



Financial constraints on exporting: Preliminary evidence from Rwanda's Export Growth Fund

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- Industrial policies are a major tool for governments to foster and direct industrial development, but evidence about their effectiveness remains scarce.
- The Export Growth Fund (EGF) provides subsidised loans to Rwandan exporters and potential exporters (10–12% interest vs. market rates of 17–19%).
- This brief provides preliminary evidence of the impact of EGF on firm outcomes, matching loan and administrative data of EGF recipients and non-recipients.
- Benefiting firms grew revenues by about 50%, expanded permanent employment by 30%, and were 10 percentage points more likely to export. Increased tax receipts pay back EGF's costs within five years.
- This brief describes potential next steps: providing state-of-the-art impact estimates using a randomised controlled trial in the form of a door-to-door marketing campaign.

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Executive summary

Rwanda's Export Growth Fund (EGF) is a programme jointly developed by the Ministry of Trade and Industry (MINICOM) and the Development Bank of Rwanda (BRD) to increase the export performance of Rwandan firms. It offers subsidised loans at 10-12% interest rates relative to market rates of 17-19%. EGF recipients tend to be large firms and are highly concentrated in agriculture and manufacturing. In this study, we offer preliminary evidence of the impact of such subsidised loans.

Preliminary evidence, based on difference-in-differences estimates, suggests the programme has a large positive effect on business revenues and employment. Receiving the EGF is associated with an increase of approximately 50% in business revenues and 30% in the number of permanent employees. In addition, obtaining the EGF is associated with an increase of 10 percentage points in the probability of exporting. We find no evidence of any increase in the value of exports for established exporters. Overall, the effects seem to be particularly pronounced for smaller firms.

We also estimate the fiscal impact of the EGF programme. Two years after receiving the subsidised loan, firms on average increase their CIT tax payable by more than 80% and their PAYE tax payable by over 30%. We calculate that, given the additional tax revenues generated by the EGF, the programme pays for itself in less than five years. These are very promising initial results.

We propose an initiative that would (1) expand access to this promising initiative, and (2) provide a 'gold-standard' impact evaluation of a similar programme aimed at alleviating credit constraints. We propose conducting a randomised door-to-door marketing and application assistance campaign. Such a campaign could be used to identify the optimal targeting strategy and thus maximise the programme's positive impact on Rwandan firms. In addition, it could be used to expand and assess the programme's impact on potentially under-represented firms, including small and medium-sized enterprises (SMEs), women-owned enterprises, and youth-owned enterprises.

Introduction

Strong export performance is often seen as key to unleashing firm productivity and spurring economic growth. Exporters tend to be larger, more productive and more skill-intensive. Exporting firms experience improved product quality, with significant evidence of learning-by-doing.

Rwanda's Export Growth Fund (EGF) is a multi-faceted programme developed jointly by the Ministry of Commerce and Industry (MINICOM) and the Development Bank of Rwanda (BRD) to increase exports. It provides loans to

exporters and potential exporters at subsidised rates of 10-12% relative to market rates of 17-19%. From the EGF's launch in 2016 to the end of 2022, more than 120 loans were issued to 80 firms, totalling approximately RWF 25 billion (USD 21 million).

While far from negligible, this figure falls below the target of 200-500 beneficiaries and USD 50 million per year in loans targeted by MINICOM in its 2015 National Export Strategy. In order to encourage adoption, in 2023 a media campaign was launched, leading to a recent spike in firm applications. In this study, we analyse the impact of the EGF on the performance of firms that received EGF loans between 2016 and 2022.

