



Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

Jawad Khawaja und Hamid Raza

**Beyond Neutrality: Uncovering the
Sectoral and Distributional
Consequences of Monetary Policy in the
Nordic Countries**

ZÖSS

ZENTRUM FÜR ÖKONOMISCHE
UND SOZIOLOGISCHE STUDIEN

ZÖSS-Discussion Papers
ISSN 1868-4947/127
Discussion Papers
Hamburg 2026

Beyond Neutrality: Uncovering the Sectoral and Distributional Consequences of Monetary Policy in the Nordic Countries

Jawad Khawaja und Hamid Raza

Discussion Paper

ISSN 1868-4947/127

Zentrum für Ökonomische und Soziologische Studien

Universität Hamburg

April 2026

Impressum:

Die Discussion Papers werden vom Zentrum für Ökonomische und Soziologische Studien veröffentlicht. Sie umfassen Beiträge von am Fachbereich Sozialökonomie Lehrenden, NachwuchswissenschaftlerInnen sowie Gast-ReferentInnen zu transdisziplinären Fragestellungen.

Herausgeber/Redaktion:

Zentrum für Ökonomische und Soziologische Studien (ZÖSS)
rouven.reinke@uni-hamburg.de
Universität Hamburg
Fakultät für Wirtschafts- und Sozialwissenschaften
Fachbereich Sozialökonomie
Welckerstr. 8
20354 Hamburg

Abstract

While mainstream macroeconomics has long treated distributional issues as secondary, often dismissing them as outside the purview of monetary policy, the post-Keynesian tradition emphasizes that income distribution, financial positions, and class dynamics are central to understanding macroeconomic outcomes. Drawing on this rich theoretical framework, this paper empirically investigates the distributive and sectoral consequences of monetary policy, an important but often neglected area within post-Keynesian empirical research. Using data for three Nordic countries (Denmark, Sweden, and Finland), we provide empirical evidence on how contractionary monetary policy shocks propagate through functional income shares, compress private demand, and reconfigure financial balances of the institutional sectors. Our paper bridges the gap between post-Keynesian theoretical insights and the empirical rigour essential in policy development. The results show that interest rate changes are not only non-neutral but fundamentally distributive, systematically redistributing income and reshaping balance sheets.

Key words: Monetary Policy, Income Distribution, Sectoral Balances, Financialization

1. Introduction

Post-Keynesian (PK) macroeconomics conceptualizes capitalist economies as monetary production systems in which income distribution, financial relations, and institutional structures play a crucial role in shaping macroeconomic outcomes. Rather than assuming markets tend naturally toward equilibrium, PK economists emphasize the instability of capitalism, which arises from dynamic interactions between income distribution, aggregate demand, and financial conditions (Lavoie, 2014; Hein 2015; Keen, 2015; Stockhammer, 2022). Within this framework, class relations between workers, capitalists, and rentiers are treated as core explanatory mechanisms, operating through specific institutional and regulatory arrangements. Macroeconomic outcomes are thus understood as the product of evolving social and financial relations, rather than as the aggregate result of optimizing choices by forward-looking representative agents with perfect foresight.¹

The dominant macroeconomic paradigm, on the other hand, has traditionally overlooked these dimensions. Mainstream models, particularly those associated with the New Consensus Macroeconomics (NCM), continue to treat distributional outcomes as secondary to the question of growth. This outlook is perhaps most pointedly captured by Robert Lucas (2004, p. 20), who famously asserted:

“Of the tendencies that are harmful to sound economics, the most seductive, and in my opinion the most poisonous, is to focus on questions of distribution.”

This remark reflects a broader intellectual commitment to growthmanship, whereby macroeconomic performance and policy effectiveness are predominantly assessed through the narrow lens of aggregate output and price stability, while distributional issues are relegated to separate welfare or tax instruments. This analytical orientation has institutionalized a functional separation of policy mandates, in which monetary policy is solely focused on price and output stability around a long-run path, formally decoupled from the goals of fiscal and income policies.

The post-Keynesian tradition fundamentally contests this presumption, conceptualizing monetary policy as a distributive mechanism that reshapes macroeconomic behavior by influencing income formation, financing conditions, and sectoral expectations (Lavoie, 1995; Godley & Lavoie, 2007; Hein & Schoder, 2011). Yet, despite theoretical advancements, post-Keynesian macroeconomics has struggled to gain traction in policy discourse.² The tradition, although unified in its opposition to the mainstream, has faced criticism for lacking a coherent

¹ While post-Keynesians recognise the importance of expectations, it departs from approaches that derive macroeconomic dynamics from the aggregation of forward-looking optimization by representative agents with perfect foresight. Under conditions of fundamental uncertainty, expectations are shaped by conventions, balance-sheet positions, and institutional settings, making macroeconomic adjustment inherently path-dependent.

² For instance, most central banks maintain DSGE models as a framework for explaining the transmission mechanism, but empirical analysis of policy shocks is typically conducted using data-driven parsimonious empirical models such as VAR and SVAR frameworks. While stock-flow consistent (SFC) models offer a richer representation of sectoral interdependence and financial dynamics, they are computationally intensive, highly parameterized, and less suited to real-time policy analysis. This creates a tension between the structural realism emphasized in post-Keynesian modeling and the operational requirements of central banks, which prioritize tractability, robustness, and comparability across policy scenarios.

research framework and sufficient empirical evidence relevant to contemporary policy debates (Lavoie, 2022, pp. 33-35). While empirical contributions over the last two decades have made important progress, particularly through the application of stock-flow consistent models and quantitative analyses of growth regimes, there remains substantial room to develop empirically testable frameworks that translate post-Keynesian insights into forms compatible with the operational requirements of monetary policymaking.³

To fill this gap, we subject the post-Keynesian perspective on policy rates to empirical scrutiny. We develop a framework to systematically quantify the distributional channels of monetary policy, analyzing how unanticipated policy rate shocks propagate through functional income distribution, sectoral financial balances, and balance sheet structures. Using quarterly data from Denmark, Sweden, and Finland spanning a 25-year period (1999Q1–2024Q4), we assess how these shocks alter income composition, effective demand, and the net lending positions of households, corporations, the state, and the rest of the world. Our analysis reveals that beneath aggregate output movements lie uneven, deeply redistributive adjustments triggered by interest rate changes – dynamics often obscured when analysis is confined to growth, as is common in prevailing literature.

Methodologically, this study offers a parsimonious, data-driven complement to large scale Stock-Flow-Consistent models. Rather than proposing novel transmission channels, we demonstrate how existing mechanisms operate through sectoral financial positions and institutional constraints. By prioritizing accounting identities, this approach bridges the gap between critical theory and operational policy needs, offering actionable insights without sacrificing theoretical consistency.

The remainder of the paper is organised as follows. Section 2 details the analytical framework, conceptualizing the interest rate as a distributive variable within a sectoral balance accounting structure. It also presents the sectoral balances for the three Nordic economies and provides the relevant institutional context. Section 3 details the empirical strategy used to identify exogenous monetary policy shocks and trace their macroeconomic effects. Section 4 presents and discusses the empirical results. Finally, Section 5 offers concluding remarks.

2. Interest Rates, Distribution, and Sectoral Adjustment: A Sectoral Balance Perspective

Building on the distributive view of monetary policy outlined above, the macroeconomy is treated here as a monetary production system where interest rates function as a key variable reshaping the financial positions of institutional sectors (Lavoie, 2022, pp. 200-203). In this context, changes in policy rates reallocate income flows between debtors and creditors, altering the relative claims of rentiers and productive agents. Crucially, because households, firms, and the state differ in their balance-sheet structures and propensities to spend, the

³ These reasons include, among others, longstanding methodological disagreements with mainstream economics, the dominance of DSGE-based frameworks within central banking practice, and the institutional separation between academic heterodox research and policy-oriented modelling environments.

transmission of monetary policy operates through uneven channels. Consequently, the effects of a rate shock depend on the underlying configuration of income distribution and financial commitments rather than aggregate parameters alone.

To analyse these dynamics, we rely on the sectoral balance perspective inspired by the New Cambridge tradition (Godley & Cripps, 1983) and later stock-flow consistent approaches (Godley & Lavoie, 2007). Formally, the net lending positions of the private domestic sector BAL_p , the public sector BAL_g , and the rest of the world BAL_{row} must sum to zero, which in its disaggregated form, can also be represented as:

$$(YD_p - C - I_p) + (T - G - I_g) + (M - X - NIA) \equiv 0 \quad \text{eq. 1}$$

where YD_p represents private disposable income, which is positive and includes all net flows excluding private expenditures on consumption and investment. Private savings is commonly calculated by deducting consumption from YD_p , after which private sector balance is typically represented as a saving-investment gap.

$$(YD_p - C - I_p) + (T - G - I_g) = (X - M + NIA) \quad \text{eq. 2}$$

Renaming these balances gives us the following identity:

$$BAL_p + BAL_g = -BAL_{row} \quad \text{eq. 3}$$

The strength of this framework lies in its grounding in national accounting identities, which make explicit the interdependence of financial flows across sectors. At the macroeconomic level, a surplus in one sector necessarily corresponds to a deficit elsewhere in the system.

