

Striving of for quality: Preliminary evidence of the impact of certification on firms and value chains

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With acknowledgments to the Rwanda Standards Board (RSB), the Ministry of Trade and Industry (MINICOM), and the British High Commission in Rwanda; ISO Capacity Building Unit.



DIRECTED BY



FUNDED BY



Final Report
February 2026

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Preliminary evidence of the impact of certification on firms and value chains



In brief

- Quality certification is often viewed as a key tool to unlock market access and foster quality upgrading, but much of the existing evidence is observational. This study provides preliminary evidence from Rwanda on the impact of certification on firm outcomes, in anticipation of a future RCT.
- Using linked data from on firm certification histories and outcomes from tax fillings, we compare certified with never-certified firms in a matched difference-in-difference approach.
- We find significant positive impacts on firm revenue, employment and profits as well as on export shares, regional exports and some changes in domestic trading. Other dimensions such as general export volumes remain inconclusive.
- Because certified firms differ from never-certified firms and some outcomes show pre-certification differences, results are suggestive. The next phase is an RCT of the government SME certification support programme to obtain robust causal estimates and identify then channels how certification affects firm outcomes.

*This project was
funded by IGC
Rwanda.*

Executive Summary

Quality certification is often viewed as a key tool to unlock market access and foster quality upgrading, but most existing evidence is observational. This project, conducted in close collaboration with the Rwanda Standards Board (RSB), provides new evidence on how certification relates to firm performance and value chains in Rwanda by linking RSB certification records to rich administrative firm data from the Rwanda Revenue Authority (RRA), including VAT-based buyer–supplier transactions, customs records, corporate income tax outcomes, and payroll employment. Using a matched difference-in-differences event-study design, we compare firms before and after their first certification to similar firms that never certified.

The retrospective analysis finds strong, though suggestive, evidence that certification is associated with substantial gains in firm outcomes. Two years after certification, certified firms are estimated to have around 35% higher revenues and gross profits and around 30% higher employment relative to the matched control group, albeit with no clear evidence of labor productivity gains. The results also suggest greater market access. Export shares rise by about 5 percentage points, with indications that export activity shifts toward regional markets. Within domestic value chains, certification does not increase the number of buyers, but it is associated with higher sales per business buyer and suggestive evidence of selling to more demanding customers such as higher-wage firms and multinationals.

These results should be interpreted with caution because certified firms differ systematically from never-certified firms and some outcomes show pre-certification differences. For this reason, the next phase is a randomized controlled trial (RCT) of the RSB's Zamukana Ubuziranenge (ZU) certification support program. By randomizing access among eligible applicants and complementing RRA outcomes with firm surveys and RSB gap assessments and lab-based testing, the RCT will provide gold-standard causal evidence and clarify whether impacts operate primarily through quality upgrading, signalling, or both.

1. Introduction

Quality certification is often seen as a key institution for unlocking market access and fostering quality upgrading in low-income countries (World Development Report, 2025). Certification is associated with access to higher-value domestic markets (Bellemare et al. 2022; Michelson 2013) and global value chains (Verhoogen 2008; Zavala et al. 2023). By facilitating standardization and quality recognition, it may also encourage quality upgrading and productivity gains (Alfaro-Serrano 2019). These benefits may extend beyond the certified firm, propagating through production networks to incentivize quality upgrading among suppliers and enable quality provision among buyers (Schuster and Maertens 2013). And yet, despite its potential, existing evidence on the impact of certification is predominantly observational, making it hard to disentangle its causal effect.

In this project, conducted in close collaboration with the Rwanda Standards Board (RSB), we leverage a newly compiled dataset linking 12 years of RSB administrative records on certifications with rich firm and transaction-level data from the Rwanda Revenue Authority (RRA), including data on firm-to-firm sales and purchases, exports and imports, profits, and employment. Using this data, we compare firms before and after they receive RSB certification to a group of never-certified firms in a differences-in-differences (DiD) approach.

Through this, we provide suggestive evidence to address the following questions:

- What is the impact of certification on firm performance including revenue, employment, and export volumes?
- How does certification affect a firm's trading partners, including its domestic network of buyers and suppliers and international market access?
- Do certified firms restructure their supply chain?

Note, however, that although matching certified firms to similar never-certified firms improves comparability, structural differences between the groups remain, so our results should be interpreted as suggestive. In a follow-up project, we will provide the most robust estimates by conducting a randomized controlled trial (RCT) on an SMS certification support programme run by the RSB called Zamukana Ubuziranenge (ZU), Kinyarwanda for “striving for quality”.

The rest of the paper is structured as follows: Section 2 describes our data and estimation methodology; Section 3 discusses the estimation results; Section 4 provides an outlook of next steps and especially our RCT-based evaluation of the ZU programme; Section 5 concludes.

2. Data and methodology

Through our relationships with the RRA and the RSB, we were able to access and merge data on individual firm certification by the RSB with information on firm outcomes from tax filings by the RRA. To best of our knowledge, we are the first to connect these data in Rwanda.

2.1. Firm-level data

RSB certification data: We accessed firm-level records of all product and system certifications issued from 2013 to 2025 including type of certification, issue, and expiration data. The analysis focuses on RSB certifications, which cover voluntary public standards certifications, and does not incorporate privately issued schemes (e.g., Rainforest Alliance) that operate alongside the national system. The most common certification is the S-Mark, a certificate issued by RSB to verifying that products comply with specific safety, quality, and performance standard. This S-Mark is recognized by other countries in the East African Community. Other RSB-issued certifications include Made in Rwanda, a national origin/branding label; ISO certifications, referring to international standards attesting that a firm's processes meet specified quality, safety, or environmental requirements; and HACCP, a food-safety certification assuring buyers that production and handling processes minimize contamination and food-borne illness risks.

The number of certified firms has grown steadily over the past decade, reflecting increasing uptake of standards. The count of firms with at least one RSB certification rose from just 21 firms in 2014 to over 422 firms by 2025 (Figure 1). Most certifications in Rwanda are for products, and not processes, and in particular S-Mark (Figure 2).