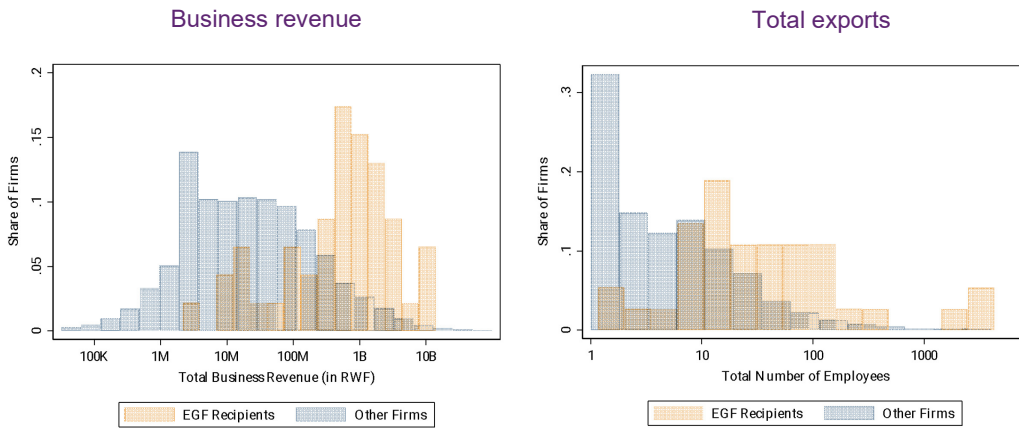
For this analysis, we combine several sources of firm-level administrative data from the Rwanda Revenue Authority (RRA) with data from the BRD on all the firms that were provided with an EGF loan, as well as the timing of each loan. The RRA data includes: (1) Corporate Income Tax (CIT) firm-level information on business revenues and tax payables, (2) Pay-As-You-Earn (PAYE) information on employment, (3) customs data on exports and imports and (4) Value Added Tax (VAT) data information. All data was accessed in a secure data facility within the RRA.

Targeting strategy

In this section, we describe how EGF recipients compare with other firms in the Rwandan economy before they receive the loan. This is therefore informative about how the EGF is targeted (but does not tell us about impact, which we discuss in the next section). Figure 1 describes the distribution of revenues and employment for EGF recipients (one year before receiving the loan) and non-recipients. Overall, firms that obtain EGF loans are much larger than other formal firms in the Rwandan economy. The median EGF recipient has annual business revenues of RWF 588 million and 27 employees, compared with median values of RWF 18 million and four employees for non-recipients. The median EGF recipient is thus larger than 90% of formal firms in Rwanda.

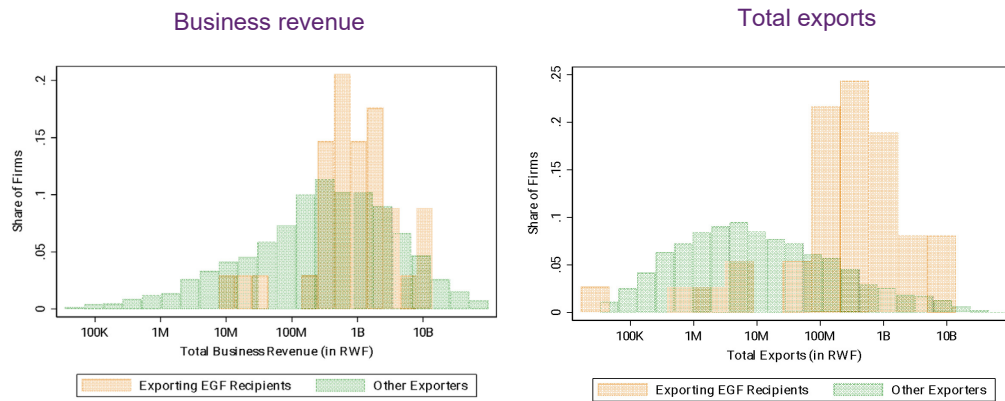
The EGF programme is targeted at exporters and potential exporters, which tend to be large. Approximately 65% of EGF recipients were already exporting prior to receiving the programme loan, compared with just 2% of other firms. Therefore, it may be more appropriate to compare their size relative to other exporters. However, Figure 2 shows that, even by this standard, exporting EGF recipients are very large.

