Research Statement – Valerio Dionisi

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I am a Ph.D. Candidate in Economics at University of Milano-Bicocca, jointly with the Catholic University of Milan, under the supervision of Prof. Andrea Colciago. My work sits at the confluence of macroeconomics, network theory, and labour markets, seeking to understand how sectoral complementarities and interactions shape aggregate dynamics. My academic journey has been significantly enriched by two international visiting positions at leading economics departments: first, at *Universitat Pompeu Fabra* (2023-2024), and more recently at the *University of Oxford* (2024-2025). These experiences have allowed me to engage with diverse research communities and deepen my methodological and quantitative toolkit.[1] I have completed two single-authored research papers (one of which serves as my Job Market Paper), presented in Sections 1 and 3, and I am currently developing a third project in collaboration with scholars from Banque de France, De Nederlandsche Bank, and the Polytechnic University of Milan, discussed in Section 2. What follows is an overview of my completed and ongoing research, organized by thematic area, as well as a brief outline of the agenda I plan to pursue after completing my Ph.D. I have pursued this agenda both theoretically and empirically, and plain to maintain such mix in my future work.

1. Production Networks and Sectoral Shock Transmission

My single-author research on production networks explores how the horizontal structure of inter-sectoral trade, extending beyond vertical supply chains, governs the propagation of shocks across the economy. By embedding complementarities in intermediate inputs within a tractable *horizontal geometry*, my work shows how shared (upstream and downstream) sectoral interconnections determine the direction of comovement between sectors in Input-Output economies.

In my Job Market Paper, ***The Horizontal Geometry of Production Networks***, I develop a novel analytical framework that advances the production networks literature by theoretically introducing and empirically validating the horizontal geometry of Input-Output economies. Unlike standard models that view intersectoral propagation as occurring only along vertical supply chains (*e.g.*, Long and Plosser 1983, Acemoglu, Carvalho, et al. 2012, Acemoglu and Azar 2020), my approach reveals that sectors are also connected by horizontal complementarities generated through similarities in their Input-Output trade structures. I formalize this by defining new measures of "network economic distances" between sectors based on shared upstream suppliers and downstream buyers relationships that complements the classical vertical (Leontief inverse) propagation channel and yields richer predictions on how shocks diffuse across sectors. Demand-based distances overlap with traditional vertical linkages, dampening the classical amplification of shocks through shared input demand, while supply-based distances introduce competition effects among sectors selling to common downstream buyers, generating negative comovement through revenue reallocation. Moreover, as sectors depend on overlapping sets of buyers/suppliers, intermediate inputs substitutability (*e.g.*, Atalay 2017, Baqaee and Farhi 2019) is linearly embedded in its horizontal geometry, and patterns

[1] As a visiting scholar at Universitat Pompeu Fabra under Prof. Davide Debortoli, I refined my skills in numerical methods to simulate complex macroeconomic models. While visiting the University of Oxford under Prof. Francesco Zanetti, I concluded a project on the horizontal dimension in production networks.

of sectoral comovement hinge on the network economic distance between sectors: nearby sectors move in opposite directions due to shared Input-Output relations, whereas distant sectors tend to comove as the standard (vertical) propagation prevails. These distance-based mechanisms operate independently of direct trade intensity, uncovering a new, parallel and complementary dimension of economic propagation of idiosyncratic shocks. Empirically, I validate these mechanisms using U.S. Input-Output and employment data, following the two-stage approach of Barattieri and Cacciatore (2023). I first isolate sector-specific structural shocks via panel Fixed Effects regressions, and then estimate their propagation across sectors using a Local Projections framework that distinguishes demand- and supply-based network distances. The results confirm the theoretical predictions: economically distant sectors exhibit positive comovement, while closely related ones often move in opposite directions determining negative comovement. By unifying vertical and horizontal propagation mechanisms within a multidimensional network framework, the paper provides a new analytical foundation for understanding sectoral comovement, and potentially the origins of aggregate fluctuations. More broadly, it linearly endogenizes intermediate-input complementarities and translates them into an empirically measurable form, offering a tractable framework that can be readily applied to study the Keynesian mechanism (*e.g.*, Guerrieri et al. 2022), fiscal and trade policies transmission in networked economies. It is along these avenues that I intend to orient my future research agenda: few research proposals are already outlined, and I am glad to discuss them with interested researchers.

2. European Networks and Strength of Monetary Policy

A part of my ongoing research, titled ***Euro Area Production Networks and the Phillips curve***, co-authored with Andrea Colciago (De Nederlandsche Bank, University of Milano-Bicoca), Daniele Siena (Polytechnic University of Milan, Bocconi University), and Riccardo Zago (Banque de France, Collège de France, ESCP Paris), focuses on the role of *participation* and *position* in Euro Area Input-Output production networks in shaping the slope of (sectoral and aggregate) Phillips curve.

