



Business Environment Reform Facility

Title: Scoping Study on Gender Differences in Enterprise Surveys

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About Business Environment Reform Facility (BERF)

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We provide expert advice, analysis of lessons learned, policy research about what works and what doesn't and develop innovative new approaches to involving businesses and consumers in investment climate reform.

BERF has a strong emphasis on strengthening the Business Environment for women and girls, as well as for young adults more generally. It is also aiming to improve the relationship between business and the physical environment including where relevant through linkage to climate change analysis. BERF recognises the need for appropriate political economy analysis in order to underpin business environment reform processes and interventions.

About this Report

Research for this study was conducted by Susan Joekes and Jonathan Kaminski between December 2016 and January 2017.

The views contained in this report are those of the authors and do not necessarily represent the views of KPMG LLP, any other BERF consortium member or DFID.

This is a working paper shared for discussion purposes only. No reliance should be placed upon this report.

Acronyms

BE	Business Environment
BEED	Business Environment for Economic Development
BERF	Business Environment Reform Facility
BERs	Business Environment Reforms
BEWG	Business Environment Working Group
DB	Doing Business
DCED	Donor Committee for Enterprise Development
DFID	Department for International Development
EBRD	European Bank for Reconstruction and Development
ES	Enterprise Surveys (of the World Bank)
GEM	Global Entrepreneurship Monitor
ICT	DFID's Investment Climate Team
IFC	International Finance Corporation
IMF	International Monetary Fund
LSMS	Living Standards Measurement Study
RCT	Randomised Controlled Trial
WBG	World Bank Group

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1. Executive Summary

The aim of this scoping study is to support DFID and partner efforts to enhance overall business performance in low income and emerging countries through contributing to the efficacy of business environment reform (BER) efforts.¹ Existing evidence suggests important gender differences in formal enterprises. In the vast majority of countries surveyed, women's businesses are fewer in number, smaller in size and concentrated in less capital and asset intensive sectors, compared to men's businesses. In some regions, they are also weaker in certain dimensions of performance.

This scoping study explores the extent to which the relative weakness of women's businesses is attributable to the Business Environment (BE), and, by extension, aims to identify the potential for business environment reforms to assist the growth of women's businesses. It lays the ground for a more rigorous assessment of these two issues, using the largest available database on this topic: the global World Bank Enterprise Survey (ES), managed by the World Bank Group (WBG), covering 147 countries. The findings of the scoping study, and of the research it proposes, are intended to inform the policy and programming of DFID's Investment Climate Team (ICT), Country Offices and partners, in particular, the Donor Committee for Enterprise Development (DCED) Business Environment Working Group (BEWG).

The study assesses the suitability of the ES datasets for sex disaggregated analysis, sets out the key gender-related findings that have emerged from previous ES-based research, and explores possible hypotheses and methodologies for understanding the different impacts that the BE may have on the prevalence and performance of women's and men's businesses. Newly available repeat (panel) ES datasets that track the situation of individual enterprises over time appear to have great promise; but they have limitations, particularly in respect of data on women's businesses. Taking a broad view of what constitutes the BE, including aspects of the general legal framework of particular concern to women, the study puts forward four hypotheses to be tested by further detailed analysis using ES data, complemented by other relevant data, using appropriate statistical methods. The hypotheses are a package of interrelated ideas, covering equity as well as efficiency aspects of BER and BE. For the analysis proposed, women's businesses are defined as those businesses that have women among the owners of the company or a woman as top manager. Both indicators will be used in tests of all the hypotheses to see if any significant differences emerge. The analysis will control for country effects, and look at enterprises grouped by sector and size.

Our first hypothesis is that **certain elements of the BE are more constraining to women's than to men's enterprises, although the effects will differ across countries.** We will test this hypothesis through regression analysis of different aspects of the business environment as captured in the ES itself,² on key variables of firm performance,³ all disaggregated by gender and at country, cohort, and enterprises levels. In some of the regressions, as part of the 'governance' country variables, additional variables will be included, representing basic gender inequalities. If this hypothesis is confirmed, this

¹ The acronyms 'BE' and 'BER' are used in the generic sense in this study; 'BERs' refers to specific statutory or regulatory elements in the BE, which can be amended by the relevant authority.

² Categorised as resources for business operations (e.g. enterprise access to productive inputs such as finance and electricity) and obstacles to business (such as corruption, cost and time taken in registration procedures).

³ E.g. profitability, sales and profit growth, investments, labour and capital productivity, investments, R&D, and employment dynamics (growth of the labour force, type of workers hired).

might be evidence that while the BE is in itself gender neutral, it may have gender effects in practice in interaction with some gender discriminatory elements within a country's legal framework,.

Our second hypothesis is that **individual BERs have had different effects on the performance of men's and women's businesses, such that**, as before, BER affects enterprises by gender in different ways in different countries. The first hypothesis might not be confirmed because of technical difficulties in specifying country effects, for example, or it might be that in the past, aspects of the BE were discriminatory and BERs in the interim have made the BE more egalitarian. We will test this second hypothesis through dynamic regression analysis of the impact of measures of BER (drawing from other WBG registers notably **Doing Business (DB)** and **Women, Business and the Law**) itemised by year and by country, on enterprises performance (as for Hypothesis 1 at country, cohort, and enterprise levels).⁴ This analysis would help to identify those elements of BER that are most likely to contribute to positive impacts for women's business, in different contexts.

Our third hypothesis is that **certain BE and related reforms have induced larger improvements in the performance of newly- (or soon to be-) formalised enterprises relative to more established businesses**. We will test this hypothesis through selection regression and matching estimators applied to panel data analysis at the enterprise and cohort levels. Confirmation of a positive impact on performance of this category of enterprises would be of special interest for women's businesses, given their greater propensity to operate in the informal sector. It would also suggest that inclusiveness and private sector development effects are greater than descriptive accounts of the impact of BER suggest.

Finally, given that female employment rates seem to be significantly higher among women's than men's businesses, the fourth proposed hypothesis that we wish to test is that the **gender gap in employment (captured by the difference in share of female employees in the enterprise workforce) is related to the gender of the enterprise owner or manager**.⁵ We will test this hypothesis using dynamic regression analysis. This is of significant interest because, if specific BE features increase the share of women's firms in the total number of firms, and women's businesses employ more women workers, then BE reforms can potentially contribute to increasing women's employment, with all the associated positive macro- and microeconomic as well as social benefits.

Three levels of analysis can be considered to examine these hypotheses: cross-country analyses using aggregate country-level data; enterprise level analysis both within and across countries; and cohort-level analysis, grouping companies by categories (sector, gender in size and other possible categories). Our assessment is that cohort-level analysis is likely to be most fruitful.⁶

We anticipate that analysis to test one or more of these hypotheses will produce findings that can increase the gender sensitivity of DFID and partners' policy and programming on BE and BER in ways that enhance both the prevalence and performance of women's businesses.

⁴ The dependent variables in this case are enterprise characteristics in all three dimensions: resources for business operations (production inputs), obstacles to business, (regulatory and other) and economic characteristics (profits, sales, sales growth, productivity etc.).

⁵ We will also study the degree of cross-country variation in this relationship (and its BE drivers) that has been found to be fairly consistent across different contexts by the existing literature.

⁶ Annex 3 describes the technical methods that need to be used for cohort-level analysis to be robust and reliable in the presence of the high attrition rates that may be found in the ES panel survey data.

2. Introduction to this Scoping Study

The World Bank periodically undertakes Enterprise Surveys (ES) across the world. Since 2007, ES have been undertaken in 147 countries. In large economies, 1200 – 1800 establishments are typically surveyed, 360 in medium sized economies and 150 in small sized economies. These primarily target formal (registered) establishments with five or more employees, in the manufacturing sector and parts of the service sector.⁷ Business owners or top managers are interviewed, and 100% state-owned enterprises are excluded. DFID jointly funds ES in some countries.⁸

DFID is a member of the Business Environment Working Group (BEWG), established in 2002 by the Donor Committee for Enterprise Development, to share knowledge on donor-supported business environment reform (BE) in developing countries and to support good practice and new approaches. The BEWG helps agencies and their programme partners to effectively position business environment reform (BER) as a part of an integrated private sector development strategy and to enhance the synergies between these reforms and broader development objectives.

DFID's Investment Climate Team (ICT) is interested in understanding better the differential impact that BE and BER have on male and female entrepreneurs, business owners and employees. On a broad definition, BER go beyond market regulations to cover policy, legal and institutional interventions intended to improve the functioning of markets and reduce transaction costs and risks associated with starting, operating and closing a business. Even so, the standard measure of the business environment, the 'Doing Business Reports' of the World Bank Group (World Bank Group 2016) are limited to the statutory and institutional framework faced by businesses. The BE variables in ES duplicate those in the Doing Business Reports⁹. Many of the DFID funded ES have disaggregated responses by enterprises according to whether the top manager is either male or female. The ICT, as a member and on behalf of the BEWG, wishes to know whether and how the sex-disaggregated data collected through the ES can be used to understand the impact of the BE and BER on women.

Since 2008, World Bank Group (WBG) staff and independent researchers, have been analysing the gender dimension of enterprises using ES data.¹⁰ Analysis to date has been largely descriptive, and focused on identifying the distinguishing features of women-owned enterprises in developing countries. As a result, a picture has emerged of the characteristics of women-owned and women-managed businesses, the share of women in the enterprise workforce, and some of the determinants of this

⁷ The unit of analysis is the establishment, although information is also collected about the status of the firm or company (legal entity) of which it is a part of. An establishment is a physical location where business is carried out and where industrial operations take place or services are provided. A firm may be composed of one or more establishments. For the purposes of this survey an establishment must make its own financial decisions and have its own financial statements separate from those of the firm. An establishment must also have its own management and control over its payroll.