FIGURE 1. Distribution of revenues and employment, EGF recipients vs other formal firms in Rwanda



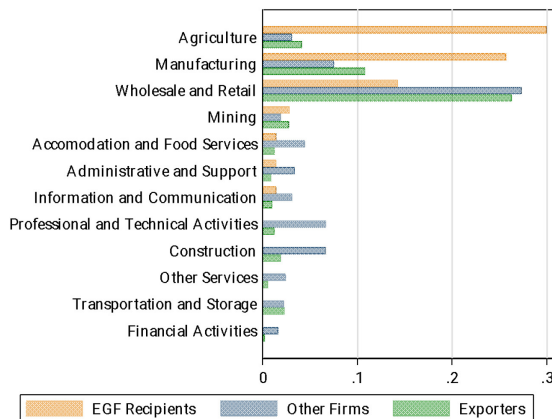
The figure shows a histogram of business revenues (left) and employment (right) for EGF recipients (one year before participating in the programme) and other formal firms in Rwanda reporting CIT and/or PAYE. Source: administrative data, RRA and BRD.

FIGURE 2. Distribution of revenues and employment, exporting EGF recipients vs other exporters



The figure shows a histogram of business revenues (left) and total exports (right) for exporting EGF recipients (one year before participating in the programme) and other exporters in Rwanda reporting CIT and/or exports. Source: administrative data, RRA and BRD.

FIGURE 3. Distribution by sector, EGF recipients vs other firms vs exporters



The figure shows the distribution of EGF recipients, other formal firms in Rwanda and other exporting firms by aggregate sector. Sector categories come from firm registration records and RRA tax filings. Source: administrative data, RRA and BRD.

In Figure 3, we show the distribution by aggregate sector of EGF recipients compared with all exporters and with all other firms in the Rwandan economy. Firms that receive the EGF are very concentrated in agricultural sectors (30% of all recipients relative to approximately 5% of all other firms, 4% of exporters) and in manufacturing (25% of EGF recipients compared with approximately 8% of other firms and 10% of exporters). The most represented industry is coffee, comprising approximately 20% of EGF recipients.

Impact of the EGF on firm performance and tax revenues

Next, we study how obtaining the EGF has affected the performance of recipients. We identify the programme's impact by applying a difference-in-differences approach: we compare the growth rates of EGF recipients (the treatment group) with those of non-EGF recipients (a comparison group), both before and after obtaining the EGF for the first time. The main challenge of this approach is the choice of comparison group. As we saw above, EGF recipients are very different from other firms in the Rwandan economy: they are larger, more likely to export, and are concentrated in agriculture and manufacturing. We therefore create a comparison group of firms using a propensity score matching technique to identify firms that look similar to recipients before they received the EGF loan based on various characteristics, including total revenue, revenue growth, employment, and sector of activity.¹

Figure 4 shows our estimates of the impact of the EGF. In these figures, we plot the estimated impact of participating in the EGF up to two years after receiving the subsidised loan ("t+2"). We find **very large increases in business revenues** (approximately 50%) **and permanent employment** (roughly 30%) two years after obtaining the loan. In addition, we find a **significant rise in the probability of exporting** (roughly 10 percentage points). We do not, however, find noticeable increases in export revenue for already established exporters. That said, the sample size of established exporters is small and thus our estimates are not very precise.²

In Figure 5 we estimate the impact of the EGF by firm size, dividing EGF beneficiaries into above and below median revenue (in the year before obtaining the loan). We find that **the impact of the EGF seems to be higher for smaller firms**. For instance, after two years, smaller firms have an average

¹ We also test alternative comparison groups, such as those that additionally match on firm purchases; results are similar to those we present here. Note that we show two different estimation methodologies to assess the impact of the EGF, both of which show similar results. The two estimation methodologies are uncorrected two-way fixed effects and a correction for treatment heterogeneity following Sun and Abraham (2021). For more information, see Section A1 of the Technical Appendix.

