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Heterogeneous Responses to Job Mobility Shocks in a HANK Model with a Frictional Labor Market

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While labor market slack measures typically focus on the quantity of employment (e.g., the unemployment rate), there is a growing interest in understanding how the quality of employment—measured by the rate at which employed workers move from one job to another without an observed unemployment spell (i.e., employer-to employer (EE) transitions)—over the business cycle affects the marginal cost of production and inflation dynamics (Moscarini and Postel-Vinay, 2022; Alves, 2020; Faccini and Melosi, 2023; and Birinci et al., 2023). At the individual level, EE flows are often the most important source of income growth and thus affect aggregate demand (Moscarini and Postel-Vinay, 2017). At the macro level, EE flows facilitate the reallocation of workers across jobs and contribute to productivity growth. Because the relative strength of wage vs productivity growth over the cycle determines inflationary pressures in the economy, EE fluctuations are relevant for understanding inflation dynamics. Furthermore, the role of EE flows in inflation dynamics drew attention during the recent recovery episode from the COVID-19 recession, where the U.S. economy experienced an elevated number of workers quitting their jobs.

Understanding how changes in EE flows affect macroeconomic outcomes is a complex task because current fluctuations in EE flows affect *future* wage and productivity distributions, as it takes time for workers to climb the productivity ladder. Put differently, it is well known that, in response to a change in *current* income, the *cur-*

rent change in demand is much larger for wealth poor individuals than those who are wealth rich (Johnson, Parker and Souleles, 2006; Parker et al., 2013; Kaplan, Moll and Violante, 2018). However, it is not clear whether this differential response of individuals with different levels of wealth caries over when there are shocks to *future* income through changes in the EE transition rate.

In this paper, we ask how changes in the EE transition rate over time affect demand for consumption for individuals with different levels of wealth holdings. In order to answer this question, we use a heterogeneous agent New Keynesian (HANK) framework combined with a labor search model featuring on-the-job search (OJS), which we develop in our companion paper (Birinci et al., 2023). We show that an increase in the EE rate driven by an exogenous shift in how efficiently employed workers can search for a job, which acts as a future income shock, leads to a larger decline in current demand for wealth-rich individuals. We find that this shock to job mobility dynamics acts as a future income shock and changes the relative size of the consumption response between the wealth poor and wealth rich compared to consumption responses of these two groups upon a shock to current income.

I. Model

We first describe our model, details of which can be found in Birinci et al. (2023). The economy is populated by a measure one of ex-ante identical individuals, firms in three vertically integrated sectors, a mutual fund, a fiscal authority, and a monetary authority. Individuals experience a stochastic life cycle, consisting of a working stage and a retirement stage. At the working stage, they supply labor inelastically in

jobs that they find in a frictional labor market featuring random search. Their individual productivity experiences changes both on and off the job via human capital dynamics, while their match-specific productivity drawn from a distribution upon meeting with a firm remains constant throughout the duration of the match. Both unemployed and employed workers search for a job. The contact rate of unemployed workers with firms is determined by an endogenous job finding rate $f(\theta)$ that is a function of labor market tightness θ—the ratio of vacancies to aggregate effective job search by unemployed and employed job seekers. On the other hand, the contact rate of employed workers is given by $\nu f(\theta)$ where ν is an exogenous parameter that determines the job search efficiency of employed (or OJS efficiency) relative to that of unemployed (which is normalized to 1). In each period, wage paid to a worker is an endogenous and history dependent piece-rate α of the flow output from the match. We follow a simplified version of the dynamic bargaining protocol in Postel-Vinay and Robin (2002) for the determination of α, where firms Bertrand compete based on flow output (instead of present discounted values). According to this protocol, when employed workers contact a new firm, they switch jobs if their new match-specific productivity draw is greater than their productivity in the incumbent firm. This is because we assume that the more productive (new) firm is willing to match the highest wage that the incumbent firm can pay to its worker. On the other hand, if the match-specific productivity draw at the new firm is lower than the existing productivity, the worker remains attached to the incumbent firm with two possible outcomes. First, the new match productivity can be so low that even the maximum potential wage from the outside job cannot match the worker's current wage. In this case, the worker's piece rate remains unchanged. Second, if the new draw is sufficiently high, it serves as a credible threat for the worker to bid up her wage with the incumbent firm. In this case, the incumbent firm matches the maximum potential wage from the outside of-

