L^H_{t-1}}{BD^H_{t-2}}\right) - 0.16 * ln\left(\frac{i^H_{BD_{t-1}}}{bd^H_{t-2}}\right) + 0.53 * \left(\frac{yd^H_{t-1}}{bd^H_{t-2}}\right) - 0.64 * \left(\frac{P^{BD}_{t-1}}{P^I_{t-1}}\right) - 0.32 * \left(\frac{L^H_{t-1}}{BD^H_{t-2}}\right) \tag{A70}$$

$$\Delta ln\left(\frac{i^H_E}{e^H_{t-1}}\right) = -0.62 * \Delta ln\left(\frac{i^H_{E_{t-1}}}{e^H_{t-2}}\right) - 0.25 * \left(\frac{i^H_{E_{t-2}}}{e^H_{t-3}}\right) + 0.19 * \left(\frac{yd^H_{t-1}}{e^H_{t-2}}\right) \tag{A71}$$

$$I^H_{BD_t} = i^H_{BD_t} * p^{BD}_t \tag{A72}$$

$$I^H_{E_t} = i^H_{E_t} * p^{EQUIP}_t \tag{A73}$$

$$i^H_t = i^H_{BD_t} + i^H_{E_t} \tag{A74}$$

$$I^H_t = I^H_{BD_t} + I^H_{E_t} \tag{A75}$$

$$E^H_t = E^H_{t-1} + I^H_E - \delta_E E^H_{t-1} + E^H_{t-1}\Delta p^E_t \tag{A76}$$

$$BD^H_t = BD^H_{t-1} + I^H_{BD} - \delta_{BD} BD^H_{t-1} + BD^H_{t-1}\Delta p^{BD}_t \tag{A77}$$

$$NL^H_t = YD^{H,1}_t + YD^{H,2}_t - C_t - I^H_{BD_t} - I^H_{E_t} + KT^H_t - NP^H_t \tag{A78}$$

$$INSTR^H_t = NPEN^H_t + INSXTR^H_t \tag{A79}$$

$$INS^H_t = INS^H_{t-1} + INSTR^H_t + INS^H_{CG_t} \tag{A80}$$

$$IBATR^H_t = NL^H + LTR^H_t - EQTR^H_t - INSTR^H_t - SECTR^H_t \tag{A81}$$

$$IBA^H_t = IBA^H_{t-1} + IBATR^H_t + IBA^H_{CG_t} \tag{A82}$$

$$\Delta\left(\frac{EQ^H_t - EQ^H_{rv,t}}{EQ^H_{t-1} + SEC^H_{t-1} + IBA^H_{t-1}}\right) = 0.07 + 6.85 * \Delta ibd_{t-1} + 0.16 * \Delta\left(\frac{DIV^H_{t-1} + EQ^H_{rv_{t-1}}}{EQ^H_{t-2}}\right) - 0.10 * \left(\frac{EQ^H_{t-1} - EQ^H_{rv,t-1}}{EQ^H_{t-2} + SEC^H_{t-2} + IBA^H_{t-2}}\right) - 2.14 * ibd_{t-1} + 0.16 * \left(\frac{DIV^H_{t-2} + EQ^H_{rv_{t-2}}}{EQ^H_{t-3}}\right) \tag{A83}$$

$$EQ^{H,N}_{d,t} = \zeta_1 EQ^H_t \tag{A84}$$

$$EQ^{H,F}_{d,t} = \zeta_2 EQ^H_t \tag{A85}$$

$$EQ^{H,W}_{d,t} = EQ^H_t - EQ^{H,N}_{d,t} - EQ^{H,F}_{d,t} \tag{A86}$$

$$\Delta\left(\frac{LTR_t^H}{YD_t^H}\right) = 1.27 + 0.13 * \Delta\left(\frac{LTR_{t-2}^H}{YD_{t-2}^H}\right) - 26.26 * \Delta i_t^L + 0.26 * \Delta ln\left(\frac{i_{BD_{t-3}}^H}{yd_{t-3}^H}\right) - 0.72 * \left(\frac{LTR_{t-1}^H}{YD_{t-1}^H}\right) - 0.49 * \left(\frac{L_{t-2}^H}{YD_{t-2}^H}\right) \tag{A87}$$

$$L_t^H = L_{t-1}^H + LTR_t^H + L_{CG_t}^H \tag{A88}$$

$$FA_t^H = IBA_t^H + EQ_t^H + INS_t^H + SEC_t^H \tag{A89}$$

$$FL^H = L_t^H \tag{A90}$$

$$FNW_t^H = FA_t^H - FL_t^H \tag{A91}$$

$$W_t^H = FNW_t^H + E_t^H + BD_t^H \tag{A92}$$

$$fnw_t^H = \frac{FNW_t^H}{P_t^c} \tag{A93}$$

$$w_t^H = \frac{W_t^H}{P_t^c} \tag{A94}$$

Financial Sector

$$S_t^F = B2_t^F + NIA_t^F + NII_t^F + ND_t^F - DT_t^F + SC_t^F - SB_t^F + OCT_t^F \tag{A95}$$

$$NIA_t^F = i_{t-1}^D IBA_{t-1}^F + i_{t-1}^S SEC_{t-1}^F + i_{t-1}^L L_{t-1}^F \tag{A96}$$

$$NII_t^F = i_{t-1}^I INS_{t-1}^F \tag{A97}$$

$$ND_t^F = div_t EQ_{t-1}^F \tag{A98}$$

$$DT_t^F = \theta^F * \left[B2_t^F + NIA_t^F + NII_t^F + ND_t^F\right] \tag{A99}$$

$$E_t^F = E_{t-1}^F + I_E^F - \delta_E E_{t-1}^F + E_{t-1}^F \Delta p_t^E \tag{A100}$$

$$BD_t^F = BD_{t-1}^F + I_{BD}^F - \delta_{BD} BD_{t-1}^F + BD_{t-1}^F \Delta p_t^{BD} \tag{A101}$$

$$NL_t^F = S_t^F - KT_t^F - I_E^F - I_{BD}^F \tag{A102}$$

$$IBATR_t^F = -(IBATR_t^N + IBATR_t^G + IBATR_t^H + IBATR_t^W) \tag{A103}$$

$$IBA_t^F = IBA_{t-1}^F + IBATR_t^F + IBA_{CG_t}^F \tag{A104}$$

$$SECTR_t^{F\sim W} = SECTR_t^W \tag{A105}$$

$$SECTR_t^{F\sim dom} = SECTR_t^{F\sim W} + NL_t^F + IBATR_t^F + INSTR_t^F - LTR_t^F - EQTR_t^F \tag{A106}$$

$$SECTR_t^F = SECTR_t^{F\sim dom} + SECTR_t^{F\sim W} \tag{A107}$$

$$SEC_t^F = SEC_{t-1}^F + SECTR_t^F + SEC_{CG_t}^F \tag{A108}$$

$$L_t^F = -(L_t^N + L_t^G + L_t^H + L_t^W) \tag{A109}$$

$$LTR_t^F = L_t^F - L_{t-1}^F - L_{CG_t}^F \tag{A110}$$

$$EQTR_t^F = EQTR_{d,t}^F - EQTR_{s,t}^F \tag{A111}$$

$$EQTR_{s,t}^F = EQTR_{d,t}^{H,F} + EQTR_{d,t}^{N,F} + EQTR_{d,t}^{G,F} + EQTR_{d,t}^{W,F} \tag{A112}$$