⁸ The ES data is considered a public good by the WBG and accordingly made available online (www.enterprisesurveys.org). The WBG is the central, coordinating funder and implementer of the ES, but increasingly bilateral donors (e.g. DFID) and multilateral banks (e.g. EBRD) have co-funded ES in developing countries or regions or on topics of interest to them.

⁹ See Annex 2.

¹⁰ It is worth noting that an analysis of the relationship between gender and enterprise is not restricted to ES data. There is overlap with three other topics and their associated bodies of knowledge: gender and *entrepreneurship*, focused on individual motivations, competencies, ambitions, social capital and so on; issues affecting *informal enterprises* (which is usually thought to be of particular importance to women); and gender and *microenterprise*, focused on single person enterprises (usually related to provision of microfinance). ES data relates only to small, medium and large, formal enterprises. We do not systematically examine here the overlap between ES-based research and those other domains, although we refer to other work that has generated insights that have informed ES-based research.

pattern. Some elements in the business environment are thought to be more salient than others to enterprises depending on the gender of the owner/manager.

Although the significance of those elements, and the differential affect they have on enterprises, are complicated, some existing papers make Business Environment (BE) policy recommendations, and 'gender-friendly' BERs have been supported in a few countries. It is striking, in this connection that no work has been done to investigate the impact of specific BERs on enterprises by gender, either in general or project impacts (WBG 2014). This scoping study focuses on the potential for newly enriched ES datasets to yield information about the gender impact of BE reforms at country level.

3. Objectives and Structure of the Scoping Study

The specific objectives of this scoping study are to:

- Determine whether and how the sex-disaggregated ES data can be used to better understand how male and female owned or managed businesses are impacted by the business environment;
- Develop a methodology for using the data to understand better these differences, and the implications for BER.

The study first assesses the suitability of the ES sex-disaggregated datasets for gender analysis (Section 3, with additional details on these datasets provided in Annex 2). Newly available repeat (panel) ES datasets, which track the situation of individual enterprises over time, appear to have great promise; but they also have limitations, particularly in respect of data on women's businesses, discussed in detail in the Annex. Section 4 sets out the key gender-related findings that have emerged from previous ES-based research. Section 5 develops the proposed hypotheses for further research, and describes the investigative methods to be used for understanding the different impacts that the BE may have on the prevalence and performance of women's and men's businesses. Section 6 sets out the main conclusions of the study. Annex 3 provides more detail on the analytical methods for the proposed research.

4. Scope, design and coverage of Enterprise Survey data on gender

4.1 Sampling and representativeness

The standard ES covers a national sample (although in some cases restricted to a major city) of formal enterprises with five or more employees.¹¹ The ES sample is drawn from national company registers, which means, as stated in the ES manuals, that it is limited to "formal" enterprises, although an enterprise may not have started up in this way.¹² Formal status is useful and remunerative for an enterprise insofar as it enables access to the banking system, and to international markets, for instance. However, the definition of formality is complex and "there is no point at which an enterprise makes a binary transition from the informal to the [formal] sector" (White and Aylward 2016). Nevertheless, in respect of non-agricultural production activities, business registration is an acceptable proxy, even if

¹¹ The coverage of individual surveys does not always exactly conform to this description; extra modules are sometimes carried out that extend the coverage (e.g. into smaller or informal firms) or explore special topics. Careful scrutiny of the coverage of individual country datasets is needed before any quantitative analysis is done, to ensure full comparability across observations.

¹² The ES questionnaire asks whether the enterprise was formally registered when it began its operations, and when it was formally registered.

that does not necessarily indicate compliance with, for example, national tax and local authority registration procedures. Information on those issues is not captured in the ES survey (WBG 2014).

The ES uses a stratified random sampling procedure designed to ensure that the data is representative of all formal firms, stratified by size, class (number of employees), and sectoral classification. Sample sizes vary by country and depend on the size of the country economies. Around 1200-1800 interviews are conducted in larger economies, 360 interviews in medium-sized economies, and 150 in smaller economies. Most surveys since the mid-2000s are matched to a standardised survey instrument with common variables and questionnaires together with country- and/or year-specific questions.

4.2 Scope ES survey and data

The standard ES topics are firm characteristics, gender participation, access to finance, annual sales, costs of inputs/labour, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilisation, land and permits, taxation, business-government relations, innovation and technology, and performance measures. Over 90 percent of the questions objectively ascertain characteristics of enterprises and of the country's business environment. The remaining questions record survey respondents' opinions on the obstacles to firm growth and performance. The mode of data collection is face-to-face interviews.

Two other features of the ES are important to this scoping study. The first is the overlap in the questionnaires of the ES and the Doing Business (DB) survey, another WBG product (WBG 2016 is the most recent).¹³ The DB survey gathers information from country experts and other key informants that is used to calculate many components of the BE and, until recently, a ranking of countries along a composite "ease of doing business" index.¹⁴ The DB database lists business reforms undertaken by year by country. This means that reforms can be assessed using the ES as well as the DB datasets as diagnostic tools (WBG 2014), and in principle, that the impact of DB reforms could be measured in relation to the objective as well as the subjective variables in the ES.

Another annual survey, "Women, Business and the Law" (for example, WBG 2015) also includes elements of the personal legal framework that may have spillover effects on women in business. The WBL database is being compiled in order to assess constraints facing women starting or expanding their businesses that are additional to those in the BE itself. It allows for much better contextualisation in the study of gender and enterprise. It records seven indicators of gender differences in formal law and institutions: accessing institutions, using property, getting a job, providing incentives to work, building credit, going to court and protecting women from violence (World Bank Group 2016). The WBL data can easily be used to complement the ES and its availability greatly enriches the potential for gender analysis of BE effects by possible construction of country-level variables.

The second feature is that ES panel datasets are being built for a number of countries, using consecutive survey rounds, typically three to six years apart.¹⁵ Since the mid-2000s, panel surveys have been administered in an effort to track the same sample of enterprises over time, but attrition

¹³ A list of shared questions between the two surveys is provided in WBG (2014), Table 1.3, reproduced in Annex 3.

¹⁴ These generated much controversy and were difficult to interpret.

¹⁵ Panel surveys re-interview the respondents of a survey in a second round, using the original (geographic) coordinates to make contact in the second round.

complicates analysis of the panel dataset.¹⁶ The panel surveys are made available alongside other cross-sectional surveys with data from different random samples over time. The ES now attempts to retain as many enterprises as possible in subsequent ES survey samples in order to enable analysis of the dynamics of individual enterprises' life cycles, operations, and economic performance. For approximately 40 countries, panel data now exists that also includes information on the gender identity of owners and managers of firms in at least one round. Unfortunately, attrition (i.e. enterprises dropping out and not captured in a second round) is a significant problem for enterprise surveys, more so than in household surveys, for example. Attrition can be addressed by a number of statistical techniques - discussed in Annex 2. The gender analysis possibilities offered by the new ES panel datasets are examined in the next section.

4.3 Gender dimensions of ES data and potential for gender analysis

The majority of ES country surveys include questions to identify the participation of women in the business. The survey asks (with some national or regional variation) whether there is a woman among the shareholders, whether a woman is the majority shareholder, and whether there is a woman among the top managers of the company.

A survey question asking whether a woman is the majority shareholder in a given enterprise was introduced recently into the ES, superseding one which sought only to identify a woman among the shareholders. This was done in response to criticism that the earlier question was too loose a definition of ownership. For example, the US Census classifies businesses as women owned only if a woman owns at least 51% of the shares. Moreover, interpretation of women's participation in ownership can be ambiguous. In some settings, it may reflect intra-family distribution of assets, for tax or other purposes, and may be far from indicating women's active participation in, let alone control of, company operations (European Bank for Reconstruction and Development (EBRD) 2016). The data shows, however, that this problem may be limited. The presence of a female top manager is strongly associated with female participation in ownership (minority or otherwise), sometimes because the owner is herself also the manager. In any case, the earlier data on women's ownership has to be accepted because it cannot be standardised to the more recent, more precise indicator. For these reasons, the sex-disaggregated management question needs to be considered as an alternative variable in any ES analysis.

