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## Taking off into the Wind: Unemployment Risk and State-Dependent Government Spending Multipliers

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### Abstract

We propose a model with involuntary unemployment, incomplete markets, and nominal rigidity, in which the effects of government spending are state-dependent. An increase in government purchases raises aggregate demand, tightens the labor market and reduces unemployment. This in turn lowers unemployment risk and thus precautionary saving, leading to a larger response of private consumption than in a model with perfect insurance. The output multiplier is further amplified through a composition effect, as the fraction of high-consumption households in total population increases in response to the spending shock. These features, along with the matching frictions in the labor market, generate significantly larger multipliers in recessions than in expansions. As the pool of job seekers is larger during downturns than during expansions, the concavity of the job-finding probability with respect to market tightness implies that an increase in government spending reduces unemployment risk more in the former case than in the latter, giving rise to countercyclical multipliers.

*Keywords:* Government spending, Multipliers, Precautionary saving, State dependence, Unemployment risk.

*JEL classification:* D52, E21, E62.

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the net effects of the increase in public spending (i.e., conditional on the Covid-19 shock) and contrasts them with those obtained when the same spending shock occurs at the steady state. The effects are clearly state dependent, being significantly larger in the Covid-19 recession than around the steady state. The present-value spending multiplier is 30% larger in the former case than in the latter (1.221 versus 0.945).<sup>33</sup>

## 6. Concluding Remarks

In this paper, we have developed a model with involuntary unemployment, incomplete markets and real wage rigidity, in which government spending increases labor-market tightness and lowers unemployment. Because markets are incomplete, precautionary saving and changes in the fraction of unemployed households in the population amplify the aggregate effects of government spending. The non-linearity arising from endogenous variations in unemployment risk implies that those effects are state dependent, spending multipliers being larger in recessions than in expansions. In particular, the output and consumption multipliers increase exponentially with the size of the recession but fall linearly with the size of the expansion. The extent of state dependence generated by the model is substantially larger than that obtained from an otherwise identical economy in which unemployment risk is fully insured.

The mechanism put forward in this paper is certainly not the only channel through which spending multipliers can exhibit state dependence; some earlier studies have succeeded in generating highly countercyclical multipliers — even exceeding 1 in recession — without relying on incomplete insurance against unemployment risk. However, by taking into consideration unemployment risk, our framework contains the key ingredients to analyze other aspects of fiscal policy for which household heterogeneity is of first-order importance — such as

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<sup>33</sup>The value of the unconditional multiplier (i.e., computed around the steady state) differs from that reported in Section 3 because the spending shock does not feature the same persistence.

social transfers and unemployment insurance. Those questions, as well as the normative implications of our results, are left for future research.

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Table 1: Parameter values.

Subjective interest rate	$\rho = 0.01$
Steady-state quarterly real interest rate	$r = 0.8977\%$
Frisch elasticity of labor supply	$1/\psi = 1$
Labor-disutility parameter	$\omega$ adjusted to get $\ell = 1$
Steady-state markup	$(\varepsilon - 1)^{-1} = 0.2$
Price-adjustment-cost parameter	$\varphi = 80$
Separation rate	$s = 0.025$
Job-finding rate	$f = 0.3039$
Worker-finding rate	$q = 0.7$
Matching curvature	$\alpha = 1$
Wage elasticity w.r.t to labor productivity	$\eta = 0.45$
Matching efficiency	$\chi = 1.0039$
Unit vacancy-posting cost	$\xi = 0.5452\bar{w} = 0.4402$
Replacement rate	$h = 0.6$
Labor-income tax rate	$\tau = 0.3076$
Government spending in GDP	$g/y = 0.2$
Debt to annual GDP ratio	$b/(4y) = 0.6$
Tax-rule-feedback parameter	$d_T = 0.1$
Steady-state inflation rate	$\bar{\pi} = 0$
Monetary-policy-rule parameter	$d_\pi = 1.5$
Persistence of government spending shocks	$\rho_g = 0.8$
Persistence of productivity shocks	$\rho_z = 0.9$

Table 2: Unconditional output multipliers.

