Abstract

My research analyzes strategic interactions between firms, regulators, and governments, most recently within the financial sector. Both the methodological as well as the topical aspects are important in linking the various pieces of my research together. In the topics dimension, my research interests have shifted from an international emphasis, with governments as central economic agents, to the role of financial regulation, in which financial institutions, such as rating agencies or insurance companies respond to government policies. Methodologically, I have extensively studied dynamic relationships between economic agents using repeated games characterizing the implications between a trade-off between these short-term interests and the long-run cost of such actions. Despite the breadth of topics, all of my papers have been published in the respective premier outlets for Finance (Journal of Financial Economics), International (Journal of International Economics), Theory (Journal of Economic Theory), as well as in general interest Economics journals (Econometrica).
I have organized my work as follows. First, I will present my papers on dynamic agency relationships, which includes my job market paper on “Expropriation risk and technology,” its underlying theoretical mechanism “Impatience versus incentives” and “Markup cycles, dynamic misallocation, and amplification.” Second, I will summarize my most recent applied work on corporate finance and financial regulation, in particular, “Rating agencies in the face of financial regulation.” Finally, I will discuss my work in international finance/trade.

1 Dynamic relationships

Motivated by Hugo Chavez’s expropriation of ConocoPhilips in Venezuela in 2007, my job market paper “Expropriation risk and technology” (Journal of Financial Economics, 2012) tries to understand the economics and dynamics of expropriation risk. Given the lack of contractual enforcement possibilities when the deviating party is the government, such a study begs the question of how (and why) such investments are made in the first place.

Typically, we think about property rights varying at the country level, such as through the channel of the legal system (La Porta et al. (1998)) or the channel of institutions (Acemoglu et al. (2001)). In my dissertation, I adopt a more granular perspective, and argue that property rights within a country vary across industrial sectors, linked to the technological level of the sector. Intuitively, the higher the comparative advantage of a firm (sector) to manage an asset, the less it has to fear expropriation by a government.

To understand firm investment dynamics in environments without resort to a legal system, contracts have to be self-enforcing. That is, neither party should have an incentive to deviate from the contract at any point in time. I model an environment in which a firm – e.g., a large multinational oil firm – interacts repeatedly with an impatient government (think about Venezuela, Russia). Formally, impatience implies that the government discounts the future at a higher rate than the multinational firm, which is supposed to capture the notion that a government is making short-sighted decisions and/or potentially starving for cash. By allowing for discount-rate shocks (induced by, for example, the election/coup of a new government), it is possible that a government expropriates in equilibrium – which is not typically a feature of repeated games. Upon such a discount-rate shock, expropriation of sectors is, however, not “random,” but rather evolves according to a pecking order, in which the government selects sectors which are relatively easy to expropriate.

My study has empirical implications: there is a tendency that expropriation occurs in those sectors that seemingly got a “good deal” from previous governments (see, for example, Yukos in Russia). That is, the typical official government narrative is that firms are expropriated as a punishment for paying “too” little for the projects ex ante and very few taxes afterwards (often implied by generous tax holidays in the first years). In my model, the same phenomenon occurs as an equilibrium outcome, but the causality is reverse. In the presence of strong expropriation
risk, the only way to entice firm investment is to require a very low upfront payment and to grant tax holidays. As long as the regime stays in place, firm profits are “extraordinarily” high to account for the possibility that the firm loses everything upon expropriation. In contrast, when expropriation risk is modest, large upfront payments, satisfying the immediate cash need of the government, are feasible. Interestingly, governments may not necessarily benefit from being weak: while government weakness makes it possible to achieve higher joint surplus (to be shared between the firm and the government), it limits the threat point of the government, i.e., the amount of surplus that the government can extract. Firms, in turn, can actively manage expropriation risk by optimally bundling activities in high- and low-expropriation risk sectors, consistent with the wide-spread phenomenon of conglomerates in emerging-market countries.