Integrating balance-sheet data with these flow identities allows for a fully stock-flow consistent analysis, where redistributive income flows are examined alongside the evolution of financial stocks. In this setting, monetary policy shocks operate through two related channels. First, interest-rate changes generate income-flow adjustments, redistributing income through interest payments and disposable income, which reconfigure balance sheets via changes in sectoral net lending. Second, tighter financial conditions may induce direct balance-sheet adjustments, as sectors respond through deleveraging, refinancing, or valuation effects; these processes may unfold independently of contemporaneous shifts in sectoral balances. Together, these mechanisms capture how monetary policy reshapes both the flow of funds and the structure of financial positions, allowing the empirical analysis to trace the full stock-flow adjustment following a policy shock.

2.1 Overview of the three Nordic sectoral balances

To operationalise the analytical framework outlined above, we examine three Nordic economies – Denmark, Sweden, and Finland.⁴ All three economies share broad institutional similarities. They are small open economies characterised by extensive welfare states, coordinated labour-market institutions, and well-developed financial systems. However, there are important structural differences that condition how monetary policy operates within each economy.

In the context of monetary transmission, two structural differences stand out. The first relates to monetary and exchange-rate regimes. Denmark maintains a fixed exchange rate against the euro, tightly aligning domestic short-term interest rates with those of the ECB. Finland, as a member of the euro area, has no independent monetary policy instrument. Sweden, by contrast, operates under a flexible exchange-rate regime and an autonomous inflation-targeting framework, allowing both interest rates and the exchange rate to adjust domestically. The second key difference concerns mortgage-market structure. In Finland, almost all housing loans are variable-rate and typically tied to 12-month Euribor, implying a relatively rapid pass-through of policy-rate changes to households. In Sweden, mortgages are commonly issued with short fixed-rate periods or on variable terms. Denmark's mortgage system differs fundamentally: it is based on capital-market-funded mortgage bonds, with 30-year fixed-rate loans constituting a standard product. As a result, monetary-policy changes primarily affect new borrowing or borrowers who actively refinance via the bond market, limiting the immediate cash-flow impact on the existing stock of household debt.

Figure 1: Sectoral balances

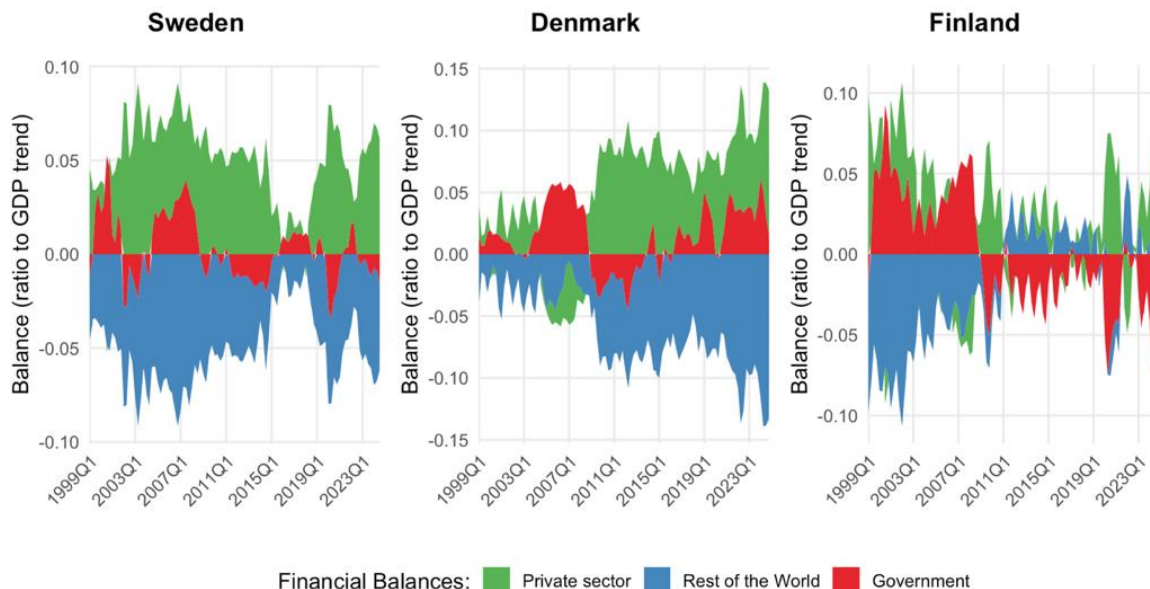


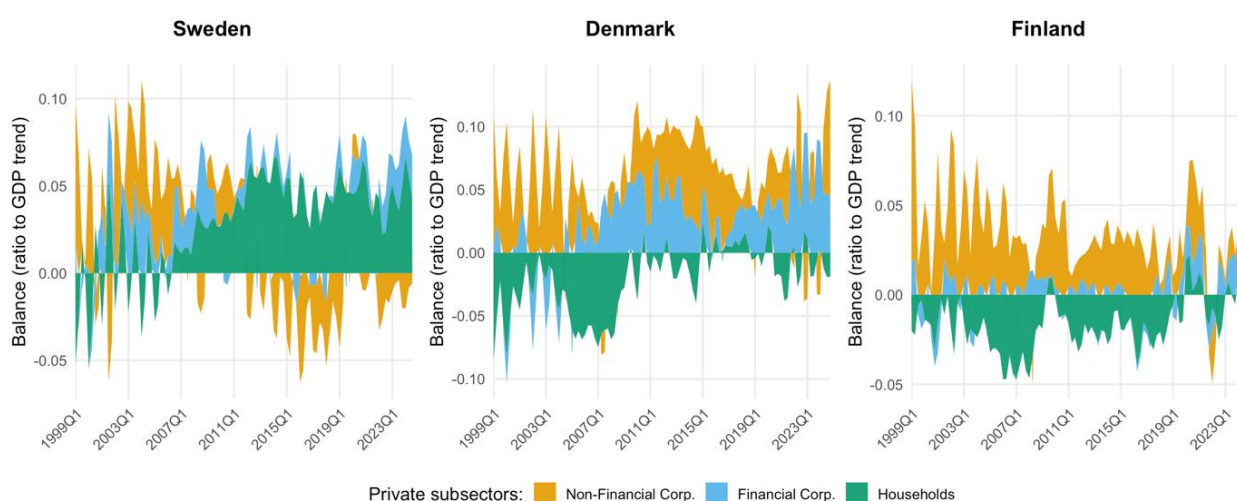
Figure 1 presents the aggregate sectoral balances of the private sector, the government, and the rest of the world. Across all three countries, sectoral imbalances generally range between

⁴ Iceland and Norway were excluded because complete data for all variables used in the analysis were not available. In addition, data on monetary policy surprises, used to construct measures of unanticipated policy shocks, were not publicly available for these countries.

5 - 10 percent of GDP (trend), indicating sizeable and persistent cross-sector financial positions. Denmark and Sweden display broadly similar configurations over much of the sample. Both economies are characterised by persistent private-sector surpluses mirrored by sustained current-account surpluses, while government balances fluctuate within a comparatively moderate range, improving during expansions and deteriorating during downturns.

Finland exhibits a clear regime shift around the global financial crisis. Prior to 2007-08, persistent private- and public-sector surpluses coincided with a strong current-account position, underpinned by strong productivity growth and a highly competitive information and communications technology (ICT)-led export sector. After the crisis, the current account weakened as the contribution of ICT diminished, aggregate productivity growth slowed, and unit labour costs rose due to sluggish wage adjustment. Within the euro area, nominal exchange rate depreciation was not available as an adjustment mechanism, implying that competitiveness had to be restored through gradual internal cost adjustment. Consequently, the external position became structurally weaker and more volatile. Concurrently, the public sector shifted into sustained deficits and the private-sector surplus narrowed. During the Covid-19 period, fiscal deficits widened further while private surpluses increased, reflecting expansionary fiscal policy and subdued private expenditure.

Figure 2: Disaggregate private sector balance



On aggregate level, even though Sweden and Denmark exhibit a broadly similar pattern, Figure 2 reveals pronounced differences once the private sector is decomposed into households, non-financial corporations, and financial corporations. In Denmark, prior to the global financial crisis, households ran substantial deficits, offset by large and persistent surpluses in the non-financial corporate sector. After the crisis, household balance sheets adjusted significantly: as deleveraging progressed, households moved toward a more balanced net lending position. In contrast, non-financial corporations continued to record sustained surpluses, remaining the primary source of private-sector surplus.

In Sweden, the configuration exhibits a distinct shift over time. In the early 2000s, non-financial corporations generated the bulk of the private surplus, while the household balance fluctuated cyclically around zero. From the mid-2000s onward, however, the configuration became predominantly household-centred. Household net lending turned persistently positive and constituted the dominant component of the private surplus for the remainder of the sample. In contrast, non-financial corporations recorded sustained deficits following the Global Financial Crisis, while financial corporations, although in surplus, remained comparatively small in magnitude. Sweden's private surplus is therefore primarily anchored in sustained household saving, consistent with the fact that Sweden ranks among the countries with the highest household saving rates in advanced economies.

