



Who should handle retail? Vertical contracts, customer service, and social welfare in a Chinese mobile phone market[☆]



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ABSTRACT

Using data on mobile phone handset sales from a single retail store, we examine the impact of different retail responsibility designations and vertical contracts on seller service provision, firm profitability, and social welfare. During our sample, this store switched from retailer-managed retailing with linear pricing contracts to manufacturer-managed retailing with revenue-sharing contracts. We estimate consumer demand and manufacturer cost parameters. Demand estimates indicate a large positive shift that coincided with the vertical change, consistent with improved retail customer service. Welfare estimates suggest that consumers derived substantial surplus from the improved customer service in addition to that from lowered prices.

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Manufacturers selling directly to consumers in retail stores and compensating retailers through revenue-sharing contracts has become common in the U.S.,² and it is a long-standing practice in China and Japan.³ A similar arrangement is also popular in the online market

and the emerging mobile platform.⁴ In these scenarios, the manufacturer sets the retail price of its product; retailer responsibilities, such as staffing and inventory management, are also borne by the manufacturer. The manufacturer then pays the retailer a percentage of the total sales revenue that it realizes in the store. The pricing implications of such revenue-sharing contracts compared to traditional contracts in which retailers pay manufacturers per-unit wholesale prices (linear pricing) have already received substantial theoretical and empirical scrutiny.⁵ There

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² Louis Vuitton in Saks Fifth Avenue and Apple in Best Buy are two notable examples. In fact, the cosmetics sections at almost all the major U.S. department stores (e.g., Bloomingdale's, Macy's, Neiman Marcus, Nordstrom, and Saks Fifth Avenue) are managed under revenue-sharing contracts. The same practice is also observed in the apparel category in the aforementioned stores (Jerath and Zhang, 2010).

³ A survey from 30 upscale department stores across major Chinese cities indicated that about 80% of product categories were managed under this type of contract during our sample period (Wu, 2005).

⁴ Amazon.com provides "marketplaces" where individual sellers can list their items and set prices. In exchange for the hosting services, Amazon.com receives a percentage of the sales price (usually 10–15%) if an item is sold. The online application stores (e.g., the Apple Store and Android Market) also adopt this type of contract to sell applications from different developers. In Apple's App Store, developers set the price of the individual iOS app and share a percentage (usually 30%) of their revenues with Apple.

⁵ Dana and Spier (2001) and Cachon and Lariviere (2004) are prominent theory examples, and Mortimer (2008) is a pioneering empirical example. Pricing has also been the primary focus in empirical work on vertical relationships more generally. From industrial organization, see Villas-Boas (2007, 2009), Manuszak (2010), Bonnet and Dubois (2010) and Ferrari and Verboven (2012), and from marketing see Chen et al. (2008), Kadiyali et al. (2000), Kim et al. (2011), and Sudhir (2001).

has, however, been relatively little attention paid to the implications of manufacturers shouldering traditional retailer responsibilities. This gap applies especially to non-price margins of the retailer experience, broadly referred to in this study as customer service.⁶

The impact of such a shift of retail responsibility and contractual type on service-quality is ambiguous. A retailer performing the sales function might provide higher (e.g., more objective) service than manufacturers could be expected to provide if they sold their products to consumers themselves. Alternatively, the retailer might offer less in the way of service. Tirole (1988, 177–8) shows that a monopolist retailer under linear pricing will provide less than the industry's profit-maximizing level of customer service; furthermore, a multiproduct retailer knows that at least some lost sales of one brand arising from lower customer service may be recaptured in sales of competing brands at the same store. Besides these incentive issues, the relative cost advantage in the provision of service-quality may also be an important determinant of customer service with respect to regime. In short, how consumers respond to the retailing regime is an empirical question.

We address the question of how well manufacturers provide retail customer service by examining a Chinese retailer's policy shift in its contracts with all of its mobile phone handset manufacturers.⁷ Before the shift, the retailer and manufacturers engaged in *retailer-managed retailing* with traditional linear pricing contracts. That is, the retailer was responsible for retail prices and the staffing that handled all manufacturer brands. After the shift, the retailer and manufacturers engaged in *manufacturer-managed retailing* with revenue-sharing contracts. Under this regime, manufacturers operated their own booths and hired their own sales staff to sell their products inside the store. This policy change thus facilitates a clean before-and-after study of how consumers respond to changes in the retail-manager.