RRA administrative data: Within the RRA's secure data lab, we merged the RSB certification to administrative records from 2010-2023. The data include VAT filings (including transaction-level records of firms' sales and purchases, allowing us to map firm-to-firm buyer-supplier linkages), customs records (export/import values and destinations), corporate income tax (annual revenues and profits), and payroll

Figure 1: Number of certified firms over time

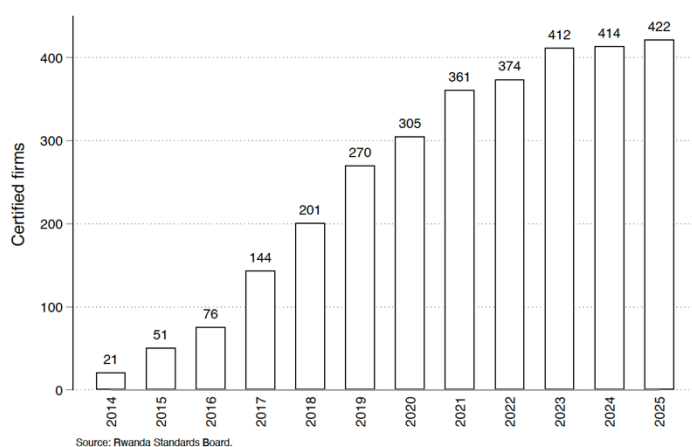
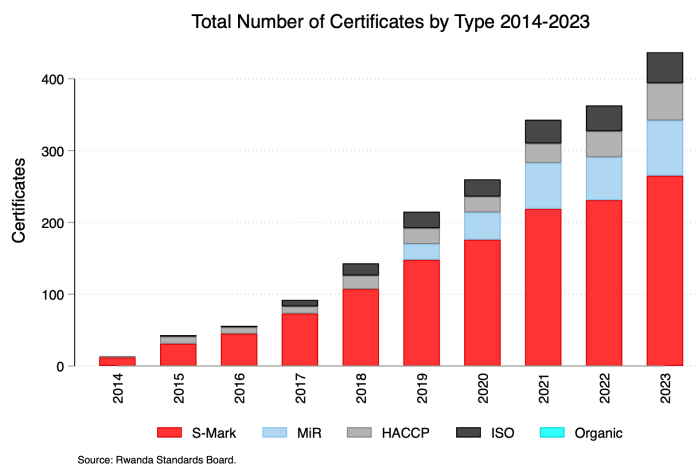


Figure 2: Types of certificates



tax (PAYE) records (monthly formal employment). This data enables us to track a variety of outcomes for all firms and their networks of trading partners who reports annual revenue above the annual VAT registration threshold of 20 million Rwf for a period of 12 month or 5 million Rwf in three consecutive months.

2.2. Firm characteristics

The merged dataset allows us to describe the characteristics of certified firms and compare them with never-certified firms. It shows that certified firms differ significantly in several dimensions. Figure 3 displays that certified firms span a range of sectors, but with a concentration in agribusiness and light manufacturing. Relative to certified firms, never-certified firms concentrate mostly in the service sector, especially in Wholesale & Retail. Unlike certified firms, their relative share of agricultural and manufacturing firms is relatively low. Never-certified firms are younger on average (Figure 4).

Figures 5 and 6 show the distribution of firm size of certified and non-certified firms along revenue and employment. Note that the x-axis is in log-scale. Both, revenue and employment distributions show that certified firms tend to be larger in size and that the share of the largest firms is substantially larger among certified firms. Lastly, Figure 7 shows that certified firms are also more likely to engage in international