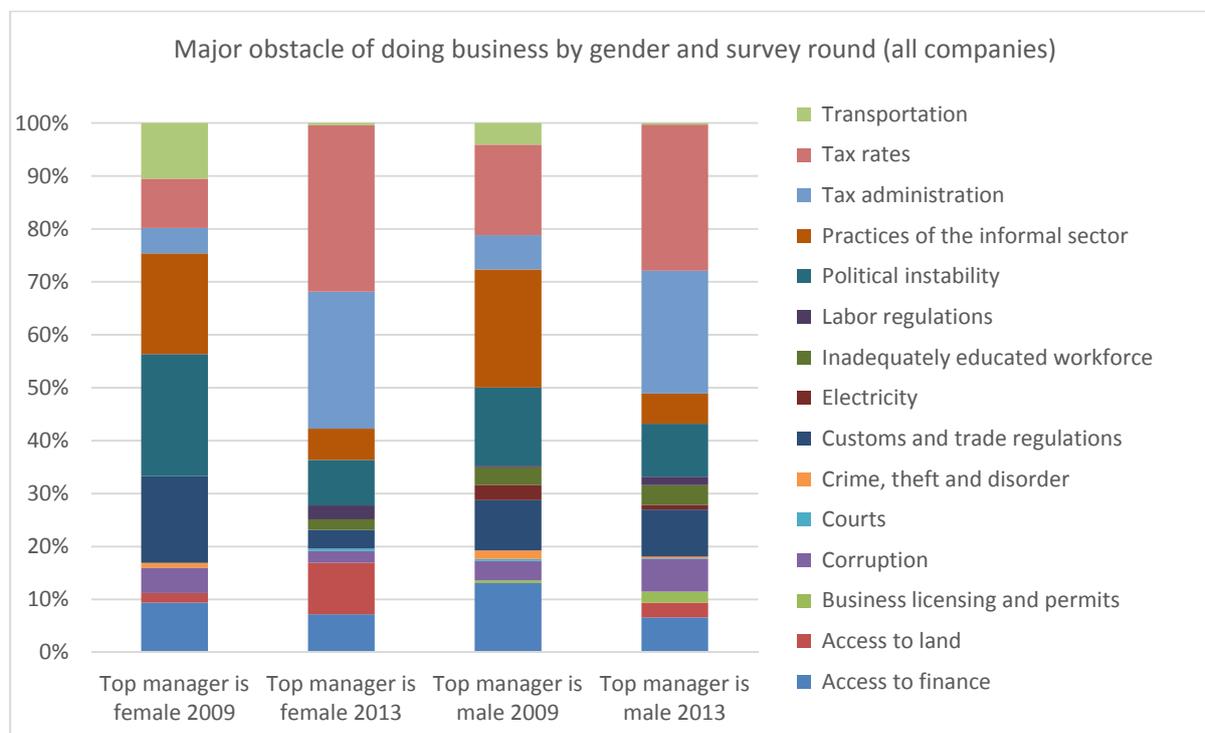
In addition to ownership and management, all enterprises are asked for information on the share of women in the company workforce. Manufacturing firms provide additional data on the share of women workers in both production and non-production positions.

The availability of sex-disaggregated data for these variables opens up a number of possibilities for producing descriptive statistics, by cross-tabulating business indicators with gender variables. An example of such a breakdown is given in Figure 1, below, which shows the biggest obstacles to operations reported by enterprises in the last two Armenia ES survey rounds (panel surveys) as shares of the total sample, according to the gender of the top manager. The data shows that some obstacles apply significantly more to women-run businesses than men-run ones and vice versa. Also, interestingly, there are significant changes over time. For example, tax issues are perceived to have become more significant barriers over time for both sexes, while political instability concerns have decreased. Women's businesses are more concerned about access to land (for instance, in obtaining

¹⁶ Attrition in panel survey data is the loss in sample size over time because of practical difficulties of finding respondents surveyed in the previous rounds (because of change of premises, disappearance, closure, unwillingness to cooperate, etc.). Attrition is generally compensated by additional observations to replace those lost (see example from Armenia below).

building permits - the second series from the bottom in red). These data invite analysis to identify the causes of variation.

Figure 1: Biggest obstacles to operations in Armenia ES panel surveys by gender of top manager



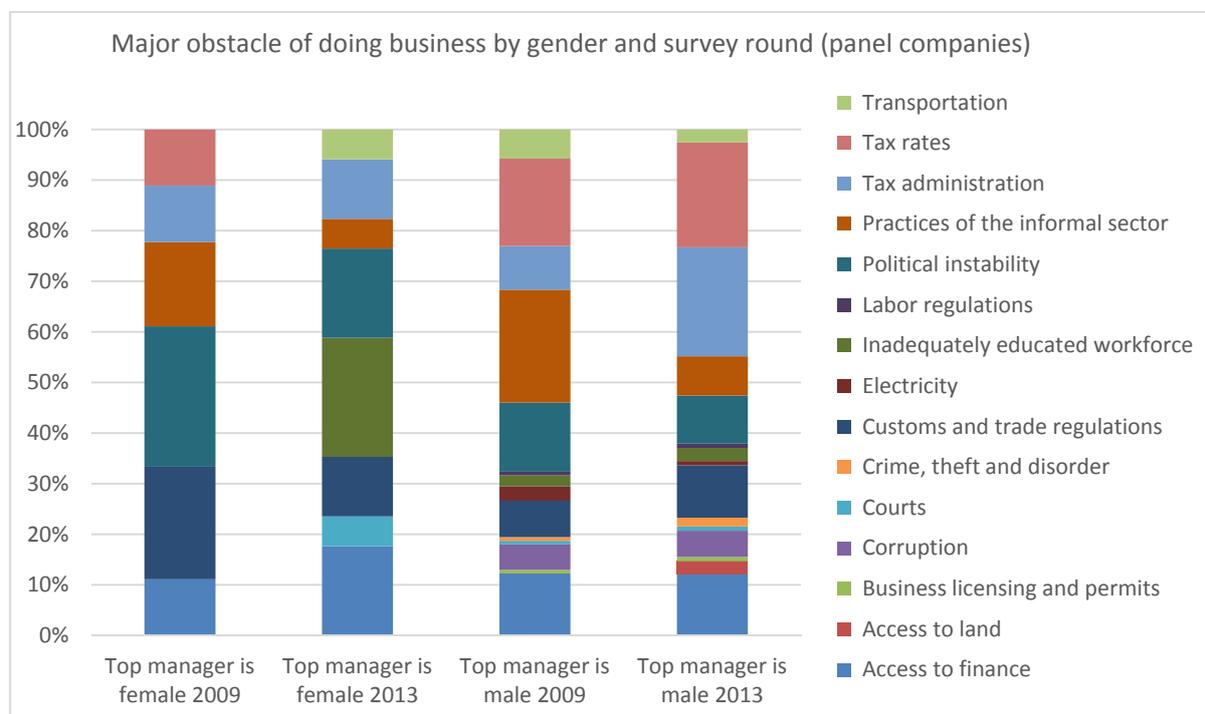
Source: Author calculations from ES data, years as indicated

The availability of panel data also opens up possibilities for probing the significance of the BE to enterprise constraints and performance, from a gender perspective.

The Armenia sample is made up of 374 enterprises in 2009 and 360 in 2013, with the proportion of women’s businesses at 14%. Both samples are statistically representative. Only 168 enterprises were surveyed in both rounds, among which only 23 women-run enterprises were surveyed twice.¹⁷ Figure 2 shows the same statistics as above but for companies featuring in the panel data only. The results are significantly different from Figure 1. This demonstrates that constraints apply differently to “panel” versus “non-panel” enterprises; and also underlines that findings have to be interpreted with care.

¹⁷ The panel data also reveals the interesting fact that the ‘gender’ of the owner/manager of an enterprise is not fixed: when ownership and management of enterprises are changed, newly appointed persons are not necessarily the same gender as their predecessor. This issue has never been examined in the literature.

Figure 2. Biggest obstacles to operations for Armenia (panel enterprises only)



Source: Author calculations from ES data, years as indicated

While “panel” enterprises run by men do not hugely differ in their reported obstacles from the rest of the men’s businesses in the sample, women’s businesses in the “panel” sample do. They tend to complain much less about the tax and land issues but more about access to finance. Similarly, women’s concern about workforce education may arise because they have more demand for skilled labour than non-panel businesses, or because they have more difficulties in recruiting workers than comparator male-led businesses. Without a quantitative analysis that controls for other factors, the determinants of these variations cannot be adequately understood.

Although the attrition rate is similar across genders (more than 50% in each case in Armenia), the small number of panel women-run enterprises is a limitation to the internal validity of the results, especially for a panel analysis.¹⁸ This does not apply to all ES datasets, and not, in particular, for the largest economies where a sufficient sample size of women-run enterprises can be found. But there might be a significant number of countries where the number of panel observations is indeed too small to be representative. To overcome those potential difficulties, we may reinstate the non-panel women-run enterprises but treat them differently (through selection or matching techniques – see Section 5).¹⁹ An alternative solution would be to pool enterprises’ panel series across different countries within a regional jurisdiction or grouping to improve statistical representativeness. Interestingly, among the panel

¹⁸ To get some decent statistical confidence in descriptive and regression analyses and be able to have statistical significance in gender bias estimates, a minimum of 30 to 40 samples is needed by gender, and if we want to break it down by sectors or other sub-categorical classification, then we need more. See the discussion in the annex.

¹⁹ In the above case, repeated cross-sectional analysis should work with the 54 women-run enterprises available in each survey round.

enterprises, three of those that were women-managed in the first round had transitioned to being managed by a man in the second round (13% of the original sample of women's businesses).

In larger countries, with larger samples, and where attrition rates are lower than in Armenia, the number of observations of women's businesses is likely to be sufficient for analysis to be statistically representative. The availability of sufficient data on women's businesses within national panel datasets will be key to identifying gender differentiated effects of various enterprises and BE features through careful analysis. The ability to distinguish panel companies from the rest of the sample will be useful for understanding the potentially differentiated effects of BE and BERs. Accordingly, the selection of countries for within-country case studies will rest on sampling power and sampling size constraints, especially for panel analyses. That might mean that only larger economies would qualify. However, groupings of smaller economies would also qualify for micro-level panel analyses and would be complementary to the former.

4. Key findings on gender and enterprise from existing analysis of ES data

This section summarises the major findings on gender and enterprises that have emerged from the research literature, which uses ES data unless otherwise stated.