While “Expropriation risk and technology” features a dynamic contracting environment, its contribution lies mainly in the application. Building on my dissertation, the paper titled "Impatience versus incentives" (joint with John Zhu, Econometrica, 2015) instead analyzes the general theoretical implications of dynamic contracting with an impatient agent (think about a firm repeatedly incentivizing a worker). This paper has been included in the reading list for Ph.D. topics courses by Debraj Ray (NYU Economics), Mikhail Golosov (Princeton), Tim Worrell (Edinburgh Economics) and Willie Fuchs (UC Berkeley Finance). The assumption of an impatient agent has become common in finance (see Demarzo and Duffie (1999), DeMarzo and Fishman (2007)) and economics (Acemoglu et al. (2008)). It introduces an interesting tension for optimal dynamic contracting: On the one hand, backloading rewards to an agent has been considered the robust optimal incentives scheme since rewards do not affect incentives as soon as they are paid out (see Harris and Holmstrom (1982) and Becker and Stigler (1974)). On the other hand, the impatience force makes such early rewards valuable.

To study how optimal contracts resolve the tension between impatience and incentives, we consider a parsimonious dynamic-agency framework in the spirit of the general treatment by Ray (2002). We show that an infinitesimal amount of relative impatience on the agent side will cause virtually all Pareto-optimal contracts to oscillate around a unique Pareto-optimal steady state. Oscillation can be damped, converging to the steady state, or can persist in the long run. In the latter case, the amplitude of oscillation grows over time, causing even arbitrarily low participation constraints to bind in the long run. These endogenous cycles occur in the absence of exogenous uncertainty or any need to randomize. Our results highlight that the assumption of impatience is far more than purely an auxiliary assumption. It can have “strong” implications for contract design: Different discount rates create dynamic trading gains and, thus, introduce surplus from a borrowing-lending relationship on top of the surplus created by actions such as effort or investment. Moreover, our framework can be used to develop tractable models of endogenous cycles via the interaction of impatience and incentives.

In joint work with Christine Parlour and Johan Walden, we study the link between asset pricing (valuation) and industrial organization (IO). Our research agenda consists of two related
projects. In “Markup cycles, dynamic misallocation, and amplification” (Journal of Economic Theory, 2014) we study the “asset-pricing implications” for IO, while the “IO implications” for asset pricing are studied in “Industrial Asset Pricing” (work in progress).

The published paper has two main results. First, counter to the conventional wisdom based on the oligopolistic model of Rotemberg and Saloner (1986), industry markups may be procyclical with regard to aggregate shocks, consistent with recent empirical evidence by Nekarda and Ramey (2013). Intuitively, while high product demand in good times increases firms’ incentives to undercut competitors to reap immediate rewards (the conventional force of oligopolistic competition), the marginal utility of an additional dollar reaped in good times is also low, making it less valuable to deviate, which is the novel asset-pricing force we highlight. With risk-averse preferences, the latter force can dominate the “demand” effect and thereby lead to procyclical markups. This set of results has important implications for the design of monetary policy since the cyclicity of markups is a key building block of leading Neo-Keynesian macroeconomic models (see, among others, Goodfriend and King (1998) or Christiano et al. (2005)).

Second, if industries are heterogeneous in terms of their competitiveness or their exposure to (exogenous) aggregate shocks, intra-industry behavior can amplify shocks, or even produce endogenous fluctuations, in the absence of aggregate shocks. These aggregate implications arise from the fact that heterogeneous industries will set different markups state-by-state. This markup dispersion across industries leads to resource misallocation (see Lerner (1934)) and, hence, affects aggregate consumption. Following standard asset-pricing insights, changes in aggregate consumption affect agents’ marginal utilities across states and thereby the valuation of firms’ future cash flows; this, in turn, feeds back into the firms’ ability to sustain collusion, leading to the rich set of implications.