	Present-value multiplier
Benchmark economy	0.8558
Variants	
No composition effect	0.8133
Complete markets	0.6562
No intensive margin	0.4870
Flexible prices	0.6679
Tax financing	0.5598
Endogenous spending rule	0.8512

Note: The unconditional multipliers are derived by assuming that the economy is initially in the steady state.

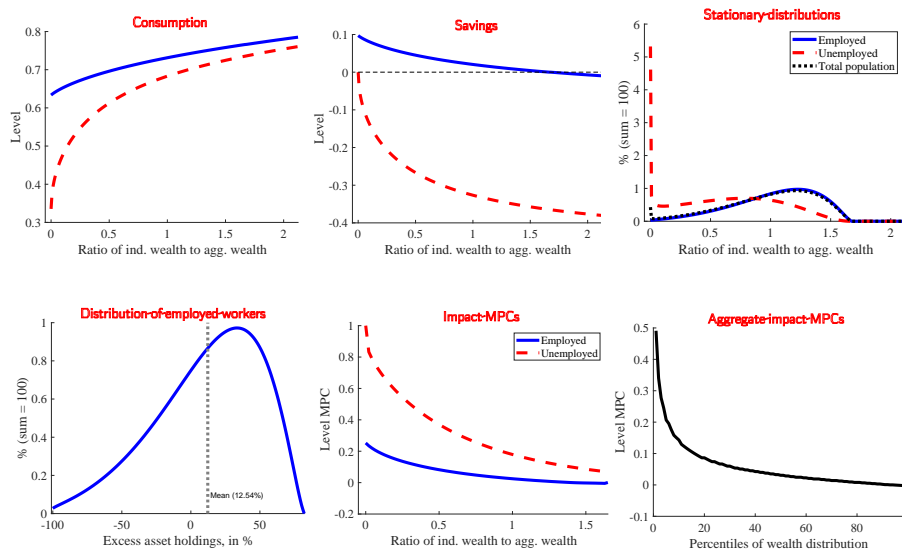
Table 3: State-dependent output multipliers.

	Present-value multiplier		
	Expansion	Recession	Difference
Benchmark economy	0.7995	1.0207	27.67%
Variants			
No composition effect	0.7779	0.9166	17.82%
Complete markets	0.6344	0.7149	12.69%
No intensive margin	0.3484	1.1124	219.32%
Flexible prices	0.6839	0.6342	-7.27%
Tax financing	0.4432	0.8593	93.88%
Endogenous spending rule	0.7984	1.0000	25.25%

Note: Expansions (resp. recessions) are generated by assuming that the economy is hit by a positive (resp. negative) productivity shock.



Figure 1: Policy functions, stationary distributions and MPCs.



Notes: MPCs are computed conditional on a transfer shock. Excess asset holdings are measured as the difference between the amount of assets held by an employed household under incomplete and complete markets.

Figure 2: Impulse responses to a 5% government spending shock around the steady state.

