Research Statement

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My research is at the intersection of economics and finance. It focuses on markets with asymmetric information and helps us make predictions on policy effects on market outcomes and characterise optimal institutions. My detailed research topics are reviewed below.

1 COMPETITIVE SCREENING AND SIGNALLING

Following my PhD thesis, I have been particularly interested in competitive screening markets and especially insurance markets. In competitive screening markets firms compete to attract and simultaneously screen informed customers. For instance, in health insurance markets, health insurers compete in menus of insurance plans to attract and screen individualls who seek insurance. As shown in Rothschild and Stiglitz (1976), in competitive insurance markets, firms tend to risk-select (i.e., select the relatively low-risk customers and dump the high-risk ones). Their analysis (i) highlights why *risk selection* destabilises insurance markets (i.e., an equilibrium might not exist and even if it exists, it might be inefficient), and (ii) justifies the widespread use of *risk adjustment* as a potential remedy against risk selection.

One caveat in the analysis of Rothschild and Stiglitz (1976) is that a game of competition is not explicitly specified and the arguments are for the most part diagrammatic. In **Nash Equilibrium in Competitive Insurance** [Dosis (2017)], I formalise a stylised insurance market with any finite number of types as a standard duopoly in which insurers compete in menus of insurance plans. I characterise sufficient conditions under which risk selection is always profitable and hence inhibits the existence of a pure strategy Nash equilibrium.

Risk adjustment attempts to correct risk selection by rewarding (punishing) insurers for enrolling high-risk (low-risk) individuals. A particular risk adjustment scheme takes the form of *reinsurance*, according to which the regulator (or even large private insurers) reimburses, for a premium, a substantial share of the ex post costs that insurers incur.

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Reinsurance has been implemented in various health insurance markets worldwide (e.g., the Australian health insurance market). However, whether reinsurance can indeed improve efficiency remains an open question. In **Efficient Reinsurance in Health Insurance Markets** [Dosis (2018a)], I show that a carefully designed reinsurance scheme can indeed correct risk selection. In fairly general insurance markets, I prove that the proposed reinsurance scheme results to efficient outcomes without distorting incentives for cost efficiency.

One criticism against conventional competitive screening models of health insurance markets is that in reality, unlike in theory, insurance plans are exogenously imposed to insurers, perhaps due to institutional constraints (e.g., US health insurance market, Swiss Health insurance market, etc.), and insurers compete in prices with these plans. In recent work in progress, I attempt to bring theory closer to how real insurance markets function. I find that in (unregulated) stylised insurance environments, equilibrium may not exist due to risk selection. However, a basic price cap regulation, with the price caps determined endogenously, corrects selection and results to efficient outcomes. The study has also a methodological contribution as it provides a link between markets with adverse selection and standard industrial organisation models of price competition.

Besides competitive screening models, I have worked extensively on signalling models. For, although competitive screening is a natural modelling choice in some settings, in other settings informed parties initiate negotiations with uninformed parties. For instance, a privately informed owner of a risky asset wishing to sell securities on the asset's cash flows will most likely make the first offer to investors.

One caveat of signalling games is that the initial offer of the informed party terminates further negotiations. This gives rise to multiple (mostly inefficient) equilibria due to the arbitrariness of off-the-equilibrium-path beliefs. In my study **On Signalling and Screening in Markets with Asymmetric Information** [Dosis (2018d)], I examine a game that combines signalling and competitive screening. Although, the informed party initiates negotiations, the uninformed parties have the right to counter-offer menus of contracts. I show that equilibrium generically exists and is efficient; a result that stands in stark contrast to the predictions a standard signalling or competitive screening model yields. This paper provides strategic foundations for efficient competition in markets with asymmetric information, particularly in settings in which the informed party moves first.

Following up on my work on signalling models, I have been motivated by more general questions on mechanism design by an informed principal. In an informed principal model, an informed party designs a contract to be executed alongside an uninformed party. For instance, an upstream manufacturer might design a contract for a downstream retailer after having collected private information about the quality of the product. Be-

cause the design of the contract might reveal information, informed principal models have features of signalling games. Unlike standard signalling games, informed principal models have a relatively richer message space as this consists of all feasible mechanisms. The main question of interest regards the type of contracts that the two parties can execute in a perfect Bayesian equilibrium. In my study **On the Informed Principal Model with Common Values** [Dosis (2018e)], I reconsider the general informed principal model studied in Maskin and Tirole (1992) and characterise the set of allocations that can be sustained as equilibrium allocations. I provide a simpler and more robust proof of their main theorem. I also make a distinction between general mechanisms and simple mechanisms and show in what environments there is no loss of generality in focusing on simple mechanisms.