2 Corporate finance

2.1 Financial regulation

The recent financial crisis has (once more) illustrated the special role of the financial sector for the functioning of the overall economy. The interconnectedness of institutions within the financial sector and the spill-over effects on the real economy have caused governments across the world to massively support ailing banks. While such interventions may have prevented an even larger scale of the crisis ex post, it is well understood that the expectation of such policies creates ex-ante distortions, a classic time-inconsistency problem. Financial institutions, in particular too-big-too-fail institutions, do not fully internalize the cost of their own failure and, hence, have an incentive to take on more risks than would be socially optimal. In fact, they may even have an incentive to coordinate their actions to induce a system-wide collapse (see Acharya and Yorulmazer (2007), Farhi and Tirole (2012)). In such environments, banks are able to “privatize
gains and socialize losses,” implying a major reason for regulating the financial sector in the first place.

One of the primary tasks of financial regulation is to mitigate such misalignment of private and social incentives. Within this broad field of financial regulation, I am particularly interested in policies targeting risk-taking incentives: capital regulation, the measurement of risk within financial regulation (credit ratings), as well as the regulation of compensation targeting risk-taking. My (mostly) theoretical approach is motivated by the fact that most proposed regulatory changes cannot be evaluated empirically before they are implemented. Moreover, relevant outcomes, such as exposure to unlikely tail events, are oftentimes not observed until it is “too late.” This creates the need for models that capture relevant economic trade-offs.

A common feature of all my studies is that I take existing rules or proposals as given and do not presume that observed policies coincide with the socially optimal tools. If actual regulation already maximized social welfare, academic research and advice on regulatory proposals would be irrelevant.\(^1\) While my research does not take an a-priori stance on the effectiveness of a particular reform, it takes the view that financial institutions rationally respond to regulation.

**Papers on financial regulation** My paper “Rating agencies in the face of financial regulation” joint with Christian Opp and Milton Harris (*Journal of Financial Economics*, 2013, see also shorter Fame version) building on Opp and Opp (2009) takes as given that a large set of regulatory rules in the financial sector are mechanically tied (hardwired) to credit ratings.\(^2\) As a result, ratings do not just convey information to investors about the creditworthiness of borrowers, but also provide regulatory certification to regulated investors, such as banks, mutual funds, money market funds, and insurance companies. If regulatory constraints of institutional investors bind, investors value the rating label in itself (see empirical evidence by Kisgen and Strahan (2010)), independent of the underlying information content that the label conveys. Following this logic, institutions should rationally care about “obviously” inflated ratings.

By identifying this regulatory value, our main point is almost immediate: The quasi-regulatory authority of credit-rating agencies feeds back into their incentives to acquire and disclose information, which ultimately affects the informativeness of ratings (a version of the Lucas-critique). Intuitively, our model predicts that the supply of highly rated securities increases with the regulatory shadow value of ratings while the effect on informativeness is ambiguous. However, if the

\(^1\) A discrepancy between socially optimal regulation and actual regulation is consistent with three explanations. First, in contrast to market participants, regulators cannot immediately adjust actions in light of new information. This “stickiness” might render even previously optimal regulation suboptimal. Second, political-economy forces (see, for instance, Stigler (1971)) might induce systematic biases between social and industry objectives, while “political activism” after large crises can lead to regulation that might be “too restrictive.” Third, well-intended and heuristically motivated regulation might have unintended side consequences.

\(^2\) Starting with ratings-based investment restrictions for banks in 1936, regulators have increasingly outsourced regulatory authority to credit-rating agencies. In 1975, the Securities and Exchange Commission (SEC) formalized this regulatory accreditation by establishing a list of nationally recognized statistical rating organizations for the purpose of dealer-broker capital requirements.
The regulatory value of ratings is above an endogenous threshold, delegated information acquisition is no longer sustainable and rating agencies inflate all ratings. The threshold, above which the regulatory shadow value triggers rating inflation, is the level at which the rating agency is just indifferent between acquiring the optimal amount of information and disclosing the “correct” rating on the one hand, and, simply capturing the regulatory benefit while producing no information on the other hand. Intuitively, if the credit rating agency spends costly resources to acquire valuable information, there is no point in diluting that information ex post. This type of rating inflation is more likely for complex securities (which are more costly to evaluate) or securities that offer more risk-taking benefits. Our predictions are, thus, consistent with empirical studies that document rating inflation only for complex structured securities, but not for corporate bonds (see Griffin and Tang (2012), Benmelech and Dlugosz (2009), Effing and Hau (Forthcoming) vs. Baghai et al. (Forthcoming) for evidence on corporate bonds).\(^3\)