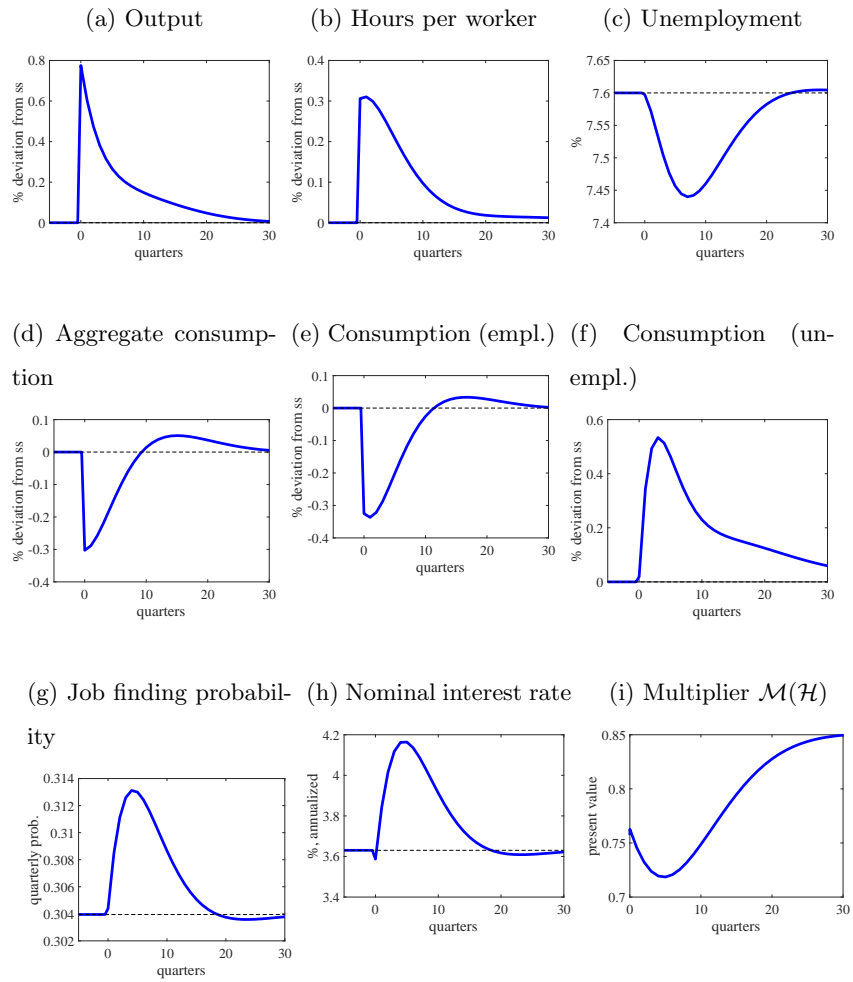
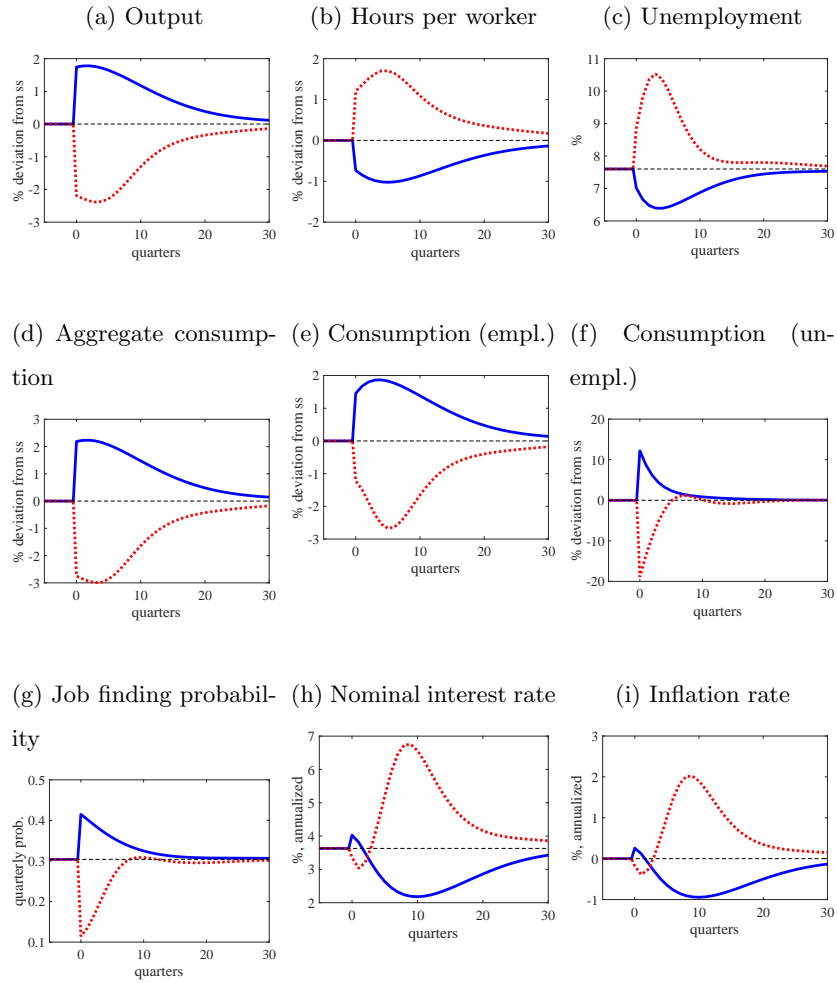
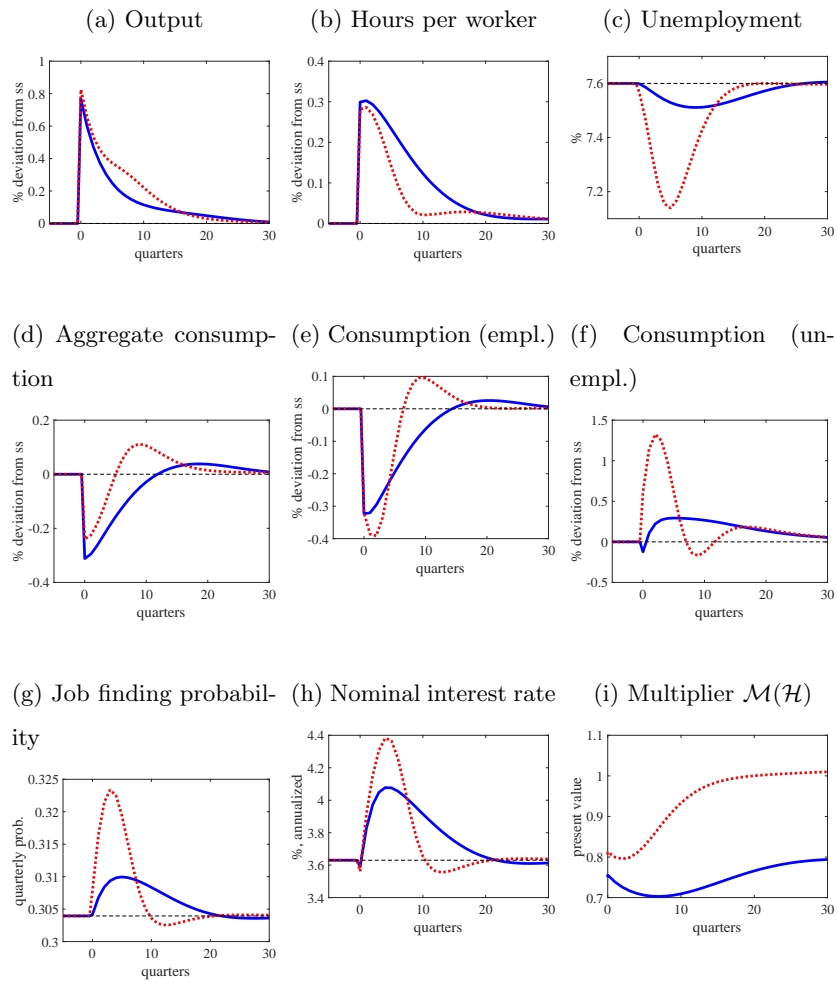


