Sebastian Di Tella—Research Summary—2021

I am a macroeconomist working on business cycles, monetary theory, and financial regulation. My research is focused on the role of countercyclical risk premiums in macroeconomic fluctuations such as recessions, persistent slumps, and financial crises. I often incorporate dynamic contracts into general equilibrium models to understand the impact of financial frictions and the design of optimal policy. My work can be split into three areas: business cycles and money, financial crises, and dynamic contracts.

Business cycles and money. My recent work explores a risk-premium view of business cycles—recessions are akin to financial panics, but in the labor market. This approach is distinct from traditional approaches that emphasize nominal rigidities and productivity shocks, and can provide new and policy-relevant insights about recessions, slumps, and the role of money.

There is a long tradition that attributes recessions to spikes in risk premiums that act like contractions in investment demand, arguably going back to the role of *animal spirits* in Keynes (1936). But it is very hard for this tradition to explain the most salient feature of business cycles: employment, consumption, and investment all contract at the same time during recessions (in general equilibrium, consumption should rise after contractions in investment demand). This comovement problem lies at the center of macroeconomics, and is the main reason the macro literature has historically highlighted the role of nominal rigidities and aggregate shocks to productivity.

In **Di Tella and Hall (2021)** we show how spikes in risk premiums can generate inefficient business cycles with comovement among all macroeconomic aggregates, without relying on nominal rigidities or simultaneous TFP shocks. The key insight, perhaps counterintuitive at first, is that instead of acting like contractions in investment demand, spikes in risk premiums act like contractions in labor demand. The asymmetry in duration between capital and labor plays a central role in the mechanism. The marginal products of capital and labor are risky, so they are both discounted with a risk premium. But capital is a long-duration store of value, while labor is not. So precautionary saving lowers interest rates and essentially cancels out the negative effect of higher risk premiums on investment demand, but not on labor demand. Once we flip the emphasis from investment demand to labor demand, the risk-premium view of business cycles falls into place quite naturally—in general equilibrium, contractions in labor demand lead to simultaneous contractions in output, consumption, and investment.

The fundamental equation captures demand for labor and can be written informally as

$$w_t = \mathbb{E}_t\left[z_{it}\right] \times (1 + \mathbb{C}ov_t[\hat{m}_{it+1}, \hat{z}_{it}]),$$

where w_t stands for wages, z_{it} for the marginal product of labor, and m_{it+1} for the marginal value of a dollar for entrepreneur i, who runs a firm and takes uninsurable risk. The covariance term $\pi_t = -\mathbb{C}ov_t[\hat{m}_{it+1}, \hat{z}_{it}] > 0$ (hat means normalized by means) is the labor risk premium, which compensates entrepreneurs for risk. With perfect risk-sharing, the covariance term disappears and we obtain the standard expression for labor demand.

The strategy is to make progress in understanding business cycles by studying the behavior of the labor risk premium, $-\mathbb{C}ov_t[\hat{m}_{it+1}, \hat{z}_{it}]$. In **Di Tella and Hall (2021)** fluctuations in the labor risk premium are generated by fluctuations in the quantity of iid uninsurable idiosyncratic risk in z_{it}. In **Di Tella and Tonetti (2021)** we aim to take this view in a more quantitative direction and study the role of persistence of firm-level idiosyncratic shocks. The observation in this project is that persistent shocks generate a dynamic hedging motive for entrepreneurs, raising the price of a given quantity of risk (that is, raising $-\mathbb{C}ov_t[\hat{m}_{it+1}, \hat{z}_{it}]$ without changing the conditional distribution of z_{it}). We believe that there are large returns to this asset-pricing approach to the labor risk premium.

The risk-premium view of business cycles has important policy implications. In **Di Tella and Hall (2021)** we show that employment, output, and consumption fall too much during recessions, compared to the constrained efficient allocation. For private entrepreneurs, raising their employment individually means *increasing*

their uninsurable risk (that's why they discount its marginal product). But an increase in aggregate employment and consumption *reduces* their exposure to uninsurable risk. The inefficiency ultimately arises due to the presence of hidden trade—agents cannot be prevented from engaging in precautionary saving. Optimal policy therefore stimulates employment and consumption during recessions when risk is high. The policy view that emerges has much in common with widespread intuitions about business cycles, usually derived from New Keynesian models. But it also has new lessons. Even if central banks succeed in targeting inflation and reproducing the flexible-price allocation, this won't eliminate inefficient recessions.