fer (i.e., wage is rebargained), leading to an updated piece rate and higher wage for the worker. Further, the model features an incomplete asset market where individuals invest in shares of a mutual fund and make consumption decisions. Overall, individuals are heterogeneous in their wealth holdings, employment status, human capital,— among the employed—match-specific productivity, and piece rate of output that they receive as wages.

On the other side of this labor market, there are firms that create vacancies by paying a fixed cost and hire workers. They combine heterogeneous labor inputs (stemming from heterogeneity in human capital and match-specific productivity) and create homogeneous bundles of labor services. These labor services are then sold to intermediate firms at a competitive real price p^l. Intermediate firms are monopolistically competitive and operate a linear technology that converts labor services into a differentiated intermediate good. These intermediate firms set their relative prices under quadratic adjustment costs (Rotemberg, 1982), which gives rise to a New Keynesian Phillips curve (NKPC) that relates inflation to output dynamics, where the real price of labor services p^l determines the real marginal cost of production for these firms. These intermediate goods are then aggregated into a consumption good by a final good producer.

A risk-neutral mutual fund owns all the firms in the economy, holds all nominal bonds issued by the government, issues shares in return, and pays dividends per share. The government (fiscal authority) implements a linear consumption tax, a progressive labor income tax, and issues nominal bonds to finance unemployment insurance (UI) benefits, retirement pensions, and an exogenous stream of expenditures. Finally, the central bank (monetary authority) controls the short-term nominal interest rate by following a Taylor rule.

Before proceeding to our main experiment and results, it is useful to discuss why this is a suitable framework for understanding how changes in the EE rate affect macroeconomic outcomes both in the ag-

gregate and the cross section. First, this model captures both wage and productivity effects of job mobility dynamics. An increase in the contact rate of employed workers to vacancies leads to higher wages through job switching and re-bargaining of current wages, while it also improves the match-specific productivity distribution as workers only switch jobs if the productivity of outside offer is larger than the existing one. Second, this model allows for an endogenous interaction between the level of self-insurance and labor income risk, a feature that is emphasized by the HANK literature for quantifying demand responses to shocks. In doing so, our framework does not rely on an exogenous labor income process, as is often assumed in the literature, but rather endogenizes the labor income process. Thus, our model links the labor income distribution with the heterogeneous marginal propensities to consume (MPC). Finally, this framework generates realistic wage changes for job losers, stayers, and switchers due to wage growth upon external offers (leading to job switches or wage re-bargaining with the incumbent firm) and changes in individual productivity on and off the job via human capital dynamics.

II. Main Experiment

We now analyze how EE flows affect macroeconomic outcomes. To do so, we introduce a 1% increase to the OJS efficiency parameter ν, which we label as a "OJS efficiency shock", that gradually recovers back to mean. This shock acts as an exogenous shifter for the contact rate of employed workers, leading to an increase in the EE rate. While we also present impulse responses of other macroeconomic variables to supplement our discussions, our main result focuses on understanding how the consumption response to this shock differs across individuals with different wealth holdings and employment states. In particular, we compare the consumption responses of two individuals with the same human capital, and when employed, the same match-specific productivity and piece rate, but differ only in their wealth hold-ings. The wealth-poor individual has no wealth, and the wealth-rich individual holds shares close to the median of the wealth distribution. In order to incrementally build up intuition, we analyze consumption responses of these individuals both in partial (PE) and general equilibrium (GE) settings. To obtain the consumption responses in PE, we fix all equilibrium objects relevant for the budget constraint (e.g., prices, dividends, taxes, etc.) at their steady-state values and only allow for the individual consumption choice to respond to higher OJS efficiency. GE consumption responses are simply the optimal consumption decision for individuals that expect all budget-relevant variables also evolve endogenously in response to the OJS efficiency shock.

