



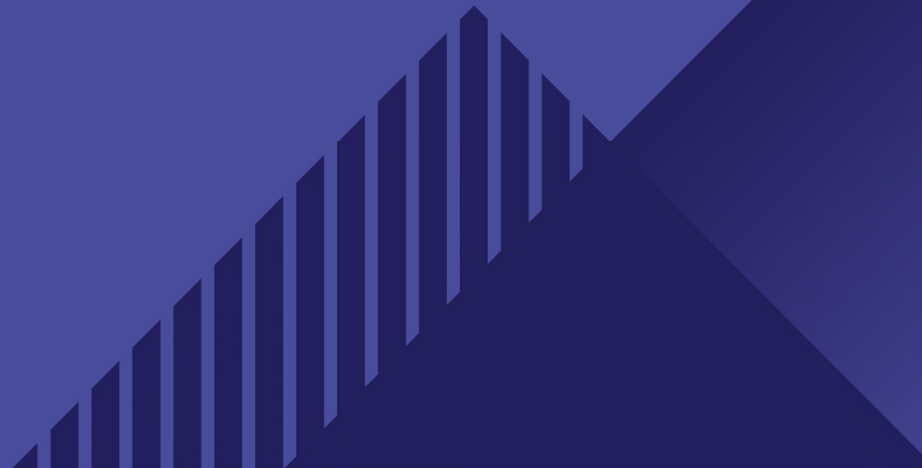
Norwegian Ministry
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Norwegian Ministry of Finance Modelling Project

Progress Update

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Progress update

- Modelling:
 - Changes to labor market to address concerns regarding response of employment and unemployment to shocks
 - Ongoing project to look at how to capture the “Scandinavian model of wage formation” in the model
 - Prototype housing model finished that we will consider adding to the main model once labor market is finished
 - Ongoing project to streamline calibration process
 - Ongoing project to estimate model. Aim for first results in late June
- Outreach and training:
 - Training course in late May/early June
 - Presentation at University of Cologne in early June
 - Workshop with Konjunkturinstitutet in August
 - New version of the documentation available shortly after summer





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Recalibration of the model

Background

- Need a robust way to update calibration of model when new model elements added
- Approach:
 - Most parameters determining steady state set to match empirical targets (e.g. depreciation rate set to match investment to GDP ratio)
 - Remaining parameters that influence steady-state (e.g. Frisch elasticity) broadly in line with latest iteration of NEMO
 - Dynamic parameters found by matching impulse responses of ten key variables in model with those in NEMO:
 - Monetary policy, productivity, consumption preference, and foreign risk premium shock
 - Parameters in monetary policy rule identical to “mimicking” policy rule in latest version of NEMO



