# Economics and Management: RITM and meaning

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The aim of this presentation is twofold: first, to present briefly the RITM's main areas of research in relation with big data[1]; second, to provide an occasion for cooperative discussion and interaction between researchers from different areas with confluent research interests on big data.

RITM is the Research Center on Economics and Management of Paris Sud. It brings its expertise in two main fields: (1) Networks and Innovation (studying new information technologies and communication, privacy and social networks, electro-mobility, venture capital,…); (2) Globalization and Territories (studying the factors that shape the economic space, the international organization of production and trade flows).

Big data is a challenge for economics and management. We face hard time dealing with its complexity and heterogeneity. As stated in the Paris-Saclay Center Data Science (CDS)'s project, unlike physical sciences, controlled experiments are uncommon in economics and management. We study the behavior of agents over periods that are too long to allow keeping some parameters fixed.

Before exposing RITM's research topics related to the CDS, I illustrate our challenges in dealing with big data with the example of international trade. Trade is a branch of economics and one of RITM's main research areas. International trade is the exchange of goods and services across international borders or territories. Understanding what shapes trade is a premise to understand globalization and how trade affects economic outcomes.

Our understanding of trade has improved over the generations with interplay between theory and evidence. "Old" theories explain trade between countries in terms of cross-country differences in factor abundance or technology. "New" theories highlight firm increasing returns to scale and consumer preferences for variety. The problem is that both old and new trade theory typically assume a representative firm. This helps solving for general equilibrium analysis but it is inconsistent with the heterogeneity of firms observed in the data.

Since the mid-1990s, a large number of empirical studies (Bernard et al., 2007, 2012; Melitz and Redding, 2014) have provided a wealth of information about the important role that firm heterogeneity plays in mediating countries' imports and exports. This was instigated by the emergence of a wide range of micro-datasets. One of the most striking features of such data is that firm participation in international trade is rare: of the 5.5 million firms operating in the US in 2000, just 4% were exporters. Among these exporting firms, the top 10% accounted for 96% of total U.S. exports (Bernard et al., 2007). This participation is far from random. Exporters are bigger in terms of employees and sales, more skill- and capital-intensive, more productive, and pay higher wage than non-exporters. This evidence suggests self-selection: exporters are more

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[1] RITM stands for Réseaux, Innovation, Territoires et Mondialisation (Network, Innovation, Territories and Globalization).

productive, not as a result of exporting, but because only the most productive firms are able to overcome the costs of entering export markets.

Some important questions remain unanswered. Beyond self-selection, do exporters increase their productivity by exporting? What are the micro-foundations of heterogeneity in firm productivity? Such a productivity remains a black box and we have little understanding of the separate roles played by technical efficiency, management practice, firm organization, and product attributes toward variation in revenues across firms. Can we benefit from the most recent customs data on individual trade transactions to enhance our ability to look inside the black box of the firm?

More broadly, firms are complex organizations and there remains scope for further research on boundaries of the firm, networks, intra-firm trade, intermediation, and the dynamics of firm entry into export markets. What are the processes through which large and successful firms emerge?

Finally, most of the research assumes that firms are atomistic, whereas in reality large multinational firms are unlikely to be of measure zero relative to the markets in which they operate (Melitz and Redding, 2014). The implications of firm heterogeneity in a world of granular firms are an active area of ongoing research. This sort of microeconomic heterogeneity can influence macroeconomic outcomes.

Beyond international trade, the following current RITM's research topics are closely related to the CDS:

*First area: networks and innovation*

* Price segmentation and their public policies implications: e-commerce allows firms to gather precise personal data about its customers so as to vary the price offered to each customer. Such pricing management raises regulation issues about the collection of personal data and their secondary usages.

* Smartphones and collection of personal data: consumers have so far little information about the amount and the nature of their personal data which is transmitted by smartphones to various data aggregators. Do consumers change their behavior as they learn about the collection of their personal data?

* The Social Network Sites (SNS) and the consumers' choices: SNS may shape the decisions of their participants and in particular their choices about privacy. The rising of the SNS give access to many newly available data that may help addressing these questions: do consumers "imitate" the network or do they take decisions on their own?

* Market finance: in such a market the stock and investments funds prices represent a huge tank of historical data which is particularly used to study "stylized facts" of return distributions. In this specific area, we will like to check if the investment funds returns are normally distributed (and what could be the differences in terms of return stylized facts between Socially Responsible Funds and other type of funds).

* Business models innovation in the digital economy: Advancing our understanding of the dynamics of business ecosystem in the digital economy by using methods such as network analysis, modeling (value chain analysis) and simulation (e.g., agent-based modeling and analysis).

*Second area: globalization and territories*

* High-speed-rail networks and spatial disparities across cities. This research project plans to assess the benefits and drawbacks of the development of the High-Speed Rail network for French cities, thanks to the collection of a large-scale dataset on TGV travel time-tables and train frequencies since 1981.

* Industrials risks, greenhouse gaz emissions (GGE) and the spatial distribution of populations and economic activities. This research project studies the relationship between GGE, exposure to industrial or climate risks and the spatial distribution of populations, based on fine-grained geolocalized data for developed and developing countries such as France or India. A particular focus will be given to providing policy recommendations regarding health, suburbanization, transportation and urban-rural migrations.

* Trade and complex goods. Using Chinese firm-level data, this project wants to estimate the effect of the density and the complexity of goods on the emergence of new "green" export products. The density measure captures how closely is related a good to the local comparative advantages, while the complexity variable measures the capabilities present in them.

* Deregulation, labor market and international migration: an experimental approach based on fine-grained geolocalized data.

References:

Bernard, A. B., Jensen, J. B., Redding, S. J., and P.K. Schott. (2007). Firms in International Trade. *Journal of Economic Perspectives*, *21*(3), 105-130.

Bernard, A. B., Jensen, J. B., Redding, S. J., and P.K. Schott (2012). The Empirics of Firm Heterogeneity and International Trade. *Annual Review of Economics*, *4*, 283-313.

Melitz, M.J, and S. J. Reddin. (Forthcoming). Heterogeneous Firms and Trade. In *Handbook of International Economics*, *4th ed*. Elsevier.