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Firm agglomeration through the lenses of customers: How proximity can facilitate information acquisition

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- By promoting entrepreneurship and technological innovation, cities are important drivers of economic development.
- This project combines a new survey of 600 tailoring firms and their customers in Kampala with a quantitative equilibrium model to study how consumers' limited information about products affects firms' choice of location within the city.
- The study finds that access to customers is the primary reason why firms agglomerate at the centre of Kampala. To operate in this area, firms pay large commuting and rental costs.
- Firm agglomeration reduces customers' costs of acquiring information about different products, allowing them to observe and compare more goods before deciding what to purchase.
- Providing customers with information about the type and the quality of goods sold by different firms would substantially reduce firm agglomeration at the centre of the city.
- Policies that alleviate customers' lack of information about products can be effective at reducing agglomeration. At the same time, they primarily benefit firms selling high-quality goods. By contrast, commonly adopted decongestion policies that discourage business clusters without improving customers' information disproportionately harm high-quality firms by increasing consumers' costs of finding high-quality products.

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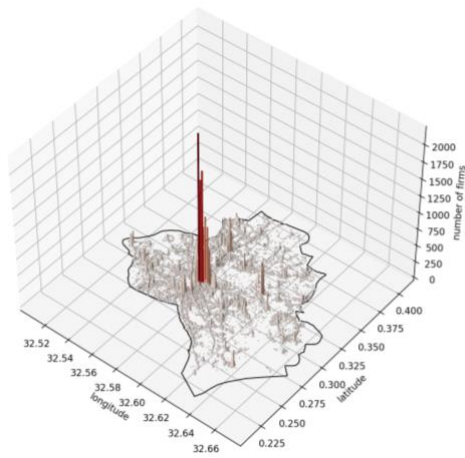
Overview of the research

In Kampala, economic activity is concentrated in a small area at the heart of the city (the *core*), with firms producing similar goods locating next to one another within this area (Figure 1). Every day, firm owners, workers, and customers spend large amounts of money and time to commute to this part of the city. As a result, travel time is estimated to be 13.5% of the city GDP, with an additional 4.2% attributable to congestion (Baertsch, 2020). How do firm owners decide where to locate their business, and why do they cluster next to firms that could be their direct competitors? With a projected 75% growth in the urban population in low-income countries over the next 30 years (UN, 2018), answering these questions is essential to accurately assess the impact of urban policies that can shape the future of cities.

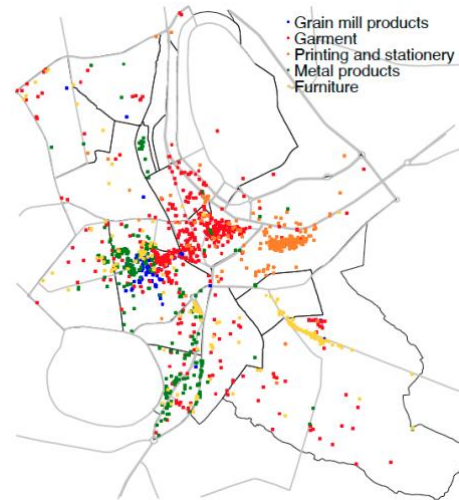
In this paper, I study how consumers' imperfect information about the type of goods sold in the market affect firms' choice of location, and its implications for firm profits and consumer welfare. The key intuition is the following: when consumers do not know what kind of goods are available in the market, they are forced to visit firms in person to learn about product characteristics and availability. This is particularly true in low-income settings, where both customers and firms have limited access to information technology. Since traveling for in-person visits is costly, consumers will favour spatially concentrated firms that let them minimise the cost of gathering information. This generates a trade-off in firms' location decisions. On the one hand, due to consumers' limited information, locations with a high number of firms attract larger pools of customers – incentivising firms to agglomerate. On the other hand, customers in these locations are shared with a larger number of competitors – incentivising firms to disperse. The trade-off between these two forces determines whether businesses have a demand-side incentive to agglomerate.

Figure 1: Spatial distribution of firms in Kampala

Panel A: All firms
manufacturing sectors



Panel B: Top-five
manufacturing sectors



Data

To study this trade-off, I collect data from a representative sample of 600 tailoring firms and their customers in Kampala. Firms were randomly sampled from an initial census of over 2,400 establishments across the city. The data collection included three key components: (i) a firm survey, (ii) a customer survey, and (iii) a mystery shoppers exercise.