In all countries, the prevalence of women-owned or managed businesses is lower than male-owned or managed enterprises. Overall, women's businesses account for one third of formal businesses worldwide, although there are wide regional variations about this average. In East Asia and the Pacific, Europe and Central Asia and Latin America and the Caribbean the prevalence is highest at 39-43%, while at the lower end, it is 24% in Sub-Saharan Africa, 14% in the Middle East and North Africa, and only 8% in South Asia (IFC 2014 Table 2, for women-owned; see also Amin, 2014, for women-managed enterprises)²⁰.

Women's businesses are on average smaller than men's (in terms of turnover and employment), are concentrated in relatively low-productivity sectors and have relatively higher shares of women in their workforces (Miles, 2016, Amin 2014).^{21,22} Other (non-ES based) studies suggest that this feature also applies to informal enterprises (Amin 2010 for Africa, and De Haan 2016).

Findings on gender differences in enterprise performance are mixed. There is no global pattern regarding differences in enterprise productivity and profitability, or in the growth performance of enterprises, according to the gender of the owner/manager (Amin 2014). However, there are patterns at regional level that cancel out in global average measures. For example, businesses managed and owned by women tend to lag behind in terms of productivity and growth in Eastern Europe and Central Asia (Sabarwal and Terrell, 2008), while in the Middle East and North Africa, there is no evidence that they perform differently (EBRD et al 2016).

²⁰ IFC (2014) uses ES data to calculate the regional distribution of women's enterprises, limiting the coverage to SMEs (defined as a formal registered enterprise in the non-agricultural private sector with 5 to 250 employees, where at least one owner is a woman), i.e. omitting data on the largest enterprises. Including large enterprises would further depress the share of women's businesses since country ES show an inverse relationship between the size and gender of enterprises.

²¹ The pooled ES data on the Middle East and North Africa region echo this picture but are not taken beyond first level descriptive statistics for individual countries because the number of data points on women-owned enterprises is too small. This may be why the regional study by Bardasi et al (2008) did not lead to a formal report, although its findings informed a more recent ES study (EBRD et al 2016). Nevertheless, Bardasi et al is interesting for its use of ES, Global Entrepreneurship Monitor (GEM) and World Values Survey datasets. The extent to which the data is combined, as opposed to analysed in parallel, bears scrutiny.

²² The greater propensity for women owners to employ women in the workforce may evaporate when controlled by sector.

Existing research suggests that, even though women can experience greater difficulties in formalising their businesses because of lengthy and complex registration, incorporation, and licensing practices (Simavi et al 2010), once inside the formal sector, women's businesses do not experience the business environment as more hostile overall than comparator men's businesses (Klapper and Parker 2010). Differences in the severity of BE constraints experienced by gender exist, but analysts have not found any systematic pattern of overall disadvantage for women's businesses, and no apparent relationship between the characteristics of women's businesses and elements in the business environment, after controlling for firm size and sector (Amin 2014). On the other hand, it is often suggested that the wider legal and social framework generates constraints beyond standard BE procedural regulations (WBG 2014), and plays an important role in impeding women's access to the world of business (WBG 2015).

Unless BE regulations are framed to take account of such second order constraints as property rights; household care work; gender discrimination in the implementation of the law; and entrepreneurs' engagement in networks, BE regulations that appear to be gender-neutral in themselves may in practice have a gender discriminatory impact and analysis of ES datasets on their own, without contextual information of this sort, will give misleading results.²³ Analysis of gender and enterprise should be conducted with reference to these wider constraints, drawing on data from complementary sources to the ES as appropriate. As noted above, the World Bank Group's Women, Business and the Law database is the best source of data that most clearly complements the ES. Other measures of gender inequality, such as gender violence, age at marriage, assessments of gender norms and so on, are easily obtainable from UN and OECD sources.

In this connection, four fundamental constraints have been identified as directly impacting the ability of women – particularly married women – to operate in the BE: unequal property ownership rights and the inability to sign contracts, register a business or open a bank account in the same way as men (WBG 2014). Well established global databases show unequivocally that women own fewer assets than men, and that, in some settings, they face legal constraints in regard to contracts (WBG 2015). Worldwide, women also have far less access to banking than men (Demirguc-Kunt, Klapper and Singer, 2013).

The prevalence of women's businesses may be affected by difficulties in formalising pre-existing enterprises and/or establishing start-ups, stemming from those gender differentiated property and contracting rights. It follows that, without changes in the wider legal framework, business registration procedures may de facto impede women's entry (WBG 2015). When such changes were made in Ethiopia, a substantial shift occurred in women's economic activity (Hallward-Driermeier et al 2013).

Financial constraints on women's business follow from gendered practices in market institutions of various kinds, or constraints on women based in social norms, which may be enshrined in family or property law. Some apparently unrelated gender variables, such as levels of violence against women and the incidence of early marriage – both manifestations of discriminatory gender norms – contribute to explaining the variation in the use of financial services between men and women (Demirguc-Kunt, Klapper and Singer 2013). Both the prevalence of women's businesses and their performance will be affected insofar as they depend on demand for and/or access to credit.^{24, 25} Another suggested source of differential performance - women's restricted professional networks - may also inhibit, among other

²³ Miles (2016, Figure B) lists a range of factors in the business environment that have a direct and specific impact on women-owned and managed enterprises and the employment of women.

²⁴ DB Reports (World Bank various years) are beginning to record sex-disaggregated responses to such questions.

²⁵ The incidence of specific financial and other constraints on women-owned SMEs' by stage of the enterprise life cycle is schematised in IFC 2014 (page 15, Figure 4).

things, their access to enterprise finance. The concentration of women in less capital intensive industries, which may also have a lower potential for growth and development, might be driven by such barriers to women's access to finance. And women may have less physical and "reputational" collateral than men, which further limits their access to finance (Klapper and Parker 2011). There is evidence in the entrepreneurship literature on the latter point and its significance for enterprise performance (e.g. Jonas Debrulle et al 2014, for Belgium).

ES data for some countries reveals significant gender differences in perceptions of operating difficulties. The point is illustrated for Armenia in Figures 1 and 2, above. Gender differences in time use, access to resources, and participation in business associations, for example, can result in elements of the BE impacting differently on enterprises (Simavi et al 2010). But there is little understanding of whether reported differences of this kind impact on the actual performance of formal firms. For example, while some ES national reports indicate that women find corruption more onerous (ibid.), other research indicates that 'greasing the wheels' payments do not, in fact, facilitate business (Freund et al 2014). Thus, although gender differences in the impact of BE are found, it is not clear whether they are significant for enterprise performance. By extension, research has not yet established the economic justification for modifying BE to specifically support the performance of women's businesses.

Some micro analytical quantitative work in effect tests the hypothesis that the performance of women's businesses may be held back by women's lower level of managerial qualifications and experience than men. Studies (e.g. De Mel et al, 2014) report on Randomised Controlled Trials (RCTs) that test the effectiveness of different types of management training or other forms of enterprise support (such as mentoring) for women owned businesses. These studies do not make any use of the ES sample or datasets but they inform policy recommendations made in some of the gender and enterprise studies.

None of these investigations looks into the potential impact of particular BE reforms, whether in general or specifically on women's enterprises. This contrasts with work done to assess the effects of changes in legal statutes on women's employment (and health) status, that find strong, positive causal impacts (Hallward-Driemeier et al, 2013).

More generally, many firm-level studies show that total factor productivity is higher in countries, and in regions within countries, where the business environment is more hospitable (WBG 2014), but research has not established the direction of causality. The literature on the impact of regulatory reforms on growth, investment, entry, and jobs is extensive but presents mixed results without any generalisable findings (WBG 2014, Hetherington 2016), in general or by gender of the enterprises.

Despite this paucity of causal evidence, some policy-driven papers have attempted to draw out practical and policy suggestions for increasing the share of women business owners and/or improving their firms' performance (e.g. Amin (various), Cicera and Qasim, 2014, Iacovone and Qasim 2013, Hallward-Driemeier 2013). Some include comprehensive, balanced reviews of the literature on gender and enterprises, not limited to WB studies. A recent paper for the DCED (Miles 2016) presents a detailed review of BE and BERs and possible gender effects and draws out practical recommendations. Hetherington (2016) and other Business Environment Reform Facility reports (e.g. BERF 2016) are other contributions in this vein. Another influential report explores how information gathering, and the design and implementation of business reforms can, in practice, be undertaken to ensure that BERs are genuinely gender neutral without making standard prescriptions for individual BERs (Simavi et al 2010).

This review of the research evidence shows that, first, apart from the standard finding of lower prevalence and sectoral concentration of women's enterprises, there is little evidence to establish the

causes of variation in firm performance by gender. Secondly, perhaps surprisingly, there has been no assessment of the impact of BE reforms over time on enterprises, either in general or by reference to gender. In the circumstances, policy-oriented papers can do little more than urge support for more business creation in general. In addition, where gender is a concern, some authors do urge complementary improvements in access to finance (International Monetary Fund (IMF) 2014) and experimentation with other forms of enterprise support or with ways of shifting social norms or influencing local institutions (Bardasi et al, 2008, Cicera and Qasim 2014), but such interventions do not rest on solid evidence.

A comprehensive evaluation of BE reforms by WBG (2014) notes that projects in 12 countries have explicitly included supposedly “women-friendly” reforms, with a view to increasing the number of women’s enterprises. Almost none, however, had reported on outcomes in gender terms.²⁶ Only one investment climate project (in Côte d’Ivoire, ongoing in 2014) that had targeted gender and enterprise had also, on the basis of contextual analysis, included efforts to change second order, de facto discriminatory constraints in the broader legal framework (World Bank Group 2014).

