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Linking business environment reform with gender and inclusion: A study of business licensing reform in Indonesia

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About this report

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Contents

List of abbreviations

ADR	Alternative Dispute Resolution
BER	Business environment reform
DDD	Difference-in-difference-in-differences
DiD	Difference-in-differences
GBEP	Global Business Environment Programme
G&I	Gender and inclusion
GRP	Gross regional product
MSME	Micro, small and medium-sized enterprise
OSS	One-stop shops
PPD	Public–Private Dialogue
PSM	Propensity score matching
PTSP	Pelayanan Terpadu Satu Pintu
SME	Small and medium-sized enterprise
VAT	Value added tax
WBES	World Bank Enterprise Survey

1. Executive Summary

Business environment reform (BER) targets inadequate business regulations. It is intended to remove constraints to business investment, enabling growth and job creation, and create opportunities for international business to contribute to and benefit from this growth. However, there is a lack of detailed knowledge of the impact of BER on gender and inclusion (G&I). Does BER remove institutional barriers which exclude formerly marginalised groups from development opportunities, and promote equal access to resources, opportunities, benefits, and services?

This research offers new insights through an in-depth analysis of the impact of the Pelayanan Terpadu Satu Pintu (PTSP) or one-stop shop business licensing reform in 2009 on firm performance in Indonesia, and how these impacts vary based on the gender of firm leadership. The results find that:

- On average, firms benefited from improved business performance (sales), as a direct or indirect effect of this reform, as well as an increase in the number of medium and large-scale firms.
- Outside Jakarta (Bali, Banten, Lampung), women-led firms experienced a small but significant benefit relative to male-led firms, related to both sales and the number of medium and large-scale firms they run.
- In Jakarta, women-led firms continued to lag behind men.
- There were no significant effects on employment, and this held across province and gender.

These findings are based on an analysis of the PTSP reform using data from the World Bank Enterprise Survey (WBES), a survey of small, medium and large firms (i.e. with more than four employees) which took place in Indonesia between 2009 and 2015.[1]

While a review of existing literature suggests that in general, there is no direct link between BER and G&I, indirect links are likely through the influence of BER on firm performance. Outcomes will be influenced by the differential ways in which women-led firms experience the business environment when compared to their male counterparts, with disparities based on how they are treated under the law, as well as structural and sociocultural factors. The fact that in many countries, female-led firms are fewer and smaller than those of their male counterparts, and may operate in different sectors, also affects these dynamics.

PTSP was broad-based and not designed to have differential effects for specific sectors or types of firms, and did not have specific gender targeting. However, women-led businesses often face particular barriers from a poor licensing regime, so in theory PTSP could be expected to have a particular benefit. For example, often women-led businesses have less capability (time, money, skills) to deal with complex and time-consuming procedures, while the largely fixed costs are a relatively greater burden for smaller businesses. The study was limited to regions where WBES data were available, and it would be important to understand whether this finding holds in other, poorer regions covered by OSS.

Other factors which could contribute to the regional variation include differences in socialisation of the reform, leading to a lack of awareness of the reforms and their potential benefits among

[1] See https://microdata.worldbank.org/index.php/catalog/2665

more marginalised businesses, and different competitive pressures facing informal firms. Even if they are aware of reforms, smaller informal firms, often led by women, may choose not to register or fail to benefit due to broader institutional weaknesses and competitive dynamics that contribute to informality. If these factors are not also addressed, then formalisation may be of little benefit. As informal firms often lack the economies of scale to respond to increased competition resulting from greater ease of entry for new firms, reform may make the business environment worse for them.

While the analysis focused on women-led businesses, there are also other inclusion implications. Women-led firms are more likely to employ other women than their male-led counterparts, and since women also tend to lead businesses in more labour-intensive sectors, improvement in their firm performance creates economic opportunities for other, poorer women. Minority business leaders may also be disproportionately disadvantaged by a poor licensing regime; for example, where language barriers or lack of personal connections in centralised processes are exclusionary. However, more research would be needed to validate this assumption.

Based on these findings, we recommend that future BER programmes:

1. Ensure services are readily available in rural areas;
2. Invest in targeted socialisation efforts to reach growth-oriented businesses led by women or minority business leaders likely to benefit;
3. Prioritise business environment measures that are relevant for the informal sector and create the conditions for them to formalise; and
4. Couple general business environment improvements with targeted efforts to improve productivity and upgrading in sectors dominated by women.

This study has looked at past reforms, in order to learn lessons for future programming. Putting them in the context of COVID-19, at least two factors are important. First, as the economic recession pushes more people into the informal sector, it is even more important to bridge rather than reinforce formal–informal divides. Second, general business environment improvements should be coupled with targeted support for sectors particularly exposed to the pandemic, which often disproportionately affect women, including agriculture, trade, hotels and restaurants, and other services. More generally, these BER recommendations should be considered as part of a holistic recovery programmes that are expected to deliver on G&I.

2. Introduction

The Prosperity Fund's Global Business Environment Programme (GBEP) aims to promote economic growth and job creation through improving the business environment in middle-income partner countries. BER targets inadequate regulations and institutions, removing constraints to business startup, upgrading and growth. As a consequence, businesses are expected to invest and expand, new jobs are created, and new opportunities emerge for international business to contribute to and benefit from this growth.

In line with the Prosperity Fund's Gender and Inclusion conceptual framework, the GBEP is committed to incorporating G&I throughout these activities. The aim is to ensure broad-based benefits that contribute to poverty alleviation, in line with the UK's global commitments and responsibilities. However, there is a lack of detailed knowledge of the impact of BER on G&I through changing business behaviour and performance. This research offers new insights into

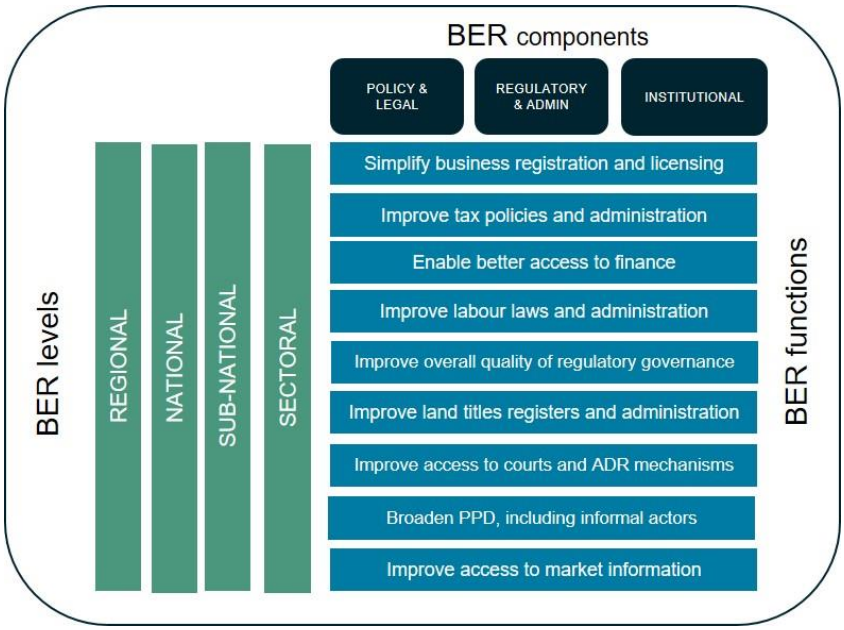
these relationships through an in-depth analysis of business licensing reform in Indonesia. It aims to respond to three questions:

- What is the effect of business licensing reform on firm performance in Indonesia?
- Does the performance of firms exposed to the reform vary based on firm characteristics (e.g. gender of leadership, location, firm size), and if so, how?
- Which factors are likely to have contributed to these results?

Business environment, gender and inclusion

The business environment is the set of policies, laws and regulations which together govern business activities[2] at the regional, national, sub-national and/or sectoral levels (Miles, 2016). BER involves improving policies, laws and regulations across key governance functions affecting, restricting, or delimiting trade, investment, and the operation of private enterprises (Figure 1). It also involves improving the overall institutional and organisational framework which determines the quality of governance and the capacity of public and private stakeholders to design and implement reforms.

Figure 1: DCED BER conceptual framework: Levels and functions



Source: Adapted with permission from Miles, 2016, p. 5.[3]

Social inclusion or exclusion is linked to personal characteristics, such as gender, age, disability, ethnicity, religion, or sexual orientation, as well as to factors like geographical isolation or low levels of education or income (low socioeconomic status). These factors affect access to social, economic and political resources, opportunities and benefits. Exclusion is the result of systematic

[2] It is a subset of the investment climate which covers business governance, as well as other issues such as property rights, rule of law, political stability and infrastructure, which are not primarily directed at business but which affect investment decisions.

[3] From "Business Environment Reform and Gender", by K. Miles, 2016 (https://www.enterprise-development.org/wp-content/uploads/BEWG-DCED-Technical-Paper-Gender-and-BER.pdf). © 2016 The Donor Committee for Enterprise Development. Reproduced with kind permission.

disadvantages which some groups face, leading to discrimination and denial of rights, recognition, and resources (Haegeman & Schauerhammer, 2018). Women and girls, for example, often experience systemic barriers (such as formal and customary regulations, and discriminatory social norms) to accessing resources and opportunities, knowledge, information, networks and markets, and generally have less influence in decision-making compared to men. Those who are most marginalised and vulnerable to exclusion, such as rural women with low education, are often at the intersection of different facets of exclusion and systematically left behind from the progress experienced by others in society (Kabeer, 2016).

Inclusion happens when institutional barriers that exclude formerly marginalised groups from development opportunities are removed, and equal access to resources, opportunities, benefits and services is promoted and enabled. Gender equality means women have full and equal exercise of rights, and access to socially, economically, and politically valued goods, resources, opportunities, benefits and services (Haegeman & Schauerhammer, 2018).

Report structure

The rest of this report proceeds as follows: First, it starts with an overview of literature on BER and G&I (Section 3), which is followed by a summary of the business environment, G&I context in Indonesia (Section 4). It then sets out the theory of change and data analysis approach underpinning the study (Section 5). The findings on BER and firm performance are presented in Section 6, followed by a discussion of business licensing reform and G&I (Section 7). The report concludes with recommendations to inform the GBEP's work across middle-income countries.

While the report focuses on a particular reform in Indonesia, it offers a structured way of conceptualising and analysing the relationship between BER and G&I which could be applied to the study of other countries and reform contexts. Overall, we hope the findings as well as the overall approach can inform and enrich the Prosperity Fund's efforts to make explicit who benefits from reform and who is excluded, and to be both ambitious and transformative in its approach. The results are also relevant in understanding how economic recovery in response to the global pandemic can support G&I.

3. Business Environment Reform and Gender and Inclusion: Literature Review

BER, poverty and inclusion

There is no evidence of a direct link between BER, poverty and inclusion. Given the number of other variables involved, it is hard to make clear causal claims (Wennmann et al., 2017; White & Fortune, 2015). However, there are two potential indirect causal links (White & Fortune, 2015): firstly that reforms lead to economic growth, which in turn can help to reduce poverty and exclusion, and secondly that reforms affect firms' behaviours in ways which can benefit inclusion.

- **BER, growth and poverty reduction:** The success of many BERs is measured in terms of their contribution to economic growth; however, the assumption that growth leads to poverty reduction needs to be caveated. White and Fortune (2015) identify an association between quality of business regulation and growth, but find little evidence of a clear relationship between business environment reforms and growth, in part owing to the fact that BERs are only one factor required for sustainable economic growth. Wennmann et al. (2017) also point out that in certain countries, particularly fragile and

conflict-affected states, a substantial proportion of GDP is generated from the informal sector. Many BERs will not extend their benefits to informal markets, since they are only typically applied to and adhered to by formally registered companies. It is true that some BERs focus on increasing formalisation, although Wennmann et al. identify some issues arising from these, namely that they can create perverse outcomes, such as formalisation disproportionately benefiting large businesses at the expense of smallholders in Rwanda. As such, there is uncertainty around the link between BERs and economic growth, in part owing to a lack of effective engagement with the informal sector.

- **BER, firm performance and inclusion:** BERs can lead to changes in firms' behaviours which in turn can impact inclusion. For example, there is good evidence that reform of labour regulations does affect business decision-making, but that the impact on poor workers varies. On the one hand, BER may protect workers, helping to reduce the risks of exclusion from the labour force. On the other hand, it can reduce opportunities, particularly for young and inexperienced workers, which is particularly pertinent for small and medium-sized enterprises (SMEs), given the higher costs associated with meeting labour regulations, as well as the important role that SMEs play in generating employment opportunities (White & Fortune, 2015).

  Other reforms, such as easing business licensing and tax registration requirements, have the effect of improving firm performance, but primarily for companies which intend to operate in the formal sector (White & Fortune, 2015). Citing 12 studies, White and Fortune find a positive link between formalisation and firm performance, but the evidence does not suggest that easing licensing procedures necessarily incentivises formalisation. Other costs and burdens, perceived or actual, deter businesses from registering.