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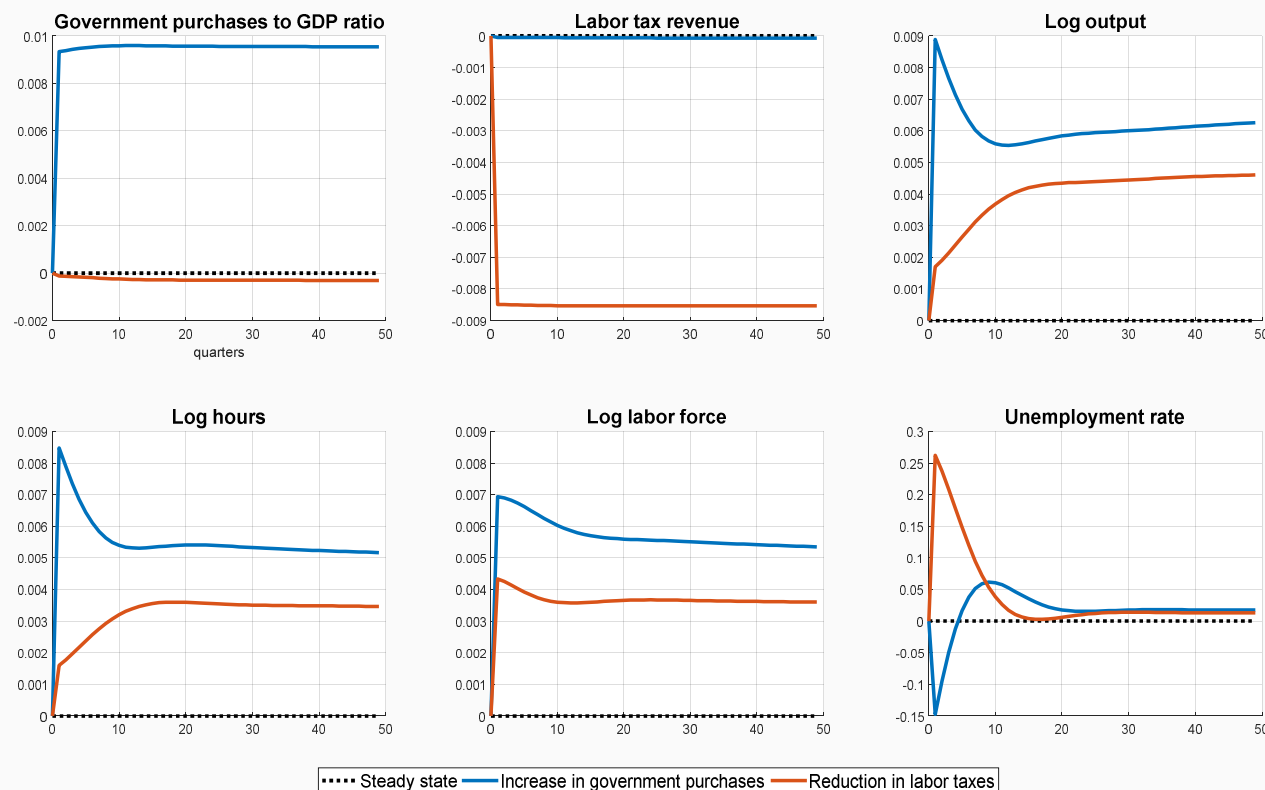
Recent changes to the labor market

Background

- Concerns about the response of employment, unemployment, and labor force participation in the model:
 - Lack of persistence in employment and unemployment, e.g. in response to a permanent government spending shock
 - Higher demand for labor should be partially met by higher labor force participation (hidden unemployment)
 - Strong supply effects on participation in the short run, while demand effects might be more important
- Thus far, model has predicted that unemployment increases in response to lower labor taxes
 - Labor force participation increases faster than employment
- KVARTS suggests a gradual increase in employment in response to sudden increase in government spending
 - In KVARTS production function only binds in steady-state
 - Short-term dynamics can be interpreted as movements in hours/worker or labor effort