Fig. 1 presents preliminary evidence that the retailing regime switch coincided with an increase in quantities sold, an increase that we hypothesize stemmed from manufacturers providing higher service quality. The figure shows brand-normalized weekly quantities for the 70 weeks when our retailer's phone-sales location was unchanged from when the regime switch occurred (week 54).⁸ Estimates indicate an increase of one half of a brand standard deviation ($b = 0.49$, $t > 5$) in the last 17 weeks of the period (after the switch) compared to the first 53 weeks. This happens despite the fact that phone sales at our retailer over the entire sample tended to display no growth or a secular decline. This increase in sales, of course, could stem from any number of sources besides our hypothesized higher service quality, including but not limited to predictable seasonality, new and more preferred brand characteristics, and lower prices that accompanied the regime switch.⁹ We therefore use data surrounding this shift and vertical models appropriate to the regimes to structurally estimate consumer demand and (inferred) marginal costs. After estimating the impact of any quality changes that accompany the contractual switch, we then explore welfare considerations under various counterfactual scenarios, enabling us to disentangle the various aspects of the vertical contracts.

⁶ The literature on exclusive reselling and franchising (e.g., Desai and Srinivasa, 1995; Lafontaine and Slade, 1997, 2008) has long concerned itself with the provision of customer service, but this has not generally spilled over into the context of retailers selling the goods of several distinct manufacturers.

⁷ While phones and service plans in China were not bundled at the time of our sample, previous work on mobile phones has focused on the U.S. model (in which phone bundling dominates) and thus taken the service plan as the primary focus. See Xiao et al. (2008), and Ascarza et al. (2012).

⁸ Brand quantities q differ sufficiently in their means and variances that standardizing by each is necessary for a visual representation. Over this subsample, the plotted value y for brand b at week t is $y_{bt} = \frac{q_{bt} - \bar{q}_b}{\sqrt{E(q_{bt} - \bar{q}_b)^2}}$.

⁹ The impact of the regime change on pricing depends on the original wholesale price and the new revenue shares and is thus also ambiguous. Liu and Shuai (forthcoming) thoroughly explore how demand fundamentals and relative competitiveness determine the equilibrium impacts of such contractual shifts.

Available data are rarely ideal for structural applications, and our application is no different. In particular, our data come from a single retailer in the market. We lack information on the number of retail competitors or the market structure, let alone competitors' prices and quantities. To address this concern, we assume an oligopoly of N firms and estimate demand first in isolation and then jointly with cost, both conditional on the specific N -firm oligopoly assumption. As Moul (2012) points out, if the assumption on the value of N is innocuous, demand parameters should be similar across the isolated and joint estimations. A significant divergence of demand-alone and joint estimates of demand then indicates a contradiction of the maintained assumption on market structure. We are thus able to draw some limited conclusions on market structure even in the absence of manufacturer cost data. While we assume that these hypothetical firms are largely similar (*essentially symmetric*) to our observed retailer, our model allows for our retailer to face idiosyncratic changes to demand (e.g., relocating phone sales area within store). In such cases, we use our model and its profit-maximizing conditions to construct the equilibrium prices that would have been charged at other retailers.

Our estimates for demand and cost are plausible and consistent with our retailer facing a reasonable degree of retail competition (at least three firms). Consumers respond to touch screens, the presence of a second screen, the main display being in color, the quality of playback, game capabilities, and camera capabilities.¹⁰ These characteristics are all associated with higher costs of production. We also find that demand increased substantially when retail responsibility was shifted from our retailer to manufacturers. This suggests that the vertical contracts could have substantial impacts on not only the equilibrium retailer and manufacturer prices, but also (through changed incentives for and differing costs of service provision) demand itself. The solutions of various counterfactual scenarios indicate that both consumer surplus and welfare increased by about 15% when the sector moved from the original regime to the new regime. Furthermore, most of the additional market-wide consumer surplus that was generated came from this improved customer service rather than the lower prices that we observed. The retailer and manufacturer profits implied under these counterfactuals suggest that, consistent with observations from the industry in China, manufacturers have a sizable cost advantage in retail quality provision from training staff and inventory management.

The paper is structured as follows. First, we describe our data and the circumstances of the regime switch that shifted retail responsibilities from our retailer to manufacturers. The second section presents a model of demand and price competition for manufacturers and retailers in the Chinese mobile phone industry. We discuss details regarding the model's estimation in the third section. The fourth and fifth sections present estimates and counterfactuals, while the final section concludes with suggestions for future research.

1. Phone data in our Chinese market

Our data come from a department store located in a Chinese city with five to ten million residents. Like most other department stores in China but unlike most U.S. stores, the store operated at a single very large location during the sample period (2003–2006). The store is among the largest of its kind across China, selling products in many categories (e.g., apparel, apparel accessories, cosmetics, jewelry, watches, home furnishings, bed and bath products, appliances, electronics, toys, food). There was only one other department store of comparable size and product selection in our retailer's city, but there were also many smaller department stores and consumer electronics specialty stores and (later in the sample) mobile phone specialty stores.

¹⁰ As Apple did not introduce the iPhone until June 2007, our sample (2003–2006) predates the smartphone era, but our estimates foreshadow the product characteristics that the industry later emphasized.

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