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E-commerce and its role during the COVID-19 pandemic in Indonesia

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Yasuyuki Sawada, Yesim Elhan-Kayalar, Matthew Shum, and Daniel Yi Xu

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ABSTRACT

Micro, small, and medium-sized enterprises (MSMEs) are recognized as crucial drivers of economic development, particularly in low- and middle-income countries. The advent of digital platforms, characterized by economies of scale and significant cross-network externalities in two-sided markets, has brought about unprecedented changes to people's daily lives, employment, businesses, and markets. These transformations have unlocked opportunities for MSMEs. In this paper, we analyze the dynamics of e-commerce and how they unfolded during the coronavirus disease (COVID-19) pandemic, using a unique, composite dataset focusing on GoFood merchants in Indonesia. This paper makes a notable contribution by expanding the analysis of the platform efficiency contributions into static efficiency and dynamic efficiency perspectives. Our analysis reveals three key findings. First, online platforms like Gojek offered a novel form of social safety nets for MSMEs. Second, as the COVID-19 pandemic intensified, we observed market congestion externalities and cannibalization tendencies. Third, women- and men-owned businesses opted for different crisis-mitigation and coping strategies. Vulnerable microenterprises, often owned by women merchants with limited support networks and business assets, were disproportionately affected by the pandemic. Overall, our study demonstrates that the rapid acceleration of digital transformation during the COVID-19 pandemic presents unique research opportunities on distributive justice, external effects, and scale economies, as well as related competition policies.

Keywords: digital platform, distributive justice, e-commerce, platform economies, MSMEs, scale economies, two-sided network externalities, competition policy, COVID-19 pandemic

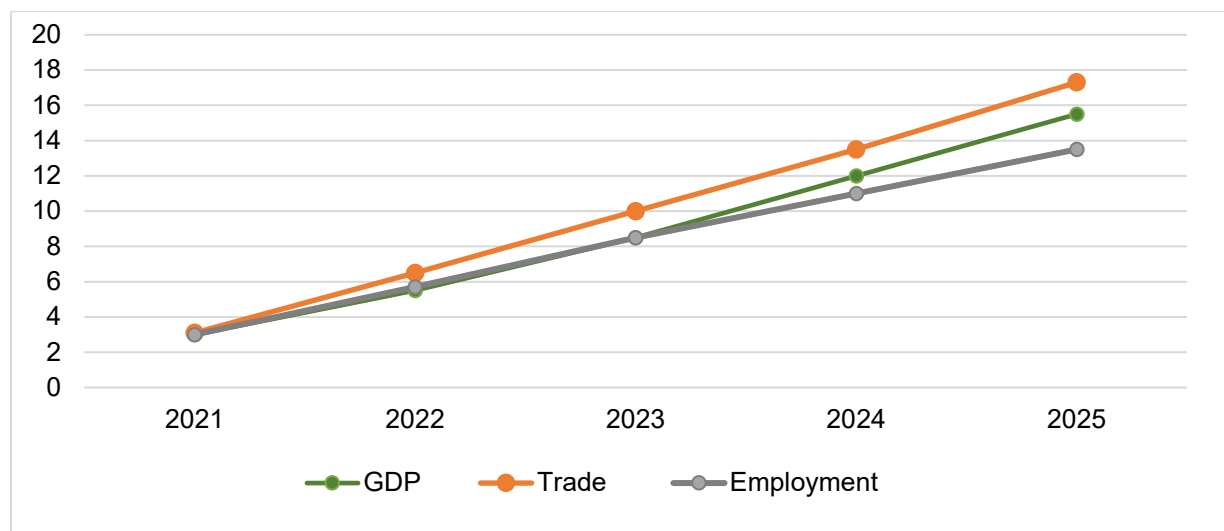
JEL codes: D22, D63, L26, L25

I. Introduction

Micro, small, and medium-sized enterprises (MSMEs) are recognized as crucial drivers of economic development, particularly in low- and middle-income countries. In Indonesia, the vast majority of enterprises are MSMEs, contributing approximately 60.5% to the country's aggregated gross domestic product and employing 96.9% of the total workforce in 2019 (Government of Indonesia, Ministry of Cooperatives and SMEs 2019).

The emergence of digital platforms has brought about unprecedented changes to people's daily lives, employment, businesses, and markets, thereby unlocking opportunities for MSMEs. While the speed of digitalization among MSMEs in Indonesia and other Asian countries has been relatively moderate, the adoption of e-commerce and other digital transactions for goods and services has the potential to enable MSMEs to expand their market reach and foster their growth. According to the Global Trade Analysis Project model of the Asian Development Bank (ADB 2021), the digitalization of the economy could yield substantial benefits for Indonesia from 2021 to 2025. These benefits include an economic dividend of more than \$130 billion per year and the creation of 16 million new jobs annually from the increased use of digital technologies (Figure 1). Moreover, MSMEs stand to gain from positive spillovers from countrywide digitalization efforts.

Figure 1: Impact of Digitalization on the Economy of Indonesia
(Gains as Proportion of 2020 Baseline, %)



GDP = gross domestic product.

Sources: ADB. 2021. *Asian Economic Integration Report 2021: Making Digital Platforms Work for Asia and the Pacific*. Manila; B. Narayanan and J. Villafuerte. 2020. "Macroeconomic Impact of Digitalization in Asia." Background Paper for the *Asian Economic Integration Report 2021*. Manuscript.

On the other hand, digital platforms are characterized by significant scale economies and strong cross-network externalities in two-sided markets. This might have contributed to an increased market concentration toward large enterprises in Indonesia and globally. Hence, fostering robust competition policies for digital platforms is important to establish a market ecosystem that encourages fair competition and maximizes the potential benefits that they can bring, especially for MSMEs.

The coronavirus disease (COVID-19) pandemic, however, had presented numerous challenges for MSMEs. They struggled to sustain their operations amid temporary business shutdowns, supply chain disruptions, sharp declines in sales and revenue, and liquidity shortages during lockdown periods. During the pandemic, digital platforms played a particularly vital role in building MSMEs' resilience and ensuring their sustainability. These platforms not only provided avenues for MSMEs to generate income

and create jobs, but they also acted as a form of social protection for vulnerable workers and sectors.

While digital platforms offer numerous potential benefits, an early evaluation of the pandemic indicates that although the crisis prompted MSMEs to embrace digital solutions, a stable digital transformation has yet to be established within the MSME sector (Shinozaki 2021). The combination of compressed demand and ongoing supply disruptions continued to impact MSMEs' revenue and financial conditions throughout the initial year of the pandemic. Moreover, digital platforms have had competing and counteracting effects on MSMEs.

For instance, a trade-off of benefits arises when MSME entrants join digital platforms. On one hand, increased participation can improve product variety and promote MSME inclusion, alleviating income and job losses during a crisis, which can be seen from the "equity" perspective. However, it can also result in cannibalization and congestion, leading to decreased profits due to an excessive number of entrants, which can be viewed from an "efficiency" perspective. As a result, the rapid penetration of digital platforms into the economy, which was accelerated by the pandemic, may yield mixed outcomes for MSMEs. This could, in turn, highlight social issues related to economic inequality and broad distributive justice.

In this paper, we analyze the dynamics of e-commerce during the COVID-19 pandemic using unique merchant-level administrative data obtained from GoFood, Indonesia's largest online food delivery platform. The primary focus of this paper is to contribute to the understanding of platform efficiency from two perspectives: static efficiency and dynamic efficiency. Static efficiency investigates whether the entry of new

merchants into the platform is efficient or not, while dynamic efficiency explores how the presence of too many merchants on a platform can impact the discovery of successful merchants in the long run.

The COVID-19 pandemic provides an excellent opportunity to study these efficiency contributions and their implications from both equity and efficiency standpoints. The exceptional circumstances created by the pandemic serve as a natural setting for us to examine the interplay between static and dynamic efficiency, as well as the trade-off between equity and efficiency. Through our analysis, we aim to shed light on the significance of establishing an appropriate mix of competition policies that can optimize both equity and efficiency (both static and dynamic) when merchants join and operate on digital platforms.

Following this introduction, Section II will review the relevant literature. Section III will then discuss static vs. dynamic efficiency and the contributions of digital platforms to MSMEs. Finally, Section IV concludes with policy recommendations.

II. Static vs. Dynamic Efficiency—Theory and Literature Review

In this section, we provide a theoretical foundation for our study by examining the welfare implications of firm entry and product diversity, which have been long-standing questions in economics. In their seminal work, Dixit and Stiglitz (1977) identified three key tradeoffs to consider: distributive justice, external effects, and scale economies. The subsequent industrial organization literature has primarily focused on the scale economies aspect of this discussion. When entering a market or introducing new products incurs fixed set-up

costs, the social planner faces tradeoffs between product quantity versus diversity. In such cases, the socially optimal outcome often differs from the market equilibrium.

This understanding was further developed in an influential paper by Mankiw and Whinston (1986). They explicitly considered the post-entry game format of competitors and introduced the concept of a “business stealing effect,” where potential entrants do not internalize the output reductions of incumbent firms when making their entry decisions. The paper demonstrates that, in a homogeneous product market, the equilibrium number of firms can exceed the socially optimal number due to the business stealing effect. However, this “over-entry” result is sensitive to the degree of product differentiation. In markets with differentiated products, the product diversification effect may outweigh the business stealing effect, leading to insufficient entry compared to the social optimum. Therefore, determining whether the entry is excessive or insufficient depends on the specific market environment and necessitates empirical analysis.