Government spending and bracket tax shock with Galí unemployment

Government spending and bracket tax shock financed by lump-sum taxes



Comparison with Holden and Sparrman (2016) and KVARTS

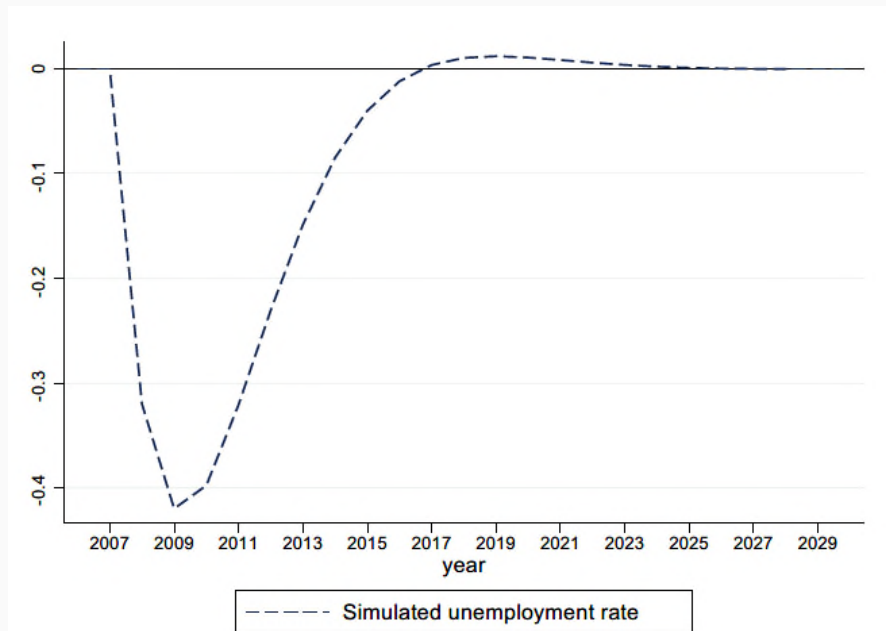
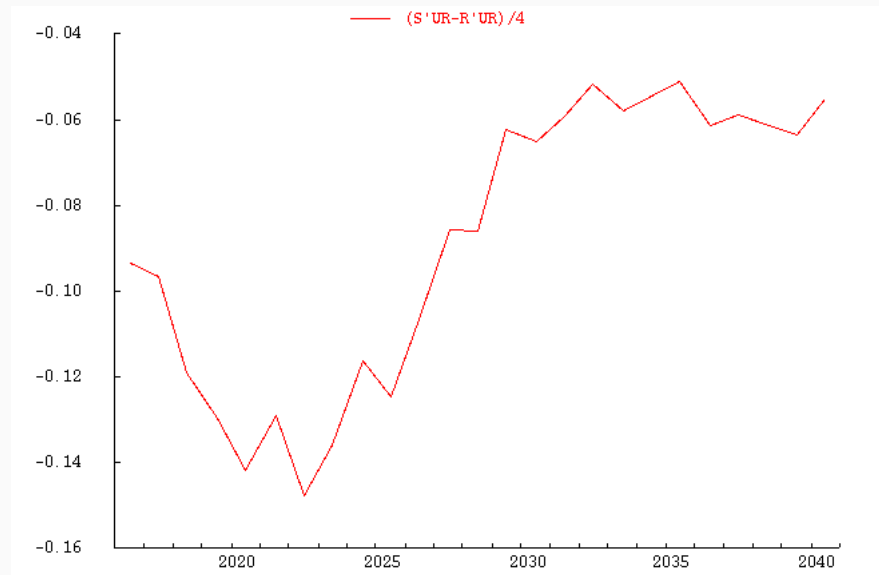


Fig. 1. Effect of a permanent increase in government purchases equal to 1 percent of GDP, from 2008, based on simulation of equation (1) with estimated coefficients from the WG Model 4 in Table 2 [Colour figure can be viewed at wileyonlinelibrary.com]



Unfinanced one percent of GDP increase in government purchases (Cappelen, 2020)