Business environment and gender

There is little evidence of the impact of BER on gender, particularly with respect to the impact of reforms in specific functional areas on women as business owners or employees. However, the literature does discuss how the business environment affects women in business, and how women's experiences of a given business environment can be different from those of men. This can be owing to differences in how men and women are treated by the law, but more often is the result of structural or sociocultural factors which affect how men and women behave in a given business environment and the barriers they face.

In many developing countries, female-led firms are fewer and smaller than those of their male counterparts (Bardasi et al., 2011; Ellis, 2008; Klapper & Parker, 2011; Simavi et al., 2010). They may also operate in different sectors. Female employees have also been observed to be more prominent in these sectors (Klapper & Parker, 2011). These factors are partly explained by the education and skills available to women. For example, a lack of experience and contacts in higher-skilled sectors can lead to women's exclusion from these sectors (Klapper & Parker, 2011; OECD, 2017), and can also contribute to women becoming entrepreneurs owing to an inability to secure well-paying formal employment. Female-led firms are found in retail and textile sectors in Europe and Central Asia and in sub-Saharan Africa (Bardasi et al., 2011). In Vietnam, female-led firms were found to focus on traded goods as opposed to production (Akram-Lodhi & van Staveren, 2003). However, looking in more detail at countries within sub-Saharan Africa, the particular sectors favoured by men and women change between country, with little overall pattern (Bardasi et al., 2007). Differences in business size across all geographies globally tended to show the same pattern, with women-led firms tending to be smaller, and also fewer in number.

Both female-led firms and female employees are often observed to underperform their male counterparts across a broad range of metrics including income, growth, and, in the case of firm ownership, longevity of firm (Klapper & Parker, 2011). Again, though, the specific differences vary by region and by metric, with gender gaps being observed in productivity metrics in Europe and Central Asia and Latin America but not sub-Saharan Africa, and in growth metrics only in Latin America (Bardasi et al., 2011).

Explaining the differences: legal treatment of men and women

Some legal differences have a clearly negative impact on women's ability to run a business on equal terms with men. For example, legal restrictions on women's property ownership restrict access to business financing owing to lack of collateral, particularly in the Middle East and North Africa region (OECD, 2017; Simavi et al., 2010). Additionally, restrictions on women's travel in certain areas can put them at a disadvantage in terms of their ability to perform business activities. In regions where traditional law predominates, it can disempower women. For example, in Cameroon and Tanzania, women's property ownership and inheritance rights can be severely restricted, resulting again in a lack of access to capital or loan collateral (Doing Business & World Bank Gender Action Plan, 2008).

Differences in the legal treatment of men and women also affect employment, with greater differences leading to lower female employment. This relationship holds across both rich and poor nations, for male and female-owned businesses, and for small and medium-sized companies, although does not hold for larger companies (Amin, 2012). In Burkina Faso, for example, labour laws restrict women's working hours ostensibly to allow for more of a balance of work with domestic roles, but making female candidates less attractive as employees (Bedford, 2009). Anti-discrimination laws have attempted to redress such imbalances. An example is Rwanda which, despite having a broadly deregulatory approach to business and labour markets, still maintains quotas for female representation in the workforce (Bedford, 2009). While these studies do not relate the results to firm performance, they demonstrate that gender differences in laws have a clear impact on gender and inclusion.

Explaining the differences: structural factors affecting the business environment

A six-country study by the OECD (2017) shows that even where there are few gender disparities under the law, male and female-led businesses operate in markedly different ways due to structural and sociocultural factors affecting the business environment, and women have very different employment prospects from men. For example, in three relevant themes that emerged from the literature – size and sector of business, business registration procedures and access to capital – women experience the business environment very differently from men despite there being no legal discrimination between the two.

As noted, female entrepreneurs and employees tend to be smaller and often located in different sectors to men, although specific patterns vary by country. Firm size in turn affects the likelihood of formalisation, since for smaller firms, the time required and costs of registering are relatively more impactful than for larger businesses (Ellis, 2008). The tax regime has further negative impacts on small businesses, which lack economies of scale and pay more VAT on inputs than larger firms, as a percentage of income (Akram-Lodhi & van Staveren, 2003). The type of sector also affects how firms experience the business environment, including the tax regime. In Vietnam, female-led businesses are more likely to be in the traded goods sector, to which the standard 10% VAT applies. The male-dominated production sector has a VAT of 5% for "essential inputs", resulting in a greater chance that a male-run businesses will pay less VAT (Akram-Lodhi & van Staveren, 2003).

Secondly, male and female-run firms operating in the same business environment can have very different experiences of being able to access capital. Size itself if a factor, which negatively affects the ability to raise finance (Loscocco et al., 1991). Commonly, women have less access to appropriate collateral, particularly in environments where they have weak ownership rights (Klapper & Parker, 2011; OECD, 2017; Doing Business & World Bank Gender Action Plan, 2008). “Immovable” assets which are often accepted as capital by lenders are typically owned by men, while women own assets such as jewellery which are less acceptable (OECD, 2017). In addition, women may be less able to travel to financial institutions, due to safety concerns, care responsibilities or men’s control over their movements (Chamlou, 2008; OECD, 2017). On the other hand, while access to capital is clearly correlated with business success, as women often work in less capital-intensive industries, the relative importance for firm performance may be less pronounced (Klapper & Parker, 2011).

Third, women may be disproportionately negatively affected by complex business registration processes, which affect both the number and size of female-led firms (Bardasi et al., 2007), and whether or not they formalise. In Kenya, for example, far more women operate in the informal sector than in the formal sector, with women perceiving difficulties in the business registration process as a far greater issue than for men (Ellis, 2008). In Uganda, 40% of female-led businesses claim that onerous procedures were an obstacle to their growth, compared with 30% of male-led businesses. According to the 2004 Uganda Regulatory Cost Survey Report, a pilot programme in Entebbe saw simplification of licensing procedures contribute to first-time business registrations of female-led firms, which were 33% higher than for their male counterparts (Bardasi et al., 2007; Ellis, 2008; Doing Business & World Bank Gender Action Plan, 2008).

In developing countries, women are typically time-poor compared with men, owing to a dual domestic and business role, and as such are less able to spend significant amounts of time in bureaucratic processes. Lower levels of education and business contacts among women make this process harder (Ellis, 2008; Simavi et al., 2010). Additionally, women are sometimes seen as easier targets for extracting bribes or ‘facilitation’ payments, including in the form of sexual favours, when going through business registration processes (Doing Business & World Bank Gender Action Plan, 2008). For example, a study of bureaucratic processes in the health and education sectors in Bangladesh found that women are more likely than men to be asked for “speed payments” in order to expedite processes (Oxford Policy Management, 2007).

Given that the business environment affects women in business in significant ways which are different for men, we can reasonably expect that the impact of BER will also vary significantly. However, there is little research into the effect of BER on women-led businesses and the implications for inclusive or exclusionary outcomes. An important aspect of this question also relates to the differential effect on formal versus informal businesses, given that many women-led businesses are in the informal sector.

4. Business Environment, Gender and Inclusion in Indonesia

The rest of this report contributes to the evidence base on BER and G&I by conceptualising and then analysing this relationship using secondary data. It uses the lens of business licensing which, as discussed, influences the number, size and formality of women-led businesses, with effects that are different from male-led businesses, and explores how reforming the business licensing regime impacts G&I in Indonesia. The choice to focus on one country is important, given that the characteristics of women-led businesses and their experience of the business

environment is not homogenous but shaped by structural factors in the legal and sociocultural context. Indonesia is chosen as it is a priority country for the GBEP, has undergone business licensing reform and offers suitable data on firm performance. Before presenting the results of the analysis, this section provides an overview of the BE and G&I context in Indonesia.

The Indonesian business environment

Over the past 25 years, Indonesian businesses have experienced a changing political and economic environment, driven in part by the country's response to the Asian financial crisis of 1997–8. The crisis paved the way for political and economic reforms (Hill & Shiraishi, 2007).

Political reform: decentralisation and inequality

Political reforms led to the devolution of authority away from the Indonesian central government to district-level governments.[4] Districts became responsible for their own affairs, with central government only retaining responsibility for finance, foreign affairs, defence, religion, and state administration (Ahmad & Mansoor, 2002; Talitha et al., 2019). District governments control their own budgets and spending; however, they are restricted in their ability to raise revenue.

While intended to bring power closer to the people, the process contributed to inequalities between provinces and districts, especially given the uneven implementation and effectiveness of laws and reforms, including BER. District governments were unprepared for the new administrative burden (Nasution, 2016), which was exacerbated by a proliferation of districts and significant disparities in government capacity to effectively manage their jurisdictions (Talitha et al., 2019). While some districts had large areas but small populations and small governing capacities, cities such as Jakarta had a large population and high governing capacity relative to the size of the district (Nasution, 2016). Unfortunately, rather than disappearing, corruption manifested at the local rather than national level (Hadiz & Robison, 2005; Pepinsky & Wihardja, 2011).

Regional inequalities persisted despite decentralisation (Talitha et al., 2019). Indonesia's average gross regional product (GRP) per capita (non-mining, millions of Rp) was 10.15 in 2013, with only three provinces well above this average: East Kalimantan (22.69), Riau Islands (25.67), and Jakarta (47.78). Twenty-eight provinces are below the Indonesian average, with the lowest being East Nusa Tenggara at 2.98. There is little adjustment of government grants, either to target inequalities or to address differences in operating costs of different local governments (Nasution, 2016), exacerbating these differences.

This political context has implications for BER since it shapes regional capacities and incentives. When the business licensing authority was decentralised to local districts, for example, the number of licences required and regulations to be complied with increased, in part owing to local district governments seeing this as a rare new opportunity to raise revenue (Steer, 2006).

Economic and business environment reform

President Yudhoyono came to power in 2004 and his regime is praised for the Indonesian economy's relatively robust performance during the global financial crisis, although he is also criticised for failing to tackle persistent poverty and fundamental problems with infrastructure

[4] Devolution largely bypassed the provincial level for fear that empowering provinces could create fault lines for secession (Ahmad & Mansoor, 2002).

(Manning & Miranti, 2015). Towards the end of Yudhoyono's presidency the economic environment became less liberal, more protectionist, and less transparent as a result of lobbying by large businesses (Mietzner, 2012). That said, some significant albeit piecemeal BERs were carried out, including in the areas of trade, access to credit and, particularly relevant for this study, business licensing (World Bank, 2014; 2013; 2012).

A series of reforms addressing complex and difficult licensing procedures stemming in part from decentralisation and creating disincentives for starting, formalising or expanding business activities was implemented in 2010–12 (Asia Foundation, 2007; Rothenberg et al., 2016b). These reforms reduced the number of procedures required and the cost involved, and created an online service (World Bank & IFC, 2013). It was estimated that if the reforms could cut the time necessary to expand a business by 4.5 days, it would raise the willingness of companies to invest by 10%, as well as reducing the opportunity for bribery and corruption (Ing et al., 2015; Steer, 2006).

A key element of simplifying business licensing was the one-stop shop reform, Pelayanan Terpadu Satu Pintu (PTSP). One-stop shops (OSS) as a means of easing licensing procedures were first introduced in the 1990s and further expanded in 2006. However, presidential instruction 27/2009 created the framework for all licensing authority to be delegated from 16 ministries to one single agency, Indonesia's Investment Coordinating Board (Ing et al., 2015; Mourougane, 2012). Prior to 2001, businesses were required to register via their local governments, but registrations and licences were approved centrally. With the OSS, all activities required to register/license a business would be done in one location, with one counterparty at district level having the authority to grant the licences, based on established standard operating procedures, transparent information for licence applicants, and channels for raising complaints. The intention is to reduce registration costs and streamline business licensing (Rothenberg et al., 2016b; Steer, 2006).

The decisions about when an OSS would open and the scope of services it would provide were made independently at the district level (Asia Foundation, 2007). Although implemented with differing levels of success in different regions, assessments of the reform in terms of simplifying licensing procedures and improving costs have broadly been positive (Anwar, 2015; Umar et al., 2019; Wahid, 2013). However, one study which assessed whether the reform encouraged formalisation found little evidence that the programme reduced the rates of informality (Rothenberg et al., 2016b).

Gender and inclusion in the Indonesian economy

Women are highly active in running enterprises in Indonesia, although these tend to be smaller than those led by men and concentrated in specific sectors of the economy. Roughly 60% of all micro, small and medium-sized enterprises (MSMEs) across the country are estimated to be run by women (Hani et al., 2012); but men control 66% of medium-sized enterprises in urban areas (IFC, 2016) and an even greater proportion of large enterprises. Women-led firms dominate in labour-intensive sectors which have relatively lower skill, technology, and capital requirements, including food and beverages, and garments and textiles. In textiles and garments, for example, almost 90% of micro and small enterprises are led by women (Istandari & Anandhika, n.d.). Women also dominate in the trade, hotel and restaurant sectors (World Bank Group, 2016; Tambunan, 2009). Men dominate in manufacturing, technology, and capital-intensive industries (IFC, 2016).