The decomposition of Finland's private sector reveals a more consistent pattern over time. Households remain persistently in a net borrowing position for virtually the entire sample period, while non-financial corporations generate sustained positive net lending. Financial corporations fluctuate around moderate surpluses.

These structural differences across countries and sectoral configurations imply that the effects of monetary policy are likely to be heterogeneous. Differences in exchange-rate regimes, mortgage-market structures, and prevailing sectoral net lending positions shape how interest-rate changes affect sectoral cash flows, redistribute income between debtors and creditors, and influence spending decisions. Consequently, policy-rate shocks are expected to generate distinct sectoral adjustments and macroeconomic outcomes across the three economies. To quantify these effects, we turn to the empirical analysis in Section 3.

3. Methodology

The empirical strategy adopted in this paper translates post-Keynesian concerns with distribution, sectoral balances, and financial structure into an empirically tractable framework relevant to contemporary policy debates. We introduce an exogenous monetary policy shock in a sectoral accounting system and study the response of the system. We preserve consistency with national accounting relationships and institutional structure while employing identification techniques that have become standard in empirical monetary economics. The full technical details of the methodology are discussed in the Appendix.

3.1 Identifying exogenous monetary policy in a forward-looking economy

While theoretical models often treat policy rates set by monetary authorities as exogenous, empirical analysis shows a more complex reality. Observed interest rates reflect not only discretionary policy decisions but also systematic responses to macroeconomic conditions and financial market expectations. Thus, realised policy rates cannot be treated as fully exogenous and require separating autonomous policy changes from systematic responses to economic developments.

To address this identification problem, the modern empirical literature increasingly relies on monetary policy surprises measured around central bank announcements. These surprises are constructed from changes in short-maturity interest rate futures or swap rates observed

within narrow time windows surrounding policy decisions. Because these instruments reflect expectations of the near-term path of policy rates, changes within the announcement window capture revisions to those expectations induced by the policy announcement. By restricting attention to very short intervals, this approach reduces contamination from other macroeconomic news and has become the standard method for identifying policy-rate shocks. In this paper, we follow this high-frequency approach and construct policy shocks from movements in short-maturity interest rate swaps around policy announcements. Specifically, we follow the popular approach of Jarociński and Karadi (2020), who demonstrate that policy announcements not only reflect adjustments in the policy stance but also revisions in the central bank’s economic outlook. Thus, a monetary policy surprise, can be decomposed into a pure policy shock and a central bank information shock.

An important feature of this identification strategy is that it embeds the forward-looking nature of financial markets. From a post-Keynesian perspective, this is analytically relevant. Financial markets mediate the transmission of policy through expectations, liquidity preferences, and portfolio allocation. High-frequency identification captures short-term revisions in anticipated risk and financing conditions as reflected in market prices. It does not, however, resolve the deeper forms of fundamental uncertainty or the longer-term instability characteristic of capitalist economies. The empirical strategy therefore traces the observable financial transmission of policy while recognising the broader limits of market-based expectations.

3.2 Sectoral modelling and empirical implementation

The identified monetary policy shocks are introduced into a set of sectorally disaggregated accounting systems estimated separately for Denmark, Sweden, and Finland using quarterly data from 1999Q1 to 2024Q4. Sectoral income flows, expenditure components, financial balances, and balance-sheet variables are constructed from Eurostat national and financial accounts as presented in Table 1.⁵ All variables are deflated by CPI.

Table 1: Sectoral accounting framework and balance sheet matrix

Macroeconomic dimension	Households (H)	Non-Financial Corps (NFC)	Financial Corps (FC)	Government (G)	Rest of World (RoW)	Aggregation (Macro identity)
Current and capital flows						
Production income	$W + \Pi_H$	Π_{NFC}	Π_{FC}	$\Pi_G + T_P$		$Y_{inc} = W + \sum \Pi_i + T_P$
Net property income	Y_H^P	Y_{NFC}^P	Y_{FC}^P	Y_G^P	Y_{RoW}^P	$\sum Y_i^P = 0$
Other income / transfers	Y_H^O	Y_{NFC}^O	Y_{FC}^O	Y_G^O	Y_{RoW}^O	$\sum Y_i^O = 0$
Expenditure	$C_H + I_H$	I_{NFC}	I_{FC}	$C_G + I_G$	$X - M$	$Y_{exp} = C + I + X - M$
Financial balance	FB_H	FB_{NFC}	FB_{FC}	FB_G	FB_{RoW}	$\sum FB_i = 0$
Stock positions						
Leverage (Debt-to-asset)	L_H/A_H	L_{NFC}/A_{NFC}	L_{FC}/A_{FC}	L_G/A_G	L_{RoW}/A_{RoW}	Aggregate leverage ratio

⁵ All flow variables are expressed as a ratio to trend GDP. This preserves cyclical fluctuations while standardising magnitudes across countries and maintaining accounting consistency, so sectoral balances remain directly additive. Balance sheet positions are measured by the debt-to-asset ratio, capturing sectoral leverage independently of scale effects.

Notes: This table maps the empirical variables to their national accounting and Stock-Flow Consistent (SFC) identities.

Flow variables:

W = compensation of employees (wages)

Π_i = gross operating surplus / mixed income (profits)

T_p = net taxes on production and imports

Y_i^P = net property income

Y_i^O = net other current transfers

C_H, C_G = final consumption expenditure by households and government

I_i = gross capital formation (investment)

X = exports

M = imports

Y_{inc} and Y_{exp} represent GDP calculated via the income and expenditure approaches, respectively.

FB_i represents the financial balance (net lending/borrowing or saving minus investment), which, in a closed global system, must sum to zero across all sectors.

NIA of Equations 1 and 2 is represented in the table by the sum of Y_{ROW}^P and Y_{ROW}^O , i.e. $NIA = Y_{ROW}^P + Y_{ROW}^O$

Stock variables: For the balance sheet metrics, L_i denotes total outstanding financial liabilities (debt) and A_i denotes total financial assets for sector i .

To estimate the behavioural parameters of each sector, we use a Structural Vector Autoregression (SVAR) for each sector, in which the externally identified monetary policy shock enters as an exogenous shock and affects income, expenditure, and financial variables contemporaneously. In this way, the shock operates as a common impulse that reconfigures production income, property income, spending decisions, and financial balances across the sectoral system.

The internal dynamics of each sector within the model follow a post-Keynesian stock-flow logic. Changes in income components such as wages, profits, or net property income are assumed to influence expenditure contemporaneously, reflecting the causal effects of income flows in shaping effective demand. Balance-sheet variables, by contrast, affect spending with a lag, capturing the gradual adjustment of consumption and investment to evolving financial positions and leverage.⁶ Because each sector is estimated as a coherent system, the monetary policy shock propagates through multiple channels simultaneously, triggering adjustments in income composition, expenditure patterns, and net lending positions.

Once we obtain the response of each sector to a monetary policy shock, we reconstruct aggregate outcomes by following the institutional structure outlined in the sectoral accounting table, where all sectors are interconnected. Not only can we derive the financial balance of each sector, but we can also compute the response of GDP using both the income and expenditure approaches. Finally, to complement the macroeconomic analysis, we further

⁶ We also estimate alternative specifications in which balance sheet variables - measured as debt-to-asset ratios - are allowed to affect spending contemporaneously, capturing potential loan-induced consumption (for households) and investment (for firms). These specifications do not statistically change the estimated effects of policy rate shocks.

explore how monetary policy shocks affect unemployment and CPI. Our framework can be understood as a data-driven empirical implementation consistent with post-Keynesian stock-flow principles. By combining externally identified policy shocks with sectoral accounting identities, it offers a convenient and tractable way to analyse the impact of exogenous monetary disturbances and their distributional consequences within a modern econometric setting.

4. Results and Discussion: Monetary Policy as Distributional Reconfiguration

The effects of an unanticipated monetary policy shock are measured as a one-standard-deviation positive change, corresponding to an increase of approximately 6 basis points in Denmark and Finland and 4 basis points in Sweden. The plots of all impulse responses are presented in the Appendix, which provides a detailed account of the dynamic adjustment path. For ease of exposition, we summarise the results in Table 2, which reports the cumulative effects of a monetary policy shock at horizon ($h=4$), corresponding to one year after the shock.