One of the most influential empirical studies on measuring the social inefficiency of entry was conducted by Berry and Waldfogel (1999). They studied cross-sectional data on advertising prices in the radio industry in the United States (US), the number of stations, and radio listening using a three-stage procedure. First, they assumed symmetric firms and estimated an empirical relationship between the number of active firms in the market and the revenue earned per firm. A negative slope on this relationship is indicative that the business stealing effect dominates, while a positive slope would suggest a market expansion or product diversification effect. Second, the authors used firm entry decisions to infer the fixed costs by comparing the per-firm profits at the observed number of firms with the predicted per-firm profits if an additional firm were to

enter the market. This difference provided a lower bound on the magnitude of the fixed-entry costs. Finally, based on the fixed cost estimates, Berry and Waldfogel (1999) simulated the counterfactual number of firms that would maximize the social surplus for each market. Their findings revealed severe excessive entry in the commercial radio market due to strong cannibalization effects, as their estimated demand results indicated a high substitutability between commercial radio stations.

In the online setting, Kawaguchi, Shum, and Uetake (2021) applied a similar empirical framework proposed by Berry and Waldfogel (1999) to examine merchant-level administrative data from GoFood, Indonesia's largest online food delivery platform. As we will explore in detail later, their analysis demonstrates a negative causal relationship between the number of firms in a local market and firm-level revenues. This suggests the presence of strong cannibalization effects arising from the entry of new firms in the platform economy, similar to what Berry and Waldfogel found for the US radio market.

While the earlier industrial organization literature primarily focused on the tradeoff between scale economies and product diversity in traditional "brick-and-mortar" markets, online e-commerce markets exhibit unique characteristics where external effects come into play. The first type of external effect is the existence of two-sided network externalities. Jullien, Pavan, and Rysman (2021) provide an excellent survey of the literature on two-sided markets and network effects, which is particularly relevant to the online platform marketplace. If consumers value the platform more when there are more varieties offered on it, the entry of a new firm onto the platform could complement the incumbents by strengthening the network externality and attracting more consumers. However, it is important to note that the standard business stealing effect still exists.

Positive network effects may dominate when the platform is small, but as the platform matures, the business stealing effect tends to dominate, leaving limited room for new consumers.

A second type of externality affecting e-commerce platforms arises on the cost side. Specifically, food delivery and online retailers draw their delivery drivers from the same pool, and the entry of new firms can intensify competition for delivery drivers, leading to higher wages and increased business costs for all firms. Platforms attempt to mitigate these “last mile” cost spillovers by creating dedicated driver fleets and optimizing dispatch through routing software. However, these efforts have had mixed success as drivers often prefer to work with multiple platforms (“multihome”) to maximize their income sources.

Complicating matters further is the fact that many delivery drivers view their delivery work as a supplementary source of income. During times of economic downturns, they may increase their delivery efforts to supplement their primary income, even when customer demand for food delivery or online retail is relatively low. This countercyclical labor supply, where drivers are more willing to work during negative macroeconomic shocks, creates a potential mismatch between labor supply and labor demand. This is a distinct characteristic of the e-commerce delivery sector and warrants further investigation.

A growing and largely recent empirical literature aims to detect and quantify these network effects in various contexts. Lee (2013) conducted a pioneering study that examined the complementarity between video games on the same console within a dynamic framework. In the online market context, Reshef (2020) investigated the net

effect of new entrants on the performance of incumbent firms and explored which types of incumbents benefited from entry. Using proprietary data from the Yelp Transactions Platform, the study found that the entry of new firms, on average, increased incumbent firms' weekly revenue by 4.5%. However, the impact varied depending on the quality of the incumbent firms. High-quality incumbents experienced a 9.8% increase in weekly revenue, while low-quality firms faced a decline of up to 9.2%. Similarly, Raj (2021) utilized innovative data from the Spotify music platform to examine the effect of peer expansion on provider performance. The study employed a temporary increase in artist popularity resulting from the sudden death of an artist as a demand shock. The findings showed that when a highly similar peer released an album, it led to an increase in the sales of unique listeners and streaming popularity on Spotify, indicating that demand spillovers outweighed substitution in this context. However, the results varied depending on the type of peer whose album was released. The release of an album by a popular peer had a positive effect on the performance of local artists, whereas the release of an album by a niche peer had a negative impact on provider performance.

These studies, along with others in the empirical literature, contribute to our understanding of network effects and their implications in different markets and industries. By examining the dynamics of complementarity, demand spillovers, and the varying effects on different types of firms, these studies shed light on the complex nature of network effects and their role in shaping market outcomes.

The two-sided network externality literature focused on the market expansion effect originating from the indirect network effect. The inclusion of search and information frictions in the analysis of online market platforms adds another important dimension into

the understanding of external effects, leading to the concept of market congestion externality. Limited consumer time and attention to search and evaluate all available products can result in congestion and the misallocation of purchases across products when new firms enter the market platform.

Ershov (2022) conducted a study using a quasi-random experiment in the Android App Store and provided evidence of the market congestion externality. He observed that after a redesign of the game categories in the store, the number of apps per category decreased. Consequently, compared to the control categories (i.e., nongame categories), game downloads increased, indicating the presence of congestion externalities.

Ershov (2022) studied a static model in which the congestion externality partially offsets the product diversity effect; in contrast, Bai et al. (2021) focused on the dynamic implications of a market congestion externality. They highlighted two novel dynamic channels through which market congestion can hamper market efficiency. First, most online platforms design their search algorithms to disproportionately benefit sellers with large historical cumulative sales. As a result, it takes a long time for new firms to stand out from established incumbents. Second, if there is information asymmetry regarding each firm's fundamental quality (e.g., Board and Meyer-ter-Vehn 2020), market congestion can exacerbate the slow resolution of information frictions and further hinder allocative efficiency. The paper conducted a randomized experiment that provided new exporters with exogenous demand and information shocks, demonstrating the limited effectiveness of existing platform mechanisms to help small sellers overcome congestion frictions. The authors then presented theoretical and quantitative analyses showing that

a large number of market participants undermines the functioning of existing online mechanisms and hampers the discovery of high-quality firms.

Finally, online platforms have the potential to alleviate entry barriers for MSMEs and provide opportunities for subsistence and opportunity-seeking entrepreneurs in developing economies. By enabling MSMEs to conduct business online, these platforms offer global reach and expand market access for financially constrained firms (ADB 2021), with the potential to contribute to distributive justice.

The literature provides evidence supporting the "insurance" effect of entry into digital platforms for small businesses. Raj, Sundarajan, and You (2021) conducted a study on the impact of COVID-19 on small restaurants and their utilization of Uber Eats' platform for food delivery and take-out services. They found that small restaurants were able to partially offset revenue losses from closing their dine-in channels by leveraging the online on-demand channel. Moreover, restaurants that remained open for delivery experienced significant increases in sales. This indicates that online platforms can serve as a means for MSMEs to adapt to challenging circumstances and sustain their operations during crises.

These findings highlight the potential of online platforms to provide MSMEs with alternative revenue streams and mitigate the adverse effects of disruptions such as the COVID-19 pandemic. By embracing digital platforms, small businesses can diversify their risk, enhance their resilience, and improve their overall market prospects.

III. Static vs. Dynamic Efficiency and the Contributions of Digital Platforms to MSMEs During the COVID-19 Pandemic

The COVID-19 pandemic presents a valuable case study for the framework outlined in Section II, as it provides a natural setting for the exploration of how entry, at least partly induced by the policy changes of digital platforms, impacts the efficiency of these platforms, as well as the implications from a distributional justice standpoint. In addition, the pandemic was an exogenous shock that disrupted business models dependent on physical supply and logistic chains, facilitating the rapid digitalization of transactions, including among MSMEs. Mobility restrictions were also imposed in many countries, including in Indonesia, to contain the pandemic. Hence, after business disruptions at the very beginning of the first lockdown, there was a spike in the number of businesses joining digital platforms, as well as rising demand for e-commerce and online services.

To investigate these points on distributive justice and efficiency further, we have focused on MSMEs using Gojek's GoFood platform. As a brief contextual background, MSMEs provide jobs, generate income, and drive overall economic growth in Indonesia. In 2019, the MSME sector contributed approximately 60.5% to Indonesia's gross domestic product and provided 96.9% of total employment (Government of Indonesia, Ministry of Cooperatives and SMEs 2019). The onset of the COVID-19 pandemic and subsequent restrictions on social movements threatened the viability of many Indonesian MSMEs, which experienced temporary shutdowns, cash shortages (Sonobe et al. 2021), and falling revenue (LPEM FEB Universitas Indonesia and United Nations Development Programme 2020).

MSMEs employed a variety of strategies to survive the pandemic, including shifting from physical to digital sales by marketing and selling their products through online platforms. The use of online platforms in regular business operations can strengthen MSMEs by (i) increasing the efficiency of sales and marketing operations, (ii) channeling new suppliers to business owners, (iii) offering financing options with low-interest rate loans, and (iv) providing business development training.

Digitalization also requires technological adaptability and agility, or it risks leaving some behind, particularly merchants who are less educated and whose businesses are not located in metropolitan areas with large markets. This is why, prior to the onset of the pandemic, MSMEs' digitalization was already on Indonesia's development agenda to help achieve social inclusion.

Established in 2010 as a courier and ride-hailing service, by 2015, Gojek had expanded its service offerings to include an easy-to-use mobile application with a dashboard providing merchants with online marketing, sales, and payment support. By 2021, Gojek accounted for 43% of the \$4.6 billion food delivery market in Indonesia (Momentum Works 2022). Gojek's food delivery service app, GoFood, allows merchants to prepare home-cooked foods and have them delivered through the app's ride-hailing service. This was critical to the continued operations of MSMEs that otherwise would have been completely cut off from customers during strict pandemic lockdowns.