A high percentage of firms in Indonesia are informal, characterised by small size, low productivity, low wages, serving local markets, having managers with low educational attainment and lacking legal status and protections. Roughly 45% of women working in the informal sector are entrepreneurs, slightly higher than for men (Babbitt et al., 2015). Entrepreneurs may choose informality due to structural exclusions based on gender, ethnicity or education, for example, as well as high regulatory barriers to formality (Babbitt et al., 2015; Rothenberg et al., 2016b). Although accurate measurements are difficult, one attempt to estimate the size of this sector in Indonesia approximated that more than 93% of all firms are informal, including 96% of micro firms and 93.2% of small firms. However, based on World Bank data, only 18% of medium firms and 10.9% of large firms were categorised as informal (Rothenberg et al., 2016b). Informal firms face a number of particular challenges beyond small size and low productivity. For example, reasons cited for informal enterprises in Indonesia to seek formalisation include greater security of operation, especially for those from ethnic minority groups, and to improve access to credit, especially for women-led businesses (Babbitt et al., 2015).

Many small, informal enterprises led by women are what may be termed 'necessity' rather than 'growth-oriented' enterprises, without an intention or ability to grow but providing vital livelihoods for the individuals involved. According to the Global Entrepreneurship Monitor, 19% of entrepreneurial activity in Indonesia is necessity driven, but the level is higher amongst women at 21%, versus 17% for men (Kelley et al., 2015) and likely to be higher still among smaller firms. Growth-oriented women entrepreneurs in Jakarta have cited lack of support from the family and difficulty in getting a business licence, as well as "other" constraints like inflation and market access as key barriers (Tambunan, 2017). When registering businesses, women in Indonesia are also more likely to report illegal payments as an issue (IFC, 2016). Although gender may affect registration processes, education, affluence, and age are also important factors. One survey of informal enterprises in Sumatra and Java found that roughly half of all entrepreneurs would like to formalise their business, with a slightly higher percentage of women reporting a desire to formalise, although the difference was not statistically significant (Babbitt et al., 2015).

5. Study Design

In order to provide evidence on the impact of BER on G&I, this study uses an in-depth and contextualised quasi-experimental analysis to estimate the effects of the PTSP reform, focusing on the performance of female-led businesses in Indonesia. This section explains the study design, including the underlying theory of change and the quantitative and statistical methods employed. Further detail on these methods is provided in Appendices A to E.

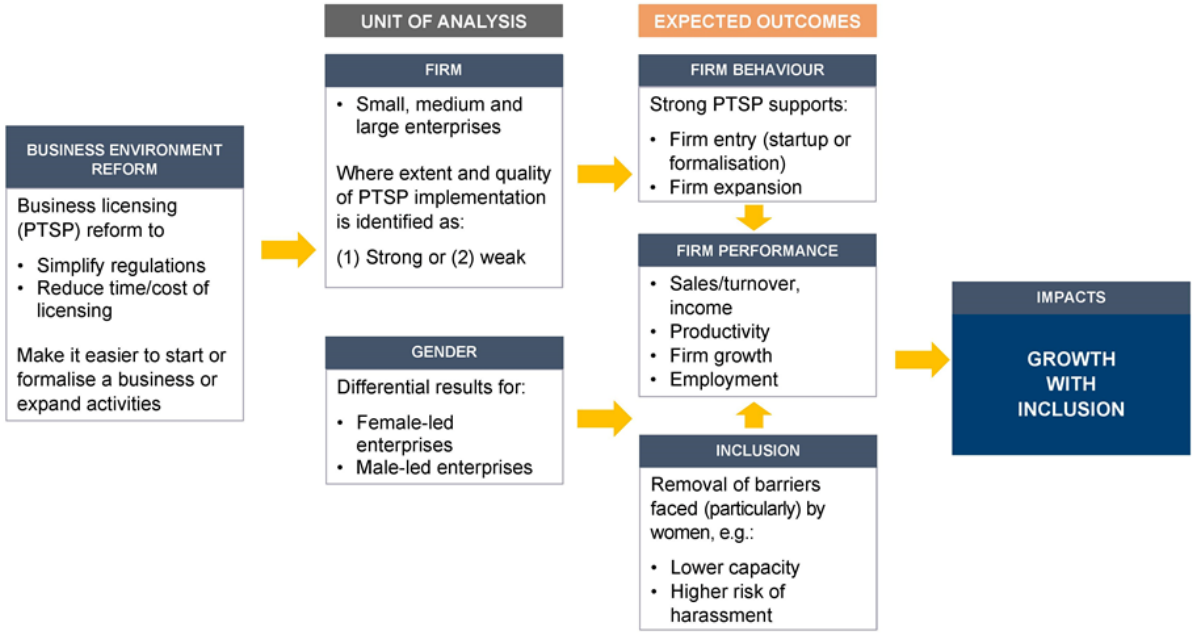
Theory of change

This section sets out the theory or impact logic being tested in this study (Figure 2). Business licensing regulates business entry into (formal) markets and conduct within these markets. It includes permits, certifications and notifications[5] that create obligations and rights for businesses. Those firms which do not meet licensing conditions may be fined or have certain activities or

[5] In Indonesia, these permits and licences typically include building permits (for constructing a building), nuisance permits (for businesses that generate noise and/or pollution), location permit (for businesses where there is no such disturbance), land use permits, and operational licences, which may include trading licences and industrial registration certificates (for the industrial and manufacturing sectors). Businesses must also register and obtain a company registration certificate after the have started operations. Licences such as the company registration and/or trade licence are often used to obtain financing (Ing et al., 2015; KPPOD & Asia Foundation, 2011).

entire operations shut down (IFC et al., 2010). While such registration procedures are necessary, inappropriate or poorly administered licensing regimes create undue costs and uncertainty for businesses, and create opportunities for corruption. These conditions deter investment and other business activity, undermining competition and innovation, and discouraging formalisation (IFC et al., 2010).

Figure 2: BER theory of change



Source: Authors' own.

BER is intended to reduce direct or opportunity costs and risks to business by reducing the number of licences required or the procedures needed to obtain a licence, and reducing the average number of days and/or the cost to obtain licences. This simplification is expected to encourage new growth-oriented firm entry, registration of enterprises at the margins of formality (Rothenberg et al., 2016b), and investment in improving or expanding business operations. These behavioural changes are visible in improved firm performance measured, for example, in terms of productivity improvements, increases in sales, turnover or net income, or firm growth (Herzberg, 2008; White & Fortune, 2015; IFC et al., 2010). These firm-level changes are expected to stimulate greater competition, economic growth, job creation and higher tax revenue (White & Fortune, 2015).

As discussed in the literature review, the impact of BER on G&I is indirect, through firm performance, and is influenced by the ways in which reforms specifically affect firms led by excluded groups. In this study, the focus is particularly on enterprises led by women; however, elements are also relevant to minority business leaders, those with lower educational attainment, and those living in rural areas. If BER resolves structural barriers faced by these groups, it can contribute to inclusion. However, if these enterprises are not reached by reforms, or do not benefit sufficiently from them, then BER is likely to contribute to exclusion or growing inequality.

In the specific case of licensing reforms, the literature shows that women-led businesses are likely to be disproportionately negatively affected by a poor business environment, including as a function of the size, sector or formality of the businesses they run. Conversely, women should

stand to benefit disproportionately from BER if it addresses key issues they face. These include (Section 3, p.10–11):

- Less capability (time, money, skills) to deal with complex and time-consuming procedures, due to lower levels of education, a dual domestic and business role, and limited funds to hire lawyers or others to help them with compliance;
- Largely fixed costs of complicated procedures (i.e. unrelated to enterprise size), meaning they are relatively greater for smaller than larger businesses (Ellis, 2008);
- Difficulty travelling to administrative centres to complete registration procedures, especially where these are located in distant administrative centres; and
- Greater susceptibility to harassment and requests for bribes in many countries.

Data analysis

Following the theory of change (Figure 2), the data analysis examines how (variation in the extent of) PTSP implementation[6] is associated with changes in firms' outcomes, and whether there are differential effects depending on the gender of the leadership. The PTSP reform was selected for analysis because despite earlier OSS efforts, it was not until 2009 that the reform really started expanding, which continued until 2013. In other words, although earlier OSS arrangements existed in some districts, implementation until 2009 was very slow. Following the reform, however, there was a near doubling of districts which were implementing OSSs, from 58% in 2009 to 90% in 2013. Assessments of the quality of implementation have been broadly positive (Anwar, 2015; Umar et al., 2019; Wahid, 2013), although the quality of reform is clearly stronger in some regions than others (Mourougane, 2012; Steer, 2006; Umar et al., 2019; Wahid, 2013).

By 2015 we would expect to see PTSP affecting business performance in line with the theory of change, although with greater effects where implementation was strongest. Our approach, therefore, is to estimate the effect of PTSP to understand whether from 2009 to 2015, differences in implementation across provinces translated to differences in business performance, and how that varies especially when we differentiate leadership based on gender. With the objective of investigating the causal effect between benefiting from the PTSP programme and economic outcomes, we ask: How have differences in implementation of PTSP translated to differences in various outcomes? How do the above differences vary when we differentiate business leadership based on gender?

The data used in the analysis come from the World Bank Enterprise Survey (WBES), which asks small, medium and large firms (i.e. over four employees) a broad range of questions; for example, about output, sales, employment, challenges with the business environment, registration, taxes and access to finance, among various others. The WBES has two years of available data for Indonesia: 2009 and 2015. Having two years of data is important in order to analyse changes in firm performance before and after the full extent of reform implementation, and in order to estimate the effect of the reform on these changes.

[6] The Indonesian economy has been characterised by spatial differences in the concentration of economic activity, employment and output (Bazzi et al., 2016; Rothenberg et al., 2016a). Various policies and business reforms have also been implemented in a decentralised manner (Rothenberg, 2011). Although it is difficult to directly measure the impact of the reform, similar to Rothenberg et al. (2016b), we evaluate its impact by examining how differences in implementation of the programme in a province is associated with changes in various firm-level outcomes.

The analysis involved identifying provinces using a set criteria related to 'implementation' – i.e. differentiating between provinces with faster and better PTSP coverage in districts, where firms are likely to benefit fully from the reform (treatment); and, those with weaker coverage (control).[7] Then, we compare similar firms before and after PTSP implementation, explaining the likelihood of having benefited fully from PTSP based on differences in its implementation and examining its effect on various outcomes. This quasi-experimental approach involves three steps (Caliendo & Kopeinig, 2008; Imbens & Wooldridge, 2009) as described below (details attached in Appendix A).

1. **Propensity score matching (PSM):** estimating the likelihood of full implementation of the PTSP programme (or the 'propensity score'). The variation in the extent of implementation of PTSP across regions is likely driven by several characteristics, which may, in turn, also be correlated with business outcomes. We deal with this potential selection bias by matching and comparing groups that had better implementation (OSS) and those that did not (Non-OSS), which are similar per a set of observable characteristics; and, identify firms in Non-OSS groups that were like the OSS ones before the full extent of the reform was implemented.
2. **Difference-in-differences (DiD):** The PSM cannot control for unobserved heterogeneity. So, in addition, we use the DiD method to estimate a counterfactual for the change in outcomes in each subgroup of matched units; and average those double-differences across matched subgroups.
3. **Diff-diff-diff (DDD):** We use the DDD model to determine whether there is any heterogeneity in the impact of the reform on outcomes with respect to firms in the OSS group in terms of female leadership. This involves estimating the standard DiD where the treatment groups distinguish between female and male leadership for firms.

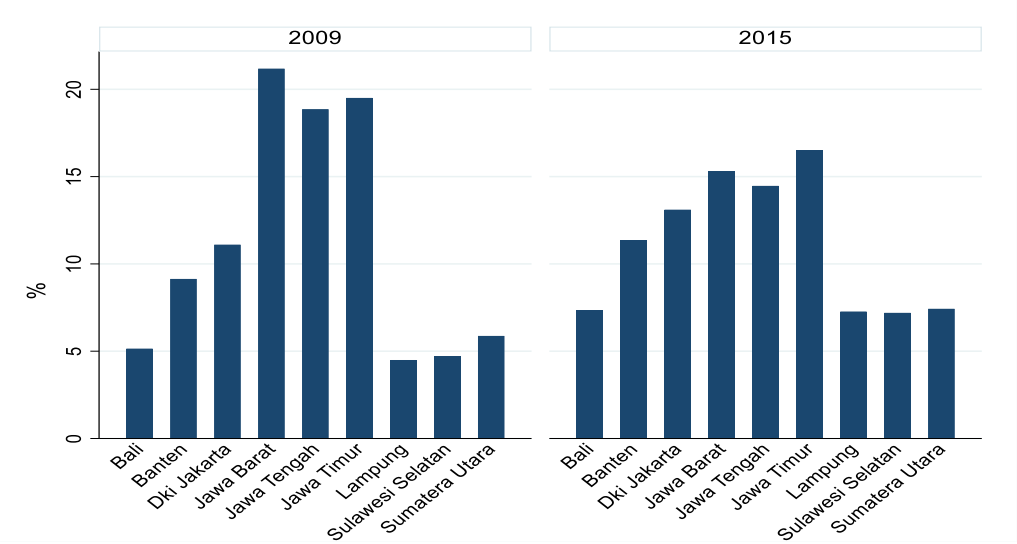
The WBES data for Indonesia cover a random sample of small, medium, and large firm establishments[8] that are stratified by industry, size and region. A total of 1,444 and 1,320 firms were interviewed in 2009 and 2015 respectively – yielding a repeated cross-section of 2,764 firms in total.