$$EQ_{s,t}^F = EQ_{d,t}^{H,F} + EQ_{d,t}^{N,F} + EQ_{d,t}^{G,F} + EQ_{d,t}^{W,F} \tag{A113}$$

$$EQ_t^F = EQ_{t-1}^F + EQTR_t^F + EQ_{CG_t}^F \tag{A114}$$

$$INSTR_t^F = INSTR_t^H + INSTR^W \tag{A115}$$

$$INS_t^F = INS_{t-1}^F + INSTR_t^F + INS_{CGt}^F \tag{A116}$$

$$FNW_t^F = -IBA_t^F + EQ_t^F + SEC_t^{F\sim H} + L_t^F - INS_t^F \tag{A117}$$

$$W_t^F = FNW_t^F + E_t^F + BD_t^F \tag{A118}$$

Government

$$DT_t^G = DT_t^N + DT_t^H + DT_t^F + DT_t^W \tag{A119}$$

$$NIT_t^G = NIT_t^N + NIT_t^W \tag{A120}$$

$$OCT_t^G = -(OCT_t^H + OCT_t^N + OCT_t^F + OCT_t^W) \tag{A121}$$

$$SB_t^G = -(SB_t^H + SB_t^W - SB_t^F) \tag{A122}$$

$$SC_t^G = (SC_t^H - SC_t^W - SC_t^F) \tag{A123}$$

$$NIA_t^G = i_{t-1}^D IBA_{t-1}^G + i_{t-1}^S SEC_{t-1}^G + i_{t-1}^L L_{t-1}^G \tag{A124}$$

$$NII_t^G = i_{t-1}^I INS_{t-1}^G \tag{A125}$$

$$ND_t^G = div_t EQ_{t-1}^G \tag{A126}$$

$$E_t^G = E_{t-1}^G + I_E^G - \delta_E E_{t-1}^G + E_{t-1}^G \Delta p_t^E \tag{A127}$$

$$BD_t^G = BD_{t-1}^G + I_{BD}^G - \delta_{BD} BD_{t-1}^G + BD_{t-1}^G \Delta p_t^{BD} \tag{A128}$$

$$\begin{aligned} NL_t^G = {} & B2_t^G + NIA_t^G + NII_t^G + ND_t^G + NIT_t^G + DT_t^G + SC_t^G - SB_t^G - OCT_t^G - G_t - I_{E_t}^G \\ & - I_{BD_t}^G + NP_t^G - KT_t^G \end{aligned} \tag{A129}$$

$$SECTR_t^G = NL_t^G - LTR_t^G - IBATR_t^G - EQTR_t^G - INSTR_t^G \tag{A130}$$

$$SEC_t^G = SEC_{t-1}^G + SECTR_t^G + SEC_{CG_t}^G \tag{A131}$$

Rest of the world

$$\begin{aligned} \Delta\log(x_t) = {} & -7.93 + 1.95\Delta\log(y_{row_{t-4}}) - 0.46\Delta\log(rer) - 0.15\Delta\log(wtrade_{t-4}) - 1.24\log(x_{t-1}) \\ & + 0.5\log(y_{row_{t-1}}) - 0.07\ \log(wtrade_{t-1}) + 1.2\log(y_{t-1}) \end{aligned} \tag{A132}$$

$$\begin{aligned} \Delta\log(m_t) = {} & -8.48 - 0.1\Delta\log(m_{t-1}) + 0.34\Delta\log(rer_{t-1}) + 1.64\Delta\log(y_t) - 0.54\log(m_{t-1}) \\ & + 1.12\log(y_{t-1}) + 0.13\log(wtrade_{t-1}) \end{aligned} \tag{A133}$$

$$rer_t = xr_t \frac{P_t^C}{P_t^*} \tag{A134}$$

$$M_t = m_t * P_t^m \tag{A135}$$

$$X_t = x_t * P_t^x \tag{A136}$$

$$NL_t^W = M_t - X_t + NIA_t^W + NII_t^W + ND_t^W + WB_t^W - NIT_t^W - DT_t^W + SC_t^W + SB_t^W + OCT_t^W + NP_t^W - KTR_t^W \tag{A137}$$

$$CAB_t = -\left[M_t - X_t + NIA_t^W + NII_t^W + ND_t^W + WB_t^W - NIT_t^W - DT_t^W + SC_t^W + SB_t^W + OCT_t^W\right] \tag{A138}$$

$$NIA_t^W = i_{t-1}^D IBA_{t-1}^W + i_{t-1}^S SEC_{t-1}^W + i_{t-1}^L L_{t-1}^W \tag{A139}$$

$$NII_t^W = i_{t-1}^I INS_{t-1}^W \tag{A140}$$

$$ND_t^W = div_t EQ_{t-1}^W \tag{A141}$$

$$IBA_t^W = IBA_{t-1}^W + IBATR_t^W + IBA_{CG_t}^W \tag{A142}$$

$$EQ_t^W = EQ_{t-1}^W + EQTR_t^W + EQ_{CG_t}^W \tag{A143}$$

$$INS_t^W = INS_{t-1}^W + INSTR_t^W + INS_{CG_t}^W \tag{A144}$$

$$IBATR_t^W = NL_t^W - EQTR_t^W - INSTR_t^W + L_t^W - SEC_t^W \tag{A145}$$

$$FNW_t^W = IBA_t^W + EQ_t^W + INS_t^W + SEC_t^W - L_t^W \tag{A146}$$

Labor market

$$Y_t^F = Y_t - T_t^{PN} \tag{A147}$$

$$WS_t = \frac{WB_t^N}{Y_t^F} \tag{A148}$$

$$N_t = \frac{y_t}{a} \tag{A149}$$

$$N_t^N = N_t + N_t^W \tag{A150}$$

$$N_t^W = \frac{WB_t^W}{wage_t} \tag{A151}$$

$$UN_t = LF_t - N_t \tag{A152}$$

$$UR_t = \frac{UN_t}{LF_t} \tag{A153}$$

$$LF_t = part * Pop_t \tag{A154}$$

$$Ret_t = \frac{Pop_{(65+),t}}{Pop_t} \tag{A155}$$

Symbols:

N = nonfinancial corporations; F = financial corporations; G = government; H = Households; W = Rest of the World; GDP = gross domestic product.