² Appendix A7 analyses the impact on other firm outcomes.

increase in business revenues of almost 60%, compared to about 30% for larger firms. In addition, the positive effects on the probability of exporting seem to be concentrated in the sample of smaller firms.

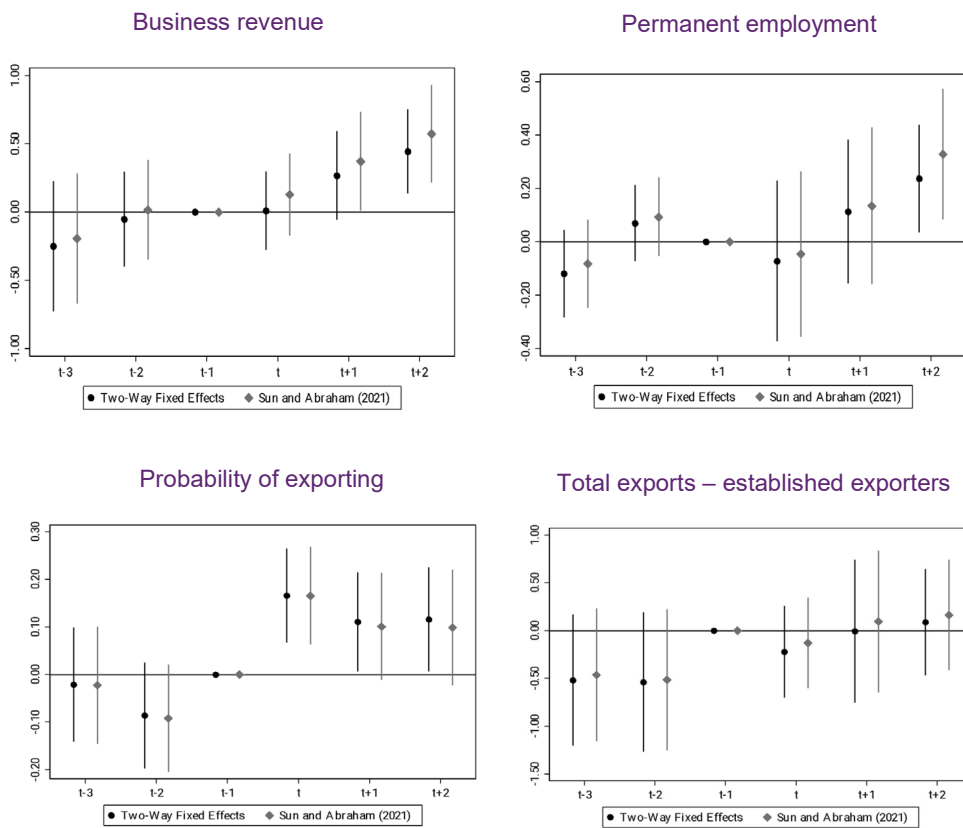
Two years after obtaining the subsidised loan, firms increased on average their CIT payable by 80-100% and their PAYE tax payable by 30-40%

We also separate the effect for recipients in the coffee industry - which account for 20% of all EGF loans - and firms in other industries. We find **larger effects for firms in non-coffee industries**, especially for business revenue and the probability of exporting.

Finally, we estimate the impact of the EGF on firm-level Corporate Income Tax (CIT) and Pay-As-You-Earn (PAYE) tax payables. With these estimations, we can assess how the EGF affects tax revenue increases and, thus, the fiscal sustainability of the programme. We find that two years after obtaining the subsidised loan, firms increase on average their CIT payable by 80-100% and their PAYE tax payable by 30-40%.