Figure 3 reports the distribution across the nine provinces in the data – Bali, Banten, Dki Jakarta, Jawa Barat, Jawa Tengah, Jawa Timur, Lampung, Sulawesi Selatan and Sumatera Utara.

Figure 3: Distribution of firms across provinces in Indonesia

[7] Though the reform is not a treatment in the traditional sense of the term, we use 'treatment' and 'control' groups to distinguish between firms that likely benefited fully from the reform and those that did not.

[8] 'Firm establishments' is the unit of data collection in the WBES survey. We use firms henceforth.



Source: Author's own, with data from World Bank, 2016.[9]

Note:

Figure 3 reports the percentage of firms in the WBES data across Indonesian provinces.

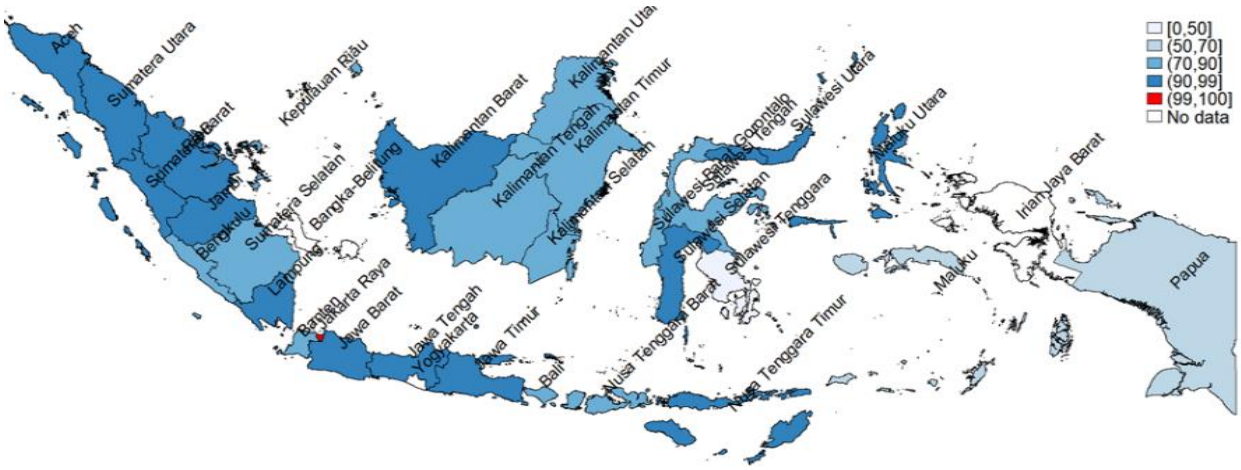
Further, these firms are stratified into seven manufacturing industries and two services industries: Food and beverages, Garments, Textiles, Chemicals, Rubber and plastics, Non-metallic mineral products, Other manufacturing, Retail, and Other Services. Size stratification included small (5 to 19 employees), medium (20 to 99 employees), and large (more than 99 employees).

We identify the treatment groups based on the extent of PTSP implementation by province in 2012 (Figure 5). Using data on timing and locations of starting operations for PTSP offices (Badan Koordinasi Penanaman Modal, 2014; Rothenberg et. al., 2016a), along with information on coverage across districts, we define three alternate definitions for treatment groups as binary indicators (1 and 0):

- **Treatment (i):** 1 denotes coverage in all districts within province by 2012 and first introduced between 2007 and 2012, 0 otherwise. This definition identifies **Jakarta** as the treatment province;
- **Treatment (ii):** 1 denotes coverage in 50% districts within province by 2012 and first introduced between 2007 and 2012, 0 otherwise. This definition identifies **Jakarta, Bali, Banten** and **Lampung** as treatment provinces;
- **Treatment (iii):** 1 denotes coverage in 50% districts within province by 2012, excluding Jakarta, and first introduced between 2007 and 2012. This definition identifies **Bali, Banten** and **Lampung**, and allows us to separate effects for the provinces other than Jakarta.

Figure 4: Districts with OSS coverage (%)

[9] Data from "Indonesia Enterprise Survey (ES) 2015," World Bank, 2016. Ref. IDN_2015_ES_v01_M. Dataset downloaded from https://microdata.worldbank.org/index.php/catalog/2665 on 07/07/2020. © 2016 World Bank. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).



Source: Author's own using data from Rothenberg et al. (2016b).[10]

Note: This figure illustrates OSS coverage by province in 2012. It shows the percentage of districts that have OSS coverage (i.e. within each province).

For gender identification of business leadership**,** we use information on females in top management positions to define a binary indicator (1 and 0) where 1 indicates female business leadership (Female) and 0 indicates male leadership (Male).

[10] Data from "Rethinking Indonesia's Informal Sector," *World Development*, *80*, 96–113., 2016. https://doi.org/10.1016/j.worlddev.2015.11.005. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

Table 1 reports the number of male and female-led firms, distributed by size, and across the nine provinces, by year. Across all provinces, the number of firms with female leadership is significantly lower than those with male leadership. The majority of female-led firms are small firms, although the number of medium and large firms has increased marginally across the two years.

Table 1: Number of male and female-led firms, by size, across provinces in Indonesia, by year

2009	Small (<20)		Medium (20–99)		Large (>100)	
Province	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Bali	15	12	26	7	8	3
Banten	41	7	33	6	31	8
Dki Jakarta	58	24	31	9	23	8
Jawa Barat	118	35	53	11	61	14
Jawa Tengah	105	64	43	6	36	3
Jawa Timur	105	61	45	13	37	8
Lampung	31	11	9	3	6	2
Sulawesi Selatan	37	12	10	2	2	2
Sumatera Utara	42	24	10	1	4	0
All	**552**	**250**	**260**	**58**	**208**	**48**
2015	Small (<20)		Medium (20–99)		Large (>100)	
Province	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Bali	26	7	35	9	13	7
Banten	25	8	37	7	53	20
Dki Jakarta	39	14	42	11	56	11
Jawa Barat	64	7	49	4	54	24
Jawa Tengah	47	26	58	6	50	4
Jawa Timur	67	25	83	10	30	3
Lampung	34	7	32	3	20	0
Sulawesi Selatan	40	5	30	3	17	0
Sumatera Utara	24	17	26	7	23	1
All	**366**	**116**	**392**	**60**	**316**	**70**

Source: Author's own, with data from World Bank, 2016.[11]

[11] Data from "Indonesia Enterprise Survey (ES) 2015," World Bank, 2016. Ref. IDN_2015_ES_v01_M. Dataset downloaded from https://microdata.worldbank.org/index.php/catalog/2665 on 07/07/2020. © 2016 World Bank. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

Note: This table reports the number of firms in the WBES data, distinguishes male and female leadership, distributed by size, and across the nine provinces, by year.

Finally, in terms of outcomes, we examine three indicators:

- **Sales:** Helps examine any effects through improved performance of firms, which could result from behavioural changes as a result of the reform, including in terms of opportunity costs and risks to business.
- **Employment:** Measured by the number of permanent and full-time employees in the given fiscal year, allowing us to capture for instance, if as businesses invest and expand, new jobs are created.
- **Number of medium and large firms:** Measured at the level of province and sector in a given year, to analyse any potential entry or expansion of larger firms as a result of the licensing reform, as well as indirect job effects.

6. Findings: Business Licensing Reforms and Firm Performance

Outcomes by group

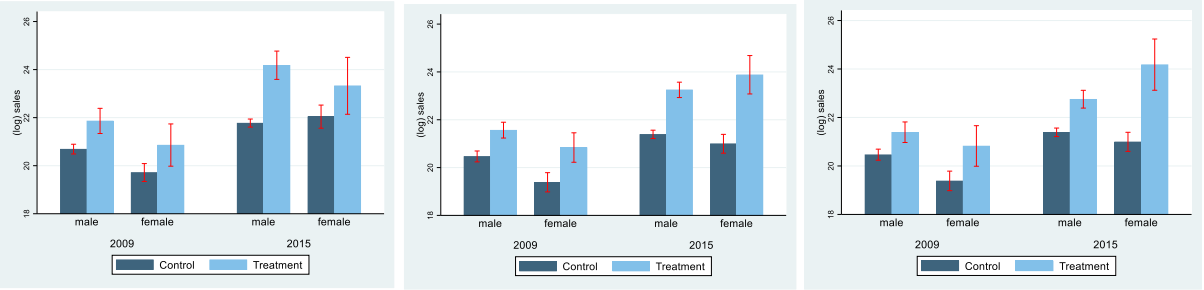
Before examining the effects of PTSP on the different outcomes, we start with a presentation of these outcomes (sales, employment and number of medium and large-scale firms) across the matched treatment and control groups (Figure 5). We note key differences across the years between firms distinguished by male and female leadership and across the three different treatment definitions.

In terms of business performance (**Panel A**), on average, male-led firms perform better than female-led ones in Jakarta (treatment 1). Interestingly, female-led firms have done marginally better than men from 2009 to 2015 when we look at Bali, Banten and Lampung in addition to Jakarta (treatment 2); and, this persists with a significant difference when we exclude Jakarta (treatment 3).

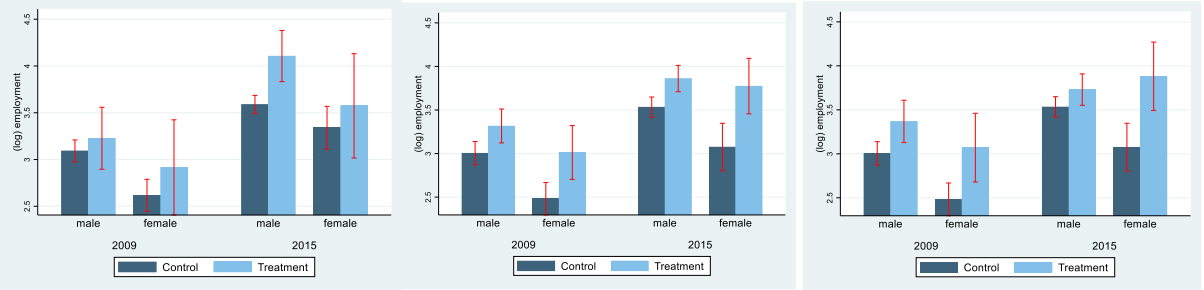
For employment (**Panel B**), on average, male-led firms employed greater number of workers than female-led ones in Jakarta (treatment 1) and in Bali, Banten and Lampung with Jakarta (treatment 2). Interestingly, female-led firms employed a marginally greater number of workers when we exclude Jakarta (treatment 3).

Figure 5: Differences across male and female-led firms – sales, employment and number of medium and large-scale firms (sectoral distribution)

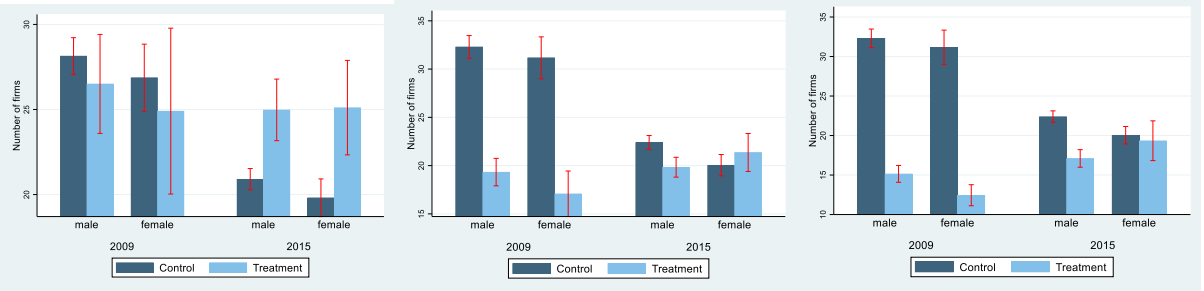
Panel A: Business performance – (log) sales



Panel B: (log) Employment



Panel C: Number of medium and large firms (by sectors)



1: Treatment 1 *2: Treatment 2* *3: Treatment 3*

Source: Author's own, with data from World Bank, 2016.[12]

Note: This figure reports average outcomes (bars) and its 95% confidence intervals (error bars) grouped by treatment and control across female and male-led firms – by years, for treatment 1 (Jakarta), treatment 2 (Bali, Banten and Lampung with Jakarta) and treatment 3 (Bali, Banten and Lampung).

Finally, when we look at the number of medium and large firms (Panel C), we note marginal drops in the number of firms between the two years for the control groups, and corresponding increase for the treatment group across all three treatment definitions.