Notation	Description
Y	Nominal GDP
C	Nominal Private Consumption
I	Nominal Gross fixed capital formation
X	Noninal Exports of goods and services
M	Nominal Imports of goods and services
P_t^y	GDP deflator
y	Real GDP
c	Real Private Consumption
i	Real Gross fixed capital formation
x	Real Exports of goods and services
m	Real Imports of goods and services
$I_{BD_t}^N$	Nonfinancial corporations Nominal Investment in Buildings and Dwellings
$I_{BD_t}^F$	Financial corporations Nominal Investment in Buildings and Dwellings
$I_{BD_t}^H$	Households Nominal Investment in Buildings and Dwellings
$I_{BD_t}^G$	Government Nominal Investment in Buildings and Dwellings
$I_{E_t}^N$	Nonfinancial corporations Nominal Investment in Equipment
$I_{E_t}^F$	Financial corporations Nominal Investment in Equipment
$I_{E_t}^H$	Households Nominal Investment in Equipment
$I_{E_t}^G$	Government Nominal Investment in Equipment
P_t^C	Price deflator on consumption
WB_t^N	Wage bill paid by firms
WB_t^H	Wage bill received by households
WB_t^W	Wage bill received by the rest of the world
N_t^N	Total Employment
N_t^H	Employment hired to the households
N_t^W	Employment hired to the rest of the world
UN_t	Unemployment
ur_t	Rate of unemployment
LF_t	Labor force
POP_t	Population
Ret_{t-1}	Retired people
$wage_t$	Wage rate
YD_t^H	Disposable income
yd_t^1	Disposable income of profit
yd_t^2	Disposable income of wages/transfers
$NPEN_t^H$	Change in pension entitlements
$NBEN_t^H$	Benefits received by the households
$S_t^N, S_t^F, S_t^H, S_t^G, S_t^W$	Savings
$B2_t$	Aggregate gross operating surplus
$B_{2_t}^N, B_{2_t}^F, B_{2_t}^H, B_{2_t}^G$	Sectoral gross operating surpluses
$NIA_t^N, NIA_t^F, NIA_t^H, NIA_t^G, NIA_t^W$	Net interest income on interest-bearing assets
$NII_t^N, NII_t^F, NII_t^H, NII_t^G, NII_t^W$	Net interest income on insurance
$ND_t^N, ND_t^F, ND_t^H, ND_t^G, ND_t^W$	Net dividends
$NIT_t^N, NIT_t^W, NIT_t^G$	Net indirect taxes
$DT_t^N, DT_t^F, DT_t^G, DT_t^H, DT_t^W$	Income taxes
$SC_t^H, SC_t^F, SC_t^G, SC_t^W$	Social contributions
$SB_t^H, SB_t^F, SB_t^G, SB_t^W$	Social benefits
$OCT_t^H, OCT_t^N, OCT_t^F, OCT_t^G, OCT_t^W$	Other current transfers
YF_t	GDP at factor costs
Π_t	Profit share
a_t	Labor productivity
u_t	Capacity utilization
q_t	Tobin's q
rer_t	Real exchange rate

(*continued*)

Continued.

Notation	Description
xr_t	Nominal exchange rate
$BD_t^N, BD_t^F, BD_t^G, BD_t^H$	Stock of buildings and dwellings
$E_t^N, E_t^F, E_t^G, E_t^H$	Stock of capital of equipment
$NL_t^N, NL_t^F, NL_t^G, NL_t^H, NL_t^W$	Net lending
CAB_t	Current account balance
$NP_t^N, NP_t^F, NP_t^G, NP_t^H, NP_t^W$	Net acquisitions of nonproduced nonfinancial assets
$KT_t^N, KT_t^F, KT_t^G, KT_t^H, KT_t^W$	Capital transfers
$EQ_t^N, EQ_t^F, EQ_t^G, EQ_t^H, EQ_t^W$	Stock of equities
$EQTR_t^N, EQTR_t^F, EQTR_t^G, EQTR_t^H, EQTR_t^{NW}$	Transaction of equities
$EQ_{CG_t}^N, EQ_{CG_t}^F, EQ_{CG_t}^G, EQ_{CG_t}^H, EQ_{CG_t}^W$	Capital gains on equities
$EQTR_{d,t}^N$	Nonfinancial corporations' demand for equities (flow)
$EQTR_{s,t}^N$	Nonfinancial corporations' supply of equities (flow)
$EQTR_{d,t}^F$	Financial corporations' demand for equities (flow)
$EQTR_{s,t}^F$	Financial corporations' supply of equities (flow)
$EQ_{d,t}^{H,N}$	Households' demand for equities issued by nonfinancial corporations
$EQ_{d,t}^{H,F}$	Households' demand for equities issued by financial corporations
$EQ_{d,t}^{H,W}$	Households' demand for equities issued by the rest of the world
$IBA_t^N, IBA_t^F, IBA_t^G, IBA_t^H, IBA_t^W$	Stock of interest-bearing assets
$IBATR_t^N, IBATR_t^F, IBAR_t^G, IBATR_t^H, IBATR_t^W$	Transaction of interest-bearing assets
$IBA_{CG_t}^N, IBA_{CG_t}^F, IBA_{CG_t}^G, IBA_{CG_t}^H, IBA_{CG_t}^W$	Capital gains on interest-bearing assets
$L_t^N, L_t^F, L_t^G, L_t^H, L_t^W$	Stock of loans
$LTR_t^N, LTR_t^F, LTR_t^G, LTR_t^H, LTR_t^W$	Transaction of loans
$L_{CG_t}^N, L_{CG_t}^F, L_{CG_t}^G, L_{CG_t}^H, L_{CG_t}^W$	Capital gains on loans
$SEC_t^N, SEC_t^F, SEC_t^G, SEC_t^H, SEC_t^W$	Stock of securities
$SECTR_t^N, SECTR_t^F, SECTR_t^G, SECTR_t^H, SECTR_t^W$	Transaction of securities
$SEC_{CG_t}^N, SEC_{CG_t}^F, SEC_{CG_t}^G, SEC_{CG_t}^H, SEC_{CG_t}^W$	Capital gains on securities
$SECTR_t^{F\sim dom}$	Domestic securities issued by Financial corporations
$SECTR_t^{F\sim W}$	Domestic securities held by the rest of the world
$INS_t^N, INS_t^F, INS_t^G, INS_t^H, INS_t^W$	Stock of insurance technical reserves
$INSTR_t^N, INSTR_t^F, INSTR_t^G, INSTR_t^H, INSTR_t^W$	Transaction of insurances
$INS_{CGt}^N, INS_{CGt}^F, INS_{CGt}^G, INS_{CGt}^H, INS_{CGt}^W$	Capital gains on insurances
$FNW_t^N, FNW_t^F, FNW_t^G, FNW_t^H, FNW_t^W$	Financial net wealth
$W_t^N, W_t^F, W_t^G, W_t^H, W_t^W$	Net wealth

Parameters

θ^{NY}, θ^{NM}	Net indirect tax rate on production and imports
$\theta^{H,1}, \theta^{H,2}$	Income tax rate levied on Households
θ^N	Income tax rate levied on nonfinancial corporations
θ^F	Income tax rate levied on financial corporations
p_t^{BD}	Price deflator of building and dwellings
p_t^E	Price deflator of Equipment
P_t^m	Price deflator of imports
P_t^x	Price deflator of exports
P_t^G	Price deflator of public consumption
P_t^*	International price index
δ_{BD}, δ_E	Depreciation rates of the capital stock
i_t^D	Interest rate on interest-bearing assets
i_t^S	Interest rate on securities
i_t^L	Interest rate on loans
i_t^I	Interest rate on insurance technical reserves
div	Dividend distribution rate
ζ_1	Households share of equities issued by nonfinancial corporations
ζ_2	Households share of equities issued by financial corporations