Figure 3: Share of certified firms per sector

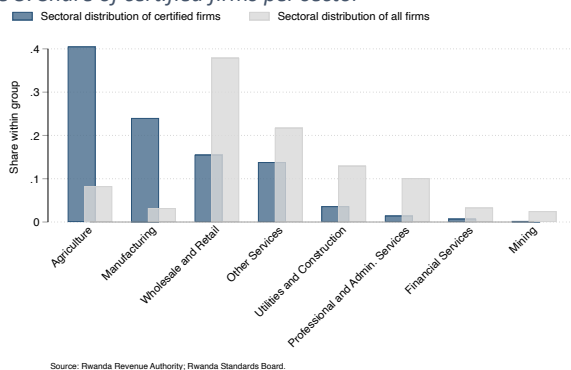


Figure 4: Age of certified and of all firms

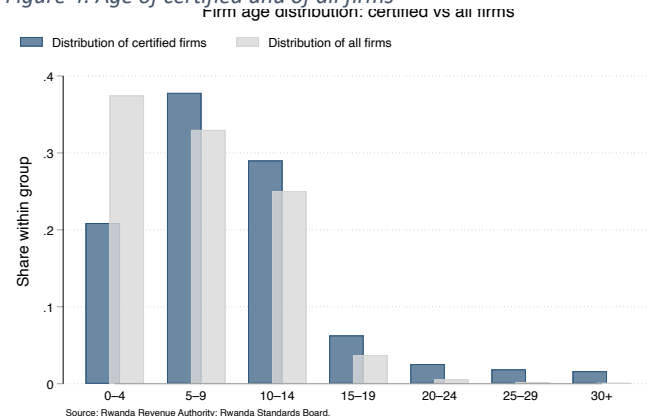


Figure 5: Firm size distribution by revenue

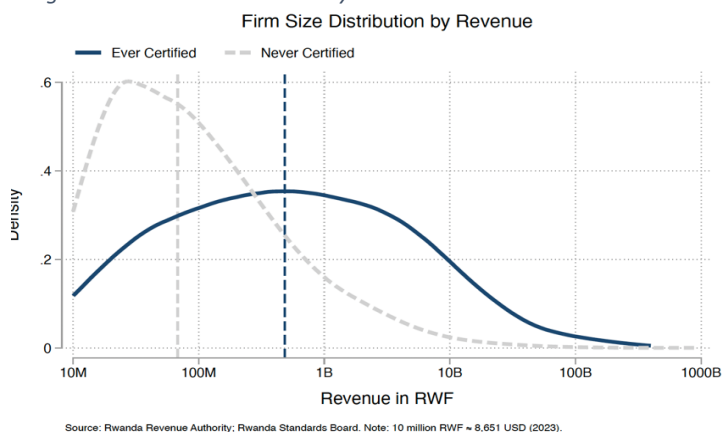


Figure 6: Firm size distribution by employment

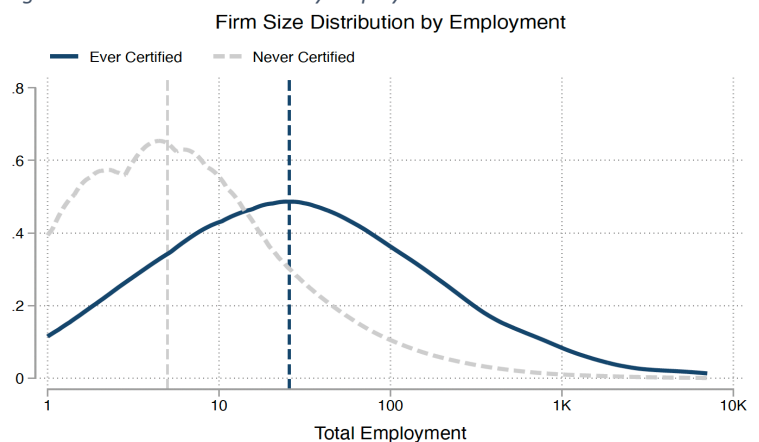
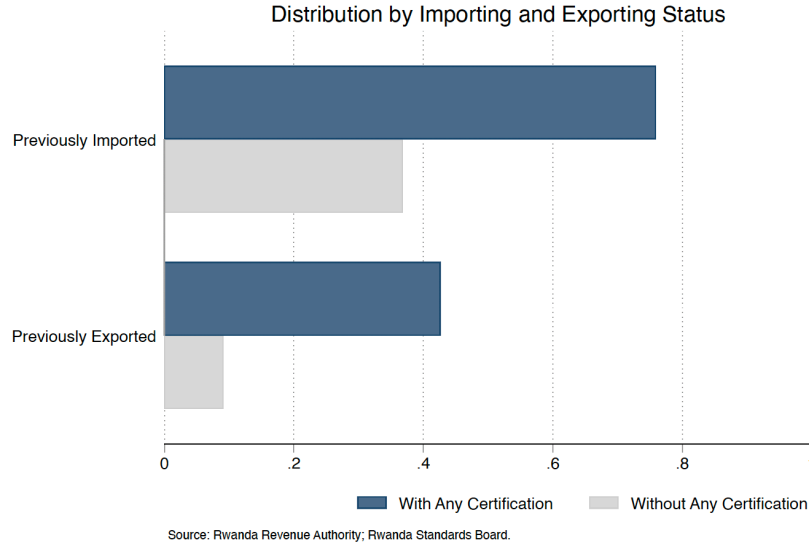


Figure 7: History of importing and exporting for certified and all firms



trade. The share of certified firms who have ever imported falls just below 80% which is below 40% for never-certified firms. The share of certified firms who have ever exported is just over 40% relative to below 10% for never-certified firms.

2.2. Empirical approach

To estimate the impact of certification, we use a retrospective DiD design. We compare firms in the year when they obtained their first certification to a control group of firms that never certified, in the years before and after the event. The identifying assumption is that, absent certification, the certified firms would have followed similar performance trends as the matched control firms. To improve comparability, we perform propensity score matching (PSM) to select control firms that had similar observable characteristics as the certified firms prior to certification. Matching variables include sector, baseline size (revenue, employment), prior growth rates, and whether the firm was already exporting, among others.

We then estimate a standard event-study regressions:

$$Y_{it} = \sum_{k=-3}^3 \beta_k \cdot \text{Cert}_{i,t+k} + \theta_i + \mu_t + \varepsilon_{it},$$

where Y_{it} is an outcome for firm i at time t , and $\text{Cert}_{i,t+k}$ are indicators for the event time (with $t=0$ being the first certification year, $t-1$, $t-2$, $t-3$ as pre-certification years and $t+1$, $t+2$, $t+3$ as post-certification years). The firm fixed effects θ_i control for time-invariant differences between firms, and time fixed effects μ_t control for macro-level shocks. Standard errors are clustered at the firm level.

It is important to note that this retrospective analysis is non-experimental. Certified firms differ from non-certified firms in meaningful ways even before certification as they tend to be larger, more likely to export, and concentrated in certain sectors. We address observable differences via matching, but unobservable differences and the possibility of reverse causality (e.g. firms experiencing growth might seek certification) mean the results should be interpreted with caution. In fact, we do detect some potential pre-trends in a

few outcomes, suggesting that certified firms were already on a positive trajectory relative to controls before certification in those dimensions. Therefore, the estimates here are suggestive.

3. The impact of certification

Below, we describe the outcomes of our DiD estimation on i) firm and productivity growth, ii) market access, and iii) domestic supplier-buyer networks.

3.1. Firm and productivity growth

Certified firms see substantially higher revenue, profits and employment growth after certification compared to the control group. Figures 8, 9 and 10 show there is little difference between the two groups in the years before certification, i.e. there are no pre-trends, strengthen the robustness of the post-certification estimates. For revenue, we find a statistically significant impact of certification. The average