ADB and Gojek undertook a joint study in 2021 and 2022 to examine the COVID-19 pandemic's impact on Indonesian MSMEs in the food and beverage sector that sell and market their products on GoFood. As with similar platforms, GoFood

provided employment opportunities for many who might not have otherwise entered the labor market.¹

Our analyses in this paper draw on the joint ADB–Gojek study and uses two key data sources: (i) weekly administrative and transactions data of all (288,296) GoFood merchants in Indonesia that are active on the platform as of February 2021, and (ii) new primary data generated through an online survey followed by a telephone survey conducted among GoFood merchants in two of the seven regions served by Gojek in Indonesia. The survey was conducted primarily to obtain two key information sets—the size of the GoFood enterprise and the gender of the enterprise owner—and it facilitated comparative analyses among all MSMEs and those owned by either men or women. The first dataset tracks new entrants and dropouts for a period spanning from before COVID-19 to after the onset of the pandemic. Specifically, this administrative data from the Gojek platform covers the period from 7 January 2019 to 28 February 2021 and is aggregated on a weekly basis per merchant.

The second dataset includes primary data from surveys conducted among a random sample of 50,000 GoFood merchants in “Jabodetabek,” which is the greater Jakarta area comprising the capital city of Jakarta, Bogor, Depok, Tangerang, and Bekasi, and merchants in EJBN, a group of administrative regions and cities in East Java, Bali, East and West Nusa Tenggara. This sampling covers the regions that generated the highest (Jabodetabek) and lowest (EJBN) revenue as tracked through gross merchandise

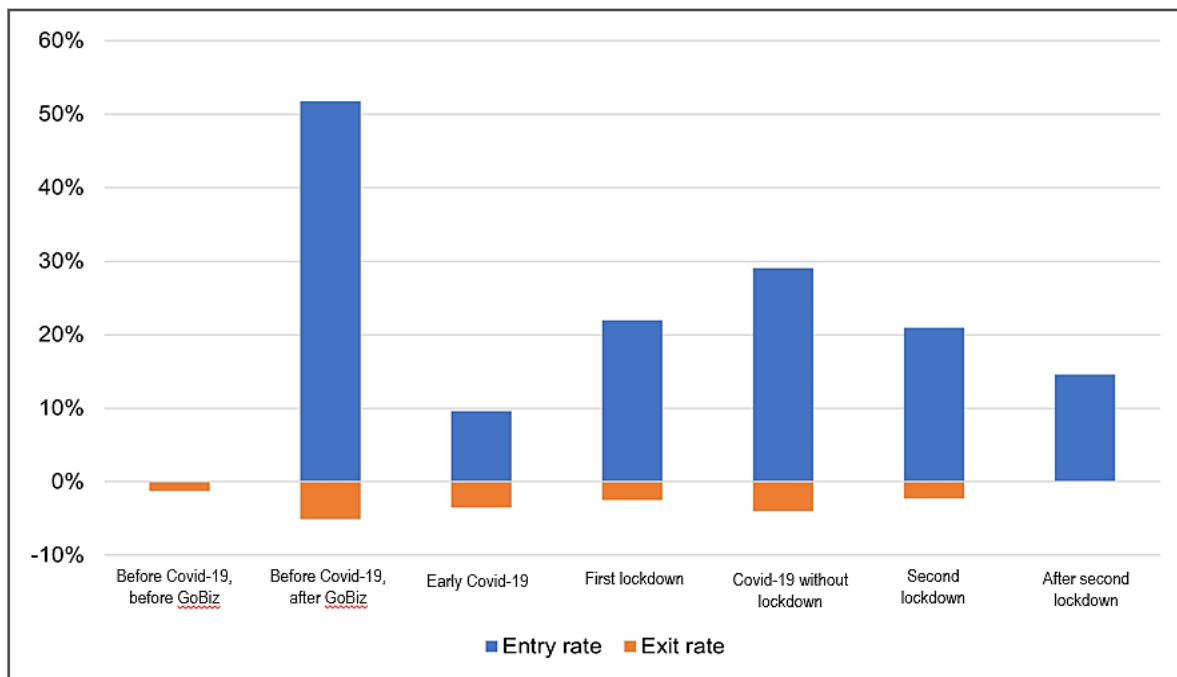
¹ In addition to providing an online platform to connect merchants with customers and match suppliers with MSMEs, Gojek also supported pandemic-afflicted businesses with technical solutions ranging from GoBiz—an all-in-one business solution that provides MSMEs with mobile connectivity, digital payments (GoPay), and other financial services such as zero-collateral working capital loans—to non-tech support such as special promotions and COVID-19 safety guidelines.

value (GMV) in GoFood transactions during the study period. Samples are drawn through a random selection from the two regions, reflecting the relative levels of all GoFood merchants operating in these two regions—that is, 65% of the surveyed merchants are from Jabodetabek, and 35% are from EJBN.²

We observed GoFood merchants' transactions and revenues, as tracked through GMV, over a period of 112 weeks from before the start of the pandemic (January 2019) until the end of its first year (February 2021). Figure 2 reports entry and exit rates by period for all GoFood merchants in Indonesia to help demonstrate increased competition and potential crowding out among merchants. This figure points to an extremely high entry rate of new merchants after Gojek introduced its GoBiz platform, an ecosystem of business support services for Gojek's MSME partners. This surge was followed by a continued influx of new entrants throughout the pandemic period, especially after the first lockdown ended.

² The relative distribution of GoFood merchants operating in Jabodetabek was 65% and 35% for EJBN when this study was conducted. This ratio was maintained in the online survey results. The distribution of phone survey respondents was almost the same at 64% for Jabodetabek and 36% for EJBN. The Appendix has additional information on the datasets used for this study.

Figure 2: Market Competition Among GoFood Merchants, Entry and Exit Rates, by Period Studied (%)



COVID-19 = coronavirus disease.

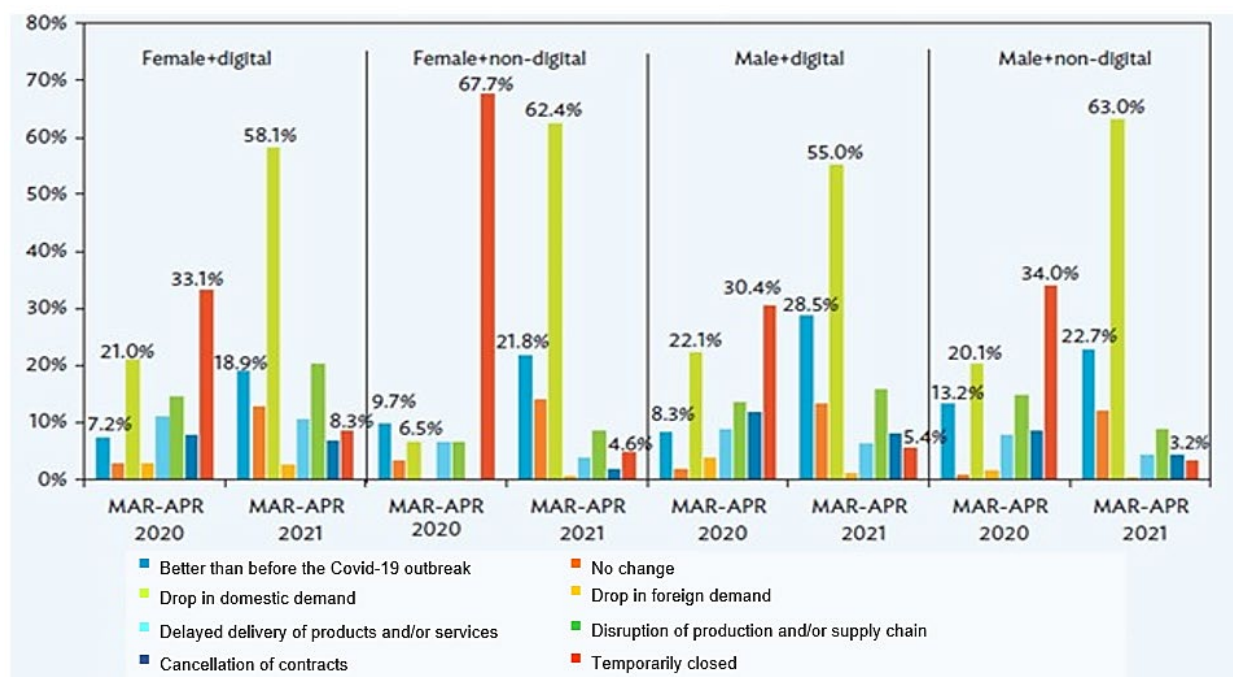
Notes: Timing structure of analysis is as follows: (i) Before COVID-19, before GoBiz (from 7 January 2019 to 30 June 2019); (ii) Before COVID-19, after GoBiz (from 1 July 2019 to 1 March 2020); (iii) Early COVID-19 (from 2 March 2020 to 5 April 2020), (iv) First lockdown (from 6 April 2020 to 5 July 2020); (v) COVID-19 without lockdown (from 6 July 2020 to 4 October 2020); (vi) Second lockdown (from 5 October 2020 to 6 December 2020); and (vii) After second lockdown (from 7 December 2020 to 28 February 2021).

Source: Gojek administrative database and authors' calculations.