Appendix B: Estimation of Behavioral Equations

In this appendix all the estimated behavioral equations are presented. The model is estimated using quarterly national account data for Denmark for the period 2005q1 to 2020q1. Prior to estimating the behavioral equations, we remove seasonal fluctuation from our variables. In most cases, the structural parameters are estimated using the AutoRegressive Distributed Lag (ARDL) model following the approach proposed in Pesaran et al. (2001), also known as the ARDL bounds test. This estimation strategy is quite useful in exploring cointegrating relationships amongst variables that have different orders of integrations. We follow a general-to-specific methodology where we start with a large number of lags and then drop irrelevant lags to choose a parsimonious model. In the case of cointegration, we estimate an error-correction version of the model. In the case of no cointegration, we simply estimate a dynamic regression using stationary data. Even though our estimation strategy attempts to choose a model structure that best fits the data for a given dependent variable, our choice of variables in every equation is purely based on theory.

Nominal wages

Dependent Variable: Log-difference of the nominal wage ($\Delta\ln(w)$)

Independent variables: Expected consumer prices ($P_t^{C^e}$); real labor productivity (a_t); unemployment rate (ur)

	Variable	Coefficient	Std. Error	t-Statistic	Prob.
$ur_{t-1} < 0.074$	$\Delta\ln\left(P_t^{C^e}\right)$	1.0955	0.1953	5.6101	0.0000
	$\Delta\ln\left(a_t\right)$	0.5214	0.1348	3.8670	0.0004
	$\Delta\ln\left(a_t\right)$	0.6247	0.0472	2.0098	0.0516
$ur_{t-1} < 0.5$	$\ln\left(w_{t-1}\right)$	−0.4492	0.2331	−1.9271	0.0615
	$\ln\left(a_{t-1}\right)$	0.6276	0.2066	3.0379	0.0043
	ur_{t-3}	−4.0365	1.4032	−2.8768	0.0066
	$\ln\left(P_{t-1}^{C^e}\right)$	0.6504	0.3537	1.8389	0.0738
$ur_{t-1} \geq 0.05$	$\ln\left(w_{t-1}\right)$	−0.8826	0.1634	−5.4020	0.0000
	$\ln\left(a_{t-1}\right)$	0.9862	0.1819	5.4225	0.0000
	ur_{t-3}	−0.9001	0.2238	−4.0223	0.0003
	$\ln\left(P_{t-1}^{C^e}\right)$	0.2524	0.0881	2.8632	0.0068
	Constant	−1.0411	0.3465	−3.0045	0.0047

Method: Least Squares, n = 50(2007Q4–2020Q1); $R^2 = 0.67$; DF = 2.26.

Prices (Private consumption at market prices)

Dependent Variable: Log-difference of consumer prices measured at market prices ($\Delta\ln\left(P_t^C\right)$)

Independent variables: Import prices (P_t^M); real labor productivity (a_t); nominal wages (w_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta(P_{t-1}^C)$	−0.1784	0.1027	−1.7373	0.0686
$\Delta(P_{t-2}^C)$	−0.1922	0.1013	−1.8974	0.0637
$\Delta(P_{t-4}^C)$	0.4461	0.1035	4.3123	0.0001
$\Delta\left(\frac{wage_t}{a_t} + pm_t\right)$	0.1364	0.0419	3.2567	0.0020
P_{t-1}^C	−0.0292	0.0171	−1.7054	0.0945
$\left(\frac{wage_t}{a_t} + pm_t\right)$	0.0213	0.0117	1.8174	0.0753

Method: Least Squares, n = 55(2006Q3–2020Q1); $R^2 = 0.53$; DF = 2.31.

Prices (Private consumption at producer prices)

Dependent Variable: Log-difference of consumer prices measured at producer prices ($\Delta \ln \left(P_t^{Cpp}\right)$)

Independent variables: Import prices (P_t^M), Expected consumer prices (P_t^{Ce}); real labor productivity (a_t); nominal wages (w_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.041389	0.043599	0.949302	0.3479
$\ln \left(P_{t-1}^{Cpc}\right)$	−0.416830	0.113579	−3.669957	0.0007
$\ln \left(P_{t-1}^{M}\right)$	0.075165	0.039797	1.888723	0.0658
$\ln \left(P_{t-1}^{Ce}\right)$	0.253310	0.090056	2.812824	0.0074
$\ln \left(\frac{w_{t-1}}{a_{t-1}}\right)$	0.154070	0.077293	1.993322	0.0527
$\Delta \ln \left(P_t^{Ce}\right)$	0.287019	0.115175	2.492020	0.0167
$\Delta \ln \left(\frac{w_t}{a_t}\right)$	0.304388	0.082917	3.670993	0.0007
$\Delta ln\left(P_t^M\right)$	0.161854	0.052804	3.065180	0.0038

Method: Least Squares, n = 50(2007Q4–2020Q1), $R^2 = 0.5$, DF = 1.97

Prices (Exports at producer prices)

Dependent Variable: Log-difference of export prices measured at producer prices ($\Delta \ln \left(P_t^{xpp}\right)$)

Independent variables: Import prices (P_t^M); real labor productivity (a_t); nominal wages (w_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.075272	0.024251	3.103827	0.0031
$\Delta \ln \left(P_{t-1}^{xpp}\right)$	0.170725	0.080195	2.128867	0.0382
$\Delta \ln \left(\frac{w_t}{a_t}\right)$	0.285205	0.131649	2.166406	0.0351
$\Delta ln\left(P_t^M\right)$	0.870402	0.106767	8.152310	0.0000
$\ln \left(P_{t-1}^{xpp}\right)$	−0.517751	0.113962	−4.543196	0.0000
$\ln \left(\frac{w_{t-1}}{a_{t-1}}\right)$	0.241779	0.054805	4.411655	0.0001
$\ln \left(P_{t-1}^{M}\right)$	0.462316	0.124613	3.710030	0.0005
Dummy	−0.013346	0.008316	−1.604887	0.1148

Method: Least Squares, n = 58(2005Q4–2020Q1); $R^2 = 0.74$; DF = 2.26.

Prices (Public consumption at producer prices)

Dependent Variable: Log-difference of public consumption prices measured at producer prices $\left(\Delta \ln \left(P_t^{gpp}\right)\right)$

Independent variables: nominal public consumption (G_t); nominal wages (w_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	−4.011493	0.898838	−4.462975	0.0000
$\Delta \ln \left(G_t\right)$	0.403876	0.061650	6.551076	0.0000
$\ln \left(P_{t-1}^{gpp}\right)$	−0.509420	0.110714	−4.601244	0.0000
$\ln \left(w_{t-1}\right)$	−0.084843	0.045761	−1.854045	0.0693
$\ln \left(G_{t-1}\right)$	0.367982	0.086872	4.235900	0.0001
Dummy	0.032383	0.005333	6.072528	0.0000

Method: Least Squares, n = 59(2005Q3–2020Q1); $R^2 = 0.62$; DF = 2.14.