Figure 3: Impulse responses to 3% productivity shocks.



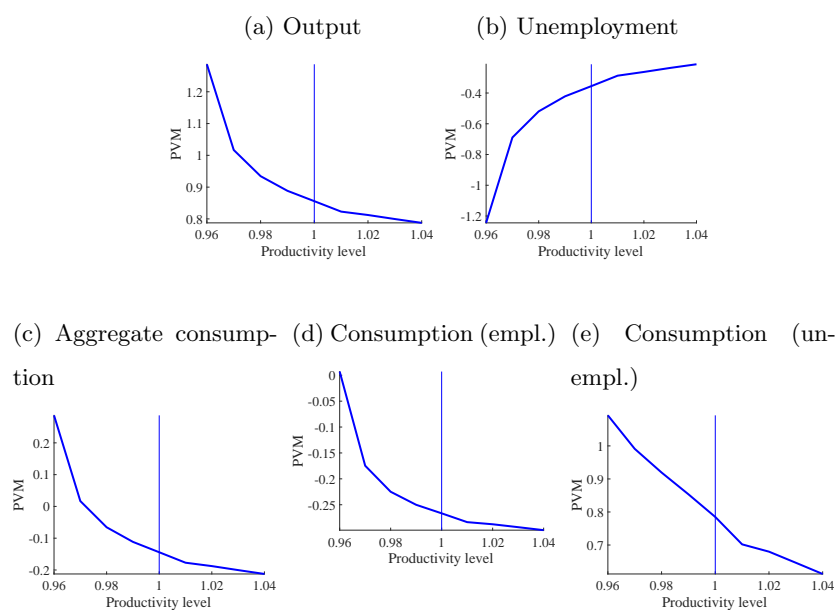
Solid blue: 3% positive shock. Dotted red: 3% negative shock.