[12] Data from "Indonesia Enterprise Survey (ES) 2015," World Bank, 2016. Ref. IDN_2015_ES_v01_M. Dataset downloaded from https://microdata.worldbank.org/index.php/catalog/2665 on 07/07/2020. © 2016 World Bank. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

Causal effect of BER on outcomes

We examine the causal effect of reform on outcomes by comparing the average change over time in the outcome variable for the treatment group, compared to the average change over time for the control group. In Tables 2, 3 and 4, we report key estimates of the effects of the PTSP programme on firm performance, employment, and number of medium and large-scale firms. Detailed results are attached in Table A4 in the Appendix.

Sales

In

Table 2, columns 1, 4 and 7 (DiD) compares changes in sales for groups that benefited fully from OSS relative to control (positive and statistically significant). Columns 2, 5 and 8 (DiD-X) introduce female leadership (negative and statistically significant). In columns 3, 6 and 9 (DDD), we estimate the triple-differences model that compares the effect of OSS on outcomes of female-led businesses relative to male-led businesses. A key observation is that our DiD and DiD-X estimators are consistent in magnitude, sign and statistical significance across the specifications. However, this is not the case for the DDD effects, where results are more sensitive, in terms of the sign and significance of estimators.

Focusing on results from the DiD, we notice positive and significant effects for OSS. Overall, the results suggest that better PTSP implementation encouraged improved business performance. However, among the three treatments, the effect for Jakarta (treatment 1) has the highest magnitude, followed by treatment 2 and treatment 3. Interestingly, these differences suggest that better implementation in Jakarta had greatest benefits for business performance than elsewhere.

Table 2: Effects of the PTSP programme on business performance (sales)

	DiD	DiD-X	DDD	DiD	DiD-X	DDD	DiD	DiD-X	DDD
Sales	**Treatment 1**			**Treatment 2**			**Treatment 3**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OSS x Post	*0.877****	*0.895****	*1.034****	*0.799****	*0.827****	*0.732****	*0.657***	*0.682****	*0.436*
	(0.330)	*(0.329)*	*(0.376)*	*(0.231)*	*(0.231)*	*(0.270)*	*(0.261)*	*(0.261)*	*(0.305)*
Female-led		*-0.422****	*-0.763****		*-0.432****	*-1.046****		*-0.356***	*-1.041****
		(0.133)	*(0.200)*		*(0.133)*	*(0.235)*		*(0.139)*	*(0.228)*
Female-led x Post			*0.865****			*0.646**			*0.640**
			(0.287)			*(0.348)*			*(0.337)*
OSS x Post x Female-led			-0.716			0.624			*1.181**
			(0.786)			*(0.573)*			*(0.646)*
OSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OSS x Female-led	No	No	Yes	No	No	Yes	No	No	Yes
R2	0.106	0.109	0.115	0.082	0.085	0.076	0.108	0.111	0.127
N	2338	2335	2335	2053	2051	2051	2037	2034	2034

Source: Author's own, with data from World Bank, 2016.[13]

*Note: This table reports the effects of OSS on firm sales. Each column presents coefficients from a different multivariate regression. The dependent variable is sales (log-transformed). OSS is a dummy that takes the value 1 for reform and 0 otherwise. Post takes a value of 1 for 2015 and a value of 0 for 2009. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.*

The DiD-X results show that the main findings for PTSP are still valid across all three treatments, meaning that the effect for OSS has the same sign, magnitude and significance as in the DiD. Further, female leadership has a negative and significant effect on business performance, indicating that there may be specific challenges related to gender of leadership which restrict the increase in sales. This gendered effect is greatest for treatment 2, when we consider Bali, Banten and Lampung along with Jakarta. Focusing in on Bali, Banten and Lampung (treatment 3) suggests a relatively reduced negative effect. A possible explanation for these results may be that female-led firms may actually face relatively greater challenges in expanding sales in the capital city.

[13] Data from "Indonesia Enterprise Survey (ES) 2015," World Bank, 2016. Ref. IDN_2015_ES_v01_M. Dataset downloaded from https://microdata.worldbank.org/index.php/catalog/2665 on 07/07/2020. © 2016 World Bank. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

Finally, we consider the heterogeneous effects of female leadership in relation to PTSP in our DDD estimation. Results are broadly consistent in terms of the direction of the treatment effects for PTSP as in the DiD and DiD-X. However, effects differ in terms of size and statistical significance. The triple-difference coefficient for treatment 1 shows that sales for female-led firms were lower than male-led firms, but the effect is not statistically significant. The same coefficient, though not statistically significant, turns positive for treatment 2. Interestingly, for treatment 3, zeroing in on Bali, Banten and Lampung, the triple-difference coefficient suggests that the PTSP effect for sales is greater for female-led firms than for male-led ones, and the effect is statistically significant. An explanation for this may be that female-led firms in Bali, Banten and Lampung benefited relative to their male counterparts as a direct result of PTSP.

Employment

In Table 3, with respect to employment, a key observation is that our DiD, DiD-X and DDD estimators are different in magnitude, sign and statistical significance for treatment 1 as compared to treatment 2 and 3. Focusing on results from the DiD, we notice a positive effect for treatment 1 and negative effects for treatment 2 and 3 – but all three are insignificant. Overall, the results suggest that better PTSP implementation had no significant effect on employment, though firms in Jakarta may be employing marginally more employees than others.

Table 3: Effects of the PTSP programme on employment

	DiD	DiD-X	DDD	DiD	DiD-X	DDD	DiD	DiD-X	DDD
Employ-ment	**Treatment 1**			**Treatment 2**			**Treatment 3**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OSS x Post	0.199	0.213	0.290	-0.034	-0.013	-0.010	-0.145	-0.124	-0.156
	(0.187)	(0.186)	(0.212)	(0.131)	(0.131)	(0.149)	(0.151)	(0.150)	(0.171)
Female-led		***-0.358****	***-0.397****		***-0.357****	***-0.480****		***-0.345****	***-0.480****
		(0.075)	***(0.113)***		***(0.075)***	***(0.129)***		***(0.080)***	***(0.127)***
Female-led x Post			0.102			0.017			0.017
			(0.162)			(0.191)			(0.188)
OSS x Post x Female-led			-0.323			0.057			0.207
			(0.444)			(0.315)			(0.362)
OSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OSS x Female-led	No	No	Yes	No	No	Yes	No	No	Yes
R2	0.106	0.109	0.115	0.082	0.085	0.076	0.108	0.111	0.127
N	2338	2335	2335	2053	2051	2051	2037	2034	2034

Source: Author's own, with data from World Bank, 2016.[14]

*Note: This table reports the effects of OSS on employment. Each column presents coefficients from a different multivariate regression. The dependent variable is employment (log-transformed). OSS is a dummy that takes the value 1 for reform and 0 otherwise. Post takes a value of 1 for 2015 and a value of 0 for 2009. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.*

The DiD-X results show that the effect for OSS has the same sign, magnitude and significance as in the DiD. Further, female leadership has a negative and significant effect on employment, therefore indicating that again there may be specific challenges related to gender of leadership which may restrict increasing the number of employees. This gendered effect is comparable across all treatments, such that female-led firms may face similar obstacles to hiring more workers.

Finally, we consider the heterogeneous effects in our DDD estimation. Results for treatment effects are broadly consistent with the DiD and DiD-X. The triple-difference coefficient for treatment 1

[14] Data from "Indonesia Enterprise Survey (ES) 2015," World Bank, 2016. Ref. IDN_2015_ES_v01_M. Dataset downloaded from https://microdata.worldbank.org/index.php/catalog/2665 on 07/07/2020. © 2016 World Bank. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

shows that employment for female-led firms was lower than male-led firms, but the effect is not statistically significant. The same coefficient, though not statistically significant, turns positive for treatments 2 and 3. These results suggest that there were no clear employment effects as a result of PTSP.

Medium and large firms

In Table 3, with respect to number of medium and large-scale firms by province and sector, our DiD and DiD-X estimators are consistent in magnitude, sign and statistical significance across the specifications. Focusing on results from the DiD and DiD-X, we notice positive and significant treatment effects. Overall, the results suggest that better PTSP implementation was associated with an increase in the number of medium and large-scale firms identified by province and sector. However, among the three treatments, the effect for Bali, Banten and Lampung (treatment 3) has the highest magnitude, followed by treatment 2 and treatment 1. Interestingly, these differences suggest that varied implementation likely had differential effects across provinces.

The DiD-X results show that the main findings for PTSP have the same sign, magnitude and significance across all three treatments, as in the DiD. Further, female leadership has a negative and significant, though marginal, effect on the number of medium and large-scale firms for treatments 2 and 3, therefore indicating that there may be specific challenges again related to gender of leadership, possibly sector-specific ones, which may restrict women from leading larger businesses. Interestingly, in this case, this gendered effect is greatest for treatment 3, when we consider Bali, Banten and Lampung without Jakarta. Zeroing in on Jakarta (treatment 1) suggests there is no significant effect for gender of leadership. A possible explanation for these results may be that female-led firms face relatively greater challenges in leading larger businesses outside the capital city.

Finally, when we consider the heterogeneous effects of female leadership in relation to PTSP in our DDD estimation, results are broadly consistent in terms of the direction of the treatment effects for PTSP as in the DiD and DiD-X. However, triple-difference coefficients differ in terms of statistical significance. While across all three treatments, we see that generally, the number of medium and large-scale female-led firms was marginally greater than male-led firms, in direct relation to PTSP, this is not statistically significant for treatment 1. The same coefficient turns positive and statistically significant for treatments 2 and 3. Interestingly, this suggests that the PTSP effect may be greater for female-led firms than for male-led ones outside Jakarta. An explanation for this may be that female-led firms in Bali, Banten and Lampung show marginal benefits in terms of the scale of the business relative to their male counterparts as a direct result of PTSP.

Table 4: Effects of the PTSP programme on number of medium and large-scale firms

	DiD	DiD-X	DDD	DiD	DiD-X	DDD	DiD	DiD-X	DDD
Medium/ large firm	**Treatment 1**			**Treatment 2**			**Treatment 3**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OSS x Post	***4.594****	***4.640****	***4.208****	***10.636****	***10.712****	***9.763****	***12.212****	***12.291****	***11.264****
	(1.228)	***(1.227)***	***(1.398)***	***(0.817)***	***(0.817)***	***(0.926)***	***(0.903)***	***(0.902)***	***(1.023)***
Female-led		-0.742	-0.673		***-0.840****	-0.313		***-0.869****	-0.313
		(0.497)	(0.744)		***(0.471)***	(0.782)		***(0.479)***	(0.743)
Female-led x Post			-0.167			-1.110			-1.046
			(1.069)			(1.414)			(1.594)
OSS x Post x Female-led			1.899			***4.579****			***4.971****
			(2.926)			***(1.974)***			***(2.188)***
OSS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OSS x Female-led	No	No	Yes	No	No	Yes	No	No	Yes
R2	0.059	0.060	0.061	0.185	0.187	0.189	0.260	0.262	0.264
N	2338	2335	2335	2452	2449	2449	2151	2148	2148

Source: Author's own, with data from World Bank, 2016.[15]

*Note: This table reports the effects of OSS on firm growth. Each column presents coefficients from a different multivariate regression. The dependent variable is the number of medium and large-scale firms. OSS is a dummy that takes the value 1 for reform and 0 otherwise. Post takes a value of 1 for 2015 and a value of 0 for 2009. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.*

Additionally, we run specifications to test the robustness of our results. First, we explored two alternate matching criteria to examine the sensitivity of the impact estimates for each treatment (Models 1 and 2 in Appendix C). Second, we employ a different measure for female leadership based on ownership and examine robustness across treatments effects (Appendix E). Overall, results are in line with benchmark results in terms of the direction and significance of treatment effects.

[15] Data from "Indonesia Enterprise Survey (ES) 2015," World Bank, 2016. Ref. IDN_2015_ES_v01_M. Dataset downloaded from https://microdata.worldbank.org/index.php/catalog/2665 on 07/07/2020. © 2016 World Bank. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

7. Discussion: Business Licensing Reform and Gender and Inclusion

This section discusses the findings of the quantitative analysis, exploring the factors that are likely to have influenced them. The discussion draws on other relevant research from related studies in Indonesia and internationally.

Business licensing reforms, sales, and gender and inclusion

As discussed in the theory of change (Section 5), business licensing reforms can be hypothesised to disproportionately benefit women-led firms, because women face greater licensing barriers stemming from lower levels of education, smaller firm size, time poverty, greater difficulty of travelling to administrative centres and vulnerability to bribes (Ellis, 2008; Simavi et al., 2010; Doing Business & World Bank Gender Action Plan, 2008). Our results do show a general link between business licensing reform and increased firm sales. However, in Jakarta, we do not find a clear differential effect in favour of women-led firms.