5 Directions for future research: hypotheses and investigative approach

As shown above, some distinct characteristics of women’s businesses are well known and there are plausible mechanisms through which the BE is thought to influence enterprise performance by gender of owner/manager. However, the causal links between the key elements of the BE and gender differences in the performance of enterprises have not thus far been established analytically. We believe that differences may exist across countries in the mechanisms whereby BE and BERs affect women’s businesses, depending on other aspects of the socio-legal environment, and that analytical work has not yet taken proper account of these. Nor has any ES-based research (with or without any interest in gender gaps) attempted to quantify effects of reforms over time by leveraging the potential of panel and repeated cross-sectional datasets at the micro level. Thus, research has not yet determined which, if any, components of the BE or BER are relatively more challenging for women’s enterprises compared to their counterparts (men’s businesses) in their current operations and if/how they affect their survival and profitability. Aspects of the BE may have differential effects on enterprises by gender, either as they stand or because they effectively transfer into the world of business other discriminatory legal or economic problems for women. New gender-focused research using ES, in combination with other datasets or through specific data restructuring,²⁷ could address these gaps and in the process inform DFID and wider BE programming.

There is good information on specific BERs undertaken in developing countries. Some of those reforms have been included in donor supported BER interventions (as in Côte d’Ivoire, noted in section 4) and some have been undertaken by governments on their own initiative, as itemised in the World Bank Group’s **Doing Business** and **Women Business and Law** data and reports. These databases can be used in combination with the ES data for dynamic analysis on the impacts of specific reforms, across different countries (see Table 1 in Annex 2). Careful preparatory work will be necessary to ensure the representativeness of data on women’s businesses throughout the analysis.

²⁶ Miles (2014) reports the same finding for a different set of 15 BER projects by various donors, categorised as gender-sensitive.

²⁷ The technical options for data restructuring include pooling panel ES data across countries, and using repeated cross sections within but treating them differently or in combination with external datasets and sources. Micro-level analyses of cohorts across countries and cross-country and within-country enterprise-level analyses with a sufficient number of women-run enterprises are likely to be the most valuable approaches²⁷. More details on using data and models are provided in the Annexes.

Based on our initial scoping, the following hypotheses are proposed for more detailed analysis.

Hypothesis 1: Certain elements of the BE are more constraining to women's than to men's enterprises.

Our first proposed hypothesis is that there are gender-specific constraints on enterprises' economic performance arising from the BE. Using simple models, it would be possible to identify the main constraints through which female-owned and/or managed companies (depending on sector, firm size, etc.) could be underperforming versus their male counterparts. The analysis will be exploratory, and widely drawn to identify elements that are significant to the gender gap in enterprise outcomes, rather than starting with a tightly specified model and limited number of independent variables.

Investigation of this hypothesis would involve cross-country, country-level analysis and regressions of economic performance variables on BE indicators, averaged by ES survey round (and differentiated by gender), controlling for time-varying country macroeconomic and policy variables (including gender inequality variables) as well as country fixed effects (time invariant). The hypothesis will also be examined through enterprise-level repeated cross sections for specific countries and across different countries (for a specific region). The regression models will be designed to decompose gender gaps in performance as a function of gender differences in BE variables, controlling for enterprises' attributes and country-level variables. This could proceed through a sequence of regressions in which the gender variable becomes non-significant or less influential when key BE variables are introduced, or in regressions in which gender is interacting with BE variables directly. For statistical representativeness and significance, we will take the whole sample of 40 panel countries and add other non-panel survey datasets (meaning 'free standing' ES datasets) that are available for a number of different years, including at least two surveys over the last 10 years. These datasets will need to be decomposed by gender. At least 300 observations and 75 countries will be needed (available twice by year of observation for women-run and men-run enterprises' average values). For micro-level analyses within countries, we will consider countries where at least two samples of more than 300 observations are available by survey round and at least 40 women-run enterprises by survey round. Otherwise we will consider one or two regional groupings of smaller country samples, to create a regional sample of at least 500 enterprises by year or short period of 2-3 years, including at least 50 women-run enterprises.

Such regressions would control for enterprise-level specific attributes (experience, technology inputs, size, sector, location and access to markets, education of the manager and employees, among others) as well as for country-level variables, as in the cross-country panel analysis. A panel analysis across countries would also be considered wherein economic performance variables, BE features, and enterprise attributes will be averaged within cohorts. In the first instance, the definition of cohorts will be based on the gender of owner/ manager, size, and sector but several alternatives will be explored and tested for robustness.

The BE indicators, country-level and enterprise-level variables, and key performance variables proposed for this analysis are set out in Tables 2A and 2B in Annex 3. BE variables include access to finance, education and skills of the labour force, and assets (e.g. land), differences in infrastructure (e.g. technology, electricity, trade and transportation), corruption and governance, tax policies and regulations that may be de facto gender discriminatory (e.g. affected by wider issues such as women's mobility constraints or care burdens). Performance variables include profits and sales (relative to size), growth in profits and sales, labour and capital productivity, investments and R&D, and employment dynamics (growth of the labour force and type of workers hired). The impact of the BE on wider measures of gender inequality, such as the Global Gender Gap Index and the Gender Inequality Index, could also potentially be tested.

Hypothesis 2: The gender gap in enterprise performance is influenced by specific country contexts and by the content of BE reforms

Our second proposed research hypothesis is that specific BE reforms have had differentiated effects on men and women businesses' performance (especially through their effects on the BE variables in particular access to productive inputs and obstacles to operations). It specifically addresses the relevance and contents of BE reforms that were associated with changes over time in economic performance driven by changes in the BE, and the differential dynamics of women's and men's businesses.

Case studies of the gender-differential impact of selected BER would be feasible in countries such as Cote d'Ivoire, the Congo and the Philippines, where specific gender issues have been tackled by BERs and ES panel data is available. Such studies can be conducted through enterprise-level panel and repeated cross sectional regressions in which the timing and contents of the reforms will be controlled for, along with other country-level time-varying variables such as those above discussed for Hypothesis 1. Country-level BER policy variables that capture the timing and specific content of the reform will be constructed from existing databases on BERs and used as explanatory variables (see Table 2A in the Annex 3)²⁸.

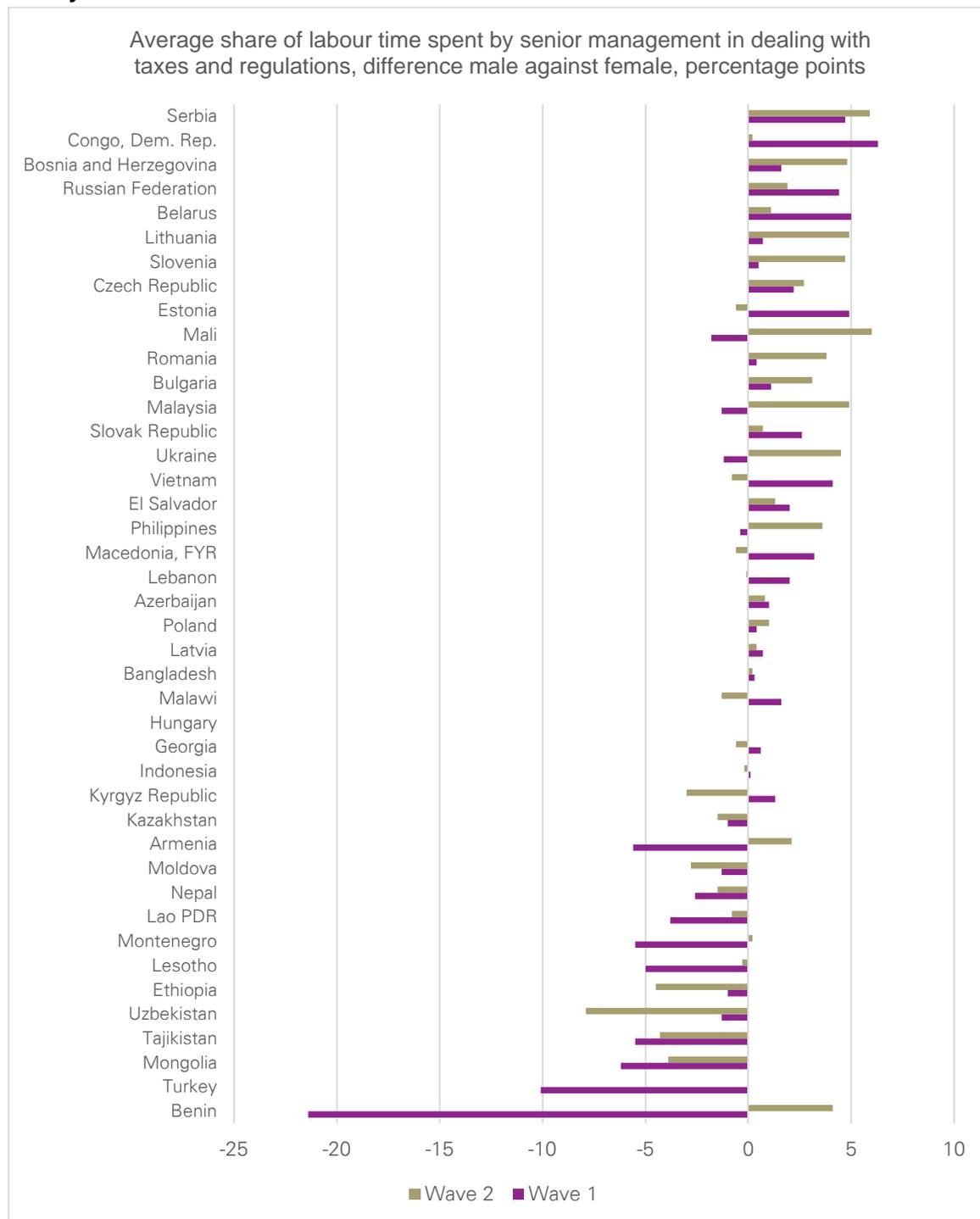
Having available data on all BERs irrespective of their gender focus or content would enable us to generalise the country case studies to all types of BERs by performing cross country panel analysis in the same fashion as proposed under Hypothesis 1. The newly available ES panel data could be used to study the gender effects of specific BERs systematically for the first time within countries. The history of BER interventions and complementary changes in the broader economic and legal environment in each country (as recorded in the WBL database) could therefore be evaluated in a comparative fashion. Pooling ES panel data across several countries would also make it possible to perform a cross-country micro-level analysis and assess different BERs that have been implemented in different countries, using the same datasets of enterprises and cohorts. This could address external validity concerns, i.e. give assurance on the generalisability of the results. Sampling size requirements will be similar to the ones already discussed under Hypothesis 1.

