1 Introduction

Fiscal policies that aim to boost consumer spending in recessions have been tried in many countries in recent decades. The nature of such policies has varied widely, perhaps because traditional macroeconomic models have not provided plausible guidance about which ones are likely to be most effective—either in reducing misery (a 'welfare metric') or in increasing output (a 'GDP metric').

But a new generation of macro models has shown that when microeconomic heterogeneity across consumer circumstances (wealth; income; education) is taken into account, the consequences of an income shock for consumer spending depend on a measurable object: the intertemporal marginal propensity to consume (iMPC) introduced in Auclert, Rognlie, and Straub (2018). The iMPC extends the notion of marginal propensity to consume to account for the speed at which households spend. Fortuitously, new sources of microeconomic data, particularly from Scandinavian national registries, have recently allowed the first high-quality measurements of the iMPC (Fagereng, Holm, and Natvik (2021)).

Even in models that can match a given measured iMPC pattern, the relative merits of alternative policies depend profoundly both on the metric (welfare or GDP) and on the quantitative structure of the rest of the model – for example, whether multipliers exist and whether the degree of multiplication is different under different economic conditions. Here, after constructing a microeconomically credible heterogeneous agent (HA) model (see below for our credibility criteria), we examine that model's implications for how effects of stimulus policies depend on the existence, nature, and timing of any "multipliers," which, following Krueger, Mitman, and Perri (2016), we model in a clean and simple way, so that the interaction of the multiplier (if any) with the other elements of the model is reasonably easy to understand. This partial equilibrium analysis allows us to transparently incorporate the possibility that multipliers may be larger in recessions. But we understand that a richer general equilibrium framework could introduce transmission channels absent from the partial equilibrium analysis, so we also analyze a standard HANK-and-SAM model GE model modified to embed our households' consumption responses.[1]

By "microeconomically credible," we mean a model that can match three things that we take to be essential stylized facts: (1) the measured iMPCs from Fagereng, Holm, and Natvik (2021), (2) the cross-sectional distribution of liquid wealth[2] and (3) the 'excess initial MPC' in the pattern of spending induced by the unanticipated transitory shock.

By 'excess' initial MPC we mean the following. Standard HA models[3] can match both the initial distribution of liquid wealth and the pattern of spending in periods after the shock arrives (the 'out years' in Fagereng, Holm, and Natvik (2021)). But, for models that match these facts, the prediction for immediate spending is considerably below the actual spending measured in that initial period.

[1] The Econ-ARK toolkit with which the partial equilibrium model was solved constructs the Jacobians necessary to connect a steady-state version of the model to the SSJ Toolkit.

[2] following Kaplan and Violante (2014)'s definition of liquid wealth.

[3] For example, specifically the model in Carroll, Slacalek, Tokuoka, and White (2017).

If multipliers are operative only in recessions (or are more powerful in recessions), a model that fails to capture the excess initial MPC might generate the wrong answers for the effectiveness of the alternative fiscal policies.

In the literature review below, we describe a substantial and longstanding literature in which the pattern of an excess initial MPC has been documented, and an active recent literature proposing various potential theoretical explanations.

The purpose of our paper is not to weigh in on which (if any) of these models is right. Instead we sought the simplest modeling device that would capture the empirical fact of an excess initial MPC and permit unambiguous welfare calculations. We accomplish this by adding to the standard model something we call "splurge" beahavior, in which each household has a portion of income out of which they have a high MPC, and the remainder of their income is disposed of as in standard buffer-stock micro models with mildly impatient but time-consistent consumers. Because of the evidence of high initial MPC's even among wealthy households, we assume that this splurge behavior is the same across households and independent of their liquid wealth holdings.[4]

Our resulting structural model could be used to evaluate a wide variety of consumption stimulus policies. We examine three that have been implemented in recent recessions in the United States (and elsewhere): an extension of unemployment insurance (UI) benefits, a means-tested stimulus check, and a payroll tax cut.

Our first metric of policy effectiveness is "spending bang for the buck": For a dollar of spending on a particular policy, how much multiplication is induced? First, we calculate the policy-induced spending dynamics in an economy with no multiplier (and, therefore, with no multiplication-bang-for-the-buck). We then follow Krueger, Mitman, and Perri (2016)'s approach to modeling the aggregate demand externality, in which output depends mechanically on the level of consumption relative to steady state. But in contrast to Krueger, Mitman, and Perri (2016), the aggregate demand externality in our model is switched on only when the economy is experiencing a recession—there is no multiplication for spending that occurs after our simulated recession is over.

Because our model's outcomes reflect the behavior of utility-maximizing consumers, we can calculate another, possibly more interesting, measure of the effectiveness of alternative policies: their effect on consumers' welfare. Even without multiplication, a utility-based metric can justify countercyclical policy because the larger idiosyncratic shocks to income that occur during a recession may justify a greater-than-normal degree of social insurance. We call this 'welfare bang for the buck.'

