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REPLY TO: Comments on "*General Equilibrium Oligopoly and Ownership Structure*"

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WE THANK OUR COMMENTATORS for their insightful comments. We appreciate the pointers to relevant extensions of our framework, raising, for example, agency and distributional issues. We should make clear at the start that, as stated in the paper, our aim is mostly methodological. We want to provide a framework for oligopoly in general equilibrium that allows for firms which have a diversified ownership to have market power in both product and labor markets. To this end, we develop first our ideas in a baseline one-sector model to provide a general equilibrium framework which is numéraire-free and allows for market power. This model is not appropriate for calibration of macroeconomic variables. Our multi-sector model is more suitable for such an endeavor (Section 4 in our paper and Azar and Vives (2018, 2019)).

Jan Eeckhout is interested in the macroeconomic effects of market power and offers several insights. He concentrates his comments on the one-sector model, however, and potentially underestimates the ability of our multi-sector model to speak to macroeconomic questions.

The one-sector version of our general equilibrium model is a device to illustrate ownership and market power mechanisms, as well as comparative statics. It does not represent a "small economy" because all prices are determined endogenously. In addition, the three "forces" for market power to affect the labor market—product market power affecting the labor share, general equilibrium effect on wages, and monopsony power—are all present both in the one-sector and in the multi-sector versions of our model (in the first one with a canceling effect on the second force as explained in our paper).

It must be noted also that, while in the exposition of the multi-sector model we have an integrated labor market, in the calibration we consider fully segmented labor markets (see footnote 36). Thus, in our calibrated model, monopsony power is present even with a large number of sectors and without full diversification. To see this, note that the markdown formula with fully segmented labor markets is the same as the markdown formula with a pooled labor market (Proposition 4), with the only modification being that the relevant labor market modified HHI is calculated using only the firms in the segmented labor market:

$$\mu^* = \frac{1 + H_{\text{labor}}/\eta}{1 - (H_{\text{product}} - \lambda_{\text{inter}})(1 - 1/N)/\theta} - 1,$$

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where $H_{\text{labor}} \equiv (1 + \lambda_{\text{intra}}(J-1))/J$ is the labor market modified HHI.[1]

Because the labor market modified HHI is now within-sector, it does not decline with the number of sectors N. In this case, the limit economy has non-vanishing labor monopsony power even with undiversified portfolios. In particular, with no common ownership, the limit markdown is

$$\mu^*_\infty \equiv \lim_{N\to\infty} \mu^*_N = \frac{1 + 1/(\eta J)}{1 - 1/(\theta J)} - 1 > 0.$$

This is also a feature, indeed, of Berger, Herkenhoff, and Mongey's (2019) model with partially segmented labor markets.

A result of our paper that is worth highlighting is that, in the version of our model with heterogeneous firms and constant returns to scale, an increase in common ownership endogenously generates a shift in market share from lower markup firms to higher markup firms, which is one of the macroeconomic stylized facts documented by De Loecker, Eeckhout, and Unger (2020). Furthermore, in this latter paper, a large increase in markups is found. However, the paper assumes perfectly competitive labor markets, while in our calibrated macroeconomic model we find that common ownership has increased the market power wedge in the labor market and, due to the general equilibrium effects, has limited the increase in product market power. Therefore, it is possible that some of the increase in markups that they find is actually capturing an increase in market power in the labor market.

With respect to the use of the HHI index in macroeconomics, we are well aware of the difficulties. Indeed, one of us has written extensively about oligopoly, concentration measures, and market power (see, e.g., Vives (2008), where it is shown under what conditions margins and concentration have a negative relation), but in any case, the limitations of the HHI have to be set against the limitations of other methods when a full structural analysis is not feasible.

Finally, the limit of our multi-sector model need not be the Dixit and Stiglitz (1977) model. Section 4.3 in the paper shows the conditions needed to arrive at Dixit–Stiglitz as a limit. Apart from the inconsistency in the models that assume a representative agent and profit maximization, we find that the monopolistically competitive limit may or may not be attained as N grows large depending on the evolution of diversification. For example, if full diversification is attained at least as fast as $1/\sqrt{N}$, then rivals' profit internalization is positive in the limit and the Dixit–Stiglitz limit is not attained.

Thomas Philippon places the common ownership framework in the context of the literature on financial structure and product market competition. His model of imperfect

[1] With segmented markets, the wage in market n is $\omega(L_n) = \chi^{1/(1-\sigma)} L_n^{1/\eta}$, and therefore the first-order condition for the firm is (where only the third summand changes from the original specification)

$$\underbrace{\rho_n(\mathbf{L})F'(L_{nj})}_{\text{VMPL}} - \underbrace{\omega(L_n)}_{\text{real wage}} - \underbrace{\frac{\partial \omega}{\partial L_{nj}}}_{(+)}\left[L_{nj} + \lambda_{\text{intra}}\sum_{k\neq j} L_{nk}\right] + \underbrace{\frac{\partial \rho_n}{\partial L_{nj}}}_{(-)}\left[F(L_{nj}) + \lambda_{\text{intra}}\sum_{k\neq j} F(L_{nk})\right]$$

$$\underbrace{\qquad\qquad\qquad\qquad\qquad\qquad}_{\text{wage effect}} \qquad\qquad \underbrace{\qquad\qquad\qquad\qquad\qquad\qquad}_{\text{own-industry relative price effect}}$$

$$+ \underbrace{\lambda_{\text{inter}}\sum_{m\neq n}\underbrace{\frac{\partial \rho_m}{\partial L_{nj}}}_{(+)}\left[\sum_{k=1}^{J} F(L_{mk})\right]}_{\text{other industries' relative price effect}} = 0.$$

governance provides an excellent example of how "better" corporate governance, in the sense of managers' objective function becoming more closely aligned with that of shareholders, can sometimes have negative implications for social welfare. Philippon uses his model to make what we think is an important point, which is that the quality of corporate governance becomes less important when competition increases. This was pointed out in Vives (2000) and is also the case in the common ownership with managerial entrenchment model of Azar (2020).

Philippon makes another good point in his discussion, which is that empirical work should be careful to separate the effect of common ownership from other changes in ownership structure, for example, an increase in within-firm ownership concentration that could affect the quality of governance.

Finally, when discussing our general equilibrium inter-industry internalization effect, Philippon states that "this result is similar to the classic result in IO that vertical integration can solve the double-marginalization problem." However, the mechanism behind our result is not related to double marginalization but to across-sector horizontal externalities.

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