Table 2: Macro-financial transmission of a 1-SD contractionary monetary shock (cumulative responses at $h=4$, % of GDP trend)

Macroeconomic channel / Variable	Denmark	Sweden	Finland
Panel A: Functional income distribution and real expenditure			
Household wages	-0.43***	-0.42***	-1.03***
NFC profits	-0.10	-0.20	-0.76***
Government net taxes on production	-0.87***	-0.21	-0.18***
Household net property income	-0.30	+0.11	-0.16***
NFC net property income	+1.48***	-0.50	+0.60***
FC net property income	-0.48***	-0.45***	+0.08***
Household consumption	-0.48***	+0.44	-1.05***
NFC investment	-1.20***	-0.16***	-0.18
Government spending	+0.38	-0.07***	-0.17
Panel B: Stock-flow interactions and balance sheet mechanics			
<i>Non-Financial Corporations (NFCs)</i>			
Financial balance	+3.01	-0.31	+0.25
Debt-to-asset ratio	+2.88***	-5.23***	-10.36***
<i>Households</i>			
Financial balance	-0.36	-0.51	+0.63
Debt-to-asset ratio	+0.23	+0.61***	-0.13***
<i>Government</i>			
Financial balance	-2.07	-0.72	-1.50
Debt-to-asset ratio	-0.60	+2.65***	+5.10***
<i>Financial Corporations (FCs)</i>			
Financial balance	-0.52	-0.63	+0.18
Debt-to-asset ratio	+0.09	-0.15	+0.92***

<i>Rest of World (RoW)</i>				
Financial balance		−0.35	+0.52	+0.76
Debt-to-asset ratio		+0.12	+1.83***	+1.23
Panel C: Aggregate and external outcomes				
GDP (income side)		−1.45***	−0.70***	−1.97***
GDP (expenditure side)		−1.30***	−0.10	−2.45***
Unemployment rate		+0.86***	+0.08	+0.17***
Exchange rate effects		+0.021***	−0.066***	+0.008***
Trade balance		+0.03	−0.17	−1.04*
Consumer prices [100·log(CPI)]		+0.001	+0.17	+0.74***

Notes: *** represents results that are significant for at least two horizons in the short-to-medium term using 68 percent confidence bands. Financial balance = saving minus investment (positive = surplus/net lending). Since financial balances are computed as an accounting balance, no statistical significance is assigned to the values. A fall (increase) in financial balances does not necessarily suggest a deficit (surplus) but indicates whether it has increased or decreased compared to the baseline. Net property income = income received minus paid. Debt-to-asset ratio is measured as financial liabilities divided by financial assets. Note that the flow variables are reported as percentage points (pp) of trend GDP, while stock variables (debt-to-asset ratios) are reported as percentage points.

Our findings systematically challenge foundational tenets of New Consensus Macroeconomics (NCM). Whereas NCM frameworks typically abstract from functional income distribution – treating it as secondary to inflation targeting – our results confirm that monetary policy is profoundly non-neutral and systematically redistributive. The analysis also challenges the assumption that fiscal and monetary policy spheres are operationally independent. Finally, evidence suggests that interest-rate increases may generate cost-push pressures that sustain inflation rather than curbing it. Collectively, these findings demonstrate that macroeconomic stabilisation is inherently a process of distributional conflict, actively reconfiguring which institutional sectors bear the burden of adjustment.

4.1 Institutional distinctiveness and the topography of adjustment

A central insight derived from this sectorally disaggregated framework is that the transmission of monetary policy is profoundly contingent upon national institutional and financial structures. Rather than yielding a uniform macroeconomic response, the results reveal three distinct typologies of adjustment across the Nordic economies.

In Denmark, the economy absorbs the monetary shock predominantly through real expenditure and income channels. The results show highly significant contractions in household wages (-0.43 pp relative to GDP trend), consumption (-0.48), and non-financial corporate (NFC) investment (-1.20). This real-side contraction culminates in a pronounced decline in aggregate income-side GDP (-1.45) and a corresponding surge in unemployment (+0.86). Denmark experiences the strongest impact on the unemployment rate among the three countries (see Panel C of Table 2). This is largely explained by Denmark’s “flexicurity” labour market model, which combines relatively low employment protection – allowing firms to adjust their workforce quickly – with a strong social safety system that provides income support and active labour market policies for displaced workers. As a result, following a

monetary shock, employment adjusts rapidly and sharply in Denmark, contributing to the pronounced decline in total real wages.

Conversely, Sweden's aggregate demand appears more insulated from the interest rate shock, with monetary policy shocks exerting no statistically significant effects on aggregate GDP. Sweden experiences a sharp decline in wages (-0.42 pp relative to GDP trend), but this surprisingly does not translate into falling consumption. Consumption remains relatively unaffected even though a considerable fraction of Swedish households is exposed to short-term fixed loans. A plausible explanation is that Swedish households – due to their high savings rate over the last two decades – have maintained a large, persistent financial surplus, which provides a robust liquidity cushion that prevents immediate consumption reductions. Instead, the adjustment is mediated mostly through open-economy and financial channels. Sweden exhibits significant exchange rate effects (see Panel C of Table 2) alongside shifts in sectoral balance sheets, notably a deleveraging in NFCs (where the debt-to-asset ratio falls by 5.23) and a corresponding increase in the Rest of the World (RoW) debt-to-asset ratio (+1.83).

Finland represents a third typology, experiencing the most severe aggregate deterioration (spending-side GDP contracts by 2.45 pp relative to GDP trend). This is driven by a synchronisation of real and financial distress. The Finnish economy registers significant declines in real variables, with wages falling by 1.03 (pp relative to GDP trend) and consumption by 1.05, concurrent with balance sheet adjustments, including a severe drop in the NFC debt-to-asset ratio (-10.36 pp) alongside a surge in the government's debt-to-asset ratio (+5.10 pp). Finnish households, unlike those in Sweden and Denmark, operate with persistent financial deficits and are highly exposed to variable interest rates (commonly linked to Euribor). Consequently, an interest rate hike immediately acts as a severe cash-flow drain, forcing sharp, contemporaneous cuts to consumption and driving the severe aggregate deterioration.

4.2 Functional income distribution and the determinants of investment

The post-Keynesian tradition has long conceptualised monetary policy fundamentally as a form of incomes policy (Hein, 2012; Lavoie, 2022). The empirical results robustly corroborate this perspective, indicating that functional income distribution is sensitive to policy rate shocks. Across all three economies, labour income contracts significantly. It is crucial to emphasise that wages in all three countries contract more severely than profits: -0.43 (wage) vs -0.10 (profits) in Denmark; -0.42 vs -0.20 in Sweden; and -1.03 vs -0.76 in Finland). Thus, the contractionary effects are fundamentally asymmetric, with workers bearing the most severe brunt of the macroeconomic adjustment. Crucially, because our variables are scaled by trend GDP rather than actual GDP, this framework explicitly controls for the "denominator effect" that is typically present in standard measures of wage shares. Consequently, these results demonstrate a genuine, absolute destruction of wage income relative to corporate profits.

The response of NFC investment sheds light on the mechanisms through which monetary tightening affects capital formation. As highlighted by Hein and Krämer (2024), competing theoretical traditions assign different weights to the interest rate versus demand and profitability conditions. In standard Keynesian formulations, investment is assumed to be

sensitive to the interest rate via the marginal efficiency of capital. By contrast, Kaleckian and post-Keynesian approaches emphasise that investment decisions are driven primarily by expected profitability, internal finance, capacity utilisation, and effective demand, with borrowing costs playing a more conditional role.

The empirical results indicate that monetary tightening compresses NFC profits across all three economies, pointing to a deterioration in internal funds and expected profitability. This suggests that the transmission mechanism does not operate solely through a mechanical user-cost channel, but also through income and demand compression that weakens firms' cash flows. While the direction of the investment response is consistent across countries, its magnitude varies. In Denmark and, to a lesser extent, Sweden, declines in investment coincide with contractions in household income and consumption, consistent with a demand-mediated adjustment process. In Finland, despite a substantial fall in profits and a severe macroeconomic contraction, the decline in NFC investment is relatively weak and statistically insignificant.

Taken together, the results demonstrate that monetary policy decisions affect investment not only through the direct cost of borrowing, but through a multitude of channels involving aggregate demand conditions, shifts in income distribution, and sectoral financial configurations.

4.3 Stock-flow interactions and balance sheet mechanics

A core analytical advantage of integrating stock variables (debt-to-asset ratios) with flow variables (financial balances) is the capacity to diagnose the precise mechanics of financial adjustment. In what follows, the discussion focuses only on statistically significant balance-sheet responses (see Panel B in Table 2), as these identify the sectors where monetary tightening produces meaningful financial adjustment.

Focusing first on the private sector, the most pronounced adjustments occur in Finland, characterized by broad deleveraging that reinforces the contraction in aggregate demand. While both non-financial corporations (NFCs) and households improve their financial balances and significantly reduce their debt-to-asset ratio, the underlying mechanics differ. For NFCs, the large drop in the debt-to-asset ratio (-10.36 pp) cannot be fully explained by the mechanical improvement in net savings. Instead, it indicates a direct balance-sheet adjustment, reflecting active deleveraging. Finnish households exhibit a similar but weaker decline in leverage. Since households financial balance increases considerably as consumption falls more than disposable income, their balance-sheet improvement appears to be driven primarily by this mechanical flow adjustment rather than by active balance-sheet contraction. As NFCs and households simultaneously reduce their debt-to-asset ratios, part of this adjustment is reflected in the balance sheets of financial corporations and the public sector, whose debt-to-asset ratios increase correspondingly.