The previous theoretical study directly relates to an empirical examination of a regulatory reform of capital requirements. In Regulatory reform and risk-taking: replacing ratings, Bo Becker and I study the first large-scale attempt by regulators to remove ratings as a basis for risk measurement in capital regulation. Officially motivated by the failures of credit-rating agencies during the financial crisis, the National Association of Insurance Commissioners (NAIC) started using “expected-loss” estimates by PIMCO and BlackRock instead of traditional credit ratings to determine capital requirements for insurers’ asset holdings of private-label mortgage-backed securities (MBS) starting 2009/2010.\(^4\)

Our study exposes that the calibration of the system to the new input implies capital buffers that only provide protection up to “expected losses,” but no protection against negative macro scenarios. As a result of this regulatory reform, industry-level capital requirements for mortgage-backed securities have been reduced from $19.36bn (under the counterfactual previous system) to $3.73bn. Insurers strongly respond to this new regulatory regime with increased risk taking within their MBS portfolios, but not in other asset classes that are unaffected by the change, such as other asset-backed securities and corporate bonds. Also, the regulation does not only apply to the existing stock of securities held by insurers, but also to new issues: while insurers’ new asset purchases consisted historically of only 10% junk-grade securities, this percentage has increased to 54.1% for their MBS portfolios after the regulatory change, a fundamental change in risk-taking behavior. As the market for new issuance of commercial mortgage-backed securities (CMBS) is reviving, we expect this behavior to also significantly affect the overall riskiness of insurers’ portfolios, potentially sowing the seeds for the next financial crisis. We conclude that these potentially large long-run costs have to be weighed against the benefits of avoiding a fire sale (see, e.g., Shleifer and Vishny (1992)) on the existing stock of MBS held by insurance companies.

\(^3\) In contrast to the suggestive term “inflation,” rating inflation is, thus, mostly a cross-sectional rather than a time-series phenomenon.

\(^4\) Since ratings also intend to measure expected losses (Moody’s), one can understand the new inputs mostly in terms of “replacing raters” rather than “replacing ratings.”
after the crisis.

In “[Macroprudential bank capital regulation in a competitive financial system]” my co-authors (Milton Harris and Christian Opp) and I develop a “double-decker model” of financial intermediation in the spirit of [Holmstrom and Tirole 1997] to understand the effects of bank capital requirements on the decomposition and scale of bank lending. Formally, we enrich their framework by incorporating public debt guarantees for banks and a cross-section of risk-taking opportunities. To mitigate asset substitution, a regulator designs equity ratio requirements, which may be made contingent on public signals of risk, such as ratings. Our tractable framework allows for an arbitrary structure of risk signals and full heterogeneity of firm payoff distributions and agency problems.

This general framework produces 3 robust empirical predictions. First, increased efficiency of (direct) public financing lowers bankers’ rents from funding firms with positive NPV projects and, thus, exacerbates asset substitution incentives. Intuitively, if competition erodes profits on “good loans,” reaching for yield becomes relatively more attractive. Second, the welfare effect of raising capital ratio requirements depends on the scarcity of intermediary capital. When intermediary capital is sufficient, an increase in equity-ratio requirements unambiguously improves total surplus (as the profitability of inefficient risk-taking is reduced). However, when intermediary capital is scarce, more stringent capital requirements will lead to a reduction in the supply of bank credit (despite the availability of profitable loans). Such a reduction in credit has an ambiguous effect on welfare depending on the value created by the banking sector’s marginal funded project. Somewhat counterintuitively, it is possible that the aggregate banking sector becomes riskier in response to an increase in capital requirements. Third, our model highlights that the effect of regulatory policies on the decomposition and scale of bank lending crucially depend on the cross-sectional distribution of firms, bank capital and the development of public markets. These predictions can be both tested in the time-series, say as public markets become more efficient, or across countries, say with a different level of development of public markets.