Figure 3, below, suggests that analysis of this kind will be worthwhile. It shows large variation over time and space in a possible explanatory variable, i.e. the ratio of time taken by men's relative to women's businesses to deal with certain aspects of the BE. The data covers 42 countries and presents a simple, computed ratio of the time taken for men's compared to women's businesses to deal with taxes and regulations between two rounds of the ES.

The data shows that some countries have experienced greater changes than others. One could investigate what caused the bigger changes, notably whether there have been country-specific BERs in the interim. Micro analysis could also be revealing. The cross-country indicators may also hide significant heterogeneity across enterprises and sectors or various cohorts, and changes over time may be driven by specific cohorts. Micro-level panel and repeated cross sectional regressions will be revealing in that regard.

²⁸ Since BE variables are endogenous to BERs they should not be introduced in the regressions in the first place and only BER variables will, but enterprise-level attributes should still do so alongside other country variables (as under Hypothesis 1). Selection bias would need to be corrected for by modelling dropout probabilities in the sample over time. This issue is discussed at length in respect of Hypothesis 3 below. Both sets of variables will then be used to explain enterprises' economic performance in order to check that BER effects on BE were indeed passed through to the enterprises and thus to outcomes.

Figure 3: Country-level gender gap in time spent dealing with regulations and taxes over panel survey rounds



Source: Researcher analysis using ES data.

Hypothesis 3: Some BERs and related reforms have enhanced the performance of previously informal enterprises to a greater extent than established enterprises

Our third proposed hypothesis is that certain BE and related reforms have induced larger improvements in the performance of newly-formalised companies (or companies that might soon transition to formality) than among more established businesses.²⁹ Confirmation of this hypothesis would be of special interest for women's businesses since it is well established that the prevalence of women's enterprises is less in the formal than the informal sector. Their smaller size, greater propensity to operate in the informal sector and the larger representation of women among early stage entrepreneurs in almost all countries (GEM 2015, Figures 3-6, with Thailand and Vietnam among the few exceptions) indicates that women's enterprises have great potential to survive and grow (IFC 2014).

This hypothesis relies on micro-level analysis only and entails within-country enterprise-level regression analysis and cross-country cohort-level analysis with the same micro-level sampling size requirements as discussed in section 1. Regressions proceed in two steps. In the first round, the probability that an enterprise enters the formal sector and remains active over the survey rounds is estimated (the outcome dependent variable) as a function of enterprise attributes, BE variables, and BER variables. This is the so-called "selection equation" standard in Heckman-regression models (Heckman, 1979). This estimation needs to be populated by data on both formal and informal enterprises and therefore relies on the available enterprises from the early rounds of the survey specifying whether they are showing up in the later rounds, as well as external data on informal firms not covered by the ES surveys (more broadly available from household surveys such as LSMS).³⁰

In the second step, the same micro-level regressions and estimations as performed under Hypothesis 2 are conducted but with regression parameters affected by the first step. If the first step of the analysis is a selection equation, then residuals of the first stage of the regressions are used to correct the effects of BE and BER variables on economic performance estimated in the second stage. If matching estimators are used, a subset of the original panel datasets and samples is extracted to rebalance for the probability to enter or leave the formal sector irrespective of BER effects. That will also affect the results of the second stage since the sample used for the regression analysis would be modified.

More focus on the first step would be needed to address Hypothesis 3 because this is where one can identify the "inclusiveness" of BERs and incentives for business formalisation and sustainability. But the second stage is nonetheless of importance because it allows one to check how correcting for BER effects on inclusiveness makes a difference to BER effects on enterprises' performance. We suspect that under Hypothesis 2, not accounting for selection effects would result in an underestimation of the BER effects on performance.

All in all, an examination of Hypothesis 3 could inform on-going and future BERs on the channels through which specific components and features of the BE are responsible for more inclusiveness by broadening the entrepreneurship base (and hence providing, among other positive effects, a broader

²⁹ Bruhn and MacKenzie (2014) review the evidence of the effects of BERs relating to business registration. Without any reference to gender, they find that easing the requirements produces only a small effect, with very few informal enterprises formalizing themselves. Given the very much larger number of informal than formal enterprises, however, even a very small effect could be statistically significant for the formal sector.

³⁰An alternative to using the selection equation is to use matching estimators (e.g. Propensity-to-Scores Matching Estimator) assuming newly formalised firms post reform are similar to some subset of formal enterprises pre-reform. For more information and issues surrounding the design and applications of using PSM estimates, see for instance Caliendo and Kopeinig (2005), available at <http://ftp.iza.org/dp1588.pdf>

base of tax contributors to the local economies). In addition, the issue of gender-differentiated inclusiveness can also be linked to the efficiency matters examined under Hypotheses 1 and 2. More equitable and gender inclusive BERs and BEs could be associated with spillover and feedback effects on men-run and more established enterprises' performance through more competition, driving improvement in labour productivity, and in the quality of upstream and downstream suppliers and customers' product offers and so on.

Hypothesis 4: The gender gap in employment is associated with the gender of the enterprise owner or manager.

Previous research studies across countries have pointed to a consistent and significant gender employment gap as between women's and men's businesses, i.e. the female share of the workforce is significantly higher among female-managed firms than male-managed ones. Our fourth proposed hypothesis will therefore investigate potential employment gaps conditional on BE, country specifics, and BE reforms. We will test this hypothesis using dynamic regression analysis. Since no systematic differences on labour productivity or firm performance have been found, the analysis has to be context-specific, as with Hypothesis 2. Hypothesis 4 will be addressed through the same frameworks as under Hypotheses 1 and 2 and with the same sampling size requirements. In this case, however, the dependent variable will be the gender gap in employment rather than divergence in economic performance.

If (from analysis of Hypothesis 3 above) we find that specific BE features increase the share of women's firms in the total number of firms, and we also find that women's businesses employ more women workers, then there is potential for BE reforms to contribute to increasing women's employment. The most solid results of these analyses from a statistical standpoint would likely come from micro-level approaches at enterprise and cohort levels. Given the attrition and representativeness issues discussed in Sections 3, 5, and in Annex 3, we would look for prima facie evidence and descriptive analysis in the first place; and could overlook the heterogeneity in the cohort and gender-specific constraints from the BE on performance.

A combination of Hypotheses 1 and 2 might seem to be the most relevant follow-up work for policy-oriented research on gender and enterprises. However, we believe that limiting of the scope of the analysis in that way would put too much focus on efficiency concerns rather than on equity ones. Investigating issues of gender inclusiveness in formal enterprise management, ownership, and employment as proposed in Hypotheses 3 and 4, would be a novel and major step towards tackling equity matters.

6. Conclusion

There are gaps in the knowledge of the gender effects of the BE and BER that can be filled by analysis of two large databases on gender and enterprise (the World Bank's Enterprise Surveys and, as a source of complementary gender-focused data, the World Bank Group's Women, Business and the Law report series). Between them, these databases cover not only the wide range of factors faced by business operators, but also elements of the personal and family legal framework that affect economic activity and are known to be gender discriminatory. New research also has to take account of the possibility that the gender effect of BE and BER varies in different countries or regional groupings.

In the overwhelming majority of countries, women's enterprises have distinctive characteristics within the enterprise population. They are fewer in number and smaller on average than men's enterprises; they are more concentrated in non-capital intensive lines of production; and they are more constrained by limited access to finance. On the other hand, the literature indicates that, overall, enterprise

performance, in terms of productivity, revenue, profits, employment growth and so on, does not differ significantly according to the gender of the business owner.

According to previous studies based on the ES, the type of BE does not, in itself, have a differential influence by gender of enterprises. This sits uneasily with the finding in the gender literature that second-order constraints, particularly but not only limited assets and access to credit, are significant and likely to interact with elements of the BE to produce a gender differential effect. That puzzle can be solved by broadening the concept – and policy agenda – of BER to cover second order variables of that kind.

A few project interventions have pursued this approach, basing their interventions on the idea that, to support women's businesses, reforms to the BE needs to be done in conjunction with changes to family and personal laws. Where such changes have been introduced (in non-BE contexts), women's economic activity was affected. Changes to the BE and legal frameworks undertaken year-by-year are now recorded in all countries. Research can, therefore, now be undertaken into the relationship of the BE, more broadly defined, and into the impact of 'broad' BERs. Technical problems with the data, related to the fact that women's enterprises account for a very small share of the total enterprises in some countries, can be addressed by advanced statistical techniques to some degree. Even so, it may only be feasible to analyse gender issues in large countries. Nevertheless, we believe that research can and should be done and that the findings would make a valuable addition to the evidence.