The risk premium view can also help understand the role of money in persistent slumps. There is a large New Keynesian literature highlighting the role of the zero lower bound on nominal interest rates. In that approach a persistently depressed economy reflects a negative output gap, and should be accompanied by deflation. I take a different approach. In **Di Tella (2019)** I show that the presence of money affects how the economy responds to a persistent rise in risk premiums, even without any nominal rigidities. Without money interest rates fall in response to higher risk premiums, leaving investment and growth unaffected. But money, and other safe assets with a liquidity premium, provide a safe store of value that weakens the precautionary saving motive and therefore keeps interest rates high and investment depressed, relative to a non-monetary economy. This effect is small when real interest rates are high, but it can become large during periods of persistently low interest rates, and survives even in the cashless limit. I also show that, in line with common intuitions, in a monetary economy investment and growth are too high during booms with low risk premiums, but too low during slumps with high risk premiums. The inefficiency can ultimately be traced back to the presence of hidden trade, an issue that arises recurrently in my work. The takeaway is that, once we focus on risk premiums, a monetary economy has very different behavior and policy implications relative to a non-monetary one, even with flexible prices.

Financial crises and regulation. Countercyclical risk premiums also play a central role in financial crises. Crises start with financial losses that are disproportionally concentrated on the balance sheets of financial institutions. Understanding why intermediaries take on so much risk is an essential ingredient of financial regulation policy. Why are financial intermediaries so exposed to aggregate risk, and what should be done about it?

Most of the literature has traditionally assumed that markets are exogenously incomplete, so highly leveraged intermediaries simply must take on aggregate risk. Leverage is therefore the central object of interest. But financial intermediaries are very sophisticated players who have access to financial instruments that allow them to hedge aggregate risk. They could be highly leveraged and yet have a small exposure to aggregate shocks. Instead, they often use these instruments to amplify their exposure to risk. Why?

In **Di Tella (2017)** I provide an explanation for financial intermediaries' exposure to aggregate risk based on the observation that financial crises are characterized by high risk premiums and excess returns. They are not simply periods of low TFP, as assumed for simplicity in traditional macro-finance models. Financial intermediaries, who are specialized in earning these excess returns, have a dynamic-hedging motive to take on aggregate risk, relative to other agents in the economy. While everyone may be worse off during financial crises, financial intermediaries at least can look forward to great investment opportunities. They are naturally hedged, relative to common households, so they are willing to take a disproportionate share of financial losses during crises. These financial losses then further depress asset prices and raise excess returns, amplifying their incentives to take on aggregate risk beforehand.

The idea is simple but I think quite powerful because it can help us understand not only how much risk financial intermediaries take but also what type of aggregate risk. Not all aggregate shocks create financial crises, and different financial intermediaries have different risk exposures. The mechanism I propose predicts that intermediaries will be disproportionally exposed to aggregate shocks that raise the excess returns they earn, relative to other agents in the economy. In **Di Tella and Kurlat (2019)** we apply this approach to explain banks' exposure to movements in interest rates, which can be an important part of the transmission of monetary

policy. Banks typically hold assets with long maturity and liabilities with short maturity, so they face financial losses when interest rates rise. We observe that banks earn a liquidity spread on their deposits that rises with interest rates. They are naturally hedged against interest rate hikes, which explains their willingness to take interest rate risk on their balance sheet.

In **Di Tella (2018)** I study optimal financial regulation when intermediaries are privately choosing to take on aggregate risk. A natural conjecture is that the resulting concentration of risk is efficient. As it turns out, this is not correct. The observation is that excess returns go up *too much* during financial crises, so intermediaries have private incentives to take on a socially excessive amount of aggregate risk. The underlying source of inefficiency is that financial intermediaries cannot be excluded from trading in financial markets. I derive a sufficient statistic for pecuniary externalities based on the idea that the risk-adjusted excess returns of intermediaries measure the shadow value of financial frictions (without frictions they shouldn't be able to obtain excess returns, after accounting for aggregate risk). The upshot is that if we internalize the pecuniary externality (e.g. with a tax on asset holdings) and reduce these excess returns during crises, intermediaries will choose to reduce their exposure to aggregate risk on their own and mitigate the crisis.

Optimal dynamic contracts. I've also made methodological contributions to the theory of dynamic contracts. Hidden trade is a central feature of market economies—private agents cannot be prevented from saving and trading financial assets—with policy-relevant implications for the efficiency properties of competitive equilibria (prices enter incentive-compatibility constraints). Hidden trade underlies the welfare and policy results in my work on money, business cycles, and financial crises.

In **Di Tella and Sannikov (2021)**, we fully characterize optimal dynamic contracts with hidden savings in a classic portfolio-consumption environment well suited to macroeconomic and financial applications. The observation is that precautionary saving aggravates incentive problems because it raises the value of diverted funds that can be used for self-insurance. Optimal contracts restrict access to capital after bad outcomes to dynamically manipulate the agent's precautionary saving motive, which can lead to rich firm dynamics with skewed size and growth distributions.

The paper also makes an important technical contribution. Hidden savings is a hard problem in the theory of dynamic contracts because the agent's action space becomes very rich. We provide a sufficient condition for global incentive compatibility—the contract is incentive compatible if the precautionary motive weakens after bad outcomes. This condition is guaranteed to hold in the optimal contract, which proves the validity of the first-order approach in our setting, but is applicable beyond this environment.