Prices (Investment in equipment at producer prices)

Dependent Variable: Log-difference of prices of equipment measured at producer prices $\left(\Delta\ln\left(P_t^{EQUIP^{pp}}\right)\right)$

Independent variables: real labor productivity (a_t); nominal wages (w_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.089570	0.027165	3.297250	0.0017
$\Delta\ln\left(\frac{w_t}{a_t}\right)$	0.456445	0.138146	3.304082	0.0017
$\ln\left(P_{t-1}^{EQUIP^{pp}}\right)$	−0.605008	0.125405	−4.824429	0.0000
$\ln\left(\frac{w_{t-1}}{a_{t-1}}\right)$	0.260043	0.062508	4.160158	0.0001

Method: Least Squares, n = 59(2005Q3–2020Q1); $R^2 = 0.33$; DF = 1.99.

Prices (Investment in buildings at producer prices)

Dependent Variable: Log-difference of prices of buildings and dwellings measured at producer prices $(\Delta\ln\left(P_t^{BD^{pp}}\right))$

Independent variables: real labor productivity (a_t); nominal wages (w_t); import prices (P_t^M); equity prices (P_t^{EQ})

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	−0.143978	0.045035	−3.197019	0.0024
$\Delta\ln\left(\frac{w}{a_t}\right)$	0.426650	0.131524	3.243884	0.0021
$\Delta ln\left(P_t^M\right)$	0.350206	0.090942	3.850884	0.0003
$\ln\left(P_{t-1}^{BD^{pp}}\right)$	−0.237478	0.070248	−3.380554	0.0014
$\ln\left(\frac{w_{t-1}}{a_{t-1}}\right)$	0.087368	0.059157	1.476875	0.1457
$ln\left(P_{t-1}^M\right)$	0.127840	0.061856	2.066740	0.0438
$ln\left(P_{t-1}^{EQ}\right)$	0.028566	0.006892	4.144769	0.0001

Method: Least Squares, n = 59(2005Q3–2020Q1); $R^2 = 0.49$; DF = 2.14.

Inflation expectations

Dependent Variable: Difference of expected inflation $(\Delta\pi_t^e)$

Independent variables: inflation (π_t)

	Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\pi_{t-1} < 0.025$	$\Delta\pi_{t-1}$	0.3597	0.0409	8.7890	0.0000
	$\Delta\pi_{t-1}^e$	−0.0375	0.0448	−0.8369	0.4072
	π_{t-1}	0.2510	0.0392	6.3941	0.0000
	π_{t-1}^e	−0.3629	0.0667	−5.4430	0.0000
$\pi_{t-1} \geq 0.025$	$\Delta\pi_{t-1}$	0.4808	0.0720	6.6781	0.0000
	$\Delta\pi_{t-1}^e$	0.7728	0.1296	5.9621	0.0000
	π_{t-1}	0.0009	0.0830	0.0103	0.9919
	π_{t-1}^e	−0.2293	0.1504	−1.5243	0.1346
	Constant	−0.0000	0.0003	−0.2047	0.8387

Method: Least Squares, n = 53(2007Q1–2020Q1); $R^2 = 0.92$; DF = 1.69.

Real Private Consumption

Dependent Variable: Log-difference of real private consumption ($\Delta\ln(c_t)$)

Independent variables: real disposable income from labor income (yd_t^1); real disposable income from profits and interest income (yd_t^2); real financial net wealth (fnw_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	1.5877	0.5906	2.6884	0.0100
$ln(c_{t-1})$	−0.3313	0.0903	−3.6670	0.0006
$ln(yd_{t-1}^1)$	0.1174	0.0478	2.4575	0.0178
$ln(yd_{t-1}^2)$	0.0604	0.0254	2.3768	0.0217
$ln(fnw_{t-1})$	0.0281	0.0093	3.0216	0.0041
$\Delta ln(yd_t^1)$	0.0614	0.0387	1.5868	0.1194
$\Delta ln(yd_{t-2}^1)$	0.0618	0.0310	1.9937	0.0521
$\Delta ln(yd_t^2)$	0.0908	0.0190	4.7767	0.0000
*Dummy*08Q4	−0.0361	0.0097	−3.7254	0.0005
*Dummy*18Q2	0.0217	0.0094	2.3112	0.0254
*Dummy*20Q1	−0.0267	0.0095	−2.8165	0.0071

Method: Least Squares, n = 57(2006Q1–2020Q1); $R^2 = 0.56$; DF = 2.18.

Exports

Dependent Variable: Log-difference of real exports ($\Delta\ln(x_t)$)

Independent variables: real income of trading partners (y_{row_t}); real exchange rate (rer_t); domestic output (y_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	−7.9333	1.7388	−4.5624	0.0000
$\Delta\log(y_{row_{t-4}})$	1.9554	0.4823	4.0541	0.0002
$\Delta\log(rer_t)$	−0.4626	0.2316	−1.9974	0.0516
$\Delta\log(wtrade_{t-4})$	−0.1546	0.0915	−1.6897	0.0977
$\log(x_{t-1})$	−1.2384	0.1681	−7.3684	0.0000
$\log(y_{row_{t-1}})$	0.5034	0.0723	6.9635	0.0000
$\log(wtrade_{t-1})$	0.0722	0.0370	1.9507	0.0571
$\log(y_{t-1})$	1.2028	0.2313	5.1995	0.0000

Method: Least Squares, n = 55(2006Q3–2020Q1); $R^2 = 0.53$; DF = 2.15.

Imports

Dependent Variable: Log-difference of real imports ($\Delta\ln(m_t)$)

Independent variables: real exchange rate (rer_t); domestic output (y_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	−8.4837	1.9407	−4.3715	0.0001
$\Delta\log(m_{t-1})$	−0.0992	0.0491	−2.0226	0.0484
$\Delta\log(rer_{-1})$	0.3380	0.2067	1.6352	0.1082
$\Delta\log(y_t)$	1.6399	0.2063	7.9474	0.0000
$\log(m_{t-1})$	−0.5376	0.1118	−4.8065	0.0000
$\log(y_{t-1})$	1.1125	0.2381	4.6718	0.0000
$\log(wtrade_{t-1})$	0.1240	0.0381	3.2514	0.0020

Method: Least Squares, n = 58(2005Q4–2020Q1); $R^2 = 0.58$; DF = 2.08.