Next, we examined MSMEs' performance and survival rates during the pandemic, by the gender of enterprise owners. Figure 3 depicts the performance of women- and men-owned digitally operated MSMEs (i.e., operating their core businesses online or both online and offline) during, before, and after the pandemic. The ones owned by men perform slightly better than those owned by women, with 55% of them suffering a drop in demand from March to April 2021. Further, about 28.5% of men-owned digital MSMEs performed better than before the COVID-19 outbreak, while only 18.9% of women-owned digital MSMEs experienced an improvement. The results suggest that the digital transformation of MSMEs had yet to be established stably among MSMEs at the

beginning of the pandemic, while digitalized MSMEs would improve their performance at the later stages of the pandemic (Oikawa et al., 2023). We will look at the gender dimension of digitalization more closely among GoFood merchants in the next section.

Figure 3: Digitally Operated MSMEs by Gender Ownership, 2020–2021



MSMEs = micro, small, and medium-sized enterprises.

Source: Adopted from ADB. 2022. *Asia Small and Medium-Sized Enterprise Monitor 2021: Volume II—How Asia's Small Businesses Survived a Year into the COVID-19 Pandemic: Survey Evidence*. Manila: Asian Development Bank. (Figure B.1).

In this country-wide context, we then look at how GoFood merchants have fared compared to the average digitally operated MSME in Indonesia, and whether the size of the enterprise (by number of employees) and the gender of the owner made a difference in GoFood MSMEs' performance and survival rates.

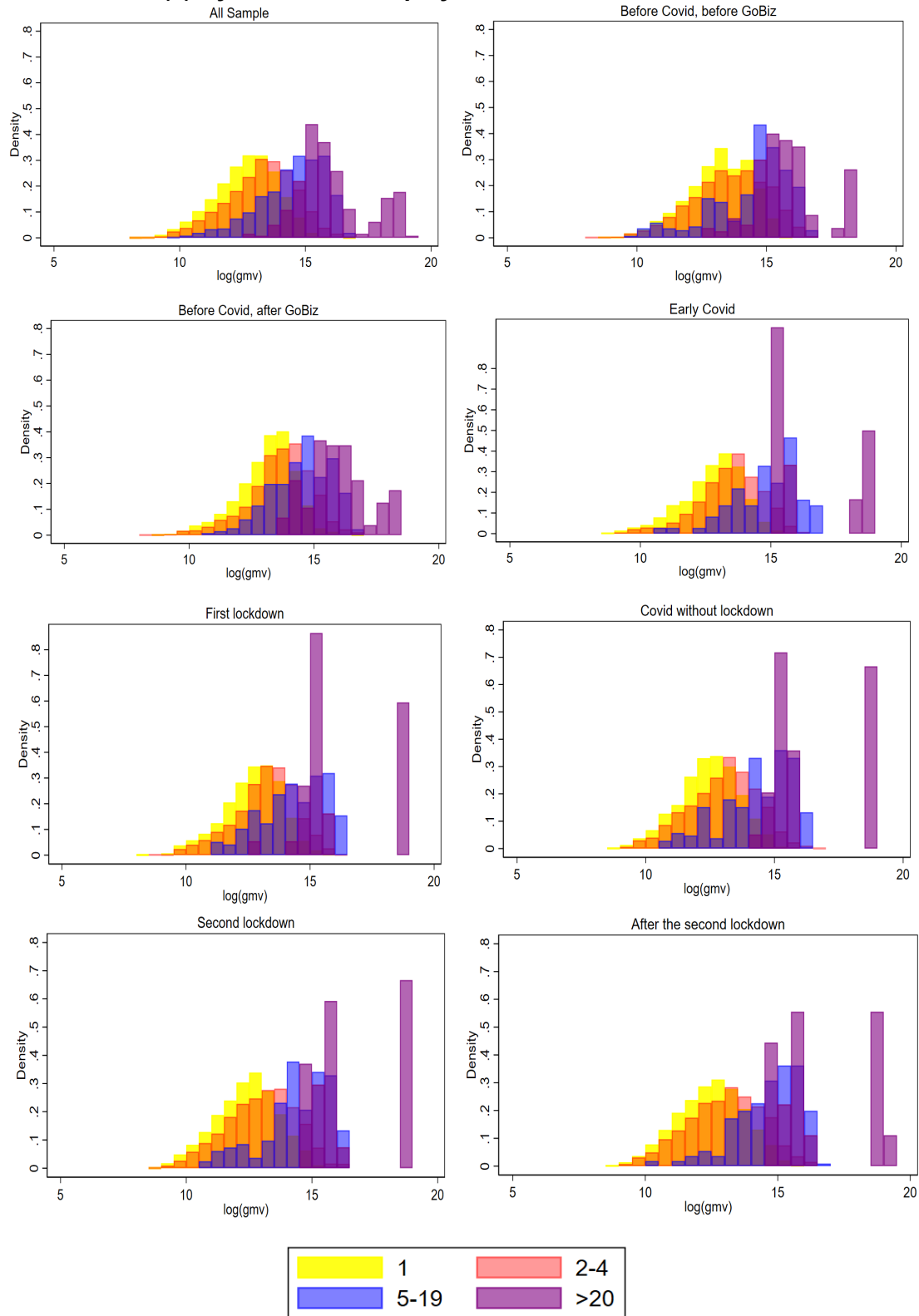
Figure 4 (a) presents the distribution of merchants' GMV (in logarithmic form), differentiated across their number of employees as well as across different time periods. Across all time periods, it is more common for larger-sized MSMEs (those with 20 or more

employees) to have higher GMVs than smaller-sized enterprises. COVID-19 and its associated mobility restriction measures do not appear to have had a significant impact on distribution (although Figure 3 indicates that a higher proportion of woman-owned non-digital firms closed temporarily).

Figure 4 (b) depicts the gender dimension of GMV variations across the seven subperiods for GoFood merchants. While there does not appear to be significant density differences based on the gender of the GoFood merchant or enterprise owner, women-owned enterprises seem to have done slightly better in the later stages of the pandemic.

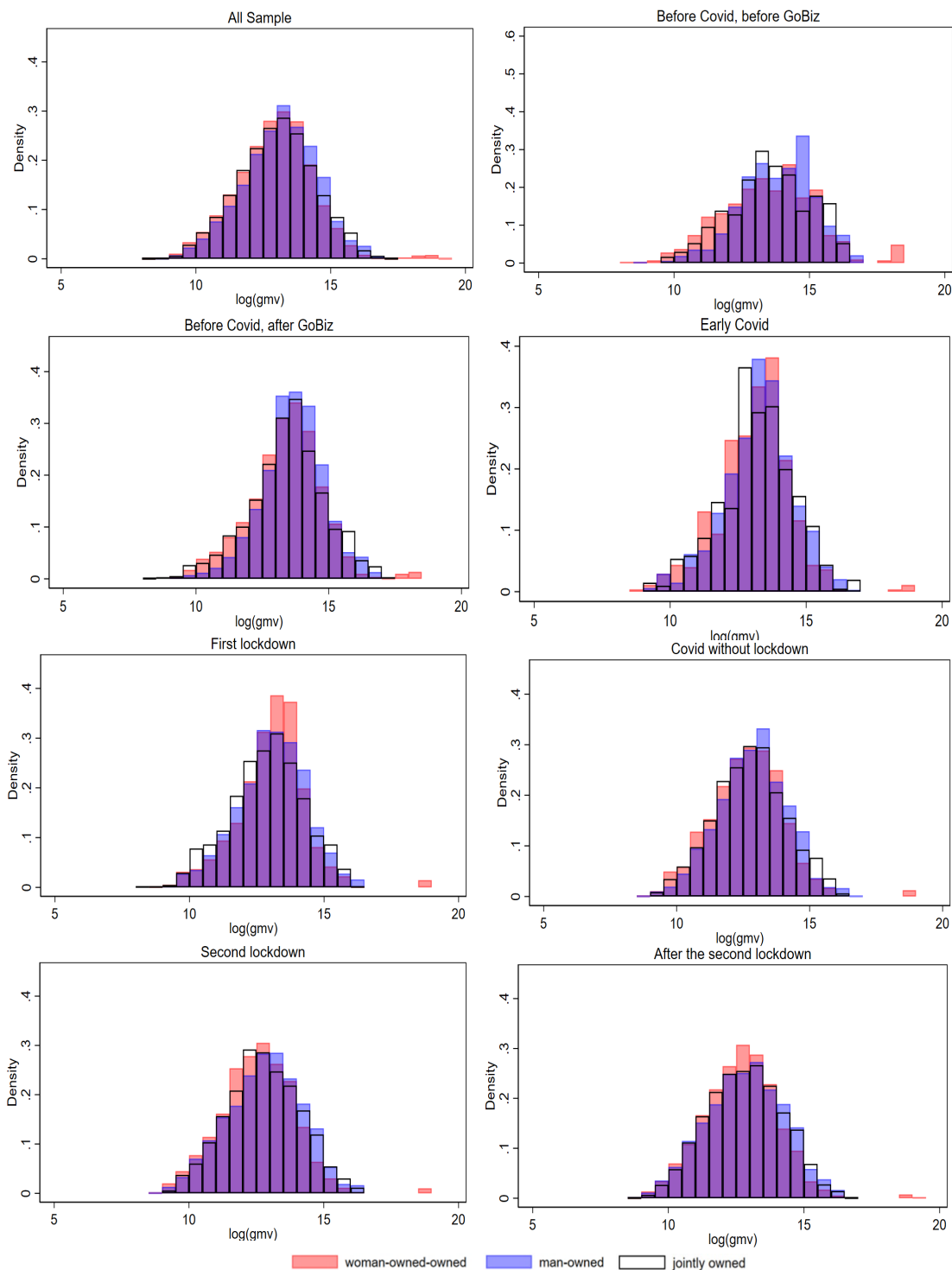
Figure 4: Gross Merchandise Value Distribution

(a) By Number of Employees and Across Time Periods



Continued on the next page

(b) By Gender of Owner(s) and Across Time Periods



COVID-19 = coronavirus disease, GMV = gross merchandise value.