The idea behind capital regulation is that it affects shareholder’s incentives and will, thus, ultimately feed back into how shareholders incentivize their managers, the actual decision makers. In contrast, recent proposals mandating deferral of bonuses or clawback clauses directly target the structure of compensation contracts. In ongoing research joint with Florian Hoffmann and Roman Inderst, we analyze the economics of deferral regulation in a general principal-agent model in which time reveals more information about an agent’s risk-taking behavior. We characterize the optimal compensation in the presence of regulation and derive conditions under which regulation reduces the instance of disasters in the financial sector.
2.2 Corporate control

Many existing theories suggest that the choice of the medium of exchange in takeovers is related to, broadly speaking, private information (see, for example, Rhodes-Kropf and Viswanathan (2004), Fishman (1989), Shleifer and Vishny (2003)). While it is by definition difficult to test directly for private information, one route to make progress in identifying the information content of merger bids is to carefully examine failed transactions. In “Target Revaluation after failed takeover attempts – cash versus stock” (forthcoming Journal of Financial Economics), my co-authors (Ulrike Malmendier and Farzad Sai’di) and I document that cash- and stock-financed takeover bids induce strikingly different revaluations among targets. In the sample of unsuccessful takeover bids between 1980 and 2008, targets of cash offers are revalued on average by +15% after deal failure, whereas stock targets return to their pre-announcement level.

We analyze the role of future takeover activities and subsequent changes in operating policies to explain these differences, but find no evidence supporting these two channels. We conclude that the differential revaluations of cash and stock targets are most consistent with a pure information story, in which cash bids reveal a previous undervaluation of the target to the market. We reconcile our conclusion with the one of Bradley et al. (1983) by pointing out a significant sample-selection bias affecting their analysis.

3 International trade

In “Tariff wars in a Ricardian model with a continuum of goods” (Journal of International Economics, 2010), I model the strategic interaction of countries in setting optimum import tariffs. The issue of optimal protectionism is one of the classical and still relevant economic questions, as the ongoing negotiations about a free-trade agreement between the United States and the European Union suggest. My contribution to the literature is to analyze the implications of technology differences between two countries (absolute productivity advantage and comparative advantage) for optimal tariff rates and the resulting Nash equilibrium of tariffs. My general-equilibrium analysis takes place in a Ricardian model with a continuum of goods in the spirit of Dornbusch et al. (1977). I show that the optimal import tariff rate is uniform across goods. Tariffs are an increasing function of productivity-adjusted relative size, increasing in the potential gains from trade (comparative advantage), and decreasing in transportation cost. Intuitively, the larger the potential gains from trade, (the smaller the barriers to trade,) the less harmful a given tariff will be. The size of the non-traded sector is thus a function of both exogenous and endogenous barriers to trade. If a country is sufficiently large, it will prefer the globally inefficient Nash equilibrium of tariffs over free trade.

In “Rybczynski’s theorem in the Heckscher-Ohlin world – anything goes” (joint with Hugo Sonnenschein and Christis Tombazos, Journal of International Economics, 2009),
we revisit one of the fundamental theorems of international trade, the Rybczynski theorem, in general equilibrium. Our setup features a classical Heckscher-Ohlin environment, i.e., 2 countries, 2 production factors (capital and labor), and homothetic preferences. The Rybczynski theorem (see Rybczynski (1955)) makes predictions about how changes in factor endowments, e.g., changes in the labor force in China, would affect its production. In its basic form, the Rybczynski theorem states an increase in labor supply leads to an increase in the equilibrium supply of the labor-intensive good and a decrease in the supply of the capital-intensive good. The theorem has received wide attention in trade theory in the context of a home economy that is small relative to the rest of the world, so that the price is determined by the rest of the world. Thus, the key to understanding its robustness in general equilibrium is to depart from the assumption of a “small” home economy. Our main contribution is to show that for a sufficiently large home economy price effects can indeed be so strong that the comparative-statics predictions of the Rybczynski theorem are reversed in sign. Such factor growth must harm the welfare of the home economy.

References


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