In Denmark, significant private-sector adjustment is confined to NFCs, revealing a stark divergence between the sector's net financial balance and its overall leverage. While the NFC financial balance improves as investment declines more than income, the debt-to-asset ratio paradoxically rises (+2.88 pp). This suggests that balance-sheet revaluation effects outweigh the net saving effect in response to a monetary policy shock. In contrast, households and

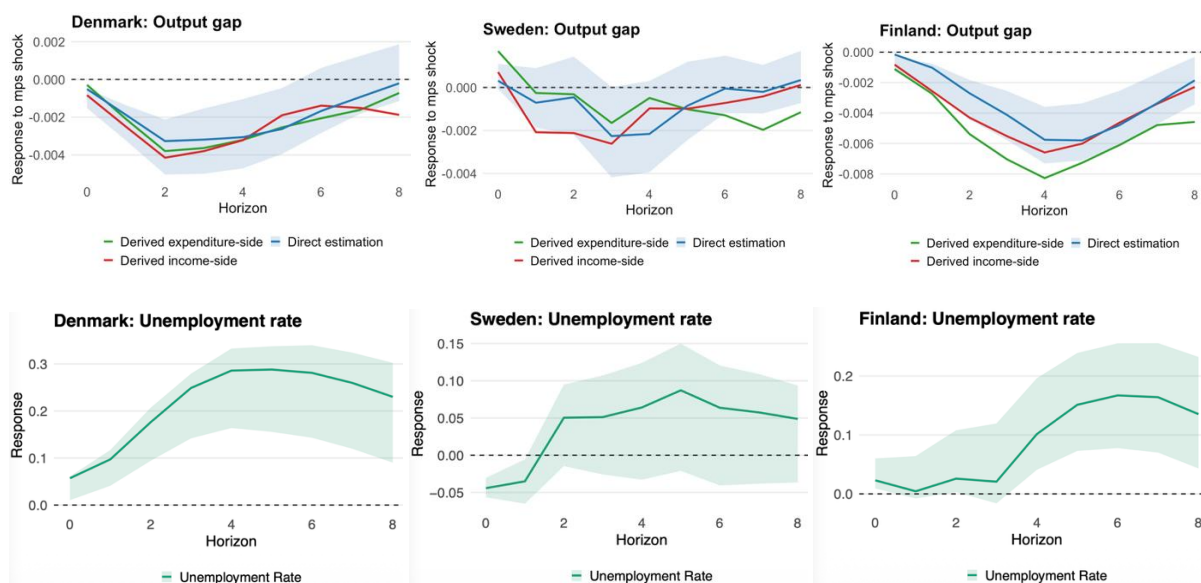
financial corporations in Denmark exhibit no statistically significant balance-sheet adjustments, consistent with the structure of the Danish mortgage system, where a considerable share of households hold long-term fixed-rate mortgages, limiting the immediate balance-sheet impact of monetary policy shocks on existing borrowers.

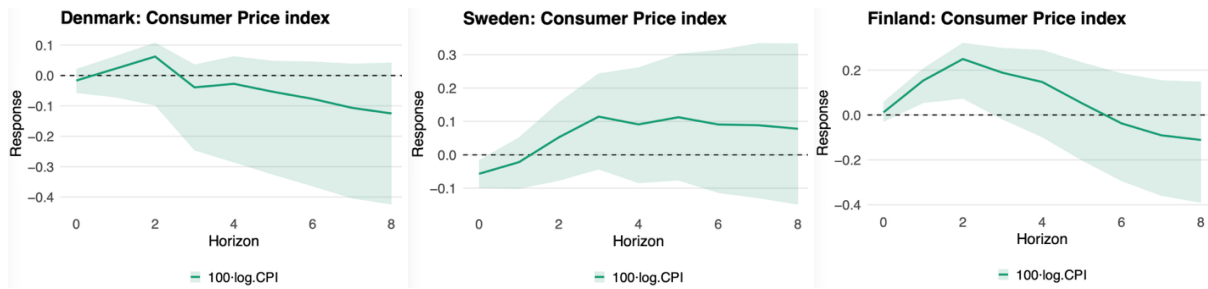
Sweden exhibits a mixed adjustment within the private sector. While the NFC financial balance deteriorates as income declines more than investment, the debt-to-asset ratio nevertheless falls significantly (-5.23 pp). Since weaker net saving would normally place upward pressure on leverage, the decline in the debt-to-asset ratio suggests that active deleveraging plays an important role in the NFC balance-sheet adjustment. In contrast, Swedish households experience a statistically significant increase in their debt-to-asset ratio (+0.61 pp) together with a decline in their financial balance, indicating that reductions in net saving mechanically translate into rising leverage. As discussed earlier, Swedish household consumption does not decline despite falling wages. The balance-sheet evidence suggests that this consumption smoothing is reflected in a deterioration of household financial positions, as households draw down savings or absorb income losses in response to a monetary policy shock. The government debt-to-asset ratio increases significantly in Sweden (+2.65 pp), partly absorbing the macroeconomic adjustment, whereas the balance sheet of financial corporations exhibits no statistically significant change.

4.4 Aggregate outcomes and the cost channel of monetary policy

The aggregate responses reported in Table 2 and illustrated in Figure 3 show that contractionary monetary policy generates clear real-side adjustments but no disinflationary effects. Real GDP declines across all three economies and unemployment rises, particularly in Denmark and Finland, indicating that the policy shock operates primarily through a contraction in real economic activity. Price responses, however, remain muted. CPI shows no statistically significant response to policy rate increases in Denmark and Sweden, while in Finland prices exhibit a weak but positive response that gradually dissipates over time.

Figure 3: Aggregate Responses





Note: Output responses are computed in three ways: i) by adding the responses of the income side, ii) by adding the responses of expenditure side, and iii) by direct estimating the effects of monetary policy shocks on output gap. The confidence bands in the plot are assigned to the direct estimation.

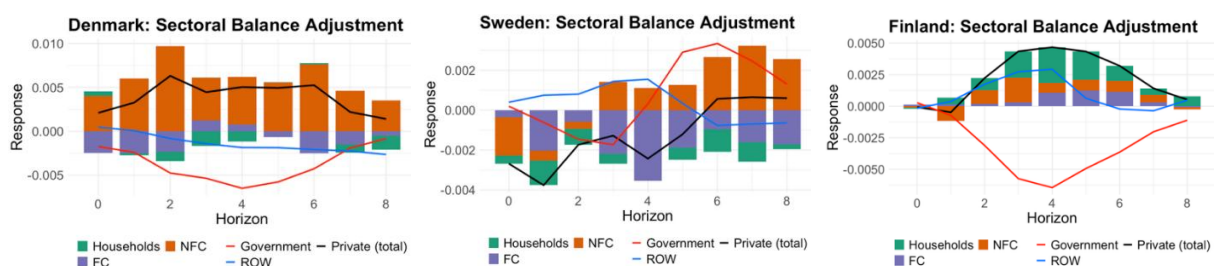
This pattern challenges the conventional short-run Phillips curve embedded in New Consensus Macroeconomics (NCM), which attributes disinflation primarily to demand compression while overlooking the role of institutional and distributive dynamics. Our findings instead support the well-established post-Keynesian view that firms typically aim to maintain stable prices and profit margins. Producers, in response to short-term cyclical movements in demand, refrain from adjusting prices for a variety of reasons, including concerns about losing market share. While post-Keynesian economists do not entirely dismiss demand-pull explanations of inflation, such episodes are typically associated with unusually large and unexpected increases in demand that strain productive capacity (Raza et al., 2023). Consistent with this view, the muted price responses observed in Denmark and Sweden likely reflect the absence of significant capacity pressures in our sample, apart from the temporary demand expansion following COVID-19, which briefly strained supply capacity.

Moreover, post-Keynesian pricing theory emphasises that prices are determined as a mark-up over production costs. When these costs increase - such as through higher interest expenses associated with tighter monetary policy - firms may partly pass them on to consumers. The gradual pass-through to CPI observed in Finland is consistent with this mechanism. In the empirical literature, such outcomes are often referred to as the “price puzzle”, whereas within the post-Keynesian framework they reflect the operation of the monetary cost channel (Barth & Ramey, 2001; Hein & Stockhammer, 2011).

4.5 The endogeneity of fiscal outcomes

Orthodox macroeconomic models frequently operate under the assumption of an institutional separation between monetary and fiscal policy. Our empirical framework demonstrates that this separation is an analytical fiction. An exogenous contraction in monetary policy triggers an endogenous, automatic deterioration of the state's financial position (see Figure 4).

Figure 4: Sectoral balance adjustment



As real economic activity slows, government net taxes on production fall significantly in Denmark (-0.87) and Finland (-0.18). Consequently, the state is forced to absorb the macro-financial fallout of the central bank's intervention. This is reflected in the highly significant deterioration of the government's debt-to-asset ratio in Sweden (+2.65) and Finland (+5.10). Far from operating independently, restrictive monetary policy effectively orchestrates a risk-shifting mechanism, transferring debt burdens from private balance sheets to the public sector.

However, the magnitude and form of this fiscal adjustment differ in Sweden, where aggregate economic activity is comparatively less affected by the monetary shock. As a result, monetary policy generates a weaker overall impact on Swedish sectoral balances, limiting the scale of automatic fiscal deterioration. By contrast, in Denmark and especially Finland - where consumption and output contract more sharply - the fiscal position absorbs a larger share of the private adjustment.