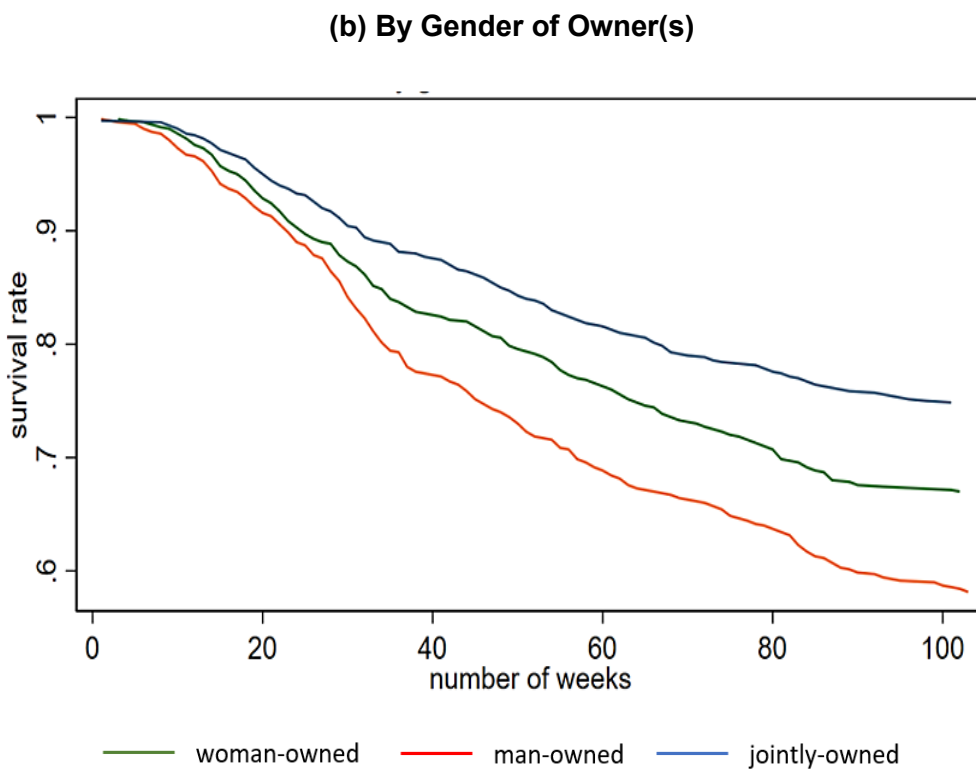
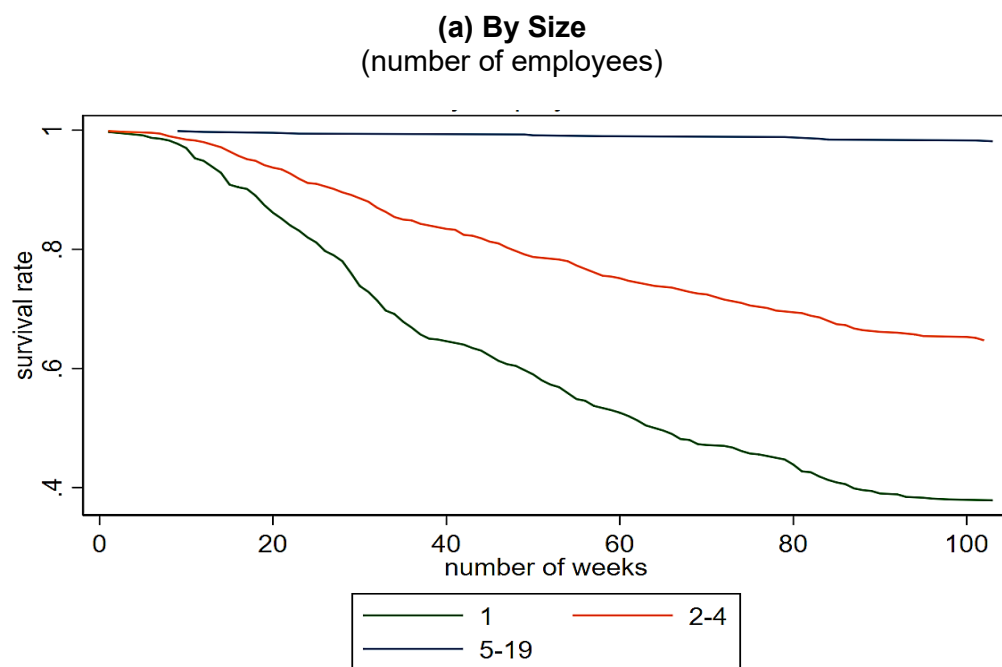
Notes: Figure 4 (a) presents the distribution of merchants' GMV (in logarithmic form), differentiated across their number of employees as well as across different time periods. Figure 4 (b) depicts the gender dimension of GMV variations across the seven subperiods for GoFood merchants.

Source: Authors' calculations.

As noted in Figure 2, the economic and health shocks of the pandemic, along with containment measures that included strict lockdowns and the closure of (physical or offline) places of business, led to a surge in new enterprise entrants onto the GoFood platform, much like other online marketplaces. As the pandemic continued, there was an increase of “entrepreneurs by necessity”—that is, those who did not have any other employment options and may or may not have had prior experience and expertise in the cooked food business—among GoFood merchants. Among these enterprises, product substitutability was relatively high, adding to survival pressures.

Figure 5 depicts the survival rates of MSMEs on the GoFood platform by the size of the enterprise and the gender of the owner over the 112-week period between the beginning of January 2019 and the end of February 2021. Survival rates among self-employed and microenterprises declined sharply as the pandemic continued, while medium-sized enterprises were more resilient (Figure 5 [a]). When we grouped MSMEs by gender of the owner, we found that enterprises owned jointly by men and women had higher survival rates, followed by women-owned businesses, while men-owned enterprises showed the lowest survival rates (Figure 5 [b]). Indeed, survival rates for enterprises owned by men were consistently lower than those enterprises owned by women or jointly owned by men and women. They also seemed to have exited the market faster and at higher rates compared to women-owned and jointly owned enterprises. We will examine gender-disaggregated business performance further in the next section.

Figure 5: Survival Rates of MSMEs on the GoFood Platform



Note: The review period comprises 112 weeks from January 2019 to February 2021.

Source: Authors' calculations.

The survey's findings supported much of the literature on the adverse economic impacts of the COVID-19 pandemic, particularly for micro-sized and self-employed MSMEs (e.g., Shinozaki and Rao 2020, Oikawa et al. 2023). Those with low cash reserves were in the greatest peril of not surviving the economic crisis. Furthermore, women-owned MSMEs faced a unique “triple burden”—of entrepreneurship, economic shock, and domestic responsibilities—that complicated their efforts to maintain a viable business amid a generational economic downturn. Digitalization helped many of the most vulnerable MSMEs endure the economic crisis through the use of the GoFood app and other similar online platforms. For more than 40% of survey respondents, GoFood not only helped their MSME survive the pandemic, but it actually facilitated increased growth in the face of adversity by channeling new customers directly to them via the platform (Elhan-Kayalar et al. 2022).

Distributive Justice?

The trends of continued entries of merchants shown in Figure 2 may reflect the inclusive nature of GoFood platform. The latter has enabled MSMEs to onboard the platform by supplying them with business support services such as marketing, supply chain connections, financial services and access to financing without collateral requirements. The platform functions, at least partly, as an instrument that fosters distributive justice by providing a new form of social safety nets for vulnerable MSMEs in

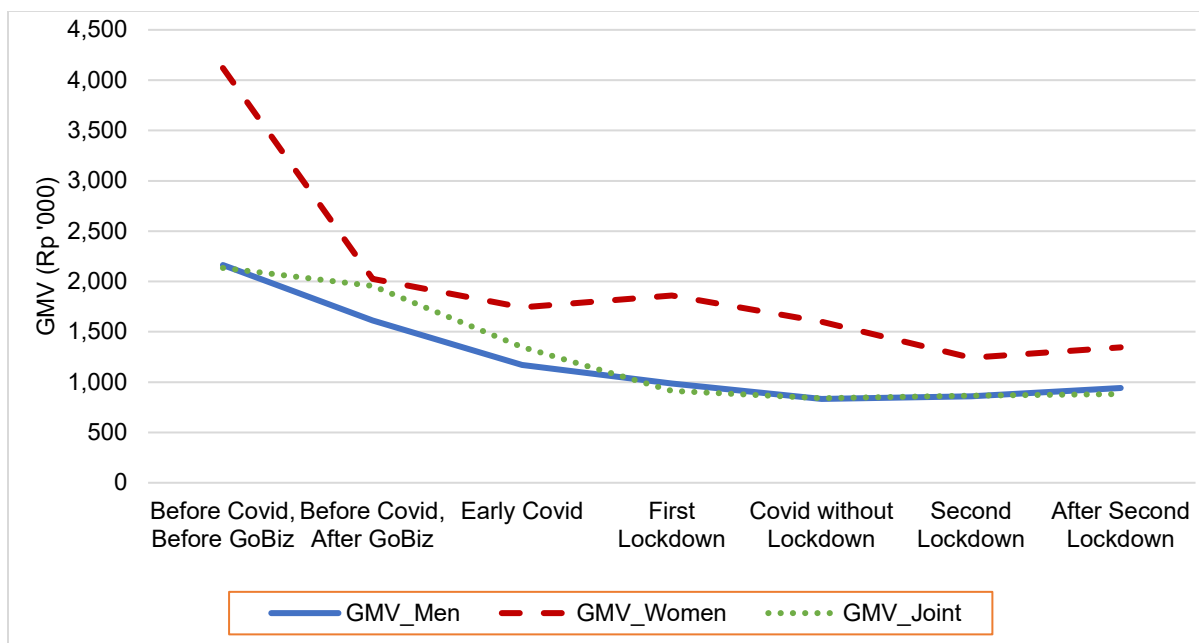
the form of increased market access, client interface, and financing channels through online applications.³