Figure 8: Estimated impact on revenue

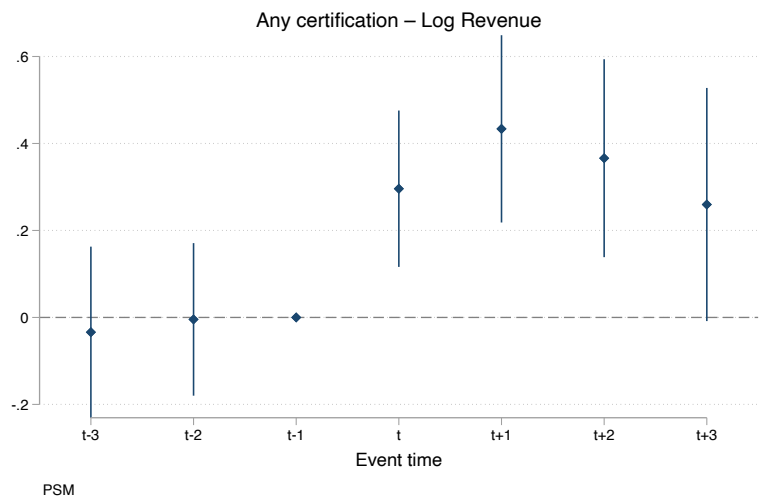


Figure 9: Estimated impact on gross profits

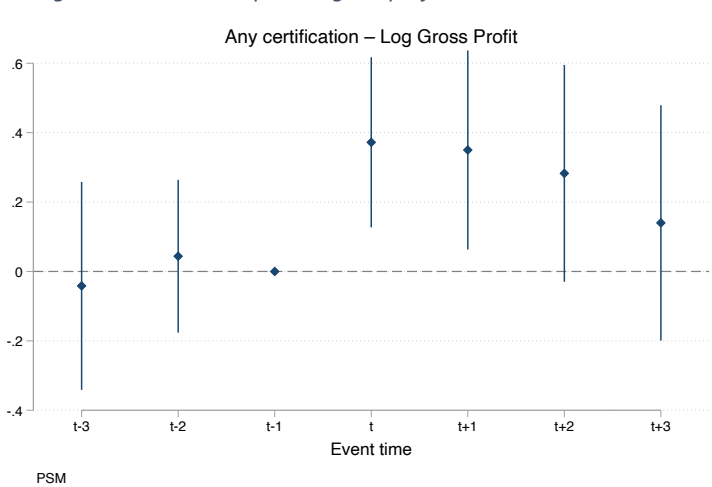


Figure 10: Estimated impact on employment

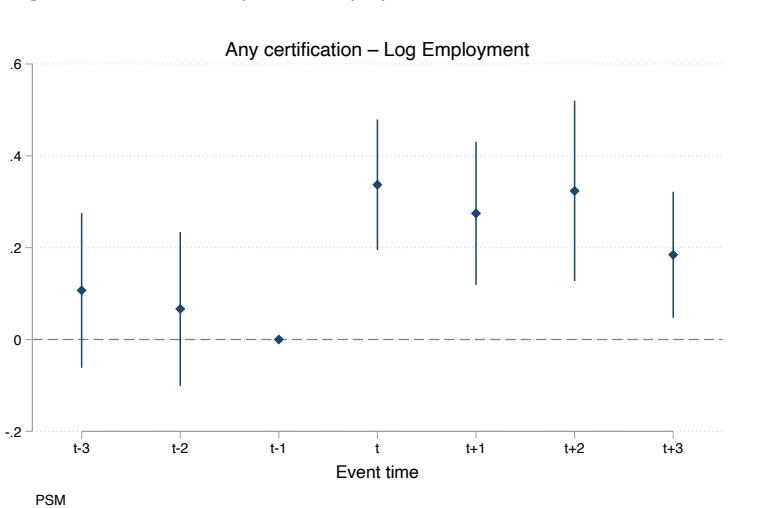
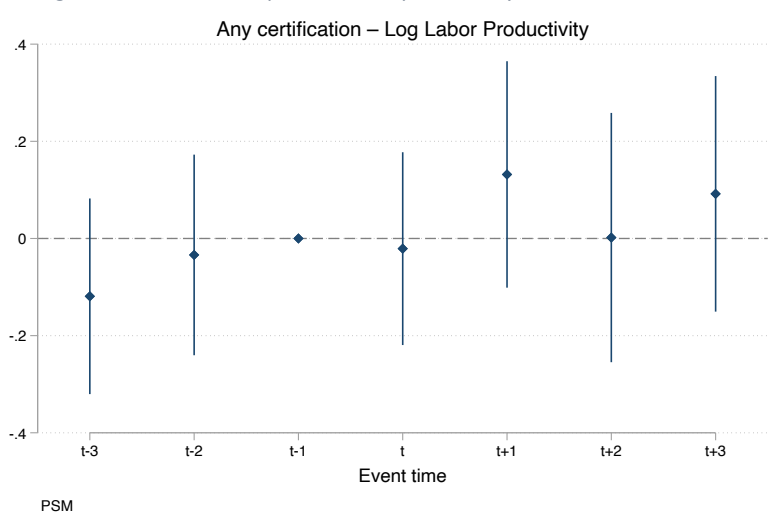


Figure 11: Estimated impact on labor productivity



certified firm's revenue after two years is about 35% higher than it would have been without certification. Similarly, gross profit increase by around 35% after two years post-certification relative to the control group and employment increase by around 30% more among certified firms. With the above-described caveats in mind, these results suggest very large and sustained effects on certification which materialises early after certification. The combination of revenue and employment results implies that certified firms are scaling up operations significantly post-certification. This could be due to increased demand (e.g. new customers gained through the credibility of certification) or internal improvements in capacity and output volume. At the same time. However, we do not observe evidence of meaningful changes in labor productivity (revenue per worker) due to certification (Figure 11).

These effects appear to vary by sector and type of certification (see the appendix for related figures). In particular, the gains in revenue and employment are concentrated in manufacturing and agribusiness firms, whereas we detect little to no impact for firms in the services sector. We also find that product certifications (such as the S-Mark for product quality) drive the positive impacts, while firms obtaining only system certifications (ISO standards for management systems) do not show significant improvements. One interpretation is that product standards have more immediate market salience (especially for consumers and B2B clients who see the certification marks), whereas ISO system standards, though beneficial for internal processes, may not translate as quickly into sales without complementary changes. These patterns will be explored further in our ongoing RCT-based study. Note that similarly, it is likely that some of our estimates, especially when considering further disaggregated data, suffer from a too small sample size leaving our estimates underpowered.

3.2. Exporting and international market access

Existing evidence points to the importance of certification to access international markets and to find new customers. In line with this, our estimates suggest that certification increases firms' export volumes and the likelihood of exporting. However, because of the existence of significant difference before certification, we cannot assess causal impacts on whether firms are more likely to export or export more, as depicted in Figures 12 and 13. At the same time, we find that certification raises firms' *share* of export in total sales, which increases by 5 percentage points relative to never-certified firms after one year after certification already (see Figure 14), suggesting that certification enables them to convert more of their production for international sale.