This result implies that attempts to achieve fiscal targets through the imposition of strict fiscal discipline are fundamentally misguided. If fiscal balances are largely determined by macroeconomic conditions and sectoral adjustments, then efforts to mechanically reduce deficits through consolidation cannot be reliably achieved through discretionary policy alone. Growing empirical evidence now suggests that these austerity policies have had consequences extending beyond macroeconomic performance (Baccini and Sattler, 2025). Fiscal consolidations have been associated with rising political fragmentation, and increased support for populist parties across Europe. When economic adjustment disproportionately affects wages, employment, and public services, the burden of stabilisation becomes politically contested (Talving, 2017; Dehdari, 2020; Guriev and Papaioannou, 2022).

5. Conclusion

This paper has examined how contractionary monetary policy reshapes sectoral and distributive dynamics across Denmark, Sweden, and Finland using high-frequency shocks embedded in a sectorally disaggregated accounting framework. While tighter monetary policy generates broadly similar aggregate outcomes - slower activity and rising unemployment - the underlying adjustment processes differ. A consistent pattern across the three economies is the disproportionate compression of labour income relative to profits. This shift in the functional income distribution drives macroeconomic adjustment, though its transmission to spending varies: in Denmark and Finland, falling wage income feeds directly into weaker consumption, whereas in Sweden accumulated household savings appear to cushion consumption. Concurrently, tighter liquidity and subdued demand severely curb investment in Denmark and Sweden, whereas in Finland investment also declines, though the effect is statistically ambiguous, highlighting the complex, institutionally contingent nature of capital formation.

The analysis also uncovers the structural interdependence between monetary and fiscal outcomes. As economic activity contracts and private-sector adjustment begins, public finances are drawn into a corresponding adjustment through automatic stabilisers. Tax revenues fall, social transfers rise, and the public balance shifts into deficit across all three

countries. This deterioration translates into rising government debt-to-asset ratios, particularly in Sweden and Finland, illustrating how central bank decisions reshape the fiscal stance even in the absence of discretionary policy changes.

Finally, contrary to orthodox consensus, the policy interest rate does not operate as a straightforward or neutral lever for achieving price stability. The price responses observed across the three economies challenge the core rationale for monetary tightening: rather than triggering disinflation, prices remain largely insensitive to policy shocks, and in Finland, instead, an increase occurs. This pattern is consistent with a monetary cost channel in which rising interest expenses feed into firms' input costs, thereby offsetting the disinflationary effects typically expected from weaker demand. In this sense, fiscal outcomes emerge as a consequence of private-sector adjustment, rather than its determinant, contrasting with the notion of Ricardian equivalence in mainstream models, in which private behaviour adjusts in anticipation of the fiscal position.

Taken together, these findings call for a reassessment of the expected effects of monetary policy. Because policy transmission is deeply grounded in sectoral balance sheets, institutional arrangements, and portfolio allocation decisions, its impacts cannot be evaluated through aggregate growth metrics alone. Recognising these distributive consequences underscores the limits of relying solely on independent monetary policy for macroeconomic stabilisation. Frameworks that assume the interest rate operates solely as a neutral demand lever – as in the New Consensus – risk actively exacerbating financial and distributional pressures.

When monetary tightening is decoupled from complementary fiscal and incomes policies, the burden of adjustment is displaced onto households and firms with the weakest balance-sheet positions, amplifying rather than mitigating macroeconomic fragility. A more coherent and resilient strategy requires explicit coordination between monetary, fiscal, and incomes policies. Coordinated wage-bargaining systems, for example, can address cost-push pressures directly, reducing the need for severe demand compression. Similarly, structural fiscal safeguards can buffer households from the liquidity strains induced by higher interest rates. The Danish framework provides an instructive example of how institutional design can support short-term financial stability: the prevalence of fixed-rate mortgages shields households from immediate increases in debt-servicing costs, and the tax system reimburses a substantial share of interest payments, thereby limiting balance-sheet deterioration during tightening cycles. However, while such fiscal subsidies protect aggregate demand, they also shift part of the increased interest burden onto the public budget, indirectly supporting the higher interest income accruing to the financial sector. Without an integrated, institutionally grounded policy framework that actively manages these distributive trade-offs, the burden of adjustment will continue to fall asymmetrically across sectors, reproducing financial fragility rather than supporting balanced and sustainable growth.

Appendix

A.1 Identification of Exogenous Monetary Policy Shocks and estimation

For Sweden, high-frequency monetary policy surprises are taken from the Riksbank's event-level dataset covering 269 monetary policy announcements and minutes releases since 20 August 2004. For each event, the surprise is computed as the change in the median market price between 10 minutes before and 20 minutes after the policy communication. The measure uses announcement-window changes in short-term interest rate instruments with maturities of 1 month, 3 months, 6 months, and 1 year. The first principal component of these maturity-specific changes is extracted and used as the baseline monetary surprise series. To separate pure monetary policy shocks from central bank information shocks, we implement the poor man's sign restriction in the spirit of Jarociński and Karadi (2020). Using changes in the OMX Stockholm index measured over the same window, observations are classified as pure monetary policy shocks when interest rates increase and equity prices decline. Observations in which both interest rates and equity prices increase are treated as information shocks and excluded. The filtered series constitutes the Swedish exogenous monetary policy shock.

For Finland, monetary policy is conducted by the European Central Bank as part of the Eurosystem. Denmark, while not a euro-area member, maintains a fixed exchange rate against the euro, resulting in very close co-movement of Danish short-term interest rates with ECB policy rates. For both countries, we build a measure of the shock based on the euro-area high-frequency monetary policy surprise series. The data for ECB surprises and the response of Stoxx 50 index around ECB announcements is taken from Jarociński's website. As discussed in the case of Sweden, we build a measure of pure monetary policy shock by implementing the poor man's sign restriction. When aggregating daily announcements to monthly frequency, we account for the aggregation bias discussed in Kilian (2024). This aggregation correction is applied consistently across all three countries.

After identifying a monetary policy shock, we estimate a structural vector autoregression (SVAR) at the quarterly frequency using 4 lags. The model is specified as follows:

$$B_0 Y_t = B(L) Y_{t-1} + \omega_t \quad \text{eq. 1}$$

Since, we estimate the model for each sector, the vector of endogenous variables (Y_t) vary. But broadly, it includes monetary policy shock, income, spending, and balance sheet.

The reduced-form residuals of SVAR are given by:

$$\varepsilon_t = B_0^{-1} \omega_t \quad \text{eq. 2}$$

Identification is achieved by imposing a recursive structure on B_0^{-1} , corresponding to a Cholesky decomposition of the reduced-form covariance matrix:

$$\begin{bmatrix} \varepsilon_t^{\text{Monetary policy}} \\ \varepsilon_t^{\text{Income}} \\ \varepsilon_t^{\text{Spending}} \\ \varepsilon_t^{\text{Debt to asset}} \end{bmatrix} = \begin{bmatrix} * & 0 & 0 & 0 & 0 \\ * & * & 0 & 0 & 0 \\ * & * & * & 0 & 0 \\ * & * & * & * & 0 \end{bmatrix} \begin{bmatrix} \omega_t^{\text{Monetary policy}} \\ \omega_t^{\text{Income}} \\ \omega_t^{\text{Spending}} \\ \omega_t^{\text{Debt to asset}} \end{bmatrix} \quad \text{eq. 3}$$

This causal ordering is grounded in the logic of post-Keynesian stock-flow consistent (SFC) models. In SFC frameworks, an exogenous disturbance - such as a monetary policy shock - immediately affects income flows, financial conditions, and asset prices within the same accounting period. Income, in turn, determines expenditure decisions contemporaneously through sector-specific propensities to consume and invest. Balance-sheet positions reflect the accumulation of past flows and therefore adjust as an accounting outcome of current income and spending decisions.

While balance-sheet structures condition behaviour, their effects on expenditure operate with a lag through financing constraints, refinancing decisions, and portfolio adjustments. The recursive ordering captures this sequencing: the monetary shock contemporaneously affects all variables; income responds within the period and shapes spending decisions in the same period. Balance-sheet positions adjust as the accounting outcome of realised income and spending flows within the period whereas balance-sheet positions feedback into spending decisions with a lag. The SVAR specification thus provides a parsimonious empirical analogue to the causal structure embedded in stock-flow consistent post-Keynesian models, allowing the dynamic interaction between policy shocks, distributive income flows, expenditure, and financial positions to be traced coherently. The impulse responses (using 68% confidence bands) are reported below:

Figure A1: Production: Income and spending

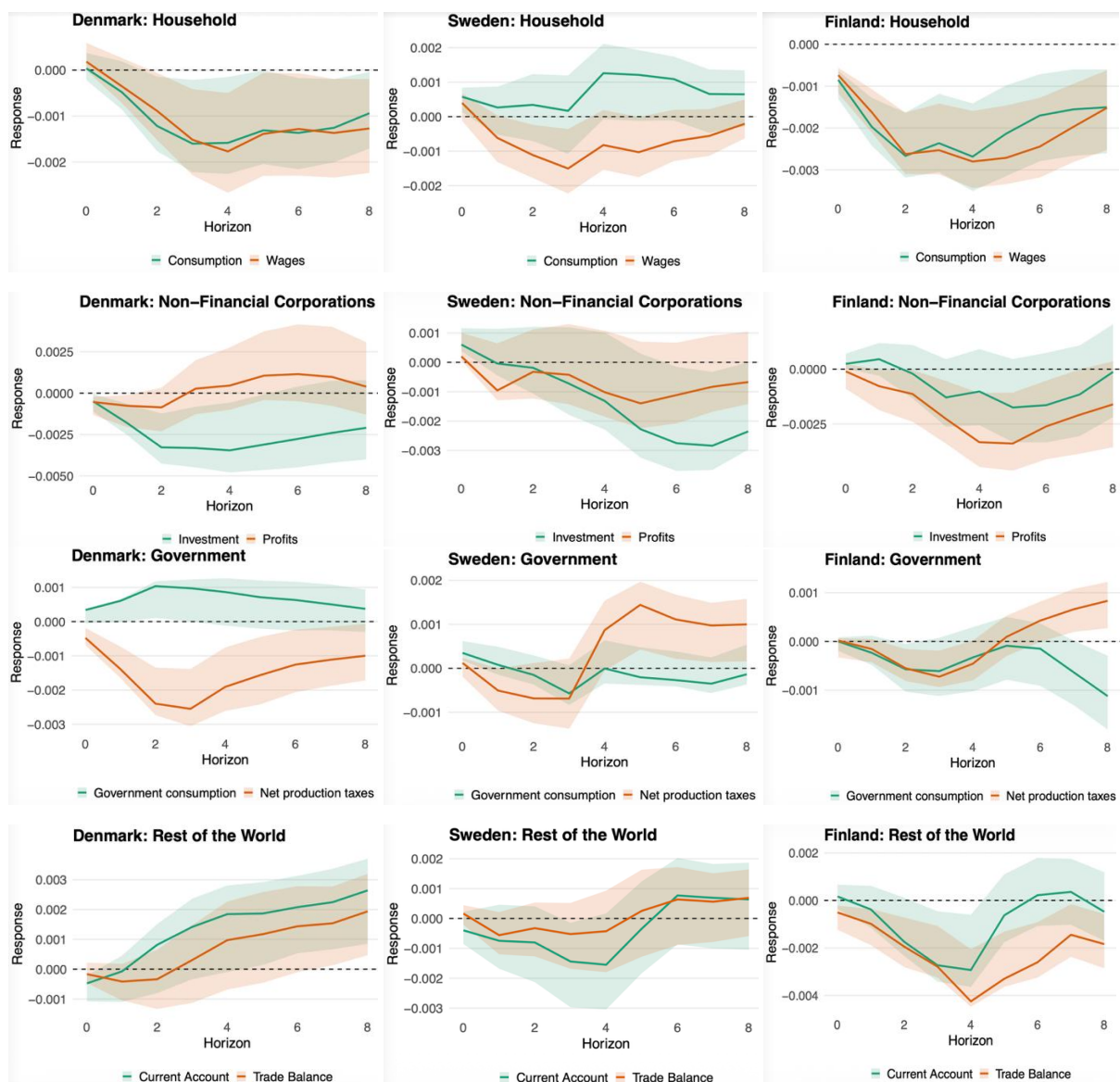


Figure A2: Redistribution and Net property Income

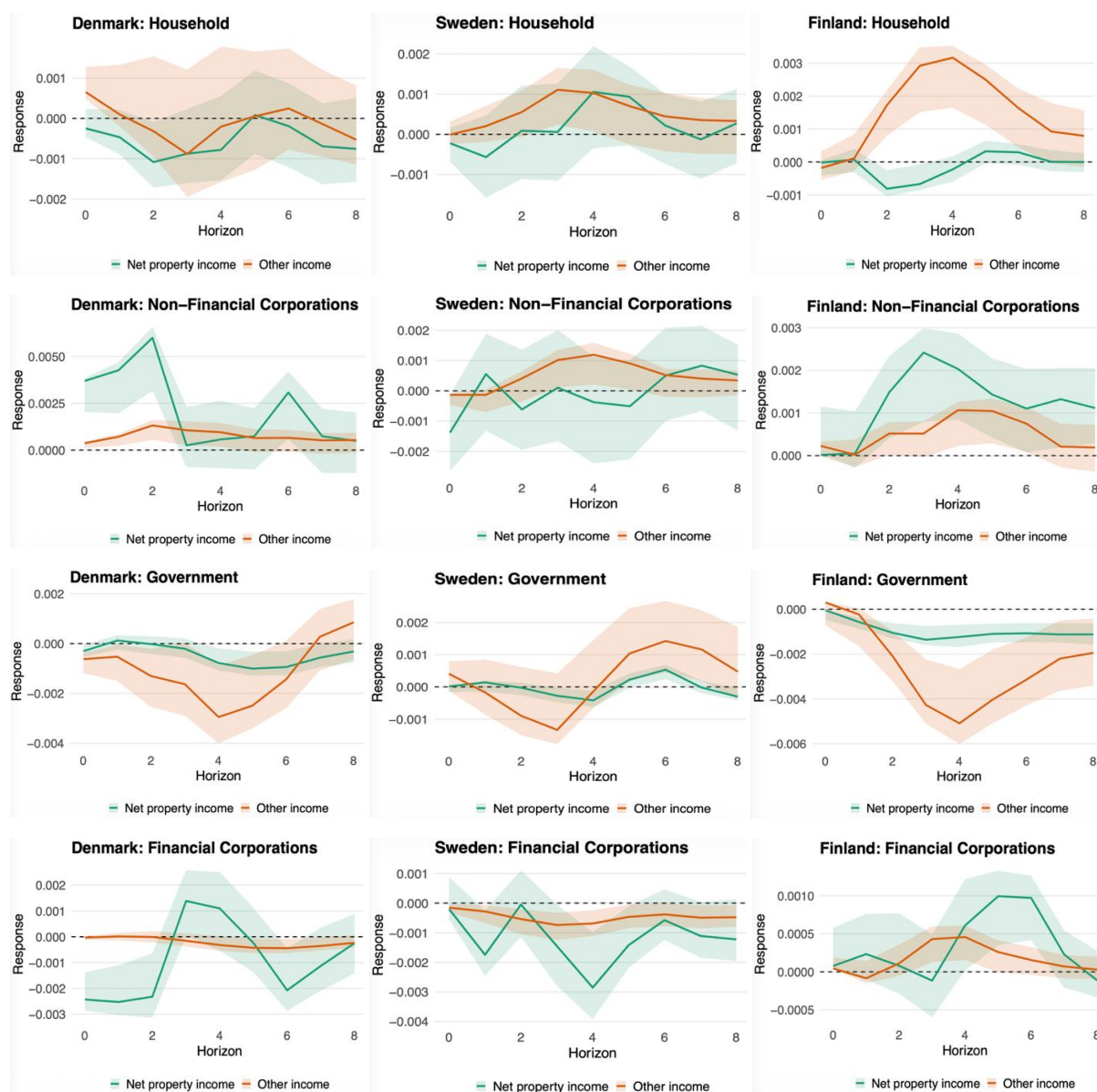


Figure A3: Balance sheet dynamics

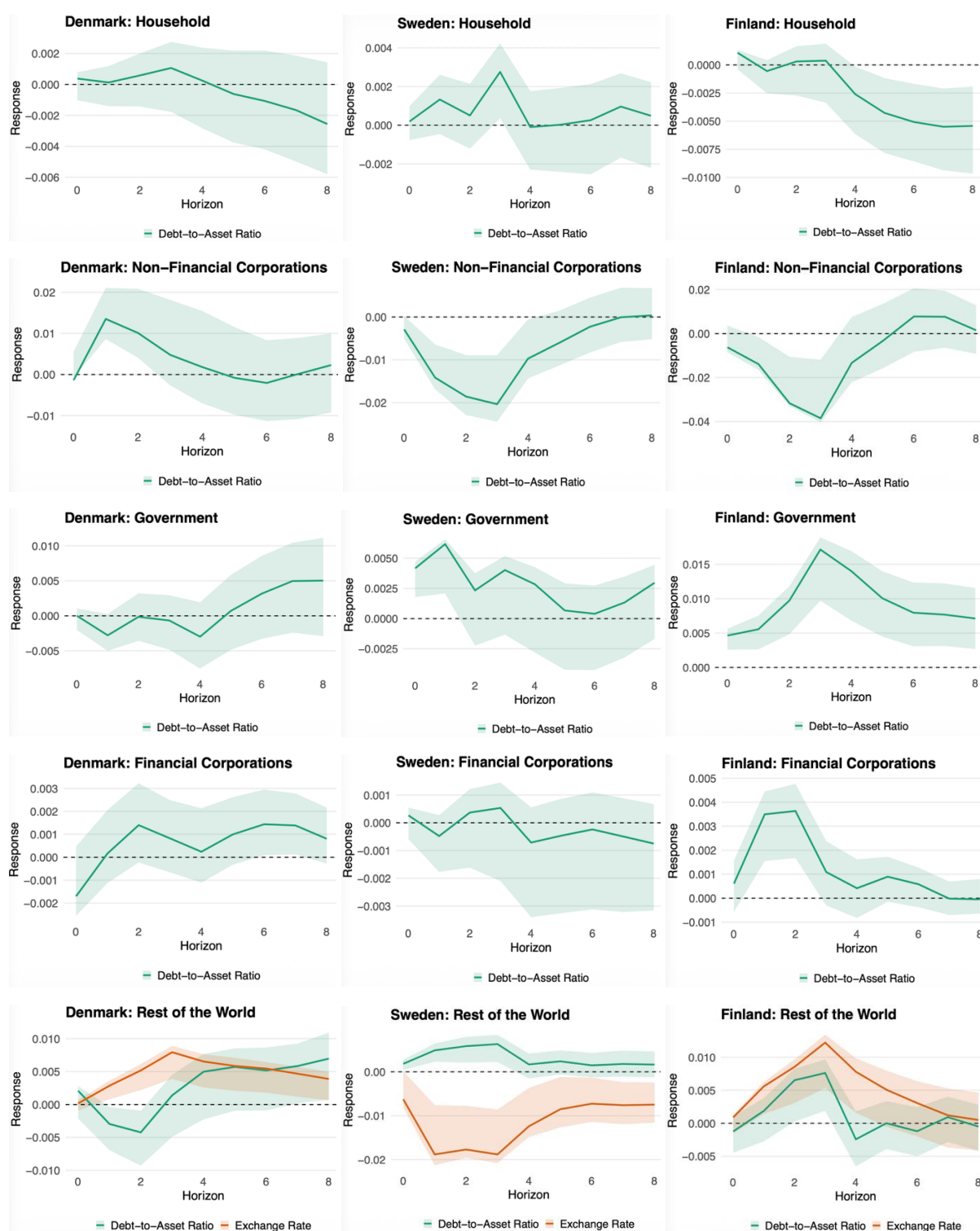
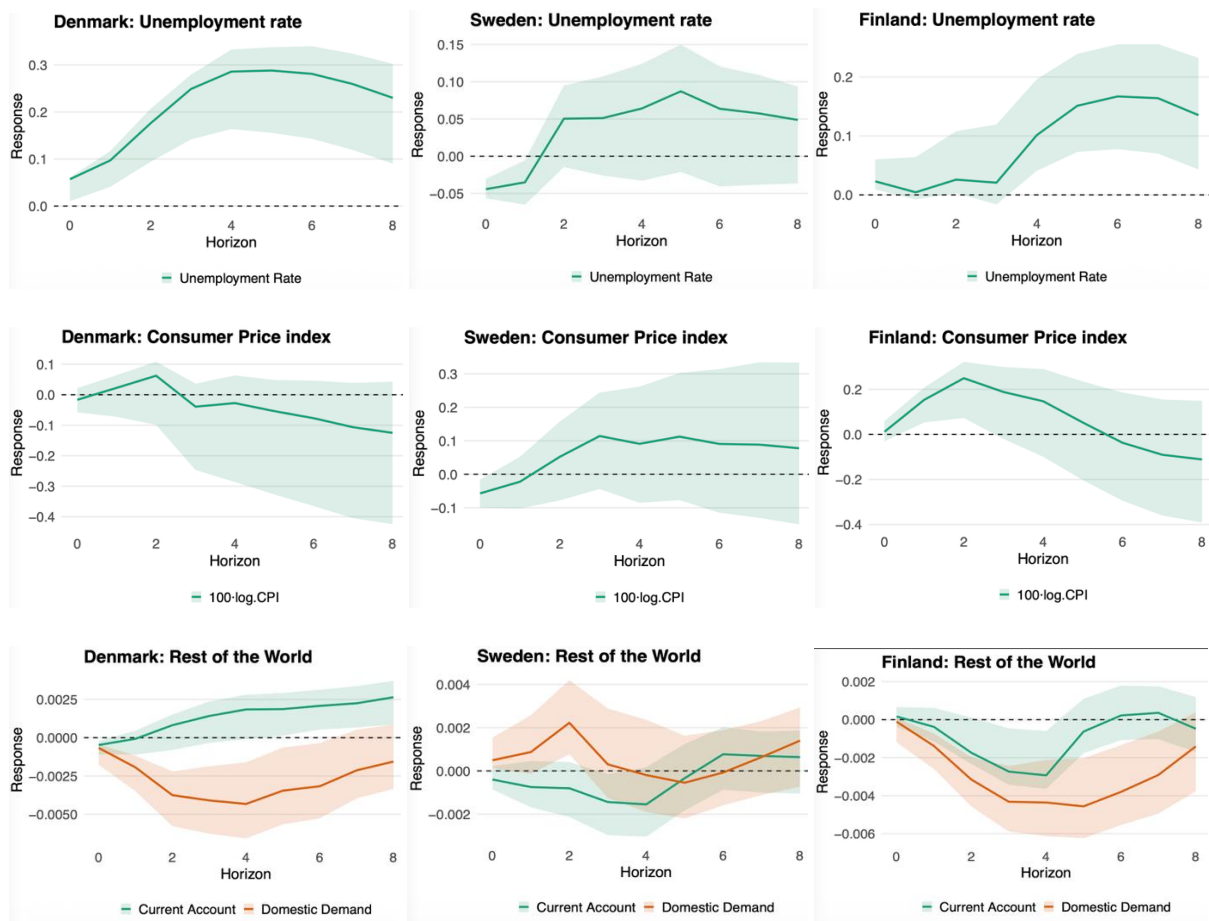


Figure A4: Prices, unemployment and macroeconomic adjustment



Information about the authors:

Hamid Raza, Associate Professor, Aalborg University Business School, raza@business.aau.dk

Jawad Khawaja, Doctoral Candidate, Department of Socioeconomics, University of Hamburg, jawad.khawaja@uni-hamburg.de

References

- Barth III, M. J., & Ramey, V. A. (2001). The cost channel of monetary transmission. *NBER macroeconomics annual*, 16, 199-240.
- Baccini, L., & Sattler, T. (2025). Austerity, economic vulnerability, and populism. *American Journal of Political Science*, 69(3), 899-914.
- Dehdari, S. H. (2022). Economic distress and support for radical right parties—evidence from Sweden. *Comparative Political Studies*, 55(2), 191-221.
- Godley, W., & Lavoie, M. (2007). Introducing the Open Economy. In *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth* (pp. 170-216). London: Palgrave Macmillan UK.
- Godley, W., and Cripps, F. (1983) “Macroeconomics”, Oxford University Press.
- Guriev, S., & Papaioannou, E. (2022). The political economy of populism. *Journal of Economic literature*, 60(3), 753-832.
- Hein, E. (2012). The macroeconomics of finance-dominated capitalism—and its crisis. In *The Macroeconomics of Finance-Dominated Capitalism—and its Crisis*. Edward Elgar Publishing.
- Hein, E. (2015). Finance-dominated capitalism and re-distribution of income: a Kaleckian perspective. *Cambridge journal of economics*, 39(3), 907-934.
- Hein, E., & Krämer, H. (2024). Kalecki’s and Keynes’s Perspectives on Achieving and Sustaining Full Employment in a Global Economy. *Post-Keynesian Economics Society Working Paper*, 2404.