However, benefits from partnering with online platforms might not have been distributed equally among all market participants. To investigate these different dimensions, we illustrate gender-disaggregated business performance on the platform before and after the outbreak of the pandemic following Elhan-Kayalar et al. (2022). Throughout the pandemic, women-owned MSMEs generally performed better than their male counterparts in terms of gross income, highlighting the critical inclusive nature of the platform (Figure 6). However, they were also hit the hardest by the pandemic's shock. One possible reason for this is because women-owned MSMEs tend to be smaller in size with limited market presence and during the pandemic they sold lower-valued products (or sold their products at a lower price than men-owned MSMEs), as indicated by a lower average GMV per item for women- than men-owned MSMEs. The reason for this could be that women-owned MSMEs sold products that had many substitutes; therefore, they could not charge prices that were too high. Women owners of MSMEs were also burdened by domestic responsibilities, such as household chores and caring for older people and children, in addition to managing their businesses. This phenomenon created a triple burden for women business owners amid the economic shock of the pandemic.

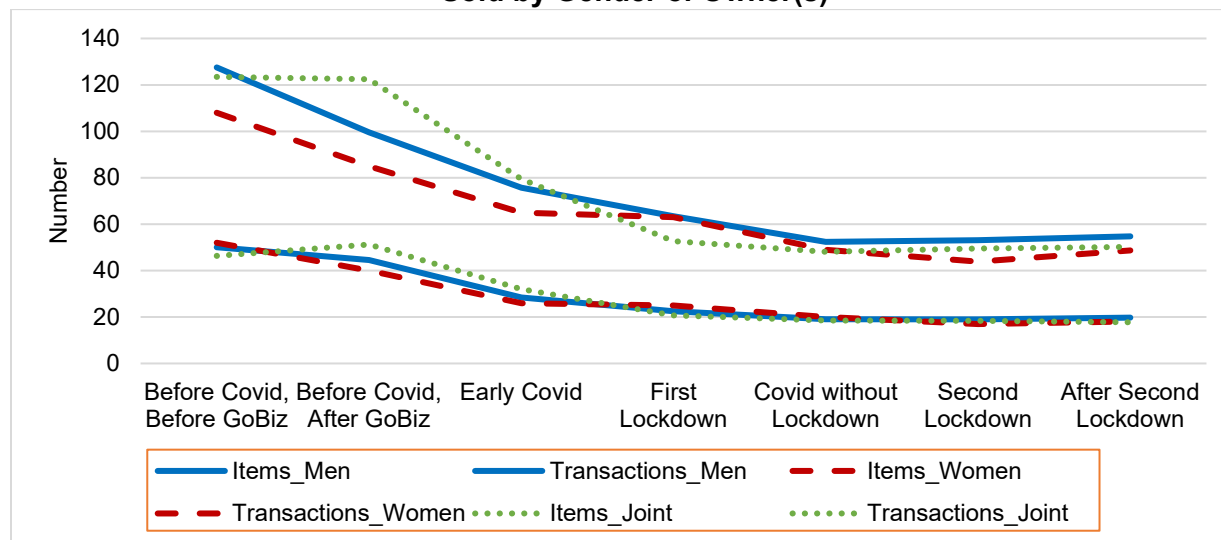
³ The key role played by Gojek in helping MSMEs maintain sufficient revenue during the pandemic through increased online sales is clearly visible in many survey responses. As noted by one survey respondent: "I decided to sell my products online to expand my business. Orders from Gojek were pretty slow during the pandemic. But Gojek still helps to make my business survive" (Phone survey participant, male, 32 years old, EJBN, 1–4 employees, high school graduate or higher). Some survey respondents said that Gojek even helped facilitate the growth of their business during the pandemic by bringing in enough new online customers to account for decreased in-person sales: "GoFood helped to make my business survive and expand. (During the pandemic) people stayed at home, shopped from home, so GoFood was helpful. Particularly, during the pandemic when no one was coming to my store" (Phone survey participant, female, 43 years old, Jabodetabek, zero employees, high school graduate or higher) (ADB 2023).

Figure 6: Weekly GoFood Administrative Data for Revenue and Transactions

(a) Average Weekly Gross Merchandise Value by Gender of Owner(s)



(b) Average Weekly Number of Transactions and Number of Items Sold by Gender of Owner(s)



COVID-19 = coronavirus disease, GMV = gross merchandise value, Rp = rupiah.

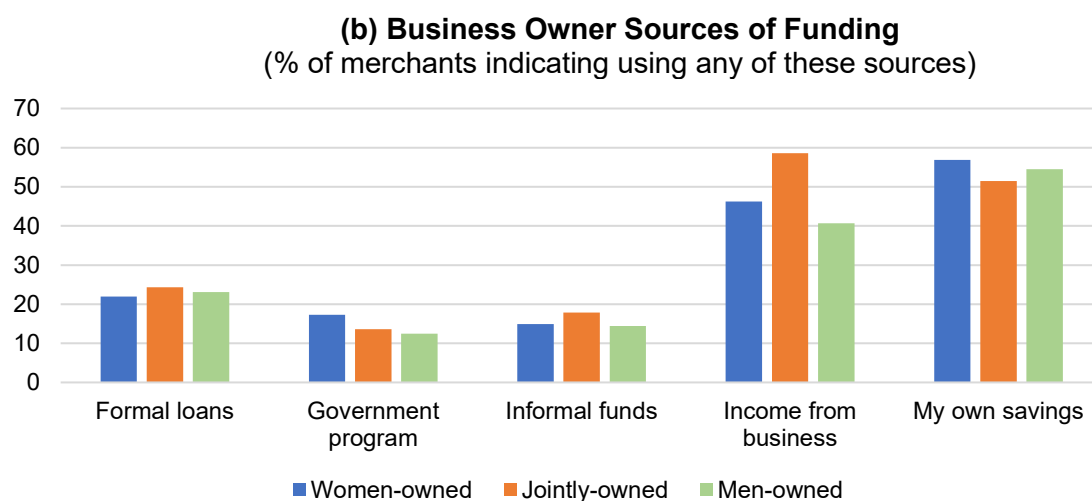
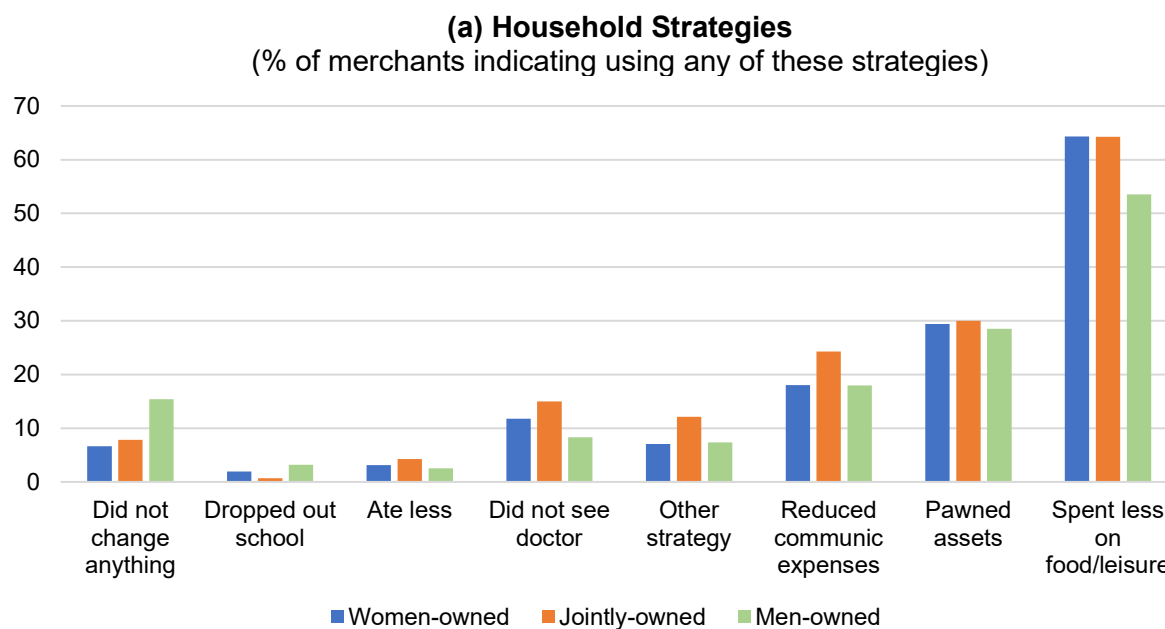
Note: For Figure 6 (b), the upper cluster of lines depicts the average weekly number of items sold by the gender of owner(s), and the lower cluster depicts the average weekly number of transactions by the gender of owner(s).

Source: Gojek administrative data and online survey of GoFood merchants.

To cope with the pandemic, most MSME owners utilized their personal savings and business income to finance their operations instead of taking loans from financial institutions or even from their informal networks such as friends or family members. The pandemic's uncertainty and the risk of not being able to repay the loans could be the reasons behind such decisions, even though merchants needed funds for working capital and operating expenses more than ever during the economic shock of the pandemic.