Four interrelated hypotheses are proposed.

- The first examines the assertion in the literature that, on a narrow definition, the BE is not, overall, gender discriminatory and, by extension, that the BE in itself does not explain the characteristics of women's enterprises. There is evidence, however, to indicate that within countries, the BE does indeed influence enterprise outcomes by gender. The pattern of influence may differ, however, from country to country and depend on the socio-legal context. Controlling properly for a fuller range of country effects, including measures of gender inequality in the regressions, could therefore yield a different result.
- The second hypothesis focuses on the impact of changes in the BE (covering both regulatory and socio-legal framework conditions). It examines the impact of BER (in both narrow and broad definitions) over time. It would combine ES and complementary data, mainly from the WBL database, but also UN and other international data that captures a range of measures of women's status that have been shown to influence women's economic activity (if not, up to now, their involvement in business specifically). It tests the idea that BER in conjunction with reforms to the broader legal framework does have beneficial effects for women's involvement in business. The findings will be of great importance to BE policy makers and practitioners.
- The third hypothesis is linked to the issue of formalisation. It examines the paradoxical proposition that, while more benign BE regimes may be favourable to the expansion of the private sector, it may be more supportive of an entry cohort of previously small and informal enterprises than of other enterprise cohorts. Women's enterprises may be strongly represented within the entry cohort. The inclusion of this group may result in a deterioration in the performance of enterprises in aggregate (although perhaps only in the short term). This is an inclusiveness effect that may, in a simple first round assessment, detract from the policy objective of increasing efficiency – although it draws attention to need for complementary measures for the entry cohort that could address those considerations.

- The fourth hypothesis directly addresses a more familiar issue of gender equity i.e. whether there is indeed a robust association between women's enterprises and female employment, which the descriptive statistics strongly suggest to be the case. There are well known macro- and micro-economic benefits, as well as social and gender gains, from increases in women's participation in paid work.

The first two research hypotheses are focussed on the efficiency effects of the BE and BER, while the second and third hypotheses address issues of equity and inclusion. This balanced approach is a key feature of the research agenda and serves a range of policy objectives.

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Annex 2: Enterprise Survey data: contents and technical limitations

A summary of the coverage of standard ES data is as follows:

- ES has results for 147 countries (with at least one survey per country); of those, 139 have data on gender ownership and management of firms.
- For 80 countries, surveys have been designed as panel surveys since 2006; 122 panel survey datasets are available out of 320 survey datasets currently available.
- Out of the 80 panel countries, 40 have already two complete and available surveys.
- Not all of those have gender dimensions captured in both survey rounds, however there are at least 20 countries for which we can track gender issues of enterprises.
- There are 100 standardised indicators; the regulatory topics have considerable overlap with those covered in the WBG's Doing Business survey (see Table 1 below).

Table 1: Mapping of Doing Business And Enterprise Surveys To The Menu Of Regulatory Reforms (Source: WBG 2014 Table 1.3)

Stage	Regulatory Topics	Enterprise Surveys	Doing Business
ENTRY	Commercial laws		
	<i>Business registration</i>	Yes	Yes
	<i>Business licensing</i>	Yes	Yes
OPERATIONS	Commercial laws		
	<i>Accounting & auditing</i>	No	No
	<i>Registration</i>	Yes	Yes
	<i>Business licensing/permits</i>	Yes	Yes
	<i>Company laws (business regulations, inspections)</i>	Yes	Yes
	<i>Contract laws</i>	No	No
	Competition policy	No	No
	Consumer protection	No	No
	Courts and proceedings (contract enforcement)	Yes	Yes
	Environmental laws	No	No
	Property rights		
	<i>Property law</i>	Yes	Yes
	<i>Intellectual property etc.</i>	No	No
	<i>Protection (privacy laws, copyrights/patents/trademarks, unfair business practices act)</i>		
	Investment policy/promotion	No	No
	Labour laws		
	<i>Employment law</i>	No	No
	<i>Labour protection</i>	No	Yes
	<i>Apprenticeships/training</i>	Yes	Yes
	<i>Labour safety and health</i>	No	No
	Land regulations	Yes	Yes
	Taxation	Yes	Yes
Trade and logistics	Yes	Yes	
EXIT	Bankruptcy	No	Yes
	Debt resolution and insolvency	No	Yes
	Alternative dispute resolution	No	No

A2.1 Limitations of ES data

The ES enterprise samples are not drawn purposively to survey women's businesses and are only meant to be representative at the national level. If the number of observations of women's businesses is very small, because the total sample size is small and/or the revealed share of women's businesses is low, it may be impossible to do robust analysis, either at the firm, gender or country levels in cross section datasets, let alone for panel firms. Sound, country level statistical analysis requires a minimum sample size of 30-40 female-managed companies.³¹

Lack of representativeness by gender and at country level may induce large sampling and estimation errors in quantitative ES analyses, as well as inference errors (i.e. failure to reject hypotheses or not to reject them). This could mean that significant gender gaps could be over – or under – estimated. The use of panel and repeated cross sections is useful here in that it mechanically increases the number of observations by longitudinally appending observations to a given country survey round (number of rounds time number of observations per round). Survey standardisation also helps since cross-country repeated cross sections and/or panel analysis at the company level can allow researchers to build bigger samples. This would also help generalise the results from a pooled sample of enterprises across countries and over time having common indicators (hence outputs of the analysis of such datasets are robust over time and across countries) if one can adequately control for context and country specific variables (such as business environment features and reforms, among others). Some variables can also be constructed from external datasets that are easy enough to merge with ES survey ones, such as policy variables from existing information and country datasets on BE reforms or other country-level macroeconomic databases (from the IMF for instance).

A2.2 Potential for gender analysis of panel datasets

The gender analysis of enterprise panel datasets will be rewarding although technically challenging, especially where attrition rates are high as in the case of ES.

First, panel data enables researchers to better evaluate the impact of interventions by the use of individual fixed effects and to relate before-and-after outcome variables to potentially causal ones if there is a possibility that those are not exogenous (i.e. they could be affected/contaminated by the outcome itself: e.g. the business environment can improve in periods of higher productivity growth).

Moreover, endogeneity biases are often better addressed by panel than cross section data analyses. They can help address internal validity concerns,³² although selection problems are difficult to deal with. When samples are randomly drawn, and respondents are not significantly different from others at a specific point in time, a selection bias can still exist over time. ES panel surveys only capture formal enterprises (and surviving firms, in the case that they are surveyed twice over time); in some countries, companies can move in and out of the formal sector quite rapidly. The effects of a given causal variable on outcomes proceed through the incentives or disincentives it introduces to firms to enter or leave the formal sector and through its effects on other formal enterprises. For instance, a tax reform can induce informal companies to formalise. If lower-performing enterprises are captured in the sample because of their induced formalisation, they may contribute negatively to the aggregate performance of the

³¹ Personal communication, WBG Enterprise Survey Unit manager Jorge Rodriguez Meza. This may still not be enough to be statistically significant as in some cohorts there would be zero or very low female participation e.g. manufacturing and the formal sector in general.

³² Internal validity refers to the extent to which causal effects identified in a study are warranted within the context of the study and the sample.

business sector owing to their inclusion. This effect, therefore, needs to be netted out from the effects of the tax reform on other (continuously formal) enterprises in the sample. While data on enterprises which drop out or entered the formal sector later are not available in both rounds, the data on those which show up in only one round can still be used to address the selection issue.

Panel data analysis will further help deal with the selection issue noted above (and illustrated in Section 3 by the Armenian data). It allows the analysis, for example, to disentangle BE effects on company outcome variables from their effects on sample selection (formalisation and sustainability of operations). It could be done by analysing BE factors and enterprise attributes from early survey rounds to identify which are the most correlated with the probability of dropping out in the later rounds of panel surveys. Using external data on informal companies from household surveys could also help (see methodological section).

Micro-level panel and repeated cross sectional data from panel surveys is, therefore, useful to address both internal and external validity concerns, if the studied samples are adequately built for and address representativeness (sampling power) at gender and national (or regional) level as well as selection issues. In some cases, it may, however, be too difficult to address those issues with enterprise-level analysis. Analysis of country-level indicators could help, but granularity of existing data will be lost and heterogeneity analyses will not be possible. Another solution is to build representative cohorts of companies in a cross-country analytical framework (see also more details in the methodological sections). All three levels of analysis will be explored and pursued. In any case, availability of only two panel survey rounds is also a limitation for more causal inference, as advocated by several surveys of the literature (see Dethier et al. 2010). In some cases it will be possible to add older ES cross section data to recent panel surveys, which could help overcome this issue (Armenia for instance has two other older rounds performed in the early 2000s), but the advantage of using panel fixed effects at the enterprise level would be lost. That is why working at the cohort level could be an interesting solution.