Proposed solutions

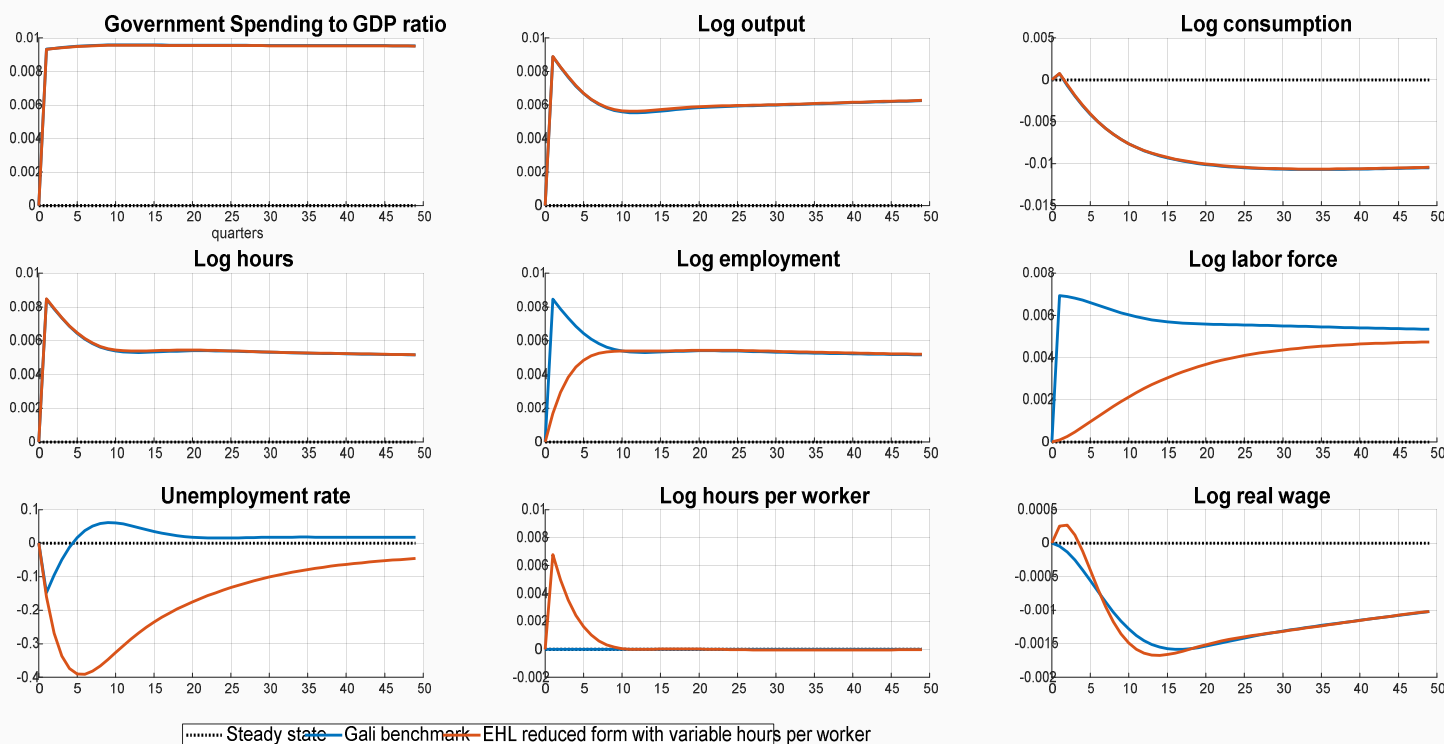
- Habits in labor supply
- Replace Galí unemployment with reduced-form equation for the labor force similar to that in KVARTS
 - Labor force positive function of after-tax wages and negative function unemployment:

$$L_t = \rho L_{t-1} + (1-\rho) \left(\bar{N}_t + \alpha + \beta((1-\tau)W_{t-1} - \overline{(1-\tau)W}_{t-1}) + \gamma(U_{t-1} - \bar{U}_{t-1}) + \epsilon \right)$$

- Introduce variable hours/worker
 - Reduced form á la Uhlig (2004)