Exploiting the extensive heterogeneity in sectoral linkages within and across European countries, this research investigates how production networks shape the slope and dynamics of aggregate supply curves. The central insight is that shocks propagate unevenly across sectors, implying that standard monetary policy rules (such as a plain-vanilla Taylor rule) cannot simultaneously stabilize inflation and close all sectoral output gaps. Most of the empirical literature on the slope of the Phillipes curve is theoretical (*e.g.*, Rubbo 2023), or focuses on U.S. or small European countries (*e.g.*, Gagliardone et al. 2024). Our approach combines theoretical modelling and empirical analysis to assess how the network structure and sectoral characteristics − specifically, a sector's position and participation within the network − affect the transmission of shocks within and between Euro Area countries. Empirically, we find that the structure of the networks shape the transmission of shocks through heterogeneous Phillips Curves: *(i)* prices are stickier in downstream and highly competitive sectors; and *(ii)* shocks originating in upstream sectors propagate strongly and amplify inflation, whereas shocks to intermediate sectors produce ambiguous effects both upstream and downstream. As a next step, we plan to validate these mechanisms in a production-network DSGE framework, leveraging the rich country-sector heterogeneity of a large monetary union to quantify the macroeconomic relevance of network-driven transmission. Particular emphasis will be devoted to the asymmetric effects of common monetary policy interventions within the Eurozone. Finally, me and Daniele Siena initiate a parallel, distinct project that micro-founds the endogenous decision of firms to locate upstream or downstream in domestic production networks and Global Value Chains (GVCs), demonstrating how these choices influence outcomes in macroeconomics, international macroeconomics, and trade. Our results speak simultaneously to monetary-policy design, to the evaluation of fiscal and trade interventions, and to the global sourcing and re-shoring choices faced by managers

3. Structural Changes and Labour Market Inequality

My single-author research on wage inequality due to sectoral composition examines how the interaction of labour-side task polarization and industry-specific production structures drives between-industry wage dispersion in the U.S. economy.

My paper, titled ***Industry Contribution to U.S. Wage Inequality***, is the first in the literature to capture the role of industrial composition on widening wage inequality in U.S. I combine the employment polarization view (*e.g.*, Autor et al. 2006, Acemoglu and Autor 2011) − emphasizing technological change and the reallocation of workers across job tasks − with the industry dimension (*e.g.*, Haltiwanger et al. 2024, Briskar et al. 2020) − which highlights sector-specific production structures −, to argue that inequality stems not solely from differences in factor accumulation, long emphasized by the Skill-Biased Technological Change (SBTC) framework, but from evolving heterogeneous elasticities of substitution across sectors. Empirically, I document that industries exhibiting the largest wage growth are those with substantial ICT adoption and a rising share of non-routine workers relative to routine workers, while industries with smaller wage growth show slower technological uptake and more stable task composition. These patterns suggest that observed wage dispersion arises not solely from differences in factor accumulation, but from structural heterogeneity in industry-level technologies interacting with labour-side transformations. To formalize these mechanisms, I build a general equilibrium model of industries differing in capital–labour substitution elasticities and labour market concentration. Employment polarization is captured through substitution between routine and non-routine labour, while the industry dimension is modelled via cross-sector differences in the evolution of production technologies. Industry-specific elasticities determine how identical growth in capital and labour inputs translates into divergent wage outcomes, rendering observed inequality primarily structural rather than quantitative. I estimate the model on 3-digit U.S. NAICS industry data (2003–2022), combining ICT adoption, labour composition, and industry wage distributions. Counterfactual simulations disentangle the sources of wage inequality into two channels. The *structural effect* (industry-specific evolution of substitution elasticities and task reorganization) accounts for over 90% of observed between-industry wage dispersion, capturing how asymmetric technological change and labour reallocation shape wage outcomes. By contrast, the *quantity effect* (changes in ICT capital, routine and non-routine labour, and sectoral productivity) explains less than 15% of observed inequality. Task-based substitution emerges as the dominant transmission channel, while labour market concentration (workers' sorting and segregation across sectors) amplifies structural disparities between sectors. I further examine the potential role of wage markdowns (*monopsony power*) in shaping observed inequality: allowing firms to set wages below the marginal product of labour produces patterns of between-industry wage dispersion broadly similar to the competitive benchmark, indicating that monopsony effects are quantitatively minor relative to structural transformations (*e.g.*, Card et al. 2024). The results demonstrate that while SBTC is necessary to rationalize the broad patterns of employment polarization, it is insufficient to explain the observed magnitude of wage dispersion. What ultimately drives contemporaneous wage inequality is the asymmetric evolution of sectoral production technologies and structural transformations in the labour market. Integrating both employment polarization and industry-level heterogeneity provides a unified framework for understanding cross-industry wage inequality in the U.S. economy.

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