Research Statement

Mario Rafael Silva

I am a macroeconomist who focuses on household and firm liquidity, endogenous variety, and search frictions in the markets for goods, labor, and credit. My work explores and quantifies the interaction between liquidity constraints, aggregate demand, and product creation.

The article "Productive Demand, Sectoral Comovement, and Total Capacity Utilization," co-authored with Marshall Urias, examines how capacity utilization disciplines the transmission of demand shocks to measured productivity when goods market frictions exist. We develop a three-sector model incorporating goods market frictions across nondurable goods, durable goods, and services. Using Bayesian techniques, we estimate the model using data on sectoral capacity utilization (nondurables and durables), consumption, investment, labor hours in both consumption and investment sectors, and investment's relative price. The model incorporates various stochastic processes, including disturbances to long-run and stationary technology, investment-specific technology, sectoral wage markups, shopping effort, and the discount factor.

We first estimate a simplified version of the model as a proof of concept. We find that incorporating capacity utilization data reveals that goods market frictions and demand shocks play a more significant role than indicated by an estimation which only uses conventional macroeconomic variables. In our general setting, we estimate high and precise values of the matching elasticity and find that shocks to shopping effort account for the majority of the forecast error variance in output, the Solow residual, and utilization. Furthermore, search demand shocks and sector-specific wage markup shocks prove essential for inducing positive comovement of utilization data and fitting sectoral data overall. These findings underscore the importance of incorporating broader aspects of sectoral comovement—including utilization—into macroeconomic models. Our parameter identification analysis validates the model's robustness: key parameters estimated using artificial data (generated at the posterior mean) cluster consistently around their true values.

More broadly, we leverage sectoral data to support a demand-based explanation of the business cycle. Following Bai et al. (2024), we deliberately abstract from nominal rigidity to isolate the

search-based demand channel, avoiding reliance on monetary policy transmission or monetary variables in estimation. This methodological choice actually favors technology shocks. Notably, we do not incorporate the established finding that technology shocks reduce short-run labor input (Gali (1999), Basu et al. (2006), Francis and Ramey (2005)). Nonetheless, a monetary context would enhance the analysis by incorporating inflation and interest rate data to discipline demand shocks. Furthermore, it would connect capacity utilization—an observable measure of economic slack—to the output gap, the latent slack measure in New Keynesian models.

In the article "Unemployment and Labor Productivity: The Role of Firm Exit," co-authored with Miroslav Gabrovski, we address a significant limitation of the Diamond-Mortensen-Pissarides model: its prediction of an almost perfect relationship between unemployment and labor productivity, which contradicts empirical evidence showing only a mild correlation. We demonstrate that incorporating sunk entry costs and a vacancy creation congestion channel into a standard framework resolves this discrepancy. The presence of sunk costs transforms vacancies into a positively valued, predetermined variable. When destruction shocks occur infrequently, most vacancies originate from previous periods, causing vacancy numbers to correlate more strongly with historical rather than current productivity. Our model, calibrated to match micro-level data on product and firm destruction, successfully replicates both contemporaneous and dynamic correlations between productivity and unemployment.

I am now pursuing a promising extension. The project "Sunk Vacancy Costs, Endogenous Product Variety, and Labor Market Frictions,"co-authored with Marshall Urias and Zhesheng Qiu, explores the interaction between product creation dynamics and labor markets. We integrate Bilbiie's (2012) endogenous business formation model with our previous labor market framework. The model examines a bidirectional relationship: increased employment enables product line expansion, while expanded product variety stimulates job creation. The first mechanism depends solely on goods' substitution elasticity, while the second also relies on consumers' taste for diversity—greater product variety enables enhanced consumption diversification and demand.

Product destruction shocks play a crucial role in this framework. These shocks eliminate product lines, associated workers, and vacancies. Combined with finitely elastic vacancy creation, they generate substantial job destruction without corresponding vacancy increases, aligning with empirical Beveridge curve patterns. Furthermore, reduced product variety limits household consumption

diversification, suppressing job creation.

We are estimating the model using Bayesian simulated method of moments, incorporating three shocks: a standard technology shock, an idiosycnratic job separation shock, and a product destruction shock. The estimation uses moments involving volatility, correlations, and autocorrelations of labor market variables, as emphasized by Shimer (2005) and Coles and Moghaddasi Kelishomi (2018), extended to include business formation. We anticipate our model's components will explain the volatility, persistence, and mild unemployment-labor productivity relationship in the data. Additionally, unlike standard labor search models, we can fit the labor share of income easily given the role of profits from search frictions and monopoly power.

In 'Corporate Finance, Monetary Policy, and Aggregate Demand', published at the Journal of Economic Dynamics and Control, I study how heterogeneity of financial frictions and monopolistic competition influence the pass through of the nominal interest rate to the real lending rate, its transmission into investment, and its effect on corporate cash holdings. Firms finance stochastic investment opportunity using bank-issued credit or money. Underlying the paper is strong empirical evidence that the effects of monetary policy differ markedly by industries and are influenced by financial constraints of firms. I explore heterogeneity in the pledgeability of assets, following the theory of Kiyotaki and Moore (1997) and empirical studies of Berger et al. (1996) and Almeida and Campello (2007). Heterogeneous financial frictions are particularly important in the presence of demand linkages from monopolistic competition, in which firms' desired investment depends on output overall. The model implies that financially constrained firms hold more cash and that, for financiall constrained firms, cash holdings rise with competition. I verify both implications on Compustat data from 1964-2017, where I measure competition in one of two ways. The first uses the sales-to-cost margin; the second estimates it using the production approach, following ?. I also find that financial constraints raise firms' sensitivity to monetary policy, that the aggregate demand externality from monopolistic competition raises transmission and interacts with financial frictions, and that a mean-preserving spread of financial frictions reduces investment and output, strengthens transmission, and reduces the external share of finance.