The survey results highlighted the variations, and even inequality, in the distribution and uptake of government assistance programs during the pandemic, with targeted beneficiaries sometimes being excluded from support programs due to clerical, data, or system errors. The findings of ADB (2023) indicate that jointly owned MSMEs; MSMEs located in less developed parts of the country—such as East Java, Bali, and East and West Nusa Tenggara—compared to central Java, where the capital Jakarta leads the country in online market size and e-commerce volumes; and MSMEs with employees compared owner-owned and -operated microenterprises were among the groups who were least likely to benefit from government assistance programs during the pandemic (Figure 7).

Figure 7: Crisis Mitigation Strategies Among GoFood Merchants, March 2020–March 2021



Source: Online survey of GoFood merchants.

The phone survey conducted among GoFood merchants provided additional insights. For the government, specific observations point to the importance of (i) expanding access to government assistance to more MSME merchants, (ii) providing financial training to enhance digital literacy in the MSME sector and raise merchants'

awareness of financing options, and (iii) promoting products sold by MSMEs with free advertising on government-sponsored media. Based on merchant feedback, online platforms can consider ways to (i) develop an improved user experience for MSME merchants; (ii) enable merchants to better market their products online by providing training or developing learning modules; (iii) expand access to credit to more MSMEs and establish a profit-sharing scheme for those unwilling to take out a loan; and (iv) directly address merchant concerns related to high commission fees, promotional schemes that burden merchants with discounted sale prices, the lack of available delivery drivers, and more frequent reimbursement. Based on the findings from this study, support from both online platform providers and the government is needed to improve the performance of MSMEs.

Market Cannibalization?

As shown in Figure 2, there was a very high entry rate of new merchants after Gojek introduced its GoBiz platform for MSME partners. This suggests that GoBiz may have been helpful in directing the platform toward more inclusion, particularly for MSMEs. Yet, given the rising demand, the massive entry of new merchants joining digital platforms that occurred during the pandemic also raises the question of whether the entry of these firms was efficient or not.

Kawaguchi, Shum, and Uetake (2021) used GoFood merchant data in a novel way to examine if the onboarding of new merchants onto a food delivery platform during the COVID-19 pandemic resulted in mostly business stealing versus positive network externalities for existing merchants. Specifically, they considered two types of “optimal”

platform size, one from the platform's perspective and the other from the social planner's or government's perspective. The platform will care about total profits resulting from the entrant's profits, net of lost profits among rivals due to cannibalization, and extra profits among rivals due to network or market expansion effects. The social planner considers overall social welfare—that is, consumer welfare as well as the total profits that increase as there are more entries and varieties. An additional firm should enter when the total profits generated by this firm in the market exceed the fixed costs. Due to the externalities that each firm does not internalize in a free-entry market, the number of entrants in a Nash equilibrium may differ from the optimal number of firms.

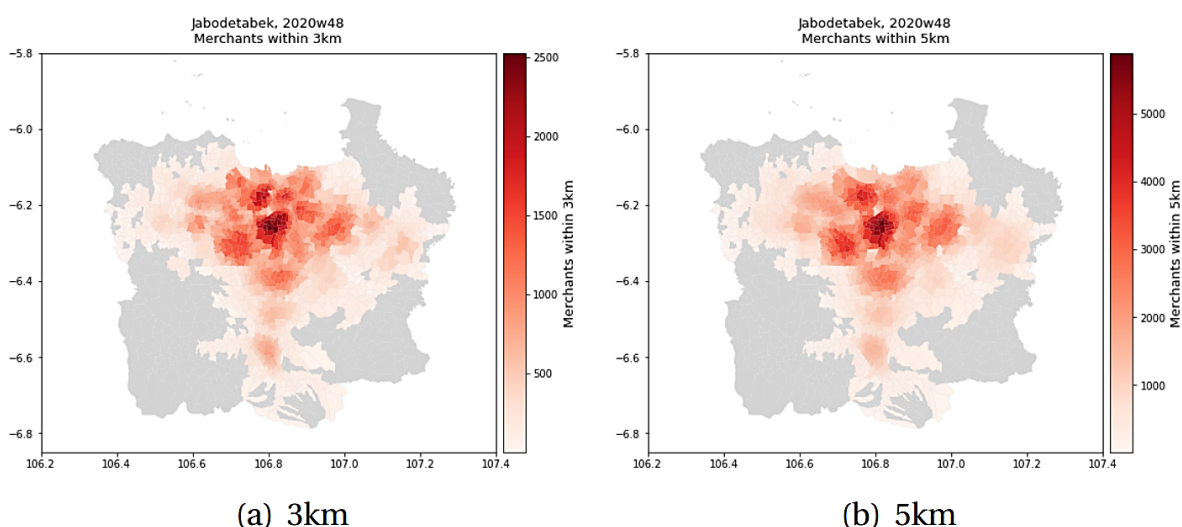
To estimate the optimal level of entry, Kawaguchi, Shum, and Uetake (2021) used a framework pioneered by Berry and Waldfogel (1999) who aimed at estimating a model of the US radio market and calculated the socially optimal number of firms. Berry and Waldfogel (1999) found that a free-entry market leads to excess entry due to a strong cannibalization effect. Kawaguchi, Shum, and Uetake (2021) used the method proposed by Berry and Waldfogel (1999) and applied it to the merchant-level administrative data on transactions, profits, and other performance measures, which were directly obtained from Gojek. They utilized nationwide data at the merchant and week level, and measured the number of rivals for each merchant by counting the number of merchants within a 3-kilometer (km) and a 5-kilometer radius (Figure 8).

If the business stealing effect dominates, an increase in the number of neighboring merchants participating in the Gojek platform would decrease the GMV of the incumbent merchant. However, rival merchants are more likely to participate when and where the demand for the Gojek platform is locally increasing during the pandemic lockdown.

Therefore, the correlation between the growth of the target merchant's GMV and the number of neighboring merchants can be positive due to this confounding factor.

To identify the business stealing (or positive network externality) effects, the paper employed an instrumental variable: a variable that is correlated with rivals' participation in a target merchant's neighborhood but uncorrelated with the merchant's GMV growth. The authors assumed that a merchant competes with rivals in a 3- kilometer radius and so used the number of rival merchants in a 3-kilometer to 5- kilometer radius as an instrument. A merchant may decide participation inspired by their neighborhood's participation. A distance over 3 km will be enough to separate the markets for the target merchant and merchants in a 3-kilometer to 5-kilometer radius. The results showed a negative correlation between the GMV and predicted rivals' participation, implying that a cannibalization effects exist (Figure 9).

Figure 8: Distribution of the Number of Rival Merchants in Jabodetabek

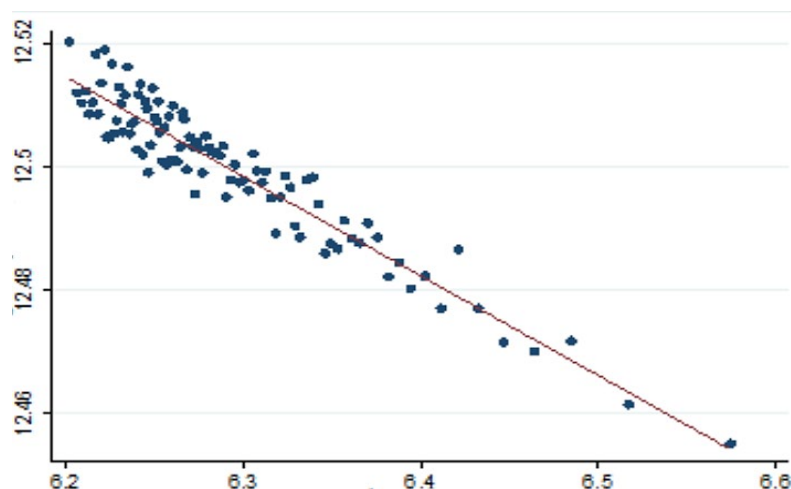


km = kilometer.

Note: These two panels depict the distribution of GoFood merchants in 3-kilometer and 5-kilometer radii of a given GoFood merchant in the Jabodetabek area. Darker colors depict higher merchant concentration.

Source: K. Kawaguchi, M. Shum, and K. Uetake. 2021. On the Optimal Food Delivery Platform Size: Evidence from Indonesia Using Administrative Data. *Technical Report*. Manila: Asian Development Bank.

Figure 9: Binned Scatter Plot Between the Firm Sales and the Predicted Number of Neighboring Rivals



Note: The authors first took a logarithm of the gross merchandise value, GMV_{it} ; the number of rivals in a neighborhood, N_{it} ; and the number of rivals within a 3-kilometer to 5-kilometer radius of a target merchant, N_{35it} . They then regressed on merchant, week, and city-week fixed effects. Then, they regressed the residuals of $\ln(N_{it})$ on the residuals of $\ln(N_{35it})$ and obtained the predicted residualized value of $\ln(N_{it})$. The figure shows the binned scatter plot between the residuals of $\ln(GMV_{it})$ and the predicted residuals of $\ln(N_{it})$.

Source: Kohei Kawaguchi, Matthew Shum, and Kosuke Uetake. 2021. On the Optimal Food Delivery Platform Size: Evidence from Indonesia Using Administrative Data. *Technical Report*. Manila: Asian Development Bank.

The massive entry of new merchants also gives us the opportunity to investigate the market congestion externality and its allocative efficiency implications. Preliminary data analysis by Xu and Bai (2022) finds that new entrants during COVID-19 lockdowns had much weaker initial performance compared with pre-COVID-19 entrants. The number of transactions and the total value of transactions of the entrants during the lockdowns are just one-third of the incumbents at a comparable age. Furthermore, the pre-COVID-19 incumbents experienced slower life-cycle growth after the massive entry during the COVID-19 lockdown. This is indicative evidence that the massive entry triggered by the pandemic might have severely congested consumer searches and slowed down market share allocations toward them.