- Hein, E., & Schoder, C. (2011). Interest rates, distribution and capital accumulation—A post-Kaleckian perspective on the US and Germany. *International Review of Applied Economics*, 25(6), 693-723.
- Hein, E., & Stockhammer, E. (Eds.). (2011). *A modern guide to Keynesian macroeconomics and economic policies*. Edward Elgar Publishing.
- Jarociński, M., & Karadi, P. (2020). Deconstructing monetary policy surprises—the role of information shocks. *American Economic Journal: Macroeconomics*, 12(2), 1-43.
- Kalecki, M., 1954. *Theory of economic dynamics: An essay on cyclical and long-run changes in capitalist economy*. London and New York: Routledge.
- Keen, S. (2015). Post Keynesian theories of crisis. *American Journal of Economics and Sociology*, 74(2), 298-324.
- Kilian, L. (2024). How to construct monthly VAR proxies based on daily surprises in futures markets. *Journal of Economic Dynamics and Control*, 168, 104966.
- Lavoie, M. (1995). Interest rates in post-Keynesian models of growth and distribution. *Metroeconomica*, 46(2), 146-177.

Lavoie, M. (2022). *Post-Keynesian Economics New Foundations*. 2nd ed. Cheltenham, UK: Edward Elgar Publishing. <https://doi.org/10.4337/9781839109621>

Lucas, R. E. (2004). The Industrial Revolution: Past and Future. *Annual Report 2003*, Federal Reserve Bank of Minneapolis, 18(May), 5-20.

Raza, H., Laurentjoye, T., Byrialsen, M. R., & Valdecantos, S. (2023). Inflation and the role of macroeconomic policies: A model for the case of Denmark. *Structural Change and Economic Dynamics*, 67, 32-43.

Stockhammer, E. (2022). Post-Keynesian macroeconomic foundations for comparative political economy. *Politics & society*, 50(1), 156-187.

Talving, Liisa. (2017). "The Electoral Consequences of Austerity: Economic Policy Voting in Europe in Times of Crisis." *West European Politics* 40(3): 560–83.