Households' investment in equipment

Dependent Variable: Log-difference of households' equipment accumulation rate $\left(\Delta ln\left(\frac{i^H_{E_t}}{e^H_{t-1}}\right)\right)$, where $i^H_{E_t}$ is households real investment in equipment; bd^H_{t-1} is households real stock of equipment in the previous period

Independent variables: real total disposable income (yd^H_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.0070	0.0061	1.1487	0.2560
$\Delta ln\left(\frac{i^H_{E_{t-1}}}{e^H_{t-2}}\right)$	−0.6192	0.0972	−6.3680	0.0000
$\Delta ln\left(\frac{i^H_{E_{t-2}}}{e^H_{t-3}}\right)$	−0.2465	0.0961	−2.5649	0.0133
$\Delta ln\left(\frac{yd^H_{t-1}}{e^H_{t-2}}\right)$	0.1968	0.1515	1.2987	0.1999
Dummy	−0.1441	0.0226	−6.3722	0.0000

Method: Least Squares, n = 56(2006Q2–2020Q1); $R^2 = 0.58$; DF = 1.86.

Households' investment in buildings and dwellings

Dependent Variable: Log-difference of households' buildings and dwellings accumulation rate $\left(\Delta ln\left(\frac{i^H_{BD_t}}{bd^H_{t-1}}\right)\right)$, where $i^H_{BD_t}$ is households real investment in buildings and dwellings; bd^H_{t-1} is households real stock of buildings and dwellings in the previous period

Independent variables: prices of buildings and dwellings (P^{BD}_t); construction prices (P^I_t); real total disposable income (yd^H_t); stock of households credit (L^H_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.4565	0.3560	1.2824	0.2067
$\Delta ln\left(\frac{i^H_{BD_{t-1}}}{bd^H_{t-2}}\right)$	−0.3901	0.1196	−3.2620	0.0022
$\Delta ln\left(\frac{i^H_{BD_{t-3}}}{bd^H_{t-4}}\right)$	−0.4283	0.1068	−4.0118	0.0002
$\Delta ln\left(\frac{P^{BD}_{t-1}}{P^I_{t-1}}\right)$	0.6327	0.3481	1.8176	0.0763
$\Delta ln\left(\frac{P^{BD}_{t-2}}{P^I_{t-2}}\right)$	0.6489	0.4008	1.6192	0.1129
$\Delta ln\left(\frac{yd^H_{t-2}}{bd^H_{t-3}}\right)$	0.2089	0.1316	1.5875	0.1199
$\Delta ln\left(\frac{L^H_{t-1}}{BD^H_{t-2}}\right)$	−0.6848	0.1897	−3.6090	0.0008
$ln\left(\frac{i^H_{BD_{t-1}}}{bd^H_{t-2}}\right)$	−0.1558	0.0430	−3.6253	0.0008
$ln\left(\frac{yd^H_{t-1}}{bd^H_{t-2}}\right)$	0.5290	0.1329	3.9798	0.0003
$ln\left(\frac{P^{BD}_{t-1}}{P^I_{t-1}}\right)$	−0.6418	0.3310	−1.9388	0.0593
$ln\left(\frac{L^H_{t-1}}{BD^H_{t-2}}\right)$	−0.3197	0.1020	−3.1335	0.0031
*Dummy*06Q4	−0.0592	0.0280	−2.1156	0.0403
*Dummy*14Q4	0.0996	0.0098	10.1321	0.0000

Method: Least Squares, n = 55(2006Q3–2020Q1); $R^2 = 0.65$; DF = 2.26.

Nonfinancial Corporations' investment in buildings and dwellings

Dependent Variable: Log-difference of nonfinancial corporations' buildings and dwellings accumulation rate $\left(\Delta ln\left(\frac{i^N_{BD_t}}{bd^N_{t-1}}\right)\right)$, where $i^N_{BD_t}$ is nonfinancial corporations real investment in buildings and dwellings; bd^N_{t-1} is nonfinancial corporations real stock of buildings and dwellings in the previous period

Independent variables: profit share (Π_t); capacity utilization rate (u_t); ratio of equity liabilities to the nominal stock of capital (q_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.3971	0.2387	1.6639	0.1026
$\Delta ln\left(\frac{i^N_{BD_{t-1}}}{bd^N_{t-2}}\right)$	−0.4851	0.1010	−4.8028	0.0000
$\Delta ln(\Pi_t)$	−0.0907	0.2426	−0.3739	0.7101
$\Delta ln\ (u_t)$	0.7207	0.4041	1.7837	0.0808
$ln\left(\frac{i^N_{BD_{t-1}}}{bd^N_{t-2}}\right)$	−0.3968	0.0971	−4.0865	0.0002
$\Delta ln(\Pi_{t-1})$	0.4022	0.2036	1.9758	0.0539
$\Delta ln\ (u_{t-1})$	1.0438	0.2791	3.7401	0.0005
$\Delta ln\ (q_t)$	0.0087	0.0711	0.1219	0.9035
$\Delta ln\ (q_{t-1})$	0.0870	0.0349	2.4915	0.0162

Method: Least Squares, n = 57(2006Q1–2020Q1); $R^2 = 0.58$; DF = 2.02.

Nonfinancial Corporations' investment in equipment

Dependent Variable: Log-difference of nonfinancial corporations' equipment accumulation rate $(\Delta ln\left(\frac{i^N_{E_t}}{e^N_{t-1}}\right))$, where $i^N_{E_t}$ is nonfinancial corporations real investment in equipment; bd^H_{t-1} is nonfinancial corporations real stock of equipment in the previous period

Independent variables: profit share (Π_t); capacity utilization rate (u_t); ratio of equity liabilities to the nominal stock of capital (q_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	−0.0077	0.3207	−0.0240	0.9809
$\Delta ln\left(\frac{i^N_{E_{t-1}}}{e^{NFC}_{t-2}}\right)$	−0.1722	0.1009	−1.7072	0.0945
$\Delta ln(\Pi_t)$	0.0057	0.2802	0.0202	0.9840
$\Delta ln\ (u_t)$	0.3176	0.4701	0.6756	0.5027
$ln\left(\frac{i^N_{E_{t-1}}}{e^N_{t-2}}\right)$	−0.4100	0.0962	−4.2615	0.0001
$ln(\Pi_{t-1})$	0.4406	0.2145	2.0539	0.0457
$ln(u_{t-1})$	0.4886	0.1521	3.2127	0.0024
Dummy	0.1794	0.0294	6.1017	0.0000
Dummy	−0.1328	0.0229	−5.8097	0.0000
$\Delta ln\ (q_t)$	−0.2393	0.0817	−2.9283	0.0053
$ln(q_{t-1})$	0.0643	0.0336	1.9136	0.0619

Method: Least Squares, n = 57(2006Q1–2020Q1); $R^2 = 0.71$; DF = 2.11.