III. Consumption Responses to Job Mobility Shocks

In PE, a positive (and persistent) OJS efficiency shock affects consumption decisions through several channels. First, employed individuals would like to consume more as they now anticipate higher future wage growth due to more frequent arrival of external offers. Second, more outside offers while employed reduces the wage scar of unemployment by making it easier for workers to climb up the job ladder following an unemployment spell. This decline in the cost of unemployment reduces the precautionary savings motive, an effect that weakens with wealth in a large class of incomplete markets models. Panel (a) of Figure 1 shows that, consistent with this logic, consumption increases more for the wealth-poor individual among the employed. Turning to unemployed individuals in Panel (b), it is the consumption of the *wealth-rich* that increases by more. Wealth-poor unemployed individuals cannot raise their consumption by much, as doing so requires borrowing against future income and the borrowing constraint precludes this possibility. This heterogeneity is different from that found in HANK models, where poorer individuals tend to be more responsive as they have a higher MPC. Because the direct effect of the shock in PE is largely on *future* income,
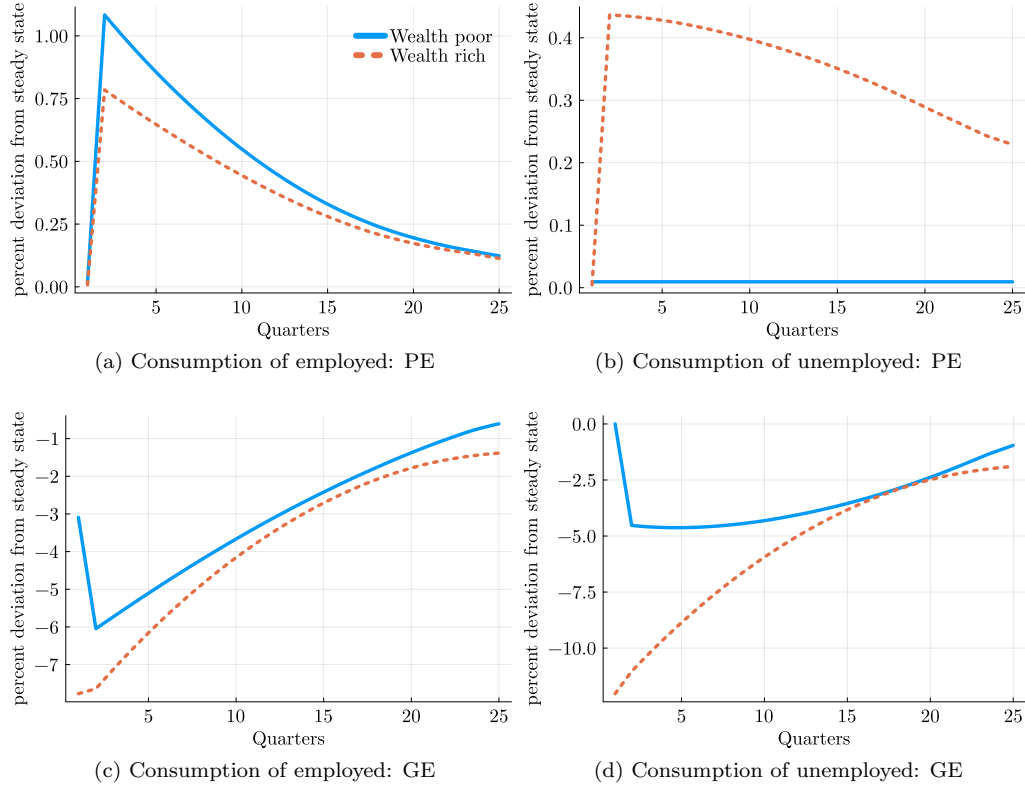
Figure 1. : Impulse responses of consumption to an OJS efficiency shock.