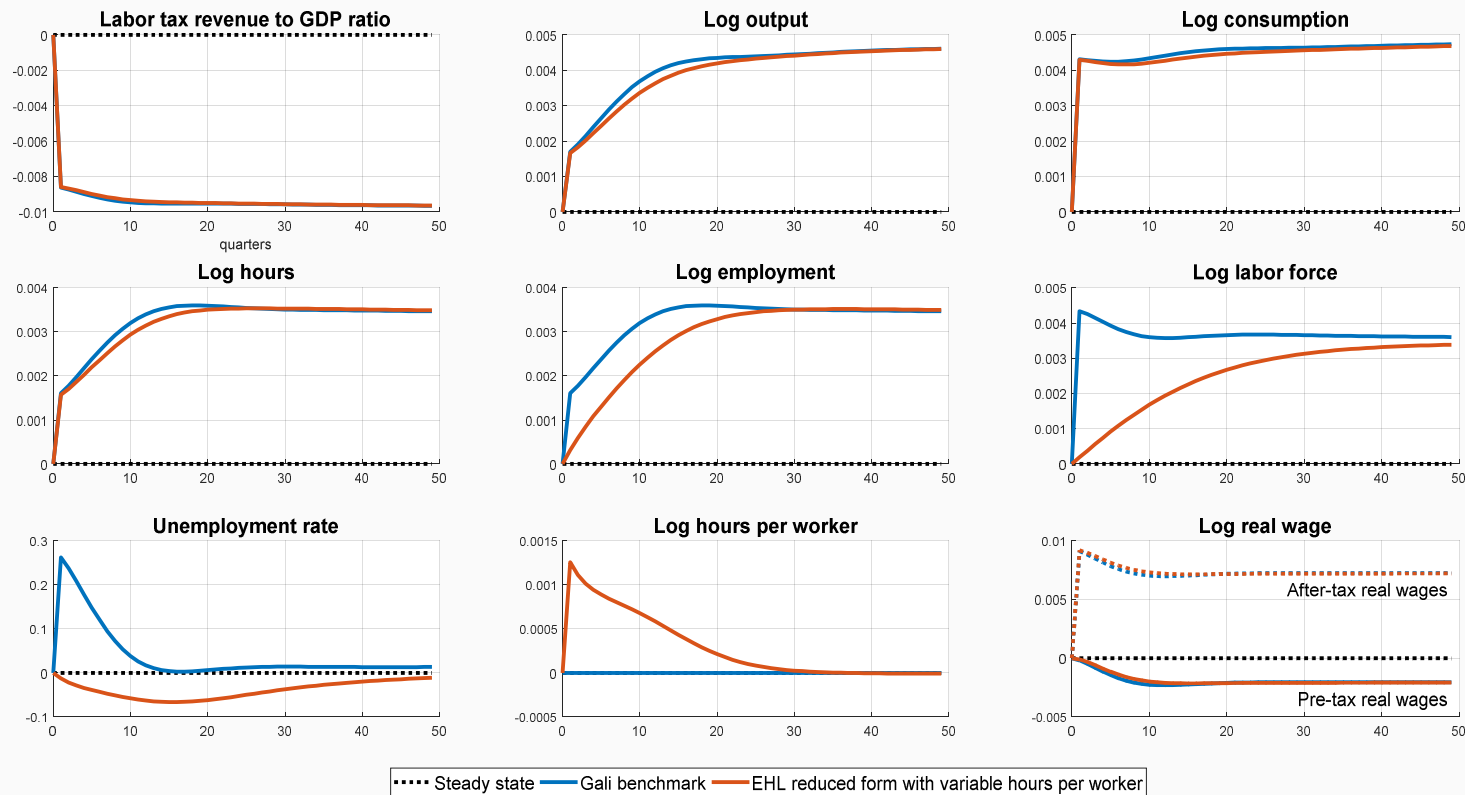
Government spending shock (comparison Galí unemployment and new reduced-form model)

Government spending shock financed by lump-sum taxes



Labor tax shock (comparison Galí unemployment and new reduced-form model)

Bracket tax shock financed by lump-sum taxes





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Scandinavian model of wage formation

Multi-pronged approach

- Check in what areas the theoretical predictions are at odds with current model
- Workshops with KVARTS team to discuss implications of theory in their model
- Theoretical modelling work to transition current model to bargaining framework
- Work very much in progress!

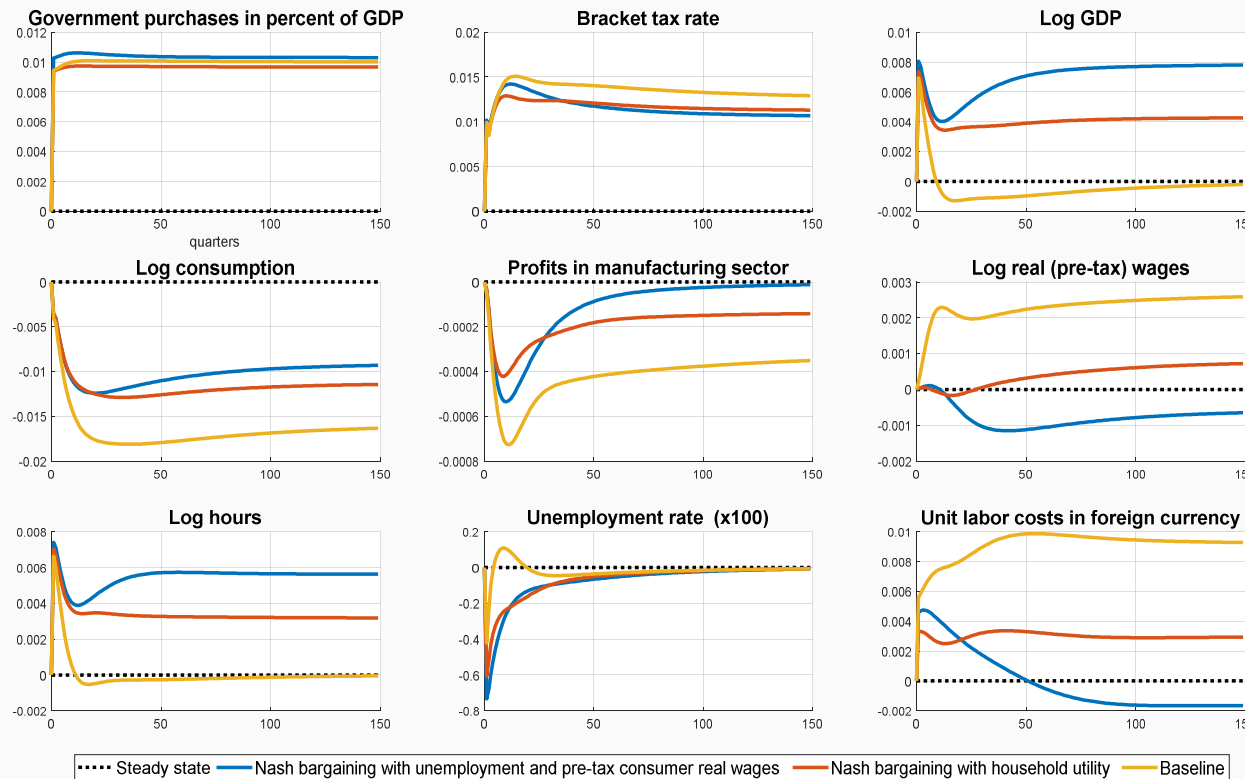
Consistency with the theoretical predictions of the Scandinavian model of wage formation?