We also investigate where new exports are going. Certification appears to especially facilitate exports to regional markets in Africa. Figure 15 plots the impact on the probability of exporting to another Sub-Saharan African (SSA) country. This likelihood rises markedly for certified firms by roughly 20% relative to baseline probability. In contrast, we do not find any significant change in the probability of exporting to non-SSA destinations (e.g. Europe, Asia, or North America, see Appendix A2). Thus, the export expansion enabled by certification seems to be primarily within regional markets, possibly leveraging Rwanda's participation in the East African Community and related regional standards recognition. Many certified

Figure 12: Estimated impact on export volume

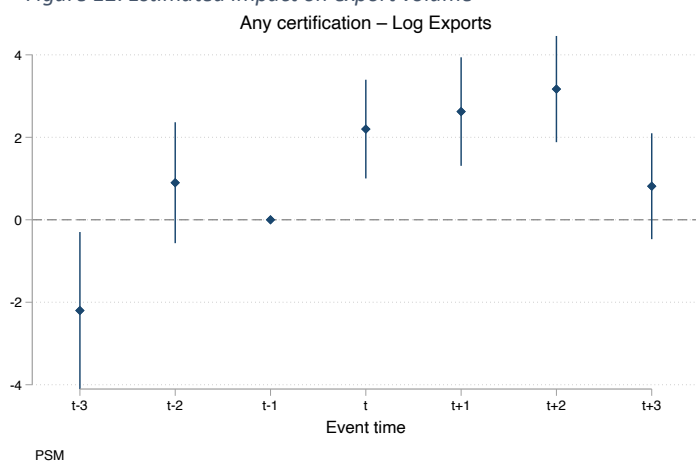


Figure 13: Estimated impact on export status

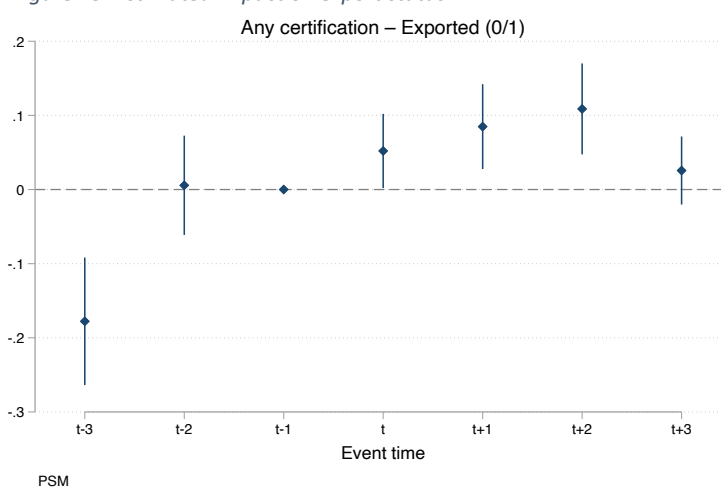


Figure 14: Estimated impact on share of exports in total sales

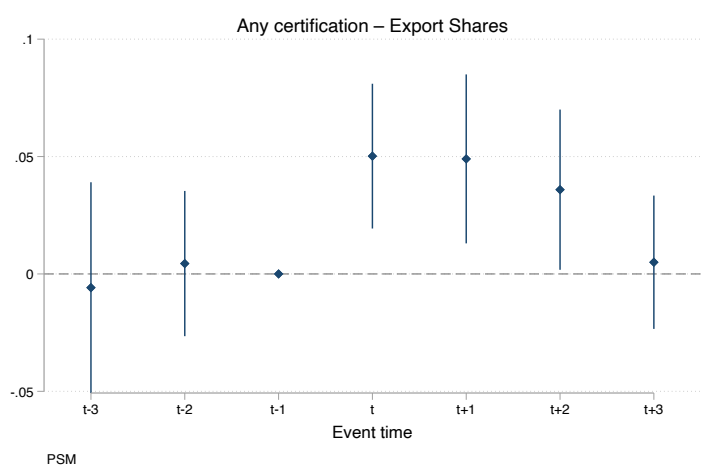
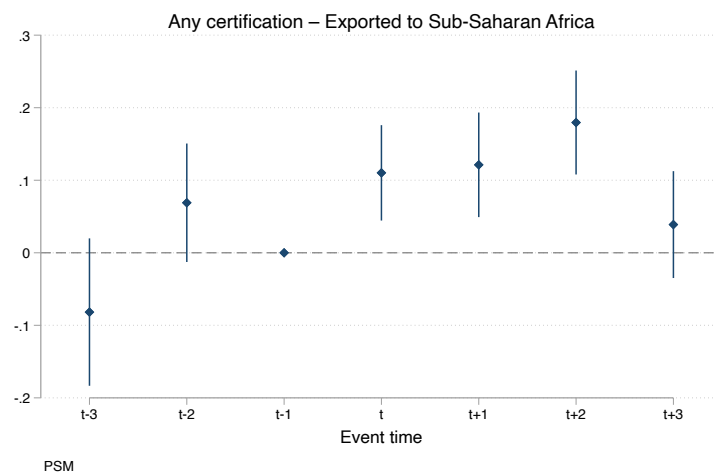


Figure 15: Estimated impact on export status to Sub-Saharan Africa



products (e.g. food and beverages with the S-Mark) can be more easily sold in neighboring countries that accept the RSB standards, whereas breaking into US or EU markets likely requires additional steps and remains challenging.

3.1.1. Domestic Buyer-Supplier Networks

Beyond exports, certification might also improve a firm's connections in the domestic B2B network. Certified firms could become more attractive suppliers for other domestic companies (e.g. as inputs meet higher quality), or certification could signal credibility that brings new business clients. We examine several indicators using VAT transaction-level network data. We do not find evidence that certified firms increase their number of domestic buyers as the count of distinct VAT-registered customers a firm sells to remains unchanged on average (Figure 16). Likewise, our results do not suggest that certification significantly affects the number of suppliers a firm buys from, nor the total volume of its input purchases (Figure 17). These results suggest certification is not simply leading firms to trade with more partners or buy more inputs in the short to medium run.