Note: This figure presents how the consumption response to a positive OJS efficiency shock differs across wealth and employment status in partial (PE) and general equilibrium (GE) settings. We compare the consumption responses of two individuals who have the same the human capital, and when employed, the same match-specific productivity and the piece-rate but differ only in their wealth. The wealth-poor individual has no wealth, and the wealth-rich individual holds shares close to the median of the wealth distribution.

increasing current consumption requires individuals to have either some wealth to tap into or a high level of income.

Consumption responses in GE are different. As Panels (c) and (d) of Figure 1 show, consumption declines for all agents, leading to a decline in aggregate demand and output in equilibrium (Figure 2). As Figure 2 documents, a higher ν leads to a lower labor market tightness and a higher unemployment rate and inflation. Through the monetary policy response, a higher inflation induces a more than one-for-one increase in the nominal rate and therefore an increase in the real rate, which reduces demand for everyone. What explains the larger consumption decline for the wealth-rich individual in GE? We rule out changes in taxes as a potential explanation given

that both workers have the same wage or UI income, and therefore pay the same taxes. The decline in labor market tightness cannot explain the heterogeneous responses either. If that was the primary driver, consumption would have fallen by more for the wealth-poor individual due to the precautionary motive. Moreover, labor income is a smaller share of total income for the wealth-rich individual and diminishing labor market prospects would have a smaller effect on her budget. It is the decline in the value of financial wealth driven by lower real dividends and relative share prices that drive this larger consumption decline of the wealth-rich. Dividends fall because the cost of labor services relative to the final good rises (i.e., the real price of labor services p^l increases), resulting in lower per-period

profits for intermediate firms (Figure 2). Lower profits combined with a higher real interest rate result in a lower relative share price. Because wealth-rich individuals finance some of their consumption with financial wealth, the unexpected 0.08 percent decline in their wealth leads to a spending cut. In contrast, the wealth-poor (who in this exercise possess no wealth) finance consumption through labor income, for whom dividends and share prices have little first-order impacts on consumption.

IV. Discussions

Why is the heterogeneity in consumption responses to a change in job mobility dynamics relevant for understanding the role of EE fluctuations in macroeconomic outcomes? In a model with perfect insurance (i.e., a representative agent New Keynesian (RANK) framework combined with a frictional labor market with OJS, as in Moscarini and Postel-Vinay, 2022), the aggregate consumption response to an increase in the EE rate would look similar to that of the wealth-rich in our model. Our findings indicate that such a model would *overstate* the decline in aggregate demand and *understate* the rise in inflation upon a positive OJS efficiency shock. As such, our analysis suggests that it is important to endogenize the interaction between the level of self-insurance and labor income risk to correctly quantify how EE fluctuations affect aggregate outcomes.

We note that in order to formally argue that incorporating wealth heterogeneity affects the quantitative responses of macroeconomic outcomes, one needs to compare impulse responses from two models that are calibrated to match the same empirical moments but are different in that one features perfect insurance and the other does not. We conduct this exercise in Birinci et al. (2023), where we find that, in response to an increase in OJS efficiency, the decline in demand, output, and market tightness are overstated, while the response of monetary policy through the increase in real rate as well as the equilibrium increase in inflation are understated

in a model with perfect insurance compared to outcomes from a model with imperfect insurance. We conclude that accounting for wealth heterogeneity is key to correctly quantifying how job mobility dynamics determine real macroeconomic outcomes, inflation, and the conduct of monetary policy.