- General long-run properties in the Scandinavian model of wage formation:
 - Constant wage shares in both exposed and sheltered sector over time
 - Same wage across sectors for the same type of work
- These properties are satisfied in our model, partly by assumption (e.g. Cobb-Douglas production function) and partly because of the model's general equilibrium mechanisms
 - Cobb-Douglas production function
 - Profitability in the exposed sector matters for wages (though indirectly)
- Areas of discrepancy with the stylized theory exist, though these can be easily justified
 - Lack of a pure exposed sector

Work on wage bargaining

- Though existing model may be qualitatively in line with predictions of Scandinavian model of wage formation, the underlying mechanism are very different
 - Existing model assumes households set wages and firms decide on employment
 - Labor demand from both the exposed and the sheltered sector are taken into account by households when they set wages
- Nymoen (2012) argues that the Scandinavian model of wage formation is consistent with bargaining between a union whose objective function depends on consumer pre-tax real wages and unemployment, and a firm that maximizes profits
 - Existing household utility function includes consumer post-tax real wages and unemployment implicitly (via consumption)
 - Households/unions in the existing framework take into account all firms labor demand
- Experiment with wage bargaining that more directly captures theory as described by Nymoen (2012)

Increase in government spending financed by higher bracket taxes



Baseline model with reduced-form labor force participation

Nash bargaining between a labor union that has the same utility function as households and firms in manufacturing sector that maximize profits

Nash bargaining between a labor union whose objective function depends on pre-tax consumer real wages and Unemployment (thus eliminating labor supply effects from disutility of labor), and firms in the manufacturing sector that maximize profits.

Some thoughts on wage bargaining

- Manufacturing firms are always more profitable with unions, relative to a setup where households set wages
- Firms influence wage setting and determine labor demand
 - Higher employment and lower wages. BUT consumption and output is also higher so not clear workers worse off
- Wage bargaining á la Nymoen removes any disincentive to working
 - Results in significant increase in fiscal multipliers
- Wage bargaining removes labor supply decision from households
 - Removes traditional distortionary effects of labor taxes on labor supply unless these taxes enter into objective function (or constraint) of union
 - Indirect channel through effect of labor taxes on labor force participation and unemployment
 - At odds with discussion in Scheel tax commission (and Lotte Arbeid)

Way forward?

- Ensure union objective function preserves distortionary effects of taxation on labor supply
 - Unions care about after-tax instead of pre-tax real wages
 - Unions care about household utility
 - Strong indirect channel through unemployment
- Ensure union objective function preserves disincentive to work in long run
- Move away from Nash bargaining and assume wages set by a union that cares about household utility and manufacturing sector profits



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Thank you!