Box C: A Simulation of the Macroeconomic Impact of Fiscal Transfers to Households using the Monetary Model of Singapore

Introduction

This box illustrates the macroeconomic impact of fiscal policy via a simulation of a one-off transfer from the government to households in the Monetary Model of Singapore (MMS). Examples of such cash transfers include the Solidarity Payment all Singaporean adults received during the circuit breaker period in 2020 and the Cost-of-Living Special Payments in Budget 2023.

The MMS is EPG's flagship model for analysing macroeconomic policies and shocks to the Singapore economy.[1] EPG has continuously refined the model over the past two decades to improve its analytical and simulation capabilities (Murphy, 2022). In 2018, the fiscal levers in the MMS were enhanced, improving the model's ability to analyse the impact of various fiscal measures (Monetary Authority of Singapore, 2019).

In 2021, the key behavioural consumption equation, which describes households' consumption decisions given incomes, prices and the desired level of national wealth, was revamped. The new equation is modelled using the "National Wealth Target" consumption function proposed by Murphy (2020), which is specifically formulated such that countercyclical tax policies are effective in the short run, even as fiscal neutrality holds in the long run. In this framework, households will respond to an increase in government spending or tax cut by consuming more in the near term, in line with empirical evidence that consumption increases with higher government spending (Crichton *et al.*, 2014). However, they will gradually reduce their consumption over the medium to long term to account for the government's intertemporal budget constraint, consistent with the idea that households understand that the government budget needs to be sustainable in the long run (Murphy, 2022). This is an improvement over the previous Ando-Modigliani specification, which relies solely on a balanced-budget rule.

The revised consumption equation, together with the rest of the behavioural equations in the MMS, provides a broad representation of the complex workings of the Singapore economy. This box presents a simulation of a fiscal transfer to households to illustrate the key transmission channels by which transfers would impact the Singapore economy.

Macroeconomic Impact of a Government Cash Transfer

The government is assumed to make cash transfers to households totalling $1 billion within a single quarter, with every resident household receiving an equal amount. The transfers raise households' nominal disposable income and initiate a series of dynamic adjustments within the economy, through channels laid out in **Figure C1** below.

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[1]   For more details, see Monetary Authority of Singapore (2014), The Monetary Model of Singapore (MMS): A Technical Overview.

Figure C1 Stylised Transmission Channels for an Increase in Government Transfers
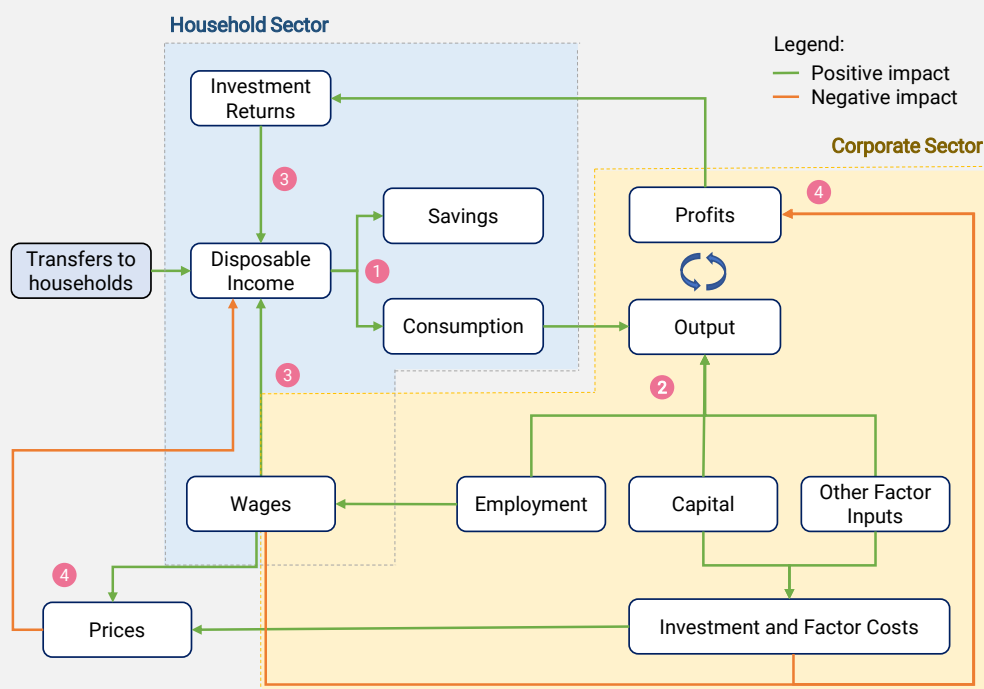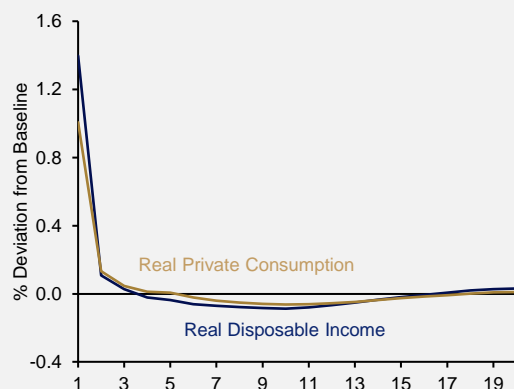

Source: EPG, MAS

1) Households increase their consumption in response to a rise in disposable income, albeit by less than one-for-one, as some of the additional income is saved.[2]

2) Firms produce more output to meet the higher level of demand for goods and services. In turn, their demand for workers, capital and other factor inputs (e.g., outsourced services and raw materials) increases.