There are a number of reasons why this expected boost for female-led enterprises may not materialise. One is a lack of awareness of the reforms and their potential benefits among more marginalised businesses. Umar et al. (2019) studied business licensing reform in the Bone regency in South Sulawesi, finding that those who used the OSS were well informed and able to self-manage their applications, but that in general, "socialisation events" among business owners were not well attended and there was low uptake of OSS services among the broader population.[16] The study authors also note that issues of socialisation are not unique to Sulawesi, with poor understanding in many areas, including Jakarta.

Based on other studies on informality and business environment (Bird, 2013; Rothenberg et al., 2016b; Wennmann et al., 2017; White & Fortune, 2015), there is also reason to believe that smaller and informal firms, often led by women, either know about the reforms but choose not to register, or register but fail to benefit. While informality is often assumed to stem from burdensome licensing laws, these studies find that it is primarily a response to broader institutional weaknesses and competitive dynamics (Bird, 2013; Mallon, 2004). These dynamics are not improved by reforming licensing. The reforms instead ease the entry of new firms and increase competitive pressures on existing informal firms, which lack the economies of scale for cost efficiencies. Women-led firms in labour-intensive sectors such as food and beverages, and textiles and garments, where low technology and capital requirements already mean low barriers to entry (IFC, 2016), may be particularly vulnerable. Further, as male-led firms in Indonesia were already estimated to earn approximately four times as much revenue as those run by women (Istandari & Anandhika, n.d.), the findings in Jakarta point to gender gaps persisting unless targeted assistance and other measures are used to level the playing field.

In Bali, Banten and Lampung, however, the result is different. The findings are that the reform has a more direct, positive outcome for female-led firms relative to those led by men over time. Since there is significant variation in the characteristics of these provinces, it is hard to generalise. However, it is likely that as you move away from Jakarta, and especially to more rural

[16] Umar (2019) describes "socialisation events" as visits by licensing officers from the OSS to sub-district level to hold meetings with locals to inform them of the existence and benefits of the OSS. In response to low socialisation levels, the author adds that the "public at the lowest level" will need to be reached using different methods, described as "door-to-door socialisation and not with conventional methods".

areas within these provinces, that the dynamics and benefits of reform change. For example, one study has found that urban entrepreneurs give tax and other regulations as a reason for preferring informality, but this pattern does not hold in rural areas, possibly because of greater enforcement in the city. In addition, the same study finds that urban women are less likely than urban men to prefer formalisation, but rural women are more likely than rural men to prefer formalisation (Babbitt et al., 2015). For those women informal entrepreneurs in rural areas that do want to register their business, the OSS reform may thus help them overcome difficulties in travelling, time constraints and vulnerability to harassment (IFC, 2016; Tambunan, 2017). Other related constraints which particularly face women from minority ethnic backgrounds include discrimination, lack of personal access to decision-makers in distant bureaucracies, and language barriers, if they speak native or traditional languages rather than Bahasa (Babbitt et al., 2015; Mallon, 2004; Tambunan, 2009).

Business licensing reforms, employment and gender and inclusion

For all firms, employment increased between 2009 and 2015. In 2009, women-led firms across all provinces hired fewer people than similar firms led by men; a finding which is consistent with other empirical studies for Indonesia (IFC, 2016; Istandari & Anandhika, n.d.). Explanatory factors are likely to be a mixture of market constraints which differentially affect women and men, as well as motivational differences among entrepreneurs in terms of their growth orientation (Istandari & Anandhika, n.d.; Kelley et al., 2015). In 2015, while this gap between men and women persisted in Jakarta, in the other three provinces, female-led firms actually employed a marginally greater number of workers than their male counterparts.

Importantly, however, the findings do not show a relationship with business licensing reform. This result may seem both surprising, given the increase in firm sales, and disappointing, given the development benefits of job growth. However, the relationship between sales and employment is in fact not straightforward, and in other countries it has been shown to vary based on sector, growth-orientation, and the use or not of family labour (Colombo et al., 2014; Delmar et al., 2003; McKelvie & Wiklund, 2010). The finding is also consistent with other studies that show limited evidence of jobs effects from business licensing reforms (Rahman, 2014; Warner, 2012; White & Fortune, 2015).

Business licensing reforms, medium and large enterprises, and gender and inclusion

In contrast to the previous section, which considered changes in employment across all firms, here the focus is on the number of medium and large firms (i.e. firms with over 20 employees). Interestingly, the pattern is similar to that observed for firm performance (sales). PTSP has contributed to an expansion in the number of medium and large firms over time, and specifically to a marginal increase outside Jakarta in women-led medium and large firms relative to male-led counterparts. It should be noted, however, that despite this growth, the absolute number of medium and large firms, particularly firms led by women, is relatively small overall.

Business licensing reform could affect the number of medium and large firms through different pathways: the growth of small firms into larger firms, the formalisation of existing (informal) medium and large firms, and the entry of new medium and large firms. Although we cannot distinguish between these in the data, new medium and large-sized firm entry is likely to be the most important factor. First, in developing countries, most larger firms have not grown to this size. They begin large while small firms face key constraints to growth (IFC, 2013). Our findings on employment also support the notion that firm growth is not the main mechanism. Second,

although business licensing reform is often intended to support formalisation, several studies, including in Indonesia, suggest they have failed to catalyse formalisation in the majority of cases (Rothenberg et al., 2016b; Wennmann et al., 2017; White & Fortune, 2015), or that the effect is small (Kaplan et al., 2011). On the other hand, complex business registration procedures are a clear barrier that particularly affects new startups (Deininger et al., 2007), especially those with the intention to operate formally.

Across both male and female-led businesses, this rise in (new) medium and large firms was most pronounced in the provinces outside Jakarta. As discussed under sales, this result may stem from differences in the quality of implementation. Alternatively, firms outside Jakarta may have previously faced greater constraints in registering a new business, meaning that reform was more advantageous. In either case, it is notable that there are positive effects outside Jakarta for women-led firms relative to those led by men. As already discussed, women-led firms are generally smaller than those run by men, so in terms of a growth in assets controlled by women, this result is positive from a gender and inclusion perspective.

It is notable, however, that women leading larger businesses in Indonesia are likely to already be relatively better off – more educated and wealthier, especially those in more developed areas like Sumatra, Java and Bali (Tambunan, 2009). On the other hand, this growth in the number of medium and large firms controlled by women offers other inclusion benefits. In particular, studies both in Indonesia (Istandari & Anandhika, n.d.) and internationally (Cirera & Qasim, 2014) show that women-led firms are more likely to employ other women than male-led firms. Since women also tend to lead businesses in more labour-intensive sectors such as food and beverages, and textiles and garments (IFC, 2016), a growth in medium and large firms led by women creates economic opportunities for other, poorer, women.

Limitations

The WBES data cover firms across generally more well-off parts of Indonesia, including Jakarta and the rest of Java, Bali and parts of Sulawesi and Sumatra. Although there is some variation in levels of development within and between these provinces, in general, the poorest and least developed parts of Indonesia are not represented. It would be important and interesting to understand whether the identified trend – that women-led firms outside the capital experience a small but significant benefit relative to male-led firms – would also hold in poorer regions where OSS has strong coverage. Similarly, the survey does not include micro enterprises (fewer than five employees), and the experience of these firms may deviate from that reported here. That said, most micro firms are informal, and so aspects of the discussion on informality can be informative for micro enterprises as well. A fuller assessment of other provinces and smaller firms would require accessing other national and census data sets.

The study focuses on a past reform, allowing us to assess the effects of the reform on business performance and G&I using available statistically representative data. As a result, we do not cover more recent changes with respect to PTSP, or cover new developments, such as the Omnibus Bill on Job Creation, which aims to significantly reform business regulations. However, the findings can inform these processes. For example, the differential findings between Jakarta and other provinces suggest treating with caution any developments that would lead to more centralised licensing authority and potentially tilt the playing field in ways that undermine inclusion.

The quality of PTSP implementation was highly variable across Indonesia and over time. We designed the study to reflect these implementation differences, focusing on reform coverage

across districts within the provinces; however, we cannot account for more detailed nuances in the way the reform was managed among districts covered.

Finally, while the patterns observed are based on statistical methods which have been verified through additional robustness checks, explaining the reasons behind these patterns requires applying and interpreting the results of other studies to help explain dynamics here. Validation of our results would require additional explanatory data, such as could be gathered through interviews with male and female business leaders, or other similar techniques.

8. Conclusions and Recommendations

This research investigates the relationship between BER and G&I through an in-depth analysis of the PTSP business licensing reform in Indonesia between 2009 and 2015. It finds that on average, there is evidence that firms improved performance (sales) as a direct or indirect effect of this reform, and while there may not be any significant employment effects, the reform appears to have encouraged a marginal expansion in the number of medium and large firms.

With respect to gender, male-led firms continue to run larger businesses, enjoy higher sales and employ more workers, and in Jakarta there is no evidence that the reforms have made inroads in changing this inequity. However, outside Jakarta, women-led firms appear to have experienced benefits relative to male-led firms, related to both firm performance (sales) and the number of medium and large-scale firms they run. Although the effect was small, it was significant. In addition, as more women run larger firms, it can be expected that they create new jobs for other, poorer women.

Business licensing reform was broad-based and not designed to have differential effects for specific sectors or types of firms, although smaller firms with less capacity (time, money, skills) to deal with complex and time-consuming procedures could have been expected to benefit the most. Bali, Banten, Jakarta and Lampung provinces were all identified as areas of high OSS coverage. The difference between Jakarta and the other three provinces is therefore most likely associated with different ways in which gender, firm performance, and business licensing interact across these different urban and rural settings.

With respect to the Prosperity Fund's Gender and Inclusion conceptual framework, our findings suggest that PTSP led to neither unintended negative consequences for women-led firms, nor evidence of transformational change. Outside Jakarta, advances for women were achieved, while in Jakarta existing exclusions were maintained and arguably deepened. Stronger G&I outcomes would require deepening and expanding the positive achievements identified.

Recommendations

Recommendations for improving G&I through business environment reforms, with relevance also beyond Indonesia, include:

1. **Ensure services are readily available in rural areas.** In Indonesia, PTSP has particularly benefited women outside Jakarta, empowering them as business leaders and offering potential spillover benefits in terms of job creation for other women. This finding points to the importance of maintaining locally accessible services outside major metropolitan centres and capital cities.
2. **Invest in targeted socialisation of reforms**, to ensure that those who stand to benefit are aware of and understand new rules. Socialisation efforts are likely to be most

effective if targeted towards growth-oriented women and minority business leaders, who are in a position to both benefit from the reforms and to create jobs for others in their community.

3. **Prioritise broad-based business environment measures relevant for the informal sector and create the conditions for them to formalise.** For marginalised sectors of society, including for many women and minority business leaders, informality is driven by complex competitive and institutional factors. Reforms that mostly benefit the formal business sector are likely to widen inequalities. On the other hand, measures that enable informal businesses to access improved technology and equipment, sources of financing, or more and higher value markets and customers, are more inclusive. Some of these areas – for example, involving infrastructure – are beyond conventional business environment reform. However, they are often part of broader investment climate programmes. In addition, areas of BER that can be more broad-based if carefully designed and implemented include public–private dialogues that enable associations of informal entrepreneurs to participate, and tax reforms targeting local taxes and fees paid also by informal enterprises. Where these are then coupled with business licensing reform, more businesses can be expected to see the benefits of formalisation.
4. **Couple general business environment improvements with targeted efforts to improve productivity and upgrading in sectors dominated by women.** Women-led firms tend to be located in labour-intensive but low productivity, low-technology and low-growth sectors. Identifying and addressing productivity constraints specifically relevant to women or minority business leaders, and supporting them to upgrade into higher value-added activities or sectors could better enable them to compete, creating job opportunities for others in their community. As well as considering specific constraints in the business environment, there is a need to look at how the business environment interacts with other legal, social and cultural factors they face.

This study has looked at past reforms, in order to learn lessons for future programming. Putting them in the context of COVID-19, at least two factors are clearly important. First, the economic recession is likely to push more people, including a segment of the middle class, into more precarious livelihoods in the informal sector. This makes the recommendations to bridge rather than reinforce formal–informal divides even more important. Second, rising unemployment due to COVID-19 is concentrated in sectors that are particularly exposed to the pandemic, and often these disproportionately affect women, such as agriculture, trade, hotels and restaurants, and other services. General business environment improvements should be coupled with targeted support for these sectors to recover or diversify their business. More generally, these recommendations on BER should be considered as part of a holistic recovery programme in which G&I outcomes are expected.

Future research

The relationship between BER and G&I depends heavily on context, and the findings and recommendations in this report are specific to business licensing reform in Indonesia. They can certainly inform other areas of GBEP programming, by highlighting potential challenges, opportunities and issues to scrutinise, but cannot be applied in a direct way to other areas of BER, such as trade promotion or taxation, or to other countries. However, the framework that underpins this study does have wide applicability and can be used to strengthen the relatively weak evidence base on the effects of BER on gender and inclusion. We identify below some areas for potential future research, although this is by no means an exhaustive list.