Finally, MSME performances during the COVID-19 pandemic can also offer a natural setting for the exploration of the efficiency vs. distributive justice impacts of digital platforms on MSMEs. During the pandemic, online platforms offered an alternative means for gainful employment, created jobs, and supported business continuity for MSMEs. Elhan-Kayalar et al. (2022, p. 223) show, in particular, how “to sustain their revenues, MSMEs increased their subscription to online platforms. Further, the low to no entry barriers, low operations costs, autonomy, and flexible location and working hours built into some online business lines created fertile ground for new entrepreneurs to join the platform during the pandemic.”

IV. Conclusion and Policy Implications

In this paper, we have discussed various features of e-commerce, online platforms, and the role these platforms can play in determining merchant resilience, efficiency, and distributive justice in online market settings. Starting from the literature on the welfare implications of firm entry and product diversity, we found that the rapid acceleration of digital transformation during the COVID-19 pandemic provided unique opportunities to further shed light on three building blocks of the welfare discussion of new firm creation and variety provision: distributive justice, external effects, and scale economies.

We have used administrative and primary survey data from GoFood merchants on Indonesia’s Gojek online platform to further explore positive and negative externalities generated by and in online platforms. Our analyses yielded three key findings. First, online platforms such as Gojek provided a new form of social safety nets in the form of market access and client interface through their online applications for vulnerable micro

and small businesses. They have provided MSMEs with business support services (for marketing, sales, supply chain support, and access to finance without collateral requirements) and helped the enterprises onboard the platform. This has provided the MSMEs with an alternative venue to earn their livelihoods as traditional, physical markets closed and supply chains were severely impeded. However, benefits from partnering with online platforms were not distributed equally among all market participants. For instance, women-owned businesses were more resilient—in that they were more likely to retain their presence on the platform and continued to draw revenue, albeit at lower levels—throughout the pandemic compared to jointly owned or men-owned businesses. On the other hand, the average size of women-owned businesses (by number of employees) shrank after the onset of the pandemic more than what was the case for men-owned businesses.

Second, platform algorithms continued to define service areas and the discoverability of merchants within a given geographic location. As the pandemic soared, employment opportunities in physical markets waned and more micro and small enterprises onboarded the platform. Competition stiffened in the GoFood merchant market as new merchants continued to join the platform throughout the pandemic, with the service areas of both incumbents and entrants shrinking over time. Using geocoded delivery data for all transactions undertaken through the GoFood platform, we found that as new merchants joined GoFood, the number of each merchant's competitors within a 3-kilometer to 5-kilometer radius increased; the areas that GoFood merchants served became smaller compared with their assigned service areas; and at the same time, the average weekly GMV, number of transactions, and number of items sold per merchant

declined. Market congestion externalities and cannibalization tendencies were observed among incumbent and new-entrant merchants. These developments have important implications for the future business performance of MSMEs as more merchants continue to join the platform and receive allocated standard service areas. While it is beyond the scope of this paper, additional research on this topic would facilitate a better understanding of intra-platform competition dynamics and their implications for the online marketplace, the platforms that facilitate e-commerce, and the merchants who earn their livelihoods with the help of these platforms.

Third, women- and men-owned businesses opted for different crisis-mitigation and coping strategies. Women merchants tended to rely on government support services and such strategies as using their own savings, liquidating personal assets, or cutting back on their expenditures for personal necessities. Men-owned and jointly owned enterprises borrowed from formal and informal sources, and liquidated business assets to weather the economic shock triggered by the pandemic and associated containment measures. This meant microenterprises (often owned by women merchants) with limited support networks and business assets were harder hit during the pandemic.

This gendered difference in coping strategies suggests there may be a unique opportunity for the government and financial institutions to improve beneficiary targeting by addressing gaps in program awareness and beneficiary skepticism. The latter seemed to have deterred women-owned businesses from availing formal financing instruments and jointly owned and men-owned businesses from government programs. The process of digitalization can also exacerbate inequality. Merchants with relatively less education and skills and those living in areas lacking digital infrastructures might be left behind

compared to those with better education and located in more developed areas. Addressing these concerns in future programs may help enhance their intended impact.

Fourth, we found that data protection, consumer and enterprise protection, and regulation of platform-native financial instruments (e.g., online payment schemes, application-specific e-wallets) warrant closer attention. While these fall outside the scope of this paper, a deeper understanding of them may facilitate better-informed policy decisions and regulatory frameworks going forward.

APPENDIX

Data Characteristics

In this paper, we examine the impact of online platforms on merchants that use them during the coronavirus disease (COVID-19) pandemic, using data from Indonesia Gojek platforms' GoFood merchants.

Our analysis is based on two data sources: (i) weekly administrative and transactions data on all (288,296) GoFood merchants in Indonesia active on the platform as of February 2021, and (ii) new primary data generated through an online survey followed by a telephone survey conducted among GoFood merchants in two of the seven regions served by Gojek in Indonesia. The first dataset tracks new entrants and dropouts for a period spanning from pre-COVID-19 to after the onset of COVID-19. The administrative data from the Gojek platform cover 7 January 2019 to 28 February 2021, aggregated on a weekly basis per merchant. The data include detailed individual-level information on merchant revenues (as measured by gross merchandise value [GMV] generated from online GoFood transactions), transactions, and consumer expenditures as well as geospatial identifiers, but they are not gender-disaggregated and enterprise size is not included.

The second dataset includes primary data from surveys conducted among a random sample of 50,000 GoFood merchants in Jabodetabek (the larger Jakarta area comprising the capital city of Jakarta, Bogor, Depok, Tangerang, and Bekasi), and merchants in EJBN (a group of administrative regions and cities in East Java, Bali, and East and West Nusa Tenggara). This sampling covers the regions that generated the highest (Jabodetabek) and lowest (EJBN) revenue as tracked through GMV in GoFood transactions during the study period. This dataset introduces gender-disaggregated data

on enterprise owners and enterprise size as measured by the number of employees. Following the definitions set by the Central Bureau of Statistics, Indonesian enterprises with up to 4 employees are “micro-sized,” 5 to 19 employees are “small-sized,” and 20–99 employees are “medium-sized.”

Samples are drawn through a random selection from the two regions, reflecting the relative levels of all GoFood merchants operating in these two regions, so 65% of the surveyed merchants were from Jabodetabek and 35% were from EJBN. Online and phone surveys were conducted between 8 November 2021 and 25 March 2022 with a subset of online survey participants who consented to share additional information. The phone interviews were instrumental in third-party verification of online survey responses and in providing qualitative data on GoFood merchants. The online and phone surveys allowed us to expand merchant and enterprise-level information to include the gender and education level of each GoFood merchant that participated in the surveys and the size of their respective enterprises. The main merchant and enterprise characteristics examined in this paper are described in Table A.

Table A: Characteristics of MSMEs Participating in the Online and Phone Surveys

Variable	Category	Online Survey Respondents (n = 869)		Phone Survey Respondents (n = 275)	
		n	%	n	%
Owner's gender	Female	270	31.1	63	22.9
	Male	336	38.7	122	44.4
	Joint	144	16.6	90	32.7
	No response	119	13.7	258	93.8
Respondent's role in business	Owner	841	96.8	13	4.7
	Manager	25	2.9	4	1.5
	Other staff	3	0.3	78	28.4
Business size as of end-February 2021	0 employee (owner operated)	446	51.3	177	64.4
	1-4 employees	339	39.0	14	5.1
	5-19 employees	18	2.1	1	0.4
	>19 employees	3	0.3	5	1.8
	No response	63	7.2	176	64
Business location	Jabodetabek	562	64.7	99	36
	EJBN	307	35.3	233	84.7
Respondents' education attainment	High school graduates or higher	629	72.4	36	13.1
	Lower than high school diploma	121	13.9	6	2.2
	No response	119	13.7	63	22.9
Number of employees variable (in categories)	Number of employees in 2021	594	1.6 (0.61)	275	1.6 (0.58)
	Number of employees in 2020	594	1.6 (0.62)	275	1.6 (0.58)
	Number of employees in 2019	594	1.9 (1.12)	275	1.9 (1.11)

EJBN = East Java, Bali, and East and West Nusa Tenggara; Jabodetabek = Jakarta, Bogor, Depok, Tangerang, and Bekasi; MSME = micro, small, and medium-sized enterprises.

Note: Numbers in parentheses show standard deviation. The categories for the number of employees are: 1 = 0 employees, 2 = 1–4 employees, 3 = 5–19 employees, and 4 = more than 19 employees.

Source: Online survey data and Gojek's administrative database.

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E-Commerce and Its Role during the COVID-19 Pandemic in Indonesia

This paper analyzes how e-commerce dynamics unfolded during the coronavirus disease (COVID-19) pandemic, using a unique, composite dataset focusing on GoFood merchants on the Gojek Indonesia platform. It expands the analysis of the platform efficiency contributions into static efficiency and dynamic efficiency perspectives. There are three key findings: online platforms like Gojek offered a novel form of social safety nets for micro, small, and medium-sized enterprises; as the COVID-19 pandemic intensified, market congestion externalities and cannibalization tendencies emerged; and women- and men-owned businesses opted for different crisis-mitigation and coping strategies. This study also demonstrates that the rapid acceleration of digital transformation presents unique research opportunities on distributive justice, external effects, and scale economies.

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