In "New Monetarism with Endogenous Product Variety and Monopolistic Competition," published at the Journal of Economic Dynamics and Control, I examine how taste for variety and monopolistic competition affect the transmission of long-run monetary policy. Taste for variety

give rise to markups, which create a wedge on the intensive margin. Inflation amplifies the wedge on the intensive margin and also reduces the amount of firms, generating inefficiency on the extensive margin as well. In general, the welfare costs of inflation are high and are increasing with firm entry and the price markup. I derive a formula for optimal firm size, which depends on technology, taste for variety, search frictions, and preference shocks in the goods market. I also show that the Friedman rule–an interest rate of zero on money–is generically efficient with preferences which exhibit constant elasticity of substitution (CES). However, under additively separable preferences, which is more consistent with empirical evidence of international trade lowering markups, inflation can reduce sellers' market power and increase firm size, generating deviations from the Friedman rule and reducing the welfare costs of inflation.

In "Unsecured Credit, Product Variety, and Unemployment Dynamics," published at Macroeconomic Dynamics, I develop a theory of feedback between revolving credit and product development and examine its ability to explain labor market volatility. I document how revolving credit is the primary determinant of short-run household liquidity, credit limits vary substantially over the cycle, and credit comoves positively with product variety and negatively with unemployment. I thereby extend the Mortensen-Pissarides model with an endogenous borrowing constraint and free entry of monopolistically competitive firms. Higher debt limits encourage firm entry and raise product variety (the entry channel), and greater variety renders default more costly and thereby raises the equilibrium debt level (the consumption value channel). The model explains the stylized facts in the data and can reasonably fit historical time series on unemployment, vacancies, and revolving credit under both financial shocks and productivity shocks. In particular, it reproduces the rise in unemployment during the Great Recession. The fit is noticeably worse, however, under productivity shocks alone, showcasing the importance of disturbances originating in financial markets.

The article "Liquidity, Unemployment, and the Stock Market", co-authored with William Branch and currently in submission, focuses on the comovement between stock prices, unemployment, and interest rate spreads. Motivated by empirical evidence from Hall (2017) and Farmer (2012) about the negative relationship between the stock market and unemployment, we develop a liquidity channel through which stock market prices influence economic activity. The environment features a Mortensen-Pissarides economy in which households receive uninsurable idiosyncratic

preference shocks, and, due to limited commitment, self-insure by accumulating shares of a mutual fund. The mutual fund consists of claims on firm profits and government bonds, providing a role for both private and public liquidity. Thus, these two assets play a role analogous to capital in Aiyagari (1994). The limited commitment friction is that consumers face uncertainty in their access to credit. This simple twist imparts a key role to the stock market in generating booms and busts. Higher stock market valuations relax consumers' liquidity constraints, thereby creating an aggregate demand channel that strengthens firms' hiring incentives. Job creation, likewise, enhances market capitalization and feeds back into consumer demand. Thus, a strong stock market does not just reflect but also promotes a robust labor market.

To develop more evidence on the comovement of these variables, we first regress stock market capitalization on real interest rates and vacancy creation costs. The regression is motivated by a generalized version of the free entry condition in labor search models. We find that a one standard deviation increase in the interest rate spread (≈ 30 basis points) is associated with a 3.09% reduction in the stock-market capitalization to GDP ratio and is statistically significant. Given the endogeneity of the interest rate, however, we also use a structural vector autoregression with sign and zero restrictions to identify a stock price shock. We find that the median stock price jumps to 2%, and the median interest rate spread falls by 6 basis points. Unemployment declines and the 68% equal-tailed probability bands do not contain zero for over 3 years after the initial shock.

We calibrate the model to long-run properties of the United States economy and examine the responses of the stock market, unemployment, and interest rate spreads in two related exercises. First, we compute the impulse response to the MIT stock market capitalization shock. That is, beginning from stead state, the stock market is subject to a one-time shock from which we compute the perfect foresight path back to the unique steady state. In line with the structural VAR evidence, we perturb the stock market by a 2% per annum shock. Unemployment and the interest rate spread decline and converge to the steady state slowly. Replacing rational expectations with adaptive learning generates a hump-shaped response in the stock market and interest rate spread and raises the series' persistence.

Second, we examine the effects of an expectations shock in a counterfactual in which aggregate demand effects are strong and there is multiplicity of equilibria. In particular, expenditure risk is

high, firms have little revenue in the absence of expenditure shocks, and public liquidity is low. In this scenario, there are three steady states, with the high and low ones being determinate. The expectations shock produces an immediate and large decrease in the stock market, slightly overshooting the intermediate steady state. The interest-rate spread increases, more than doubling its original value. The combination of lower firm values and a higher real interest rate generate a substantially higher unemployment rate that peaks at 11%. The dependence on private liquidity thus makes the economy susceptible to self-fulfilling crashes.

I limit discussion of research due to succinctness. However, I welcome you to visit `mariorafaelsilva.com` for information on other papers.

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