Figure 16: Estimated impact on number of buyers

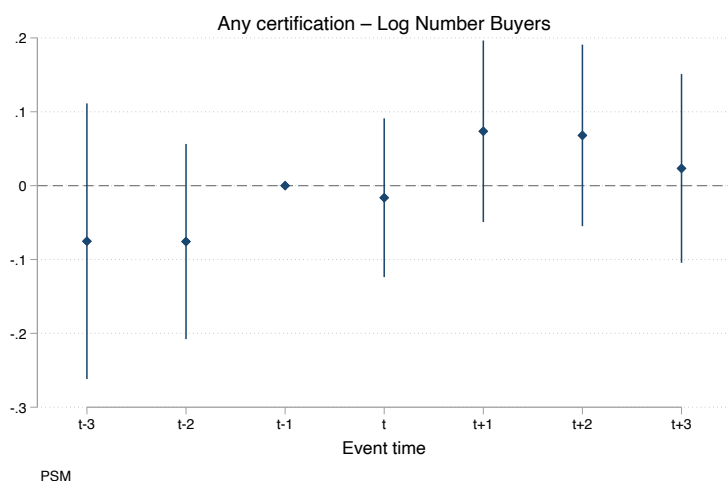


Figure 17: Estimated impact on number of suppliers

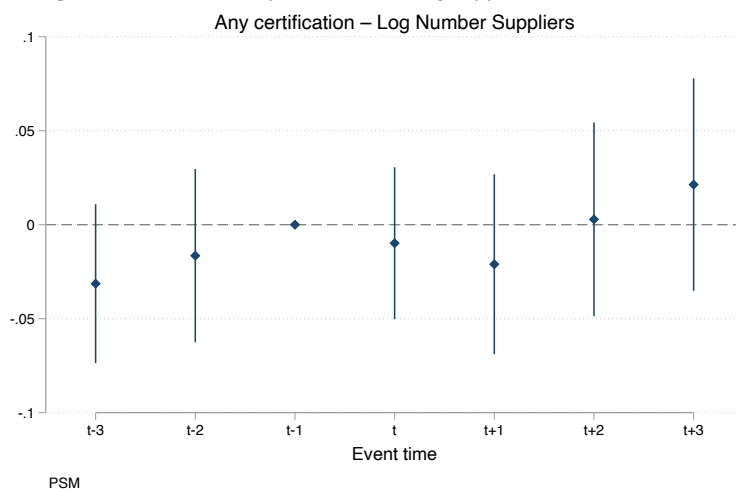
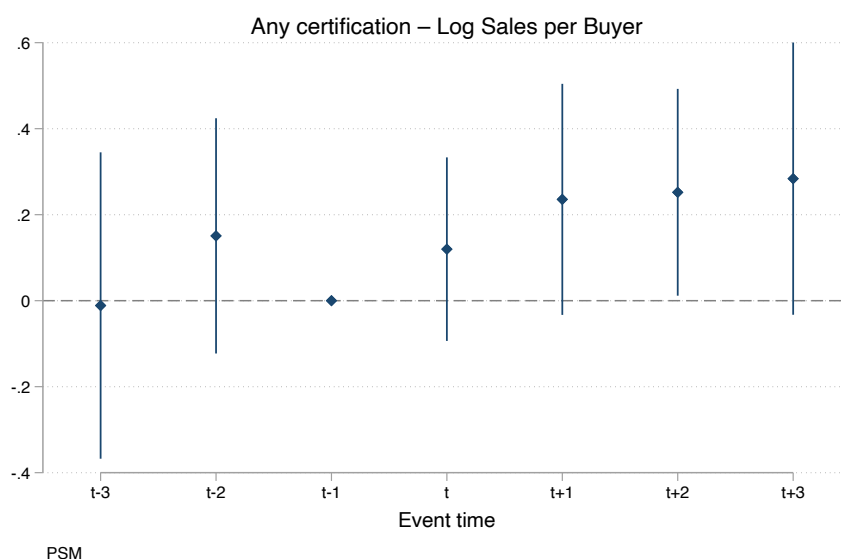


Figure 18: Estimated impact on sales per buyer



However, we do find changes in how much certified firms sell to each buyer and the *type* of buyers to which certified firms sell. Certified firms increase the volume of sales per existing buyer, as shown in Figure 18. Two years after certification, the average sales *per buyer* is around 50% higher for certified. This indicates that while the client pool doesn't expand in count, certified firms deepen their sales relationships, potentially by getting larger orders from the same customers. This could reflect buyers placing more trust in certified suppliers and thus sourcing more of their purchases from them. It aligns with the idea that certification may help a firm become a preferred supplier for quality-conscious clients, increasing business volumes

We also see some suggestive evidence for changes in the type of buyer. Certified firms become more likely to sell to larger, higher-wage firms and to multinational enterprises in Rwanda. Figure 19 shows that after certification there is an uptick in the probability that a firm's B2B sales include at least one high-wage domestic firm (defined here as a firm in the top decile of the wage distribution). Similarly, Figure 20 shows