Households' investment in equities

Dependent Variable: Difference of households' portfolio equity share $\left(\Delta\left(\frac{EQ_t^H - EQ_{rv,t}^H}{EQ_{t-1}^H + SEC_{t-1}^H + IBA_{t-1}^H}\right)\right)$, where EQ_t^H is the stock of equity held at the end of period t; $EQ_{rv,t}^H$ are the revaluations registered over period t (the difference between EQ_t^H; $EQ_{rv,t}^H$ provides the end of period stock of equity netted out of revaluations, which is our proxy for the demand for equities); SEC_t^H is the stock of securities held by households at the end of period t; IBA_t^H is the stock of other interest-bearing assets held by households at the end of period t

Independent variables: interest rate earned on securities and other interest-bearing assets (ibd_t); profit rate earned on equity holdings $\left(\frac{DIV_{t-1}^H + EQ_{rv_{t-1}}^H}{EQ_{t-2}^H}\right)$, where DIV_t^H are dividends

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.0429	0.0163	2.6198	0.0116
Δibd_{t-1}	5.2096	1.8186	2.8631	0.0061
$\Delta\left(\frac{DIV_{t-1}^H + EQ_{rv_{t-1}}^H}{EQ_{t-2}^H}\right)$	0.1937	0.0177	10.932	0.0000
$\left(\frac{EQ_{t-1}^H - EQ_{rv,t-1}^H}{EQ_{t-2}^H + SEC_{t-2}^H + IBA_{t-2}^H}\right)$	−0.0604	0.0230	−2.6285	0.0114
ibd_{t-1}	−1.3597	0.4837	−2.8108	0.0000
$\left(\frac{DIV_{t-2}^H + EQ_{rv_{t-2}}^H}{EQ_{t-3}^H}\right)$	0.1831	0.0222	8.2309	0.0000
Dummy	0.0381	0.0078	4.8641	0.0000

Method: Least Squares, n = 57(2006Q1–2020Q1); $R^2 = 0.70$; DF = 2.32.

Net benefits paid to Households

Dependent Variable: Log-difference of net benefits received by households ($\Delta ln\left(NBEN_t^H\right)$)

Independent variables: population (POP_t); labor force (LF_t); unemployment rate (UN_t)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	−28.1801	4.3079	−6.5414	0.0000
$\Delta ln(POP_t - LF_t)$	1.6520	0.4038	4.0911	0.0002
$\Delta(UN_t)$	0.0018	0.0002	8.2048	0.0000
$\Delta(UN_{t-1})$	0.0005	0.0002	2.0980	0.0409
$ln\left(NBEN_{t-1}^H\right)$	−0.7716	0.1193	−6.4664	0.0000
(UN_{t-1})	0.0004	0.0001	3.4996	0.0010
$ln(POP_{t-1} - LF_{t-1})$	2.4796	0.3767	6.5831	0.0000

Method: Least Squares, n = 58(2005Q4–2020Q1); $R^2 = 0.72$; DF = 1.78.

Households' demand for loans

Dependent Variable: Difference of households' demand for loans (flow) as a share of nominal disposable income $\left(\Delta\frac{LTR_t^H}{YD_t^H}\right)$

Independent variables: interest rate on loans (i_t^L), households' investment on buildings and dwellings as a share of real disposable income $\left(\left(\frac{i_{BD_t}^H}{yd_t^H}\right)\right)$; households stock of loans as a share of nominal disposable income $\left(\frac{L_t^H}{yd_t^H}\right)$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta\left(\frac{LTR^H_{t-2}}{YD^H_{t-2}}\right)$	0.1010	0.1147	0.8803	0.3831
Δi^L_t	−17.8382	10.2171	−1.7459	0.0874
$\Delta ln\left(\frac{i^H_{BD_{t-3}}}{yd^H_{t-3}}\right)$	0.1821	0.0817	2.2275	0.0307
$\left(\frac{LTR^H_{t-1}}{YD^H_{t-1}}\right)$	−0.8094	0.0641	−12.6161	0.0000
$\left(\frac{L^H_{t-2}}{YD^H_{t-2}}\right)$	−0.5257	0.0997	−5.2681	0.0000
Constant	1.3827	0.2431	5.6862	0.0000
*Dummy*07Q3Q4	0.1655	0.0339	4.8691	0.0000
Dummy11q1	−0.1980	0.0190	−10.4166	0.0000
Trend	−0.0035	0.0004	−7.8847	0.0000

Method: Least Squares, n = 56(2006Q2–2020Q1); $R^2 = 0.67$; DF = 2.14.

Pension entitlements

Dependent Variable: Log-difference of the adjustment for the change in pension entitlements ($\Delta ln\left(NPEN^H_t\right)$)

Independent variables: wage bill (WB^H_t); ratio of retirees to population $\left(\frac{Ret_t}{Pop_t}\right)$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta ln(NPEN^H_{t-1})$	0.0724	0.1028	0.7045	0.4843
$\Delta ln(WB^H_t)$	0.3036	0.7766	0.3909	0.76975
$\Delta ln\left(\frac{Ret_{t-1}}{Pop_{t-1}}\right)$	−41.6060	19.0732	−2.1813	0.0339
$ln(NPEN^H_{t-1})$	−0.7643	0.1063	−7.1890	0.0000
$ln(WB^H_{t-1})$	0.4896	0.0830	5.8964	0.0000
$ln\left(\frac{Ret_{t-1}}{Pop_{t-1}}\right)$	−0.9272	0.3341	−2.7753	0.0077
*Dummy*14Q3	−1.1062	0.2433	−4.5459	0.0000
Dummy14Q1	−0.7572	0.1757	−4.3096	0.0001

Method: Least Squares, n = 58(2005Q4–2020Q1); $R^2 = 0.37$; DF = 2.40.

Bounds test

In Table B1 we present the results of the bounds tests (Pesaran et al. 2001) we used to test for cointegration.

Table B1. Bounds test.

Dependent variable	Lower Bound	Upper Bound	F-statistic	H0
$\Delta \ln(w_t)$	3.650***	4.660***	13.29	Rejected
$\Delta \ln\left(P^{C^{pc}}_t\right)$	4.180***	5.328***	12.48	Rejected
$\Delta \ln\left(P^{x^{pc}}_t\right)$	4.610***	5.563***	6.02	Rejected
$\Delta \ln\left(P^{g^{pc}}_t\right)$	4.118***	5.200***	13.99	Rejected
$\Delta \ln\left(P^{EQUIP^{pc}}_t\right)$	5.377***	6.047***	10.06	Rejected
$\Delta \ln\left(P^{BD^{pc}}_t\right)$	4.118***	5.200***	7.19	Rejected
$\Delta\pi^e_t$	3.177*	3.653*	4.29	Rejected
$\Delta ln(c_t)$	4.118***	5.200***	6.40	Rejected
$\Delta \ln(x_t)$	3.290***	4.370***	14.75	Rejected
$\Delta \ln(m_t)$	3.650***	4.660***	15.48	Rejected

(*continued*)

Table B1. Continued.

Dependent variable	Lower Bound	Upper Bound	F-statistic	H0
$\Delta ln\left(\frac{i^H_{BD_t}}{bd^H_{t-1}}\right)$	3.543***	4.839***	10.88	Rejected
$\Delta ln\left(\frac{i^N_{BD_t}}{bd^N_{t-1}}\right)$	4.118***	5.200***	9.74	Rejected
$\Delta ln\left(\frac{i^N_{E_t}}{e^{NFC}_{t-1}}\right)$	3.543***	4.839***	5.91	Rejected
$\Delta\left(\frac{EQ^H_t - EQ^H_{rv,t}}{EQ^H_{t-1}+SEC^H_{t-1}+IBA^H_{t-1}}\right)$	4.610***	5.563***	13.34	Rejected
$\Delta\left(\frac{LTR^H_t}{YD^H_t}\right)$	5.377***	6.047***	6.39	Rejected
$\Delta ln\left(NBEN^H_t\right)$	4.610***	5.563***	15.11	Rejected
$\Delta ln(NPEN^H_t)$	2.982**	3.942**	5.06	Rejected

H0: No cointegration; Case 2: Restricted constant; No Trend, * 10%, ** 5%, *** 1%.