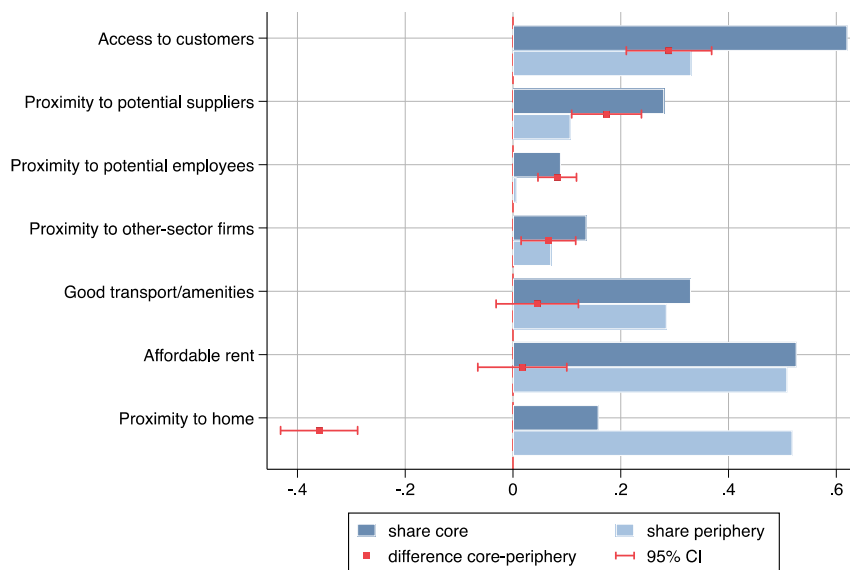
1. The focus of the **firm survey** was to understand the determinants of firms' choice of location. As part of this exercise, business owners were required to maintain a record of all their transactions over a three-day period. These records are rarely available for small, informal businesses in low-income countries, but are essential for studying their demand.
2. The **customer survey** involved 600 customers randomly sampled from the transaction records and was designed to gain insights on how consumers search for products in this context.
3. Finally, the study included a **mystery shoppers exercise**, where interviewers posed as customers and purchased the same garment from all firms in the sample. This exercise provided accurate information on the price charged by firms for the same product, as well as on its quality, which was rated by an expert tailor.

Key findings

How do firms make their initial location decision?

Finding customers is by far the most common constraint faced by firms when setting up their business, with 73% of respondents mentioning it. In comparison, access to finance, which has been widely studied as a potential barrier to starting a business in a developing country, is only mentioned by 53% of firms. Figure 2 shows the reasons why firms report deciding to locate their business in the core (in blue) or the periphery (in grey). Two things emerge clearly from this graph. First, the primary reason why firms locate in the core is to have access to customers: almost 60% of businesses in the core say that their location decision has been driven by the large number of customers shopping in this area. Second, the only reason motivating firms to remain in the periphery is proximity to home (52% vs. 16%), indicating that commuting cost are a key congestion force.

Figure 2: Reasons for locating in Core vs. Periphery



How do customers decide where to search for goods?

Data from the customer survey reveals that the presence of many tailors and varieties (55% of customers), and firms' reputation of selling high quality products (58%) are the main reasons why customers search in the core. To travel to this central area, customers pay approximately three times the transport costs they would pay to travel to a firm in the periphery. However, the advantage of searching for products in the core is that they observe a larger number of products that they can choose from. This intuition is supported by the

data, which shows that once in the core, customers visit 22% more firms prior to purchasing.

Are firms in the core more profitable?

Perhaps surprisingly, transaction records reveal that firms in the core serve fewer customers on average. However, the majority of these customers are retailers buying products in bulk (55% vs. 10% in the periphery). As a result, firms in the core have 78% higher revenues and 44% higher profits than firms in the periphery.

How much of firms' agglomeration is explained by consumers' search behaviour?

I build and estimate a quantitative model of consumer search and firm location to explain how much of the firms' agglomeration within Kampala is explained by the presence of information frictions. I find that eliminating information frictions would induce 8.2% of firms to relocate outside the core. Because most firms that would move to the periphery are high-quality, this would cause a 42% drop in the share of sales concentrated in the core.

By allowing customers to observe and compare all products in the market, removing information frictions would enhance competition across locations and lead to a 14% and an 18% decrease in prices and profits respectively. These averages mask substantial heterogeneity across high and low-quality firms. The simulation reveals that high-quality businesses would gain considerable market share and experience a 17% increase in profits. By contrast, in the absence of information frictions 37% of low-quality businesses would make losses and exit the market. Overall, eliminating information frictions would lead to an 11% increase in customer welfare, driven by lower prices and access to a larger number of product varieties.

Evaluating potential policie

I use the model to evaluate the consequences of two sets of policies that are either under discussion or being implemented in Uganda: (i) the introduction of an **e-commerce platform** where small firms can sell their products, and (ii) policies aimed at **decongesting Kampala city centre**. The policy simulation reveals that firms' access to an e-commerce platform would lead to a 39% reduction in the number of firms operating in the core, driven by high-quality businesses relocating in the periphery. This is because the platform would allow customers to observe and choose from all products in the market, eliminating the incentive for customers to search in person and hence reducing the incentives for firms to agglomerate. By making it easier for customers to compare products, the policy would harm low-quality firms, whose profits would

drop by more than half, whereas it would lead to a 27% increase in the profits of high-quality businesses.

