

REPLY TO:
Comments on “*Walras–Bowley Lecture: Market Power and Wage Inequality*”

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VIOLANTE (2023) AND VAN REENEN (2023) offer a comprehensive review of the lecture and point out the key aspects of the paper. We are grateful for their comments which have greatly improved this research.

Our goals in this paper are twofold: (a) to provide a methodological framework that jointly incorporates goods market power (oligopoly) and labor market power (oligopsony) in a general equilibrium setting, and (b) to propose an empirical strategy for applying such a framework to microdata to estimate key structural parameters and a joint distribution of establishment-level productivity. Combined, these features allow us to quantify the relative importance of technological change and changes in market structure on the labor market, in particular on the evolution of wages, wage stagnation, and wage inequality. The main insight of our model is that market power and wage inequality are both endogenous objects, determined simultaneously in equilibrium by (1) the market structure (the number of competing firms); (2) the dispersion of establishment-level productivity; and (3) the substitutability parameters in the product and labor markets.

We find that a change in the market structure (excluding changes in the dispersion of productivity and within- and between-market substitutability parameters) accounts for 8.1% of the rise in the skill premium, and 54.8% of the increase in between-establishment inequality. Our analysis also establishes that technology is indeed the main driver of wage inequality, whereas the decline in competition is behind the increasing gap between wages and productivity.

Both commentators rightly point out that our assumption of perfectly *overlapping boundaries* between product and labor markets is strong. We agree, and nonetheless maintain this simplifying assumption for two reasons. The first is for computational tractability, as allowing for non-overlapping boundaries greatly increases the dimensionality of the system of equations needed to compute the economy's equilibrium.¹ Second, we es-

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¹Recent work by Gutiérrez (2022) allows for overlapping product and labor market boundaries in a framework with labor as the sole input in production to study the pro-competitive gains from trade. He found that labor and product market power interact with each other, amplifying rather than dampening the pro-competitive gains from trade.

time market structure without using industry, occupation, or geography-based definitions, which would be considerably more challenging without overlapping boundaries.² Additional future work is needed to establish whether, in which direction, and by what magnitude non-overlapping markets will alter our results with multiple skilled inputs. Despite the simplification in our analysis, our model provides a computationally tractable way to analyze the effect of imperfect competition on labor market inequality.

Both commentators further emphasize the need to carefully disentangle the *sources* of firms' market power. We agree that it is important to understand whether rising markups are due to lax antitrust enforcement or to past investments. While the nature of our model (static and without entry) makes it difficult to definitively attribute rising markups to investment or lax antitrust enforcement, our estimated distribution of establishment-level TFP provides two valuable insights: first, a look at the *resulting* technology dispersion without distinguishing the sources, and second, how this resulting technology dispersion has changed over time. An important contribution of this research is that technology dispersion by itself is a source of market power. In that sense, more dispersed firm technologies and hence firm sizes are a sign of inefficiency, and not of efficiency as is usually heralded in the work on misallocation (Hsieh and Klenow (2009)). In addition, our more general framework highlights the importance of accounting for establishment-specific product and labor market power in estimating TFP distributions. As our model shows, excluding market power from the analysis biases estimates of the underlying productivity dispersion, which has not been considered in the general equilibrium framework of technological change and job polarization (see, e.g., Patel (2021), Bárány and Siegel (2021)). Finally, contemporaneous work has begun to shed light on distinguishing the sources of rising market power, attributing a key role to technological change, in particular the role of fixed costs and technology dispersion (Loecker, Eeckhout, and Mongey (2021), Deb (2023), De Ridder (2023)), and innovation (Bao and Eeckhout (2023), Olmstead-Rumsey (2023)).³ In addition to technological explanations, firms use a broad range of tactics that allows them to build market power, including common ownership, abusing the patent system, In our model without this amalgam of additional sources of market power, all those are absorbed in the technology and market structure, which is likely to change the estimates, though it is not immediately clear in which direction.

Of course, one major change in the economy is globalization. While globalization has its own specifics, we think of globalization as a form of technological change. Most notably, the China shock, which potentially replaced low-skilled manufacturing jobs, would show up in our model as a decline in the estimates of A_{Linj} due to declining employment of low-skilled workers L_{inj} in these establishments. We like to believe that globalization can be interpreted as a form of technological change due to the advancement of transportation and information technology, in the same way that outsourcing (say of cleaning services or a call center) within an economy is interpreted as technological change.

Violante (2023) further rightly qualifies our welfare analysis. Our view that the level of wage inequality is Pareto efficient in the absence of market power is true within the limits of our framework. The only source of inefficiency in our model is Cournot competition. This leads to market power, which depends on the dispersion of technology and the

²In addition, recent work by Jarosch, Nimczik, and Sorkin (2024) and Nimczik (2020) has relied on data-driven methods using worker flows and stochastic block models to identify local labor markets, as opposed to a priori choices such as industry or geography. We see the identification of labor and product markets as an important avenue for future research.

³Those explanations are in addition to the micro-founded sources of technological change due to capital-skill complementarities; see, for example, Krusell, Ohanian, Ríos-Rull, and Violante (2000).

imperfect substitutability of worker and consumer preferences in addition to the number of competitors. Of course, we fully agree that this is not a complete description of reality. Other sources can lead to inefficiencies, such as market incompleteness (uninsurable wage volatility or risk) or frictional reallocation of labor due to uneven technological change. These alternative sources of inefficient outcomes reduce welfare and open additional avenues for welfare-enhancing policies such as educational reforms and slowing the rate of technological adoption.

Finally, Van Reenen (2023) raises an excellent point that in bargaining models, increased product market power can potentially raise wages.⁴ As rents rise, rent sharing will bestow a higher piece of the pie to the rent-sharing parties.⁵ This point is also made in Kaplan and Zoch (2022) and in Bao, De Loecker, and Eeckhout (2022) where managers have span of control that leads to surplus sharing in a matching market. However, it is not clear ex ante that surplus sharing will lead to an increase in the wage level of all workers, even if it raises wages for workers in firms that gain power. This is likely to depend on the effect on equilibrium employment of increased market power and changes in workers' outside options. This is related to the point that Violante (2023) raises regarding declining union membership. In our setting, declining union membership would show up in the estimates of the substitutability parameters $\hat{\eta}_s, \hat{\theta}_s$ in the labor market, that is, how wages vary by the size of the firm due to differential union membership across firm sizes. But if union membership declines uniformly across firms of all sizes, then this would in our model be picked up by a decline in the productivity parameters A_{Sinj} .

The commentators of this lecture have opened several avenues for future work that can build on this discussion. The economic question under investigation is big: market power has important implications for wage inequality, and we need to dig deeper to fully understand the underlying mechanisms. Most importantly, because market power is a source of inefficiency, there are important policy implications that hinge on the outcome of this debate in order to create a more efficient economy with higher welfare for all. This discussion provides a first step in that direction.

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⁴Note that our model can also incorporate a joint increase in wages and product market power in equilibrium. In our framework, a rise in the dispersion of establishment-level productivity will translate into increased market power (both in the product and the labor markets) for relatively more productive firms as well as an increase in wages for workers within these firms.

⁵Note that, contrary to rent sharing, as market power increases the share that goes to workers decreases. This is true both for monopoly power in the goods market—with the ensuing general equilibrium decline in wages—or monopsony power in the labor market. Indeed, in Deb, Eeckhout, Patel, and Warren (2022), we showed that the majority of the change in wages is due to goods market power (75%).

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