Normality of residuals test

In Table B2 we present the results of the normality of the residuals of the short-run equations. We use the Jarque-Bera test in all cases.

Table B2. Normality test.

Dependent variable	Method	Test	*p*-value	H0
$\Delta \ln(w_t)$	Jarque Bera	0.98	0.61	Not Rejected
$\Delta \ln\left(P^{c^{pc}}_t\right)$	Jarque Bera	2.57	0.28	Not Rejected
$\Delta \ln\left(P^{k^{pc}}_t\right)$	Jarque Bera	2.05	0.46	Not Rejected
$\Delta \ln\left(P^{g^{pc}}_t\right)$	Jarque Bera	1.80	0.41	Not Rejected
$\Delta \ln\left(P^{EQUIP^{pc}}_t\right)$	Jarque Bera	3.62	0.16	Not Rejected
$\Delta \ln\left(P^{BD^c}_t\right)$	Jarque Bera	0.81	0.67	Not Rejected
$\Delta\pi^e_t$	Jarque Bera	0.28	0.87	Not Rejected
$\Delta ln(c_t)$	Jarque Bera	1.25	0.53	Not Rejected
$\Delta \ln(x_t)$	Jarque Bera	5.06	0.08	Not Rejected*
$\Delta \ln(m_t)$	Jarque Bera	1.62	0.45	Not Rejected
$\Delta ln\left(\frac{i^H_{BD_t}}{bd^H_{t-1}}\right)$	Jarque Bera	4.09	0.13	Not Rejected
$\Delta ln\left(\frac{i^H_{E_t}}{e^H_{t-1}}\right)$	Jarque Bera	1.48	0.48	Not Rejected
$\Delta ln\left(\frac{i^N_{BD_t}}{bd^N_{t-1}}\right)$	Jarque Bera	5.04	0.08	Not Rejected*
$\Delta ln\left(\frac{i^N_{E_t}}{e^{NFC}_{t-1}}\right)$	Jarque Bera	3.14	0.21	Not Rejected
$\Delta\left(\frac{EQ^H_t - EQ^H_{rv,t}}{EQ^H_{t-1}+SEC^H_{t-1}+IBA^H_{t-1}}\right)$	Jarque Bera	1.25	0.54	Not Rejected
$\Delta\left(\frac{LTR^H_t}{YD^H_t}\right)$	Jarque Bera	1.32	0.52	Not Rejected
$\Delta ln\left(NBEN^H_t\right)$	Jarque Bera	0.03	0.99	Not Rejected
$\Delta ln(NPEN^H_t)$	Jarque Bera	1.93	0.38	Not Rejected

H0: Normality. * Not rejected at a 5% level of significance.

Homoskedasticity of residuals test

In Table B3 we present the homoskedasticity tests on the residuals of the short run equations. We use the White test in all cases, except for the ones with insufficient number of observations. In those cases, we use the Breusch-Pagan-Godfrey test (BPG). As shown in the Table, there are a few cases where the test is not passed. We tried to solve this by adding dummies in the periods where residuals exhibit a high deviation from the average. Although this solution worked, we preferred to keep the estimation with heteroskedasticity to avoid including too many parameters in the model. It is worth mentioning that in the cases where we use the equation with non-homoscedastic errors, the large variance occurs in the initial periods (not in the part of the sample where we do the simulations).

Table B3. Homoskedasticity test.

Dependent variable	Method	Test	P-value	H0
$\Delta \ln (w_t)$	White	1.49	0.16	Not Rejected
$\Delta n\left(P_t^{Cpc}\right)$	White	41.77	0.20	Not Rejected
$\Delta \ln \left(P_t^{xpc}\right)$	White	22.71	0.83	Not Rejected
$\Delta \ln \left(P_t^{gpc}\right)$	White	21.03	0.07	Not Rejected*
$\Delta \ln \left(P_t^{EQUIPpc}\right)$	White	11.70	0.26	Not Rejected
$\Delta \ln \left(P_t^{BDpc}\right)$	White	31.35	0.26	Not Rejected
$\Delta \pi_t^e$	BPG	12.39	0.05	Not Rejected*
$\Delta ln(c_t)$	BPG	14.56	0.36	Not Rejected
$\Delta \ln (x_t)$	White	14.93	0.97	Not Rejected
$\Delta \ln (m_t)$	White	32.54	0.04	Not Rejected*
$\Delta ln \left(\frac{i^H_{BD_t}}{bd^H_{t-1}}\right)$	BPG	26.13	0.29	Not Rejected
$\Delta ln\left(\frac{i^H_{E_t}}{e^H_{t-1}}\right)$	White	5.71	0.96	Not Rejected
$\Delta ln\left(\frac{i^N_{BD_t}}{bd^N_{t-1}}\right)$	White	46.90	0.35	Not Rejected
$\Delta ln\left(\frac{i^N_{E_t}}{e^{NRC}_{t-1}}\right)$	BPG	7.91	0.79	Not Rejected
$\Delta\left(\frac{EQ^H_t - EQ^H_{rv,t}}{EQ^H_{t-1}+SEC^H_{t-1}+IBA^H_{t-1}}\right)$	White	19.77	0.54	Not Rejected
$\Delta\left(\frac{LTH^H_t}{YD^H_t}\right)$	White	49.05	0.02	Not Rejected**
$\Delta ln\left(NBEN^H_t\right)$	White	32.29	0.12	Not Rejected
$\Delta ln\left(NPEN^H_t\right)$	White	30.40	0.17	Not Rejected

H0: Homoscedasticity. ** 1% level of significance; * a 5% level of significance.

Breakpoint tests

In Table B4 we present the Breakpoints tests, which motivates our scenarios. We use the Quandt-Andrews breakpoints test (Q-A) within 15% trimmed data. The test sample for all three tests the test sample is from 2005Q3 to 2020Q1. As shown in the Table, we reject the null hypothesis of no breakpoints in all three cases. In the last two columns of the table, we perform Chow test for breaks in 1. Quarter of 2010. As seen in the table, we reject the null hypothesis in both cases.

Table B4. Breakpoints test.

Dependent variable	Method	Test	P-value	H0
$\Delta \ln (x_t)$	Q-A	7.74	0.0001	Rejected
$\Delta \ln (m_t)$	Q-A	7.73	0.0001	Rejected
$\Delta \ln \left(P_t^{xpc}\right)$	Q-A	6.78	0.0006	Rejected
$\Delta \ln (x_t)$ 2010Q1	Chow	5.33	0.0013	Rejected
$\Delta \ln (m_t)$ 2010Q1	Chow	3.62	0.0114	Rejected

H0: No breakpoints.