3) Average household labour income then increases as employment rises, and as wages increase in response to a tighter labour market. Higher corporate profits also boost households' capital income. The increase in disposable income then leads to an additional positive impact on consumption.

4) Over time, however, general equilibrium dynamics kick in. Greater competition for scarce resources drives up the cost of production, inducing firms to raise prices and cut back on production. Higher prices in the economy reduce households' real purchasing power and consumption. With the pullback in production and spending, the economy eventually converges back to the scenario absent the additional transfers.

The simulation results show that, on net, the cash transfer of $1 billion raises real disposable income of households by 1.4% in the quarter of disbursement (i.e., T=1) **(Chart C1)**. Real disposable income is supported beyond the baseline (i.e., a scenario absent transfers) for three quarters after disbursement, primarily as a result of the subsequent increases in local employment and nominal resident wages **(Chart C2)**. Households also see some gains in their investment returns alongside an increase in firms' gross operating surplus,

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[2]   Data from the *Household Expenditure Survey 2017/18* suggest that households in Singapore have an average propensity to consume of 0.6.
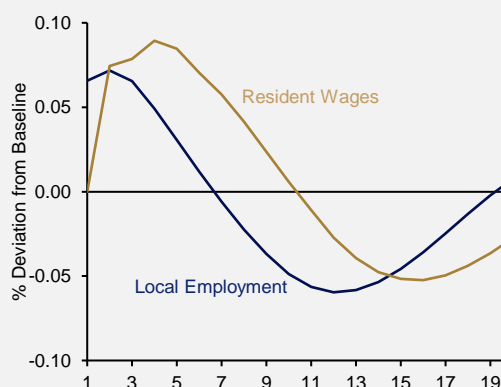
but this effect fades by the third quarter as firms' profit increases are eroded by a rise in production costs.

Chart C1 Impact on Real Personal Disposable Income and Private Consumption
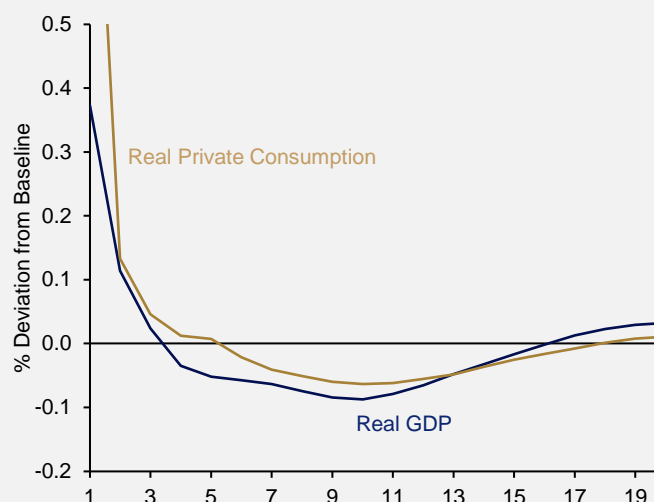

Source: EPG, MAS estimates

Chart C2 Impact on Nominal Resident Wages and Local Employment

Source: EPG, MAS estimates

Real private consumption rises by 1% in response to the boost to disposable income, in line with the empirical evidence that transfers lead to increased household spending immediately (Agarwal and Qian, 2014, Agarwal *et al.*, 2023). Private consumption remains above the baseline for two quarters longer than the boost to disposable income, reflecting habit persistence. This captures the idea that households' utility is influenced in part by the relative level of current to past consumption. Over the medium to long run, private consumption declines slightly below the baseline. This illustrates the effects of Ricardian behaviour kicking in as households gradually increase their savings to offset the fall in government savings.

Overall, real GDP rises initially, as firms ramp up their production to meet the increase in aggregate demand **(Chart C3)**. However, the impact of higher consumption on GDP is partially eroded by a rise in real imports. As a highly open economy, Singapore imports goods and services for consumption and intermediate inputs for production. Imports are further increased over time as higher domestic prices cause households and businesses to switch away from domestic output. Accordingly, real GDP falls below the baseline by the fourth quarter, ahead of consumption.

Chart C3 Impact on Real GDP versus Private Consumption

Source: EPG, MAS estimates

Sum-up

This box describes the transmission channels through which a one-off transfer from the government to households temporarily boosts consumption and GDP in the Singapore economy. Besides household transfers, the MMS is also used extensively to analyse Singapore's variety of fiscal policy measures within a consistent general equilibrium framework.

References

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