The principal difference between the two metrics is that what matters for the degree of spending multiplication is how much of the policy-induced extra spending occurs during the recession (when the multiplier matters), while effectiveness in the utility metric also depends on who is doing the extra spending (because the recession hits some households much harder than others).

Because high-MPC consumers have high marginal utility, a standard aggregated welfare function would favor redistribution to such consumers even in the absence of a

[4]Proponents of any of the theoretical models articulated above might choose to think of our splurge as a reduced form for a deeper explanation; we would not necessarily resist such an interpretation.

recession. We are interested in the degree of *extra* motivation for social insurance that is present in a recession, so we construct our social welfare metric specifically to measure only the *incremental* social welfare effect of alternative policies during recessions (beyond whatever redistributional logic might apply during expansions – see section 4.3).

When the multiplier is active, any reduction in aggregate consumption below its steady-state level directly reduces aggregate productivity and thus labor income. Hence, any policy stimulating consumption will also boost incomes through this aggregate demand multiplier channel.

Our results are intuitive. In the economy with no recession multiplier, the benefit of a sustained payroll tax cut is negligible.[5] When a multiplier exists, the tax cut has more benefits, especially if the recession continues long enough that most of the spending induced by the tax cut happens while the economy is still in recession (and the multiplier still is in force). The typical recession, however, ends long before our "sustained" wage tax cut is reversed—and even longer before lower-MPC consumers have spent down most of their extra after-tax income. Accordingly, even in an economy with a multiplier that is powerful during recessions, much of the wage tax cut's effect on consumption occurs when any multiplier that might have existed in a recession is no longer operative.

Even leaving aside any multiplier effects, the stimulus checks improve welfare more than the wage tax cut, because at least a portion of such checks go to unemployed people who have both high MPCs and high marginal utilities (while wage tax cuts, by definition, go only to persons who are employed and earning wages). The greatest "welfare bang for the buck" comes from the UI insurance extension, because many of the recipients are in circumstances in which they have a much higher marginal utility than they would have had in the absence of the recession, whether or not the multiplier aggregate demand externality exists.

And, in contrast to the wage-tax cut, both the UI extension and the stimulus checks concentrate most of the marginal increment to consumption at times when the multiplier (if it exists) is still powerful. A disadvantage of the UI extension, in terms of "spending bang for the buck," is that (relative to the assumed-to-be-immediate-upon-recession checks) it takes somewhat more time until the transfers reach the beneficiaries. Countering this disadvantage is the fact that the MPC of UI recipients is higher than that of stimulus check recipients, and, furthermore, the insurance nature of the UI payments reduces the precautionary saving motive. In the end, our model says that these two forces roughly balance each other, so that the spending-bang-for-the-buck of the two policies is similar. In the welfare metric, however, there is considerable marginal value to UI recipients even if they receive some of the benefits after the recession is over (and

[5] One reason there is any (welfare) benefit at all, even for people who have not experienced an unemployment spell, is that the heightened risk of unemployment during a recession increases the marginal value of current income because it helps them build extra precautionary reserves to buffer against the extra risk. A second benefit is that, for someone who becomes unemployed some time into the recession, the temporary tax reduction will have allowed them to accumulate a larger buffer to sustain them during unemployment. Finally, in a recession, there are more people who will have experienced a spell of unemployment, and the larger population of beneficiaries means that the consequences of the prior mechanism will be greater. But, quantitatively, all of these effects are small.

no multiplier exists). Hence, in the welfare metric, the relative value of UI benefits is increased compared with the policy of sending stimulus checks.

We conclude that extended UI benefits should be the first weapon employed from this arsenal, as they have a greater welfare benefit than stimulus checks and a similar (multiplied) spending effect. But a disadvantage is that the total amount of stimulus that can be accomplished with the UI extension is constrained by the fact that only a limited number of people become unemployed. If more stimulation is called for than can be accomplished via the UI extension, checks have the advantage that their effects scale almost linearly in the size of the stimulus—see Beraja and Zorzi (2023) for a more detailed exposition of the relation between MPC and stimulus size. The wage tax cut is also, in principle, scalable, but its effects are smaller than those of checks because recipients have lower MPCs and marginal utility than check and UI recipients. In the real world, a tax cut is also likely the least flexible of the three tools: UI benefits can be further extended, and multiple rounds of checks can be sent, but multiple rounds of changes in payroll tax rates would likely be administratively and politically more difficult.

One theme of our paper is that which policies are better or worse, and by how much, depends on both the quantitative details of the policies and the quantitative modeling of the economy.

But the tools we are using could be reasonably easily modified to evaluate a number of other policies. For example, in the COVID-19 recession in the US, not only was the duration of UI benefits extended, but those benefits were also supplemented by substantial extra payments to every UI recipient. We did not calibrate the model to match this particular policy, but the framework could accommodate such an analysis.

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