As the relationship between BER and G&I depends on structural, sociocultural and legal factors that shape the way that women or minority-led firms experience the business environment, comparative analysis between countries with different contexts would be fruitful. It could be based on a country typology, defined by factors in the business environment and/or constraints faced by specific types of businesses in those countries. This typology would then offer the potential to draw lessons with clearer relevance for other countries with similar characteristics.

Of course, a variety of studies could be identified to focus on specific functional areas of BER, other than business licensing. For instance, public–private dialogue is one area which has particular salience for inclusion, especially related to the meaningfulness of these processes, who has access to them and on what terms. In southeast Asia, the signing of the Regional Comprehensive Economic Partnership (RCEP) can be a trigger for domestic reforms where research would be of particular relevance for RCEP member countries, including Indonesia and the Philippines. These areas include investment facilitation and promotion; trade policies and customs administration reform; and the overall quality of regulatory governance.[17] Such analyses would, however, require some concerted efforts towards mapping alternative scenarios (sectors, products, etc.) and estimating impact using partial or general equilibrium models that are theoretically rigorous but data intensive.

Another promising area for research relates to sub-national reforms. There seems to be an interest in stronger BER programming focused on the local and regional business environment, and the regional variation in the findings from this study suggest that such efforts may be well placed. However, this is an area with relatively less existing research available.

A fourth area of enquiry would be to look at different gender dimensions. Research could explore the relationship between BER and women's employment. This relationship between BER, firm performance and job creation/job quality is indirect, making it challenging to deliver strong conclusions through a relatively small, desk-based study. However, a starting point could be more theoretical work in this area. Research could also look at the productivity of women-led firms, given a number of studies have identified productivity differences between female and male-owned businesses. What are the determinants of productivity gaps (as well as the degree of such gaps) and how do these relate to the business environment?

Finally, the majority of enterprises in Indonesia – as in many other countries – are informal. While this study raises several points related to the informal sector, it was beyond the scope to address these dynamics in detail. More work on the relationship between informality, the different drivers of informality and the type of reforms that support growth-oriented informal firms to prosper would be valuable.

Under any of the research areas identified above, the studies which are possible will be determined by the available data. The WBES covers most countries, but access to broader national and census data sets would enrich analysis. Understanding of the reasons behind the identified trends in the data would benefit from additional information gathered through interviews or similar engagement with relevant firms. Studies could also be enriched through an analysis of the political dynamics associated with reforms, which may shape design and implementation in ways that may not be immediately visible through secondary sources but which may have important implications for G&I.

[17] See also Saha & Ray (2020) for further discussion of RCEP.

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Appendices

Appendix A: Methodology Details

The first step of our empirical strategy is to estimate the PSM. A major concern in assigning a causal interpretation to the effect of PTSP is that the programme was not randomly assigned, as a result of which our estimates may be confounded. The main challenge is therefore in constructing the credible counterfactual. To do this, we use PSM with a set of characteristics (Z) that can, in principle, drive the likelihood of benefiting fully from the PTSP programme: size, firm age, sector, subsector, legal status, state owned, fixed assets, credit and informality (**Table A1** presents summary statistics for these variables, reports the means, standard deviations, and sample sizes of variables). Using information on these observable characteristics, we estimate the propensity score, which can be written as follows:

$$OSS = \alpha + \beta Z + \varepsilon$$

Where *OSS* is a binary variable equal to one for meeting the implementation criteria and zero for the others. Z is the vector of observed characteristics of firms and ε is an error term. We estimate the propensity score, defined as the conditional probability of treatment given pre-participation characteristics using the logit model (Sianesi, 2004; Faltermeier & Abdulai 2009). The estimation uses the nearest neighbour matching algorithm and the standardised bias approach proposed by Rosenbaum and Rubin (1983) to assess the quality of matches. **Table A2** reports the details of the propensity score estimation (the benchmark estimation is used) and **Table A3** and **Figure A1** provide additional information on the balancing property between covariates before and after the matching procedure. In the unmatched sample we observe statistically significant differences in means between treated and untreated subsets, after the matching procedure, all variables are balanced.

Next, to evaluate the impact of implementation differences in the PTSP programme on an outcome *y*, we estimate a regression equation for difference-in-differences (DiD) as follows:

$$y = \alpha + \beta\, OSS + \gamma t + \delta\,(OSS \cdot t) + \theta X + e$$

where *y* is the outcome, *OSS* is the indicator based on the implementation of the PTSP programme (1 for those that benefited fully from the PTSP and 0 for those that did not) and *t* is the time trend that is common to both these groups. *X* is a binary variable that identifies gender-based business leadership. β captures the specific effect for those that benefited fully from the PTSP implementation; γ captures the effect of the time trend. The key parameters of interest are δ, the treatment effect, and θ, the effect for female-led businesses. The time trend controls for any nationwide targeting bias that is specific to the year 2009 but invariant across the provinces. This approach of PSM-DiD allows us to control for all observable and unobservable time-invariant variables that may influence δ and the outcome (Duncan et al., 1998; Smith & Todd, 2005).

Additionally, we introduce an interaction term between OSS and female leadership that will capture the extent to which female leadership may relate with the effect of OSS on the outcome variables.

$$y = \alpha + \beta\, OSS + \gamma t + \delta_1\,(OSS \cdot t) + \delta_2\,(OSS \cdot X) + \delta_3\,(OSS \cdot t \cdot X)$$

We perform a difference-in-difference-in-differences (DDD) analysis where we compare the effect of the reform on outcomes for female-led firms (i.e. difference between the change in female outcomes in treated relative to control groups) to its effect on outcomes for male-led firms.

Appendix B: Data Description

Table A1: Data description and statistics for propensity score estimation

Variable	N	Mean	SD	Min.	Max.	Description
Sector	2699	0.81	0.39	0	1	Sector, manufacturing (=1) or services (=0)
State ownership	2699	0.99	0.09	0	1	State-owned enterprises, be it fully or partially? 1=Yes, 0=No
Fixed assets	2686	0.2	0.4	0	1	Did this establishment purchase any fixed assets in last fiscal year? 1=Yes, 0=No
Informality	2699	0.6	0.49	0	1	Does this establishment compete against unregistered or informal firms? 1=Yes, 0=No
Size	2699	1.76	0.81	1	3	Small, medium, and large firm categories based on No. of employees • Small (<20); • Medium (20–99); • Large (100 and over)
Legal status	2699	3.2	0.83	1	6	Legal status of the firm • Shareholding company with shares trade; • Shareholding company with non-traded shares; • Sole proprietorship; • Partnership; • Limited partnership; • Other
Subsector	2699	4.94	2.49	1	9	Stratification of sector • Chemicals and chemical products; • Food; • Garments; • Non-metallic mineral products; • Other manufacturing; • Other services; • Retail; • Rubber and plastic products; • Textiles
Firm age	2665	18.98	11.6	2	97	Number of years the firm has been in operation
Credit	2636	8.07	17.63	0	100	Share of working capital purchased on credit/advances from suppliers /customers

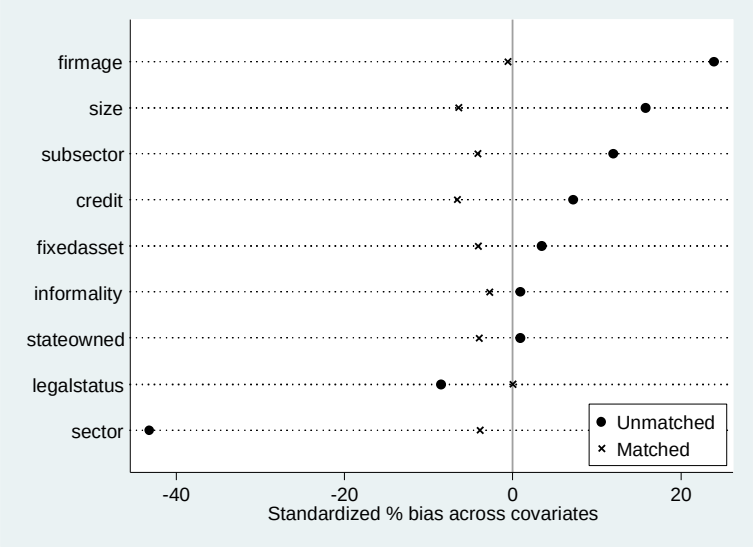
Appendix C: Propensity Score Matching

Table A2: Propensity score estimation – benchmark specifications and robustness checks

	(1)	(2)	(3)
	Model 1	Model 2	Benchmark
Size	0.289***	0.300***	0.279***
	(0.079)	(0.079)	(0.082)
Firm age	0.015***	0.017***	0.018***
	(0.005)	(0.005)	(0.005)
Sector	-1.256***	-1.274***	-1.242***
	(0.145)	(0.146)	(0.148)
Subsector	-0.005	-0.005	-0.011
	(0.028)	(0.028)	(0.029)
Legal status		-0.155**	-0.182**
		(0.071)	(0.075)
State owned		0.613	0.878
		(0.685)	(0.828)
Fixed asset			-0.006
			(0.153)
Credit			0.004
			(0.003)
Informality			-0.026
			(0.125)
Constant	-1.852***	-1.996***	-2.085**
	(0.251)	(0.768)	(0.928)
N	2665	2665	2465
Pseudo R^2	0.048	0.051	0.051

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A1: Matching – standardise bias across covariates with benchmark



Source: Authors' own.

Table A3: Balancing property of the covariates – benchmark

T-test of observed covariates before and after matching

		Mean					
Variable	**Unmatched (U) & Matched (M)**	**Treated**	**Control**	**% Bias**	**% Reduction**	**t-statistic**	**p>|t|**
Size	*U*	*1.88*	*1.75*	*15.8*		*2.59*	*0.01*
	M	*1.88*	*1.93*	*-6.5*	*59*	*-0.78*	*0.437*
Firm age	*U*	*21.28*	*18.53*	*23.9*		*3.88*	*0*
	M	*21.15*	*21.22*	*-0.6*	*97.6*	*-0.07*	*0.947*
Sector	*U*	*0.65*	*0.84*	*-43.2*		*-7.75*	*0*
	M	*0.65*	*0.67*	*-3.9*	*91*	*-0.43*	*0.667*
Subsector	*U*	*5.16*	*4.88*	*11.9*		*1.86*	*0.063*
	M	*5.16*	*5.26*	*-4.2*	*64.9*	*-0.52*	*0.601*
Legal status	*U*	*3.17*	*3.24*	*-8.5*		*-1.43*	*0.154*
	M	*3.18*	*3.18*	*0*	*100*	*0*	*1*
State owned	*U*	*0.99*	*0.99*	*0.9*		*0.14*	*0.888*
	M	*0.99*	*1.00*	*-4*	*-348.2*	*-0.58*	*0.563*
Fixed asset	*U*	*0.22*	*0.20*	*3.4*		*0.56*	*0.574*
	M	*0.21*	*0.23*	*-4.1*	*-19*	*-0.49*	*0.624*
Credit	*U*	*9.83*	*8.54*	*7.2*		*1.15*	*0.248*

	M	*9.86*	*11.05*	*-6.6*	*8.5*	*-0.76*	*0.448*
Informality	*U*	*1.36*	*1.36*	*0.9*		*0.15*	*0.882*
	M	*1.37*	*1.38*	*-2.8*	*-202.3*	*-0.34*	*0.736*
Subsector	*U*	*5.16*	*4.88*	*11.9*		*1.86*	*0.063*
	M	*5.1561*	*5.2558*	*-4.2*	*64.9*	*-0.52*	*0.601*

Sample	**Pseudo R2**	**LR chi2**	**p>chi2**	**Mean bias**	**Median bias**	**B**	**R**	**%Var**
Unmatched	*0.048*	*87.04*	*0*	*12.8*	*10.2*	*58.1**	*1.24*	*0*
Matched	*0.003*	*2.42*	*0.983*	*3.7*	*4*	*12.7*	*0.9*	*29*

* If B>25%, R outside [0.5; 2].

Notes: Percentage bias is calculated as $100 * \frac{(X_T - X_C)}{\sqrt{0.5(V_T(X) + V_C(X))}}$ while % Reduction indicates its absolute reduction. B is the absolute standardised difference of the means of the linear index of the propensity score in the treated and (matched) non-treated group and R is the ratio of treated to (matched) non-treated variances of the propensity score index. T-test is the mean test for the baseline period. T-test is the mean test for the baseline period. *** p<0.01, ** p<0.05, * p<0.1.