Annex 3: Technical Methods

Table 2A. Hypotheses, variables, and analyses

Hypothesis	Level of analysis	Dependent variables	Independent variables	Models
1. Certain elements of the BE are more constraining to women's than to men's enterprises.	Country and gender.	Profitability: net profits/total costs.	GDP/capita.	Cross-country panel regressions.
		Sales and profit growth.	Governance, gender inequality and policy variables.	
		Investments (from loans and own assets).	BE variables (country averages).	
		Employment growth.	Country fixed effects.	
		Labour productivity (Profits/workforce).	Exchange rates, fiscal policy (public expenditures).	
		Capital productivity (Profits/asset value).	Access to assets (country averages).	
		IT and innovation.		
	Cohort.	As above.	Cohort fixed effects.	Regional groupings of cross-country cohort panel regressions.
			Cohort time-varying attributes (within cohort averages of enterprises).	
			Cohort averages of BE variables.	
			Cohort averages of access to assets variables.	
			Country variables (see above).	
Enterprise.		Same as for cohorts but at enterprise level.	Repeated cross sections of enterprises within and (possibly across) countries	
2. Individual BERs have had different effects on the performance of men's and women's businesses	Country-gender and cohort.	Same as under Hypothesis 1.	Occurrence of BE reforms (dummy variables).	Cross-country panel and cross-cohort regressions.
		BE variables (first stage equation: how BERs affect BE).	Content of reforms (categorical variables interacted with time).	
			Same as under Hypothesis 1 with or without the BE variables according to the level of analysis.	

	Enterprise level.	Performance and BE variables as above.	Same as under Hypothesis 1 with or without the BE variables according to the level of analysis.	Within country case studies with repeated cross section regressions.
3. Certain BE and related reforms have induced larger improvements in the performance of newly- (or soon to be-) formalised companies relative to more established businesses.	Cohort level	Probability to be part of the sample.	Country variables and cohort fixed effects.	Cross-country cohort panel regressions
		Sustainability over time	Cohort-level average of BE variables.	
		Economic performance of established enterprises.	BER Variables as in Hypothesis 2.	
		Economic performance of new firms.	Cohort-level averages of enterprise attributes.	
	Enterprise level.	Same as above.	Same at enterprise level + country and BERs variables.	Within country case studies with repeated cross section regressions with a selection/matching equation
4. The gender gap in employment is related to the gender of the enterprise owner or manager.	Same as under Hypothesis 1.	Employment gender gaps (difference in share of female employees in the enterprise workforce).	Same as under Hypothesis 1.	Same as under Hypothesis 1

Table 2B. Enterprise-level variables to be considered and averaged within cohorts and countries (except economic performance ones above defined)

Access to assets.	BE.	IT and innovation.	Enterprises attributes
Building owned or rented (G6).	Business environment (M1).	Use of email and website (C22).	Size and sectoral classification.
Land owned or rented (G1).	Payments to reduce theft, crime and disorder (I3-I4).	New or improved product or service etc. (H1-H3) – as indicators of innovation.	Ownership structure.
Construction-related permit received (G2).	Payment for level of security (I1-I2).	New or improved supporting activities etc. (H4).	Ownership and management – gender.
Access to finance and expenditure on assets (various) (K1-K7).	Gift made relating to construction permit (G3).	New or improved organisational structures or management practices (H5).	Formalisation status.
Access to line of credit (K8 – K15c, K17, K20).	Number of days to get electric connection.	Improved marketing (H6).	Certification.
Access to personal loans (K15d).	Duration of power outages.	Improved research and development (H7).	Education of employees.
Labour and employment (L1 etc.).	Time to clear customs.	Allowing employees time to carry out the above-mentioned, viz. H1-H7 (H8).	
	Competition against informal firms.	Spending on R&D.	
	Time to obtain a construction permit.		
	Time to deal with regulations.		
	Gift made relating to tax inspections.		

A3.1 Levels of analysis

While **cross-country analysis** of the ES data would be interesting, there would only be 40-80 country year observations and 80-160 observations if we consider gender of top manager or owner as separate samples. This will probably place severe limitations on statistical work, given lack of degrees of freedom and the usual small sample properties, not to mention the severe selection bias issues raised above and which will be more difficult to handle than at a more disaggregated level (see also the discussion in the data section). However, interesting cross-country descriptive statistical work and simple panel models can be done by looking at gender gaps in several indicators and cross-tabulating them against firms' attributes, which could be ultimately related to the business reform environment (by crossing over the database on country-level implemented business reform types and dates, as well as doing business indicators available from the DB datasets). Possible cross-country panel regressions such as the one suggested in Hypotheses 1 and 2 and detailed in Figure A1 could also be conducted to explain gender gaps in some key aspects of corporate management, performance (labour and asset productivity, as well as access to assets and infrastructures), and identify key policy and macroeconomic drivers.

The **cohort-level approach** is the most promising, together with company-level repeated cross-sections appended to the panel companies that are tracked and resurveyed between waves (between 30 and 60% of the total samples covered by the panel surveys). This analysis can be performed within countries, or across a specific region, considering both company-level (and groups of companies) and

country fixed-effects and time-varying variables. Fixed characteristics are permanent (such as geography) and time-varying variables include policy, macroeconomic performance, as well as company attributes and other correlated variables. To our knowledge, no micro-level approach has been performed on ES panel data across countries and no pseudo-panel cohort-level approach has ever been conducted. The cohort-level approach, while fraught with empirical and estimation challenges, would enable us to undertake in-depth analysis that can help us to understand the role of the BE and BERs on enterprises (in total and by gender), whilst avoiding statistical problems such as internal and external validity concerns.

Breaking the data down by broad sectoral classification and firm size (as well as by gender of top manager and/or owner) could be conducive to a cohort-type (pseudo-panel) analysis. Such an approach is needed to cope with attrition in the ES (much more significantly than in the household surveys or farm surveys for instance), due to high turnover of new and discontinued businesses between two survey rounds. The cohort pseudo-panel approach removes both attrition and part of the selection bias problems with the application of specific error-correction estimators. However, understanding cohort-level composition dynamics (in size and nature) over time and space still requires additional robustness checks in order to be compatible within a consistent and robust panel data estimation strategy.

It will be important to test for the relevant firm attributes, outside of gender, which would qualify as relevant cohort characteristics that we would like to track over time. We would also need to understand the mechanisms through which single companies may shift from one cohort to another and what is driving the relative shares and sizes of cohorts over time and across countries. We will need to work with the appropriate number and size of cohorts. That would involve a substantial amount of robustness checks and testing. Simulation procedures such as Monte-Carlo simulations could be helpful in this regard since they can both test for relevant cohort characteristics and for pseudo-panel regression estimators that could correct for errors in variables. Several errors-in variables correction estimators do exist and have been developed in the empirical econometric literature; see for instance Verbeek and Nijman (1992) or Deaton (1985) for seminal estimation strategies.

Once regressions are performed, Oaxaca-Blinder (Blinder 1973, Oaxaca 1973) and other panel-based decomposition techniques could also be run on sex-disaggregated data in order to identify the main drivers of gender bias over time (changes in productivity of assets and labour or changes in their amount/endowments).

A3.2 Addressing Selection Bias (for Hypothesis 3)

The sampling method for ES, which excludes the informal sector, may lead to a “sample selection” effect, with endogeneity concerns. The ES datasets contain data only on formal sector firms and thus may not be representative of all businesses in the country, which can lead to bias in the results of analysis. For example, improvements to the business climate may encourage firms to transition from the informal to the formal sector. Consequently, following such reforms, the formal sector might include less productive companies which would otherwise have remained in the informal sector and not participated in the ES. Failure to account for this effect could be misleading in respect of country-level outcome indicators: the composition of the sample may have changed over time, failing to convey such changes at the individual firm level. This may also bias the coefficient and significance of BE variables in enterprise-level and cohort-level regressions. A corrective selection-equation model a la Heckman (1979) needs to be applied.

A simple approach could be adopted to address the selection issue underlying Hypothesis 2, in order to properly evaluate causal effects of any reform. We would explain dropout rates at the micro level not

only as a function of enterprise attributes, but also by explaining how BERs and BE impacted enterprises' performance and survival, which in turn affected the composition of the sample. Identifying the channels through which BE and BERs were more "inclusive" or "exclusive" across sectors, gender, and country contexts would be the main objective of this part of the study.

The approach, therefore, has to distinguish the impact on the pre-existing formal sector, from the impact on firms which have recently transitioned to the formal sector (and vice-versa), even if prior (or later) data on those firms is not readily available. To do this work, there are two possibilities. One is to obtain external data with information on informal firms that can be used to evaluate whether the reforms caused informal firms to formalise (for instance data from household survey with a labour module in which informal household enterprises and self-employment is captured, e.g., recent Living Standards Measurement Study (LSMS) surveys also conducted and/or supported by the World Bank). With that information, it would be possible to inform and populate a selection equation (Heckman 1979) which can be used to explain propensity to formalise, show up, and remain in the sample over time or probability of dropping out. Residuals of this equation are used to correct for the coefficients and significance of the BE variables in the estimation of economic performance.

A second possibility is to assume that newly formalised firms post reform are similar to some subset of formal firms pre-reform and then use this subset as a control to estimate the impact of reform on informal and newly formalised firms. Formally, a matching type estimator can be used to estimate the impact of reform (e.g. Propensity-to-Scores Matching Estimator).³³ Formal firms which have dropped out in the later rounds could also be used, assuming that some have dropped because of financial unsustainability and others because of moving back to the informal sector. We will evaluate the potential of both possibilities. For the latter, we will identify firms in the pre-reform data that are similar to newly formalising firms and use matching estimators.³⁴

³³ For more information and issues surrounding the design and applications of using PSM estimates, see for instance Caliendo and Kopeinig (2005), available at <http://ftp.iza.org/dp1588.pdf>

³⁴ On occasion, in some years and in some countries, ES are applied to larger samples in order to generate extra data on specific topics (such as informality, or firms with fewer than 5 employees). Data in such modules is rarely comparable across time and across countries and has to be analysed in its own right. This study is therefore limited to discussion of the datasets deriving from the standard surveys.

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