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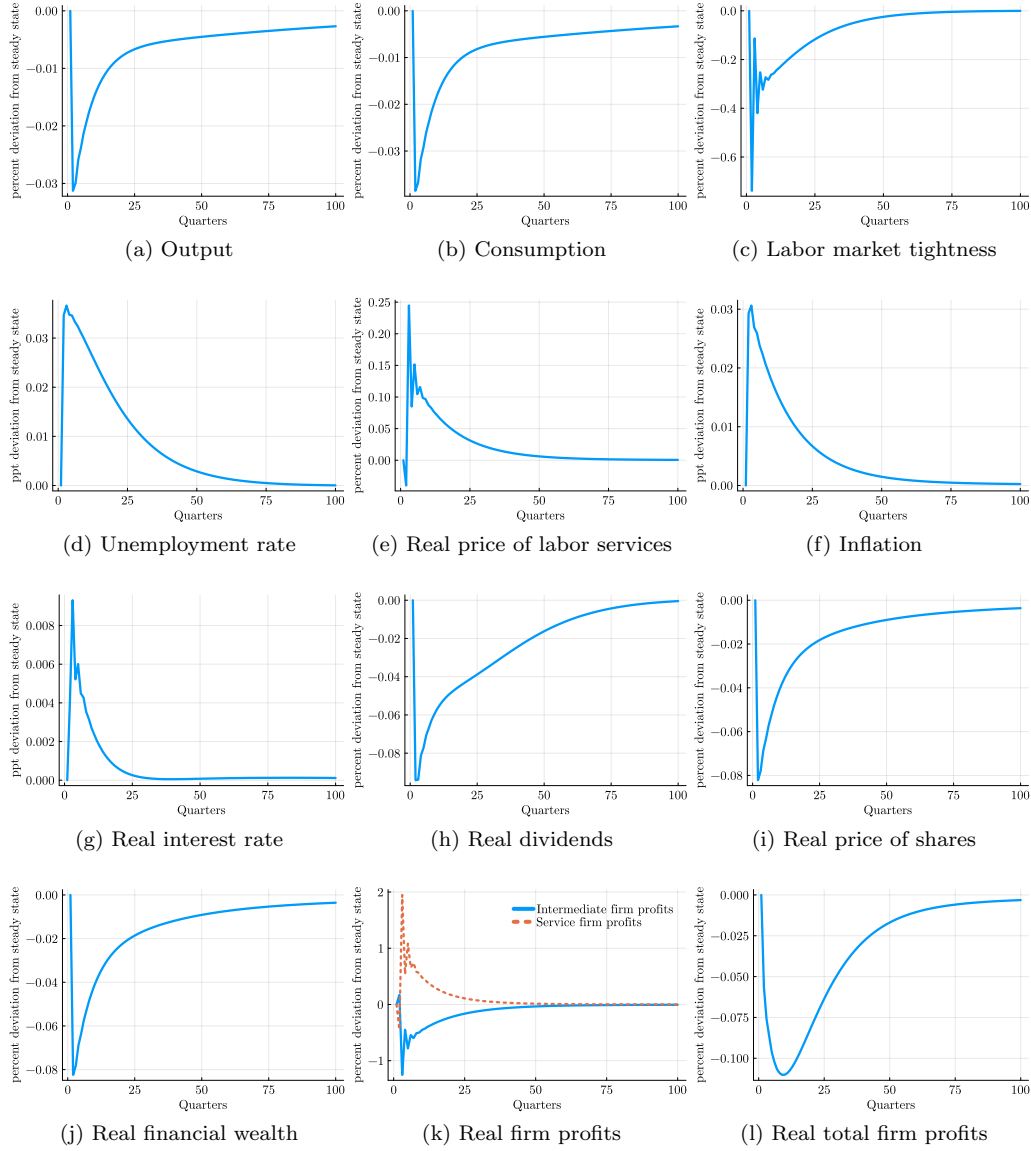
Figure 2. : Impulse responses to a positive OJS efficiency shock.

Note: This figure presents impulse responses of various outcomes to a positive OJS efficiency shock. Real financial wealth is the sum of real price of shares and real dividends. Real total firm profits are the sum of real profits for the intermediate and labor service firms.

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