**Note:** Post integration w\_2A is higher than p\_1A? (Not always)

Defontenay and gans 2007 talks about “integrated units weakening their own competitive choices"

Fiocco: “competition horizontal effect”

# Intro:

Recent vertical mergers such as in healthcare (CVS-Aetna) and telecommunications (ATT-Time Warner) have brought the competitive effects of vertical integration into the spotlight for policy makers and regulators. Vertically integrating firms often claim to be able to achieve efficiencies that otherwise would be unfeasible if they were separate. Regulators worry about gains in market power and potential negative welfare effects resulting from vertical integration.

Whether or not efficiencies can be achieved without offsetting anticompetitive effects is a popular area of research. The Chicago School pioneered leading theories of antitrust and vertical merger theory in the 1970s, showing that many previously accepted theories of vertical mergers underestimated the gains in efficiencies. A new school of thought emerged in the late 80s that adopted oligopoly market structures to study effects of vertical integration. These papers such as \cite{salinger1988vertical} and \cite{ordover1990equilibrium}, directed their attention to market foreclosure, the market power gained by restricting supply (demand) to downstream (upstream) competitors.

Foreclosure and the closely related raising rivals’ cost theory remained the most intensely studied aspects of vertical mergers for the next decade. Following \cite{ordover1990equilibrium}, the focus in this literature shifted towards equilibrium outcomes and foreclosing rivals to obtain monopoly power. \cite{hart1990vertical}, \cite{o1992vertical}, \cite{mcafee1994opportunism} discover that a dominant supplier can exert monopoly power when competition is already lacking in the upstream market. \cite{chen2001vertical} analyzed foreclosure in equilibrium outcomes while introducing tweaks in market structure.

More recently, the vertical integration literature has branched out into many areas of economics, antitrust, and regulatory interests. \cite{nocke2007vertical} uses a repeated game to study the effect that vertical arrangements can have on sustaining collusion in an oligopoly market structure. Welfare effects of partial vertical integration, where upstream and downstream firms only share some of the joint profits, have also been studied more closely recently by \cite{levy2018partial}. Some have furthered the market foreclosure literature from the 90s and early 2000s; \cite{nocke2018exclusive} adopt secret contracting and interlocking relationships to study foreclosure. One commonality across all these recent results is that the products in the market are now assumed to be differentiated in both the upstream and downstream markets. Product differentiation comes in a variety of manners; some papers adopt Hotelling type models \citep{matsushima2009vertical} while others use some parameter or function for substitutability \citep{zanchettin2017vertical}. Furthermore, more authors have incorporated bargaining to divide upstream and downstream profits. Such innovations in methodology have enabled vertical integration models to demonstrate the subtle effects that vertically integrating firms have on pricing, market structure, and competition.

This paper simulates an equilibrium in a vertical market structure similar to the dual upstream-downstream oligopolies in \cite{salinger1988vertical} and \cite{hart1990vertical}. Unlike \cite{ordover1990equilibrium} or \cite{chen2001vertical}, equilibria are found numerically via simulation rather than solved with an analytical model. We enable product differentiation in both the upstream and downstream firms, and firms compete in prices in both the intermediate good and the final good market. For downstream consumers, we assume a logit or nested logit demand model; parameters across a range of values are chosen and the effects of vertical integration are analyzed. Our model can be thought of as a “supermarket” model, where each of the upstream firms stock goods that the downstream retailing firm attempts to sell. Therefore, the model is not traditional in the sense that there are four total downstream goods rather than two.

We focus our attention on parameters and market settings in which the price of a good produced wholly by an integrated firm increases post integration. This phenomenon happens when the “horizontal integration effect” outweighs any elimination of double marginalization effect (EDM). The idea of the horizontal integration effect is described in \cite{moresi2013vguppi} – the downstream subsidiary of the vertically integrated firm has an incentive to raise prices post-merger because substitution drives consumers into purchasing another downstream good that is supplied by the integrated firm. In essence, the vertically integrated firm can behave as if horizontal integration has happened, because one of the four intermediate markets is eliminated with vertical integration. The horizontal integration effect is an under-studied negative effect of vertical mergers, and in some sense, it is more important than the commonly reviewed foreclosure or raising rivals’ cost (RRC) effects. This is because in cases where the horizontal integration effect dominates EDM, welfare of the downstream consumer is directly impacted. Whereas it is possible that if the downstream firms are affected by foreclosure or RRC, the impacts may not be completely passed through to the consumer.

This paper is organized as follows. The next section presents the models and assumptions made about vertical integration. Then, Section \ref{logit results} discusses the methodology and results from the logit model simulation. Section \ref{nested results} analyzes results from the nested logit model. Concluding remarks are offered in Section \ref{conclusion}.

# Model

# Conclusion:

We develop a simulation model in this paper to illustrate situations where vertically integrated firms have a new strategic decision to operate in an anti-competitive manner. These firms can ignore any efficiencies gained through integration and instead raise the price of its downstream good to the final consumer. We call this effect a dominating horizontal integration effect and observe it in certain situations given assumptions on consumer demand behavior and parameters of the consumer utility function. In one scenario, we show that vertical integration in which the market share of the outside good is low causes a dominating horizontal integration effect. This effect may be explained by the lack of available market left to capture, dissuading integrating firms to pass through efficiencies to the consumer. Another scenario occurs when upstream firms have more power than the downstream firms, and therefore have a higher relative margin with respect to the final price. In this situation, the integrated firm may increase their downstream good price in order to create substitution to a competing good for which they provide an intermediate input to. Rather than losing all the profits resulting from a price increase, the integrated firm can recoup some of the losses because of increased demand for the intermediate good.

The results of this paper should be of interest to regulators and policy makers interested in competition effects in industry. Vertical mergers are often less scrutinized than horizontal mergers because the common belief is that vertical mergers enable efficiencies without concerns of monopolizing market power. While other anticompetitive effects may occur in the intermediate good market, we show situations where the integrated firm can create negative welfare effects in both the intermediate good market and the downstream market post-integration. Regulators need to be cognizant of these situations and examine consequences of vertical merger more closely if such cases do arise.

There are many logical extensions of this paper and its methodology and/or design. Most importantly is the lack of an empirical application, which is an obvious next step. A straightforward empirical application of this paper would find a market where vertical integration happens and estimate the consumer demand parameters before running this model. Other methodological improvements can be made in the assumptions of the consumer utility and consumer demand function. For example, one can choose an Almost Ideal Demand System or a BLP type model to simulate demand - the degree of complexity depends on what a they are striving to achieve. Future projects can also alter the model structure like timing and enable partial integration to observe richer effects. Product differentiation is done through the utility function and nesting in this model, but many other adaptions may be used. The oligopoly structure in this paper can possibly be generalized to include more firms and more downstream products. One final suggestion is to include bargaining between the upstream and downstream firms, rather than having take-it-or-leave-it offers.