Figure 19: Estimated impact on selling to high-wage firms

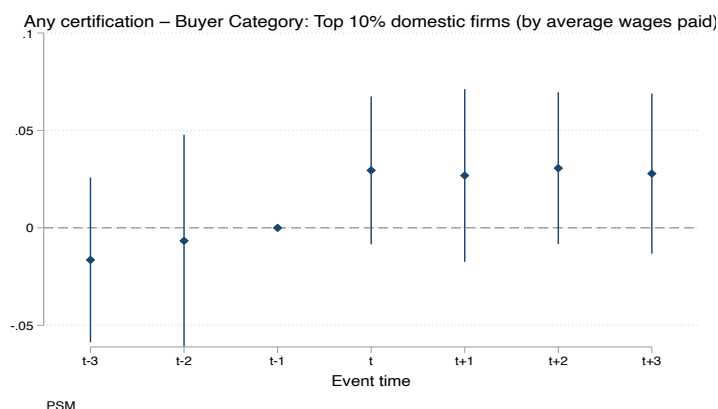
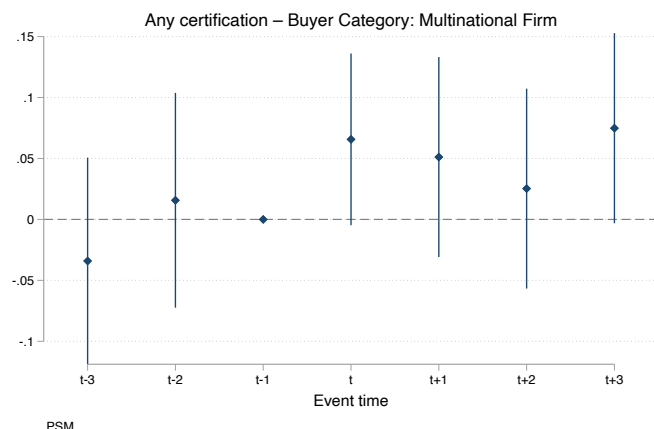


Figure 20: Estimated impact on selling to multinational companies



an increase in the likelihood of selling to a multinational company. These results are, however, estimated with a lot of noise. Therefore, while suggestive, we interpret them cautiously. The estimates, however, suggest that certification might enable local SMEs to join the supply chains of more sophisticated firms which tend to demand certified inputs.

4. Next steps: Causal evidence from a randomized controlled trial

The above retrospective analysis provides encouraging *suggestive* evidence that certification is associated with improvements in firm performance. However, the central challenge for robust causal identification remains that firms that obtain certifications may differ from those that do not, biasing estimates. To generate rigorous causal evidence on the impact of certification, we continue to partner with the RSB to implement an RCT of the Zamukana Ubuziranenge (ZU) program. ZU offers structured technical assistance to SMEs to meet national and international quality standards, including S-Mark and ISO certifications. It begins with benchmarking products and practices against standards (including lab testing where needed), followed by tailored training and hands-on support to fulfil the required criteria for a certificate. The program also covers all certification application costs.

In the RCT, we will randomize access to the ZU program among a pool of eligible applicants allowing us to estimate the causal impact of certification support on firm performance, market access and value chains. In addition to using data on firm outcomes from the RRA, we will complement administrative records with firm surveys and RSB diagnostics, including pre and post program “gap assessments” and lab-based product testing of both control and treatment group. We will use this data to directly measure firms’ baseline quality, track upgrading investments and organisational practices, and distinguish quality upgrading from pure signalling effects of certification.

Through this, we aim to address the following questions:

- **Programme effectiveness:** How effective is the design of ZU to support SMEs in obtaining certification?

- **Impacts on market access and performance:** What is the effect of certification on exports/imports, domestic B2B sales/purchases, revenues, profits, employment, wages, and workforce composition?
- **Quality upgrading vs signalling:** Post certification, do outcomes improve because firms truly upgrade product/process quality (measured directly via RSB testing and process assessments) or primarily because certification credibly signals existing quality?
- **Networks and spillovers:** how does certification reshapes buyer–supplier networks and do benefits propagate through production networks (and potentially to competitors)?

The RCT will be rolled out in waves to align with RSB’s training capacity constraints and hence conducted over the next fiscal years. As of February 2026, we have finalised the recruitment of the first wave of firms. After initial gap assessment, lab testing and our baseline survey, the ZU training of firms in the wave 1 treatment group will begin in March 2026.

5. Conclusion

The retrospective analysis conducted in this project provides strong, although suggestive, evidence on the impact of certification on firm outcomes. Firms that receive certification through the RSB experience sizeable improvements in key performance outcomes in the years following certification. The estimates indicate substantial growth in revenues, gross profits, and employment, alongside higher business-to-business sales volumes.

The findings also point to market-access mechanisms. Certified firms appear to become more export-oriented, with higher export shares and indications of a shift in export activity toward regional markets. Domestically, certification does not increase the number of buyers, but it is associated with higher sales per business buyer and with selling to more demanding customers, including higher-wage firms and multinationals. Overall, these patterns are consistent with certification acting as an enabling technology for market access, improving credibility and potentially product and process quality, and helping firms scale relationships with quality-sensitive buyers.

At the same time, results must be interpreted with caution: certified firms differ systematically from never-certified firms across several margins, including being larger on average and more likely to participate in international trade, which limits the extent to which a retrospective design can support strong causal claims.

For this reason, the next phase of the project is an RCT of the RSB’s ZU certification support program. By randomizing access among eligible applicants, the RCT will generate gold-standard causal evidence on the effects of certification support on firm growth, market access, and network outcomes. By complementing RRA firm outcome data with firm surveys and RSB gap assessments and lab-based product testing, the study will also identify the channels through which certification affects firms and disentangle whether impacts operate primarily through quality upgrading, signalling, or both. This evidence will be directly policy-relevant for the RSB and partners as they consider how to scale, target, and refine certification support as part of Rwanda’s broader strategy to raise firm competitiveness and promote structural transformation.