Appendix D: Impact Analysis – Detailed Results

Table A4: Impact of participation on outcomes – detailed results

	Panel A: SALES								
	DiD	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**
	Treatment 1			*Treatment 2*			*Treatment 3*		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
OSS	1.385	1.378	1.421*	1.016*	1.092***	1.016*	0.821	0.807	0.881***
	(1.274)	(1.385)	(0.795)	(0.596)	(0.217)	(0.596)	(0.653)	(0.730)	(0.247)
Post	1.504***	1.473***	1.284***	1.286***	0.995***	1.286***	1.326***	1.294***	1.005***
	(0.119)	(0.119)	(0.135)	(0.139)	(0.161)	(0.139)	(0.134)	(0.135)	(0.156)
OSS x Post	0.877***	0.895***	1.034***	0.799***	0.827***	0.732***	0.657**	0.682***	0.436
	(0.330)	(0.329)	(0.376)	(0.231)	(0.231)	(0.270)	(0.261)	(0.261)	(0.305)
Female Leadership		-0.422***	-0.763***		-0.432***	-1.046***		-0.356**	-1.041***
		(0.133)	(0.200)		(0.133)	(0.235)		(0.139)	(0.228)
OSS x Female Leadership			-0.241			0.382			0.598
			(0.574)			(0.412)			(0.472)
Female Leadership x Post			0.865***			0.646*			0.640*
			(0.287)			(0.348)			(0.337)
OSS x Female Leadership x Post			-0.716			0.624			1.181*
			(0.786)			(0.573)			(0.646)
Constant	20.233***	20.343***	20.443***	19.889***	20.003***	20.373***	19.886***	19.980***	20.360***
	(0.427)	(0.465)	(0.269)	(0.364)	(0.395)	(0.128)	(0.394)	(0.443)	(0.126)
Observations	2338	2335	2335	2338	2335	2335	2037	2034	2034
Within_R2	0.086	0.090	0.094	0.088	0.092	0.097	0.081	0.083	0.095
Between_R2	0.209	0.207	0.226	0.337	0.337	0.372	0.228	0.228	0.278
Overall_R2	0.106	0.109	0.115	0.140	0.144	0.153	0.108	0.111	0.127
	Panel B: EMPLOYMENT								
	DiD	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**
	Treatment 1			*Treatment 2*			*Treatment 3*		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
OSS	0.316	0.311	0.273	0.382*	0.373*	0.314*	0.386	0.376	0.312*
	(0.440)	(0.478)	(0.289)	(0.212)	(0.220)	(0.165)	(0.257)	(0.274)	(0.186)
Post	0.643***	0.617***	0.588***	0.677***	0.645***	0.622***	0.679***	0.648***	0.622***

	(0.067)	(0.067)	(0.076)	(0.079)	(0.079)	(0.089)	(0.077)	(0.077)	(0.088)
OSS x Post	0.199	0.213	0.290	-0.034	-0.013	-0.010	-0.145	-0.124	-0.156
	(0.187)	(0.186)	(0.212)	(0.131)	(0.131)	(0.149)	(0.151)	(0.150)	(0.171)
Female Leadership		-0.358***	-0.397***		-0.357***	-0.480***		-0.345***	-0.480***
		(0.075)	(0.113)		(0.075)	(0.129)		(0.080)	(0.127)
OSS x Female Leadership			0.085			0.273			0.336
			(0.324)			(0.226)			(0.264)
Female Leadership x Post			0.102			0.017			0.017
			(0.162)			(0.191)			(0.188)
OSS x Female Leadership x Post			-0.323			0.057			0.207
			(0.444)			(0.315)			(0.362)
Constant	2.836***	2.928***	2.955***	2.714***	2.807***	2.860***	2.710***	2.800***	2.859***
	(0.149)	(0.162)	(0.100)	(0.138)	(0.144)	(0.104)	(0.152)	(0.164)	(0.103)
Observations	2338	2335	2335	2338	2335	2335	2037	2034	2034
Within_R2	0.047	0.056	0.057	0.047	0.056	0.057	0.045	0.054	0.057
Between_R2	0.032	0.035	0.038	0.104	0.109	0.116	0.045	0.049	0.061
Overall_R2	0.043	0.052	0.053	0.051	0.060	0.062	0.044	0.053	0.056
	Panel C: NUMBER OF MEDIUM AND LARGE-SCALE FIRMS								
	DiD	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**
	Treatment 1			*Treatment 2*			*Treatment 3*		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
OSS	2.659	2.637	2.870	-11.407***	-11.454**	-11.147*	-14.984***	-15.032***	-14.727**
	(7.809)	(8.524)	(9.535)	(4.087)	(4.574)	(6.268)	(4.280)	(4.944)	(6.827)
Post	-5.703***	-5.773***	-5.736***	-8.856***	-8.956***	-8.523***	-8.856***	-8.957***	-8.523***
	(0.444)	(0.445)	(0.503)	(0.484)	(0.486)	(0.547)	(0.460)	(0.461)	(0.519)
OSS x Post	4.594***	4.640***	4.208***	10.636***	10.712***	9.763***	12.212***	12.291***	11.264***
	(1.228)	(1.227)	(1.398)	(0.817)	(0.817)	(0.926)	(0.903)	(0.902)	(1.023)
Female Leadership		-0.742	-0.673		-0.840*	-0.313		-0.869*	-0.313
		(0.497)	(0.744)		(0.471)	(0.782)		(0.479)	(0.743)
OSS x Female Leadership			-0.926			-1.110			
			(2.135)			(1.414)			-1.046
Female Leadership x			-0.167			-2.180*			(1.594)
			(1.069)			(1.183)			-2.180*

Post						4.579**			(1.123)
OSS x Female Leadership x Post			1.899			(1.974)			4.971**
			(2.926)						(2.188)
Constant	23.455***	23.659***	23.635***	28.081***	28.319***	28.162***	28.080***	28.323***	28.160***
	(2.608)	(2.849)	(3.184)	(2.717)	(3.045)	(4.172)	(2.609)	(3.020)	(4.170)
Observations	2338	2335	2335	2452	2449	2449	2151	2148	2148
Within_R2	0.066	0.068	0.068	0.123	0.125	0.127	0.154	0.156	0.159
Between_R2	0.122	0.123	0.123	0.203	0.202	0.205	0.311	0.311	0.313
Overall_R2	0.059	0.060	0.061	0.185	0.187	0.189	0.260	0.262	0.264

Note: This table reports the effects of PTSP on sales, employees and number of medium and large-scale firms. Each column presents coefficients from a different multivariate regression. Columns 1, 4 and 7 (DiD) compares changes for groups that benefited fully from OSS relative to control. Columns 2, 5 and 8 (DiD-X) introduce female leadership. In Columns 3, 6 and 9 (DDD), we estimate the triple-differences model that compares the effect of OSS on outcomes of female-led businesses relative to male-led businesses. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

Appendix E: Impact analysis – robustness with alternate definition of female leadership

Table A5: Robustness checks for the impact of participation on outcomes

	Panel A: SALES								
	DiD	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**
	Treatment 1			*Treatment 2*			*Treatment 3*		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
OSS	1.385	1.399	1.322	1.030*	1.005**	0.968***	0.821	0.769	0.755**
	(1.274)	(1.156)	(0.844)	(0.552)	(0.486)	(0.285)	(0.653)	(0.559)	(0.319)
Post	1.504***	1.485***	1.297***	1.325***	1.300***	1.110***	1.326***	1.277***	1.112***
	(0.119)	(0.120)	(0.144)	(0.139)	(0.141)	(0.169)	(0.134)	(0.136)	(0.164)
OSS x Post	0.877***	0.888***	0.369	0.799***	0.809***	0.465*	0.657**	0.681***	0.441
	(0.330)	(0.331)	(0.404)	(0.231)	(0.233)	(0.281)	(0.261)	(0.262)	(0.315)
Female Leadership		-0.141	-0.561***		-0.156	-0.726***		-0.313**	-0.723***
		(0.122)	(0.181)		(0.122)	(0.207)		(0.127)	(0.200)
OSS x Female Leadership			0.170			0.293			0.289
			(0.520)			(0.370)			(0.430)
Female Leadership x Post			0.545**			0.298			0.299
			(0.261)			(0.305)			(0.295)
OSS x Female Leadership x Post			1.532**			1.377***			1.019*
			(0.700)			(0.510)			(0.589)
Constant	20.233***	20.266***	20.428***	19.889***	19.946***	20.235***	19.886***	20.009***	20.229***
	(0.427)	(0.391)	(0.286)	(0.364)	(0.323)	(0.179)	(0.394)	(0.339)	(0.177)
Observations	2338	2316	2316	2338	2316	2316	2037	2018	2018
Within_R2	0.086	0.087	0.096	0.088	0.089	0.101	0.081	0.083	0.089
Between_R2	0.209	0.218	0.238	0.337	0.328	0.392	0.228	0.228	0.278
Overall_R2	0.106	0.107	0.119	0.140	0.140	0.159	0.108	0.111	0.124
	Panel B: EMPLOYMENT								
	DiD	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**
	Treatment 1			*Treatment 2*			*Treatment 3*		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
OSS	0.382*	0.390**	0.302**	0.386	0.384*	0.362***	0.382*	0.390**	0.302**
	(0.212)	(0.171)	(0.122)	(0.257)	(0.212)	(0.140)	(0.212)	(0.171)	(0.122)

Post	0.677***	0.667***	0.541***	0.679***	0.657***	0.541***	0.677***	0.667***	0.541***
	(0.079)	(0.080)	(0.096)	(0.077)	(0.078)	(0.095)	(0.079)	(0.080)	(0.096)
OSS x Post	-0.034	-0.053	-0.200	-0.145	-0.162	-0.267	-0.034	-0.053	-0.200
	(0.131)	(0.132)	(0.160)	(0.151)	(0.151)	(0.183)	(0.131)	(0.132)	(0.160)
Female Leadership		-0.004	-0.295**		-0.096	-0.295**		-0.004	-0.295**
		(0.069)	(0.118)		(0.073)	(0.116)		(0.069)	(0.118)
OSS x Female Leadership			0.176			0.135			0.176
			(0.210)			(0.249)			(0.210)
Female Leadership x Post			-0.016			-0.016			-0.016
			(0.174)			(0.172)			(0.174)
OSS x Female Leadership x Post			0.830***			0.628*			0.830***
			(0.290)			(0.341)			(0.290)
Constant	2.714***	2.719***	2.973***	2.710***	2.750***	2.973***	2.714***	2.719***	2.973***
	(0.138)	(0.113)	(0.072)	(0.152)	(0.127)	(0.072)	(0.138)	(0.113)	(0.072)
Observations	2338	2316	2316	2037	2018	2018	2338	2316	2316
Within_R2	0.047	0.046	0.053	0.045	0.045	0.046	0.047	0.046	0.053
Between_R2	0.104	0.097	0.204	0.045	0.048	0.126	0.104	0.097	0.204
Overall_R2	0.051	0.049	0.063	0.044	0.044	0.051	0.051	0.049	0.063
	Panel C: NUMBER OF MEDIUM & LARGE-SCALE FIRMS								
	DiD	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**	**DiD**	**DiD-X**	**DDD**
	Treatment 1			*Treatment 2*			*Treatment 3*		
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
OSS	2.659	2.673	3.710	-11.407***	-11.432***	-11.123***	-14.984***	-14.953***	-15.003***
	(7.809)	(7.602)	(7.910)	(4.087)	(4.403)	(4.299)	(4.280)	(4.213)	(4.684)
Post	-5.703***	-5.763***	-5.687***	-8.856***	-8.885***	-8.719***	-8.856***	-8.850***	-8.718***
	(0.444)	(0.448)	(0.536)	(0.484)	(0.490)	(0.587)	(0.460)	(0.466)	(0.557)
OSS x Post	4.594***	4.794***	4.033***	10.636***	10.561***	10.085***	12.212***	11.985***	11.687***
	(1.228)	(1.230)	(1.507)	(0.817)	(0.820)	(0.989)	(0.903)	(0.906)	(1.086)
Female Leadership		-0.302	0.026		-0.497	-0.229		-0.258	-0.228
		(0.453)	(0.676)		(0.429)	(0.709)		(0.439)	(0.673)
OSS x Female Leadership			-3.039			-0.892			0.176
			(1.938)			(1.300)			(1.479)

Female Leadership x Post			-0.143			-0.542			-0.539
			(0.972)			(1.065)			(1.012)
OSS x Female Leadership x Post			2.192			1.544			1.247
			(2.609)			(1.808)			(2.045)
Constant	23.455***	23.543***	23.416***	28.081***	28.263***	28.169***	28.080***	28.170***	28.164***
	(2.608)	(2.545)	(2.645)	(2.717)	(2.933)	(2.856)	(2.609)	(2.574)	(2.853)
Observations	2338	2316	2316	2452	2430	2430	2151	2132	2132
Within_R2	0.066	0.067	0.069	0.123	0.122	0.123	0.154	0.153	0.153
Between_R2	0.122	0.127	0.123	0.203	0.211	0.216	0.311	0.320	0.327
Overall_R2	0.059	0.061	0.061	0.185	0.188	0.190	0.260	0.264	0.266

Note: This table reports the effects of PTSP on sales, employees and number of medium and large-scale firms – using alternate definition of female leadership. Each column presents coefficients from a different multivariate regression. Columns 1, 4 and 7 (DiD) compares changes for groups that benefited fully from OSS relative to control. Columns 2, 5 and 8 (DiD-X) introduce female leadership. In columns 3, 6 and 9 (DDD), we estimate the triple-differences model that compares the effect of OSS on outcomes of female-led businesses relative to male-led businesses. Standard errors are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.