Figure 4: Impulse responses to a 5% government spending shock. Net effect in recession and expansion.



Solid blue: conditional on an expansion. Dotted red: conditional on a recession.

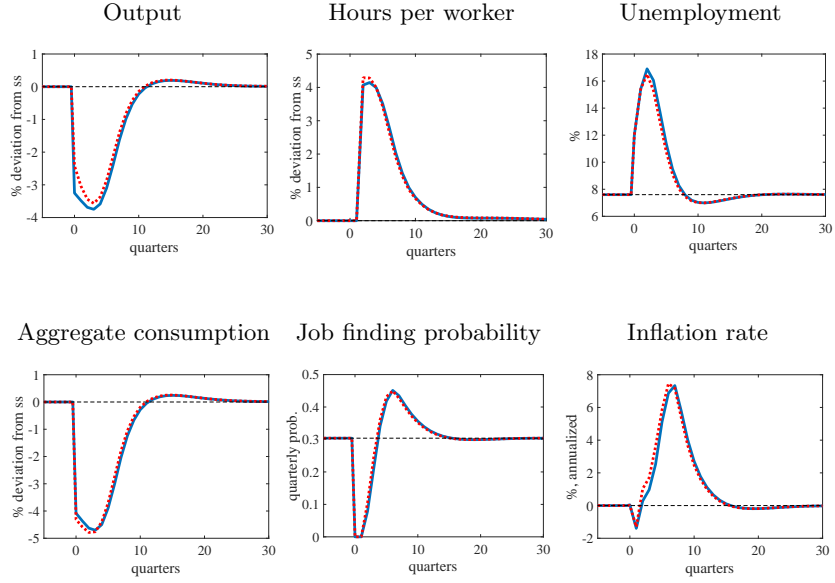
Figure 5: Present-value multipliers conditional on productivity shocks.



Notes: Present-value multiplier are computed according to Equation (19) with  $x_t$  being the variable of interest. The productivity shock ranges from  $-4\%$  to  $4\%$ .

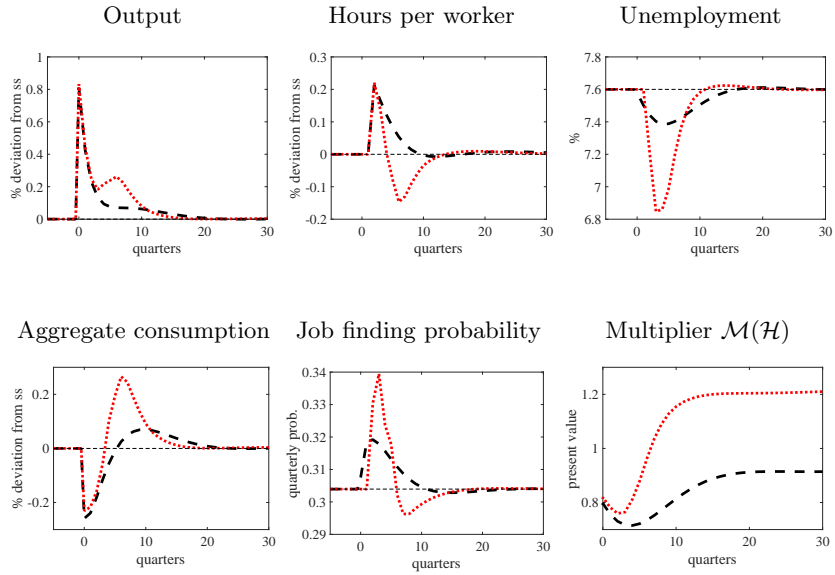
Figure 6: The effects of government spending in the Covid-19 recession.

(a) Effects of the Covid-19 shock.



Solid blue: Covid-19 shock only. Dotted red: Covid-19 & spending shocks.

(b) Net effects of the government spending shock.



Dashed black: around steady state. Dotted red: conditional on the Covid-19 shock.