2   FINANCIAL ECONOMICS

Besides my theoretical work on competitive screening and signalling, I am also interested in financial economics and macroeconomics. Specifically, I employ theoretical models to study the effects of information asymmetries on financial market outcomes and aggregate economic activity.

In a recent strand of work, I study the role of banks in the financial system and how monetary policy influences lending standards and consequently economic activity. My motivation arises from the recent US and Euro area experiences. In particular, although conventional wisdom pressumes that investment is inversely related to market interest rates, in the aftermath of the financial crisis, near zero interest rate policies had an unexpectedly weak impact on lending and investment. In **Interest Rates and Investment Under Competitive Screening and Moral Hazard** [Dosis (2018b)], I analyse the relationship between interest rates and investment in a model of competitive screening and moral hazard. It shows that the investment curve might not be monotonic in the market rate as the market rate affects, alongside the opportunity cost of capital, banks' lending standards. The paper offers novel insights on the monetary policy transmission mechanism.

Following up on these findings, I have been motivated by questions related to how expectations of future liquidation values affect current bank lending standards. In recent work in progress, I study a dynamic model in which financially constrained firms can liquidate projects at an endogenously determined price. Low liquidation values (e.g., fire sales) tighten lending standards and reduce firms' expected values. Because expected values affect incentives to undertake higher-quality projects, there is a feedback effect from future values to current access to the financial market. I find that multiple equilbria can be sustained, with one of which exhibiting the characteristics of a self-fulfilling credit crunch.

I have also been interested in how inter-entrepreneurial productivity variation affects investment under asymmetric information and signalling in the credit market. In **Signalling, Productivity and Investment** [Dosis (2018f)], I show that when productivity is not sufficiently dispersed, safe-type entrepreneurs face borrowing constraints and might under- or over-invest relative to the social optimum. Reversals in the order of productivities cause large fluctuations in investment and output. Better economic conditions, expansionary monetary policy and decreases in default probabilities do not always boost investment and welfare. When the model is extended to allow for endogenous occupational choice, would-be safe-type entrepreneurs might inefficiently select to become workers. In a numerical example, I show that (a) the interest rate elasticity of investment is considerably higher during booms than during busts, and (b) a decrease in interest rates during busts has an effect on both the intensive and extensive margin.

Following up on this work, I have developed a research agenda on the effect of adverse selection in dynamic economies. In recent work, I examine a rather standard dynamic economy with no aggregate uncertainty. When firms of high-quality projects are credit constrained, the economy may exhibit investment and output fluctuations even in the absence of exogenous shocks. The result relies on the incentives of firms of high-quality projects to signal their type. In booms, demand for loanable funds is high and savings increase, whereas in busts, the opposite effect prevails.

It was during my PhD thesis that I developed an interest in policy-oriented questions. For instance, in **Investment, Adverse Selection and Optimal Redistributive Taxation** [Dosis (2018c)], I study optimal taxation in a financial market with adverse selection and signalling. I find that a simple budget-balanced, tax-subsidy scheme implemented by the government can improve social welfare by either decreasing or increasing aggregate investment. The tax-subsidy scheme reconciles a standard, budget-balanced government loan guarantee scheme in which the government guarantees part of the losses of entrepreneurial loans. However, contrary to conventional government guarantee schemes, the proposed tax-subsidy scheme entails only low-risk firms to endogenously use the subsidy as a guarantee against potential default.

3 INDUSTRIAL ORGANISATION

Besides my interests on Information Economics, I also work actively on questions in Industrial Organisation and am particularly interested in the economics of the internet.

The widespread use of the internet has given rise to a wealth of data that is mainly generated by user browsing and online commerce. One of the most fundamentally policy-relevant question regards the ownership of data. In particular, who should own the generated data firms or consumers? In joint work with W. Sand-Zantmann, we attempt to

answer this question. We study a model that combines online browsing and data extraction that can monetised if sold to data brokers. We study the efficiency of the allocation of resources in different data-ownership regimes. We find that crucial in terms of economic efficiency is whether data extraction is contractible and if not whether a well-established market for property rights exists.

In joint work with A. Muthoo, we study dynamic R&D competition with experimentation and learning. Two firms compete in the development of a new product but need to complete two stages before they can file for the allocation of a patent that gives exclusive rights in the commercialisation of the product. Firms face uncertainty about the potential completion of the project; the project may not be viable. We study the incentive of firms to invest in R&D if they can learn from one another. The possibility of learning introduces a trade-off for the each firm; a breakthrough provides a lead in the race but may give incentives to the rival to invest. In the unique symmetric equilibrium, we find that the equilibrium stopping time is not monotonically decreasing in the profitability of the project. This implies that a potential reduction in the profitability of the project can spur innovation. Equilibrium investment is inefficient relative to the social optimum.

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