Policies that relocate firms in space without addressing customers' information frictions could instead backfire. I study the effect of two measures in particular: imposing a cap to the number of firms allowed to operate in the core and banning motorcycle taxis from the central part of the city. I find that imposing caps would unambiguously lead to a decline in firm profits. Importantly, high quality firms would experience the highest losses. This is because the larger spatial dispersion of firms would make it more costly for consumers to compare products across different locations, shielding low-quality firms from the competition of higher-quality businesses and making it harder for consumers to find the good products in the market. In the last policy experiment, I show that banning motorcycle-taxis from the city centre would reduce the profits of firms in the core, but increase those of businesses in the periphery. Although these effects would lead 10% of firms to relocate outside the core, the impact on consumer welfare would be negligible.

Policy recommendations

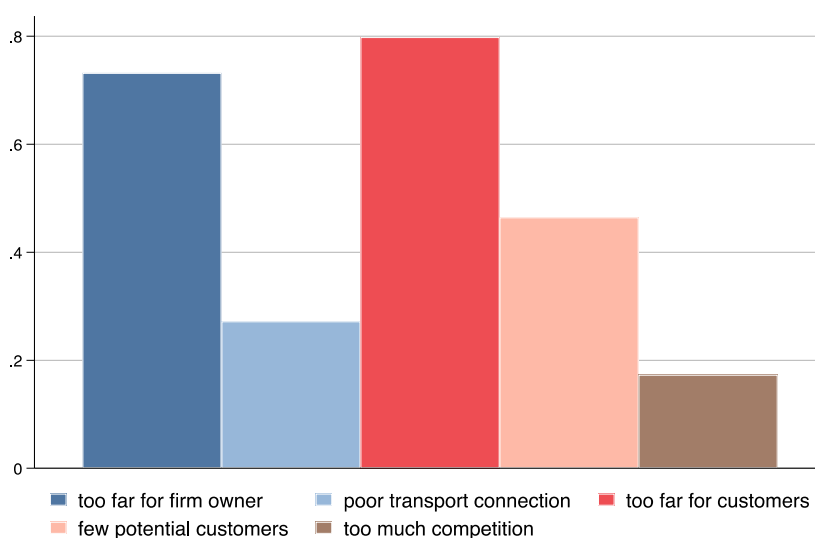
This study shows that consumers' limited information about available products and their subsequent search behaviour are key determinants of firms' choice of location within cities. This has important implications for the design of policies aimed at relocating firms in space.

The main lesson from this study is that implementing **policies to alleviate consumers' information frictions** can have large benefits for both high-quality firms and consumers. These include policies that encourage customers and firms to use online platforms to buy and sell products. The exact type of policy to be put in place to encourage individuals to transact online depends on the constraints that are currently preventing the adoption of this type of behaviour. For instance, subsidies would help firms face the upfront costs of setting up an online shop (e.g. the cost of purchasing a smartphone), training would allow tackling firm owners' limited digital literacy, and information provision would allow businesses to learn about the potential returns from selling online.

The policy simulations conducted in this study reveal that policies aimed at decongesting Kampala city centre could backfire, disproportionately favouring low-quality businesses. This might be the case when this type of policies (i) are not accompanied by interventions that alleviate consumers' information frictions and (ii) lead to a greater dispersion of firms in the city. However, policies such as **the creation of business parks** may not generate such negative effects if the government is able to recreate similar levels of firm agglomeration in an area outside the core. This requires the employment of resources that are large enough to move a critical mass of firms outside the city centre.

Given the importance for firm owners and customers to be able to reach business parks, an element that must be taken into consideration when designing this type of policy is the connectedness and accessibility of the location where business parks are created. The importance of this dimension is confirmed by the data. As part of the data collection, firms were asked whether they would be interested in moving to a business park in Nsambya, Bugolobi and Namanve, locations that are progressively further away from the core. Among firms in the core, 50%, 35% and 22% of firms respectively expressed some interest in moving their business to these locations. On average, interested firms would only be willing to pay 64%, 49% and 42% of their current rent to operate in one of these locations. Figure 4 plots the reasons why some firms report not being willing to move to a business park, confirming the importance of access to customers and transport costs.

Figure 4: Reasons for lack of interest in industrial parks



In recent years, Uganda has been promoting urbanization as a prerequisite for the country to achieve middle-income status (MoFPED 2020). While cities can be an important driver of economic development, poor planning can also lead to the formation of clusters of low-productivity, informal businesses that are unable to foster growth. This study highlights the importance of taking into considerations consumers' search behaviour when evaluating the consequences of policies that move firms within cities. Studying interventions that incentivize individuals to transact online or recreate firm agglomeration outside the city centre via rigorous evaluations would be a promising step forward to design policies that can lead to the creation of productive cities in Uganda.

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