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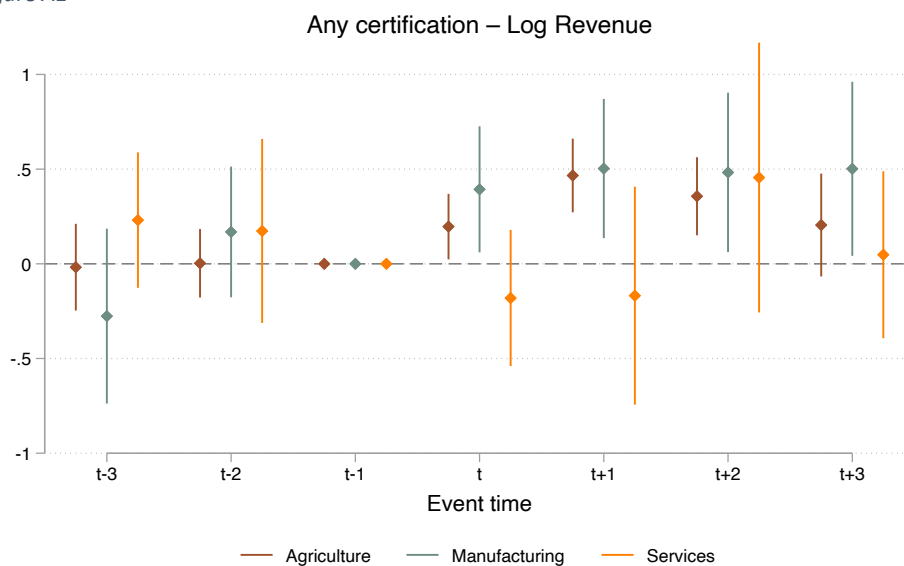
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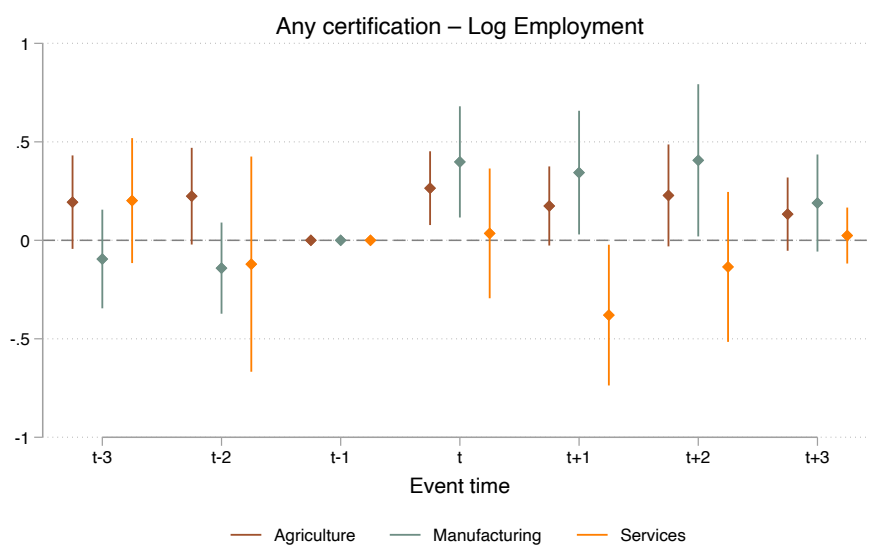
Appendix – additional figures

Figure A1



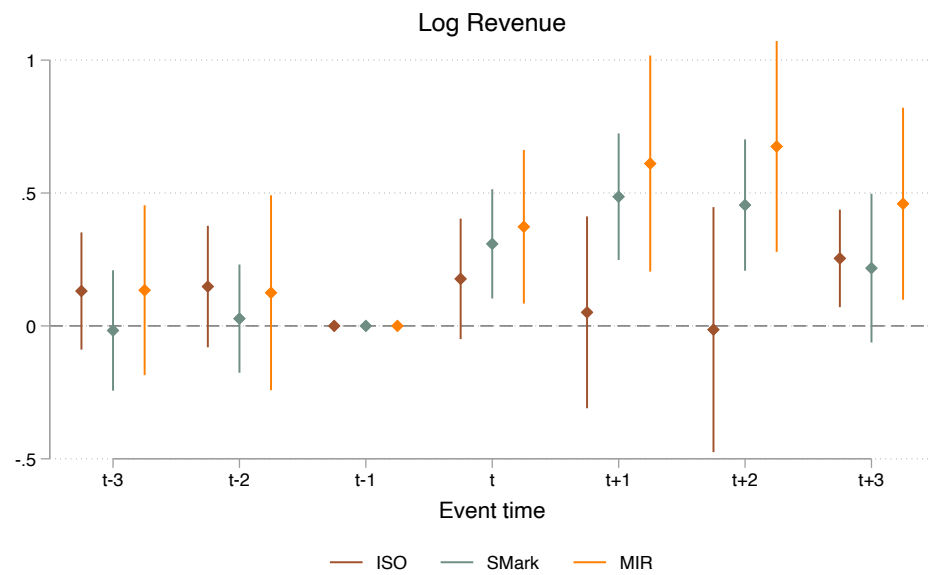
PSM, Sun and Abraham (2021).

Figure A2



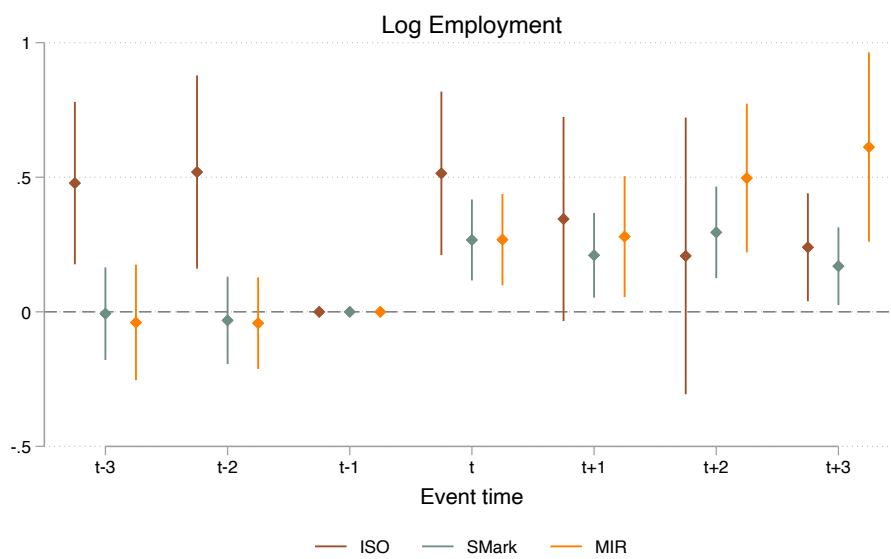
PSM, Sun and Abraham (2021).

Figure A3



PSM, Sun and Abraham (2021).

Figure A4



PSM, Sun and Abraham (2021).

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