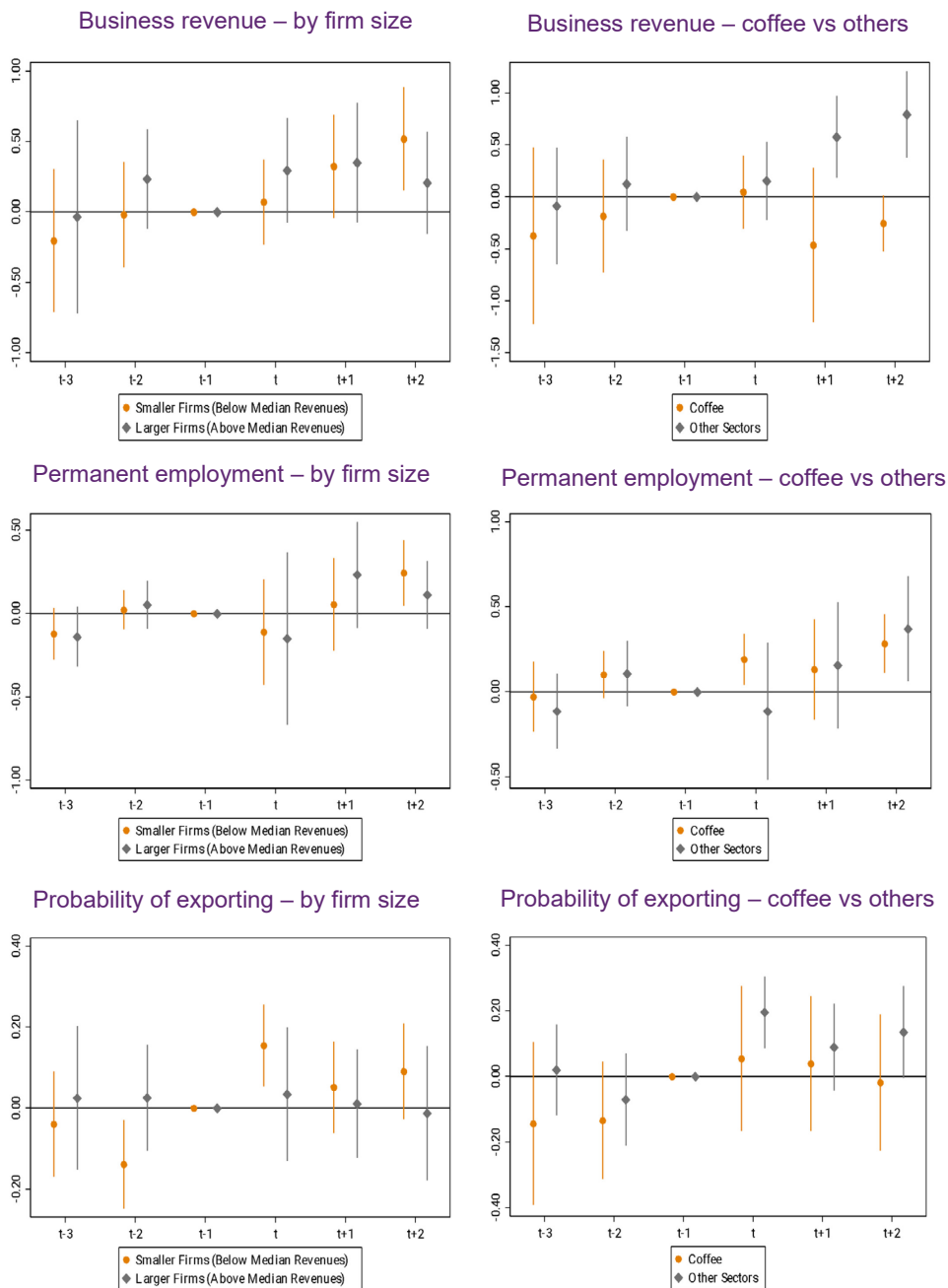
Given the average tax bill of EGF recipients, this translates to approximately **RWF 17 million additional CIT payable and RWF 1.2 million additional PAYE tax payable** per year for each EGF recipient. Between 2016 and 2022, there were 80 EGF tax recipients, leading to an estimated total increase in tax revenues of approximately RWF 1.4 billion (USD 1.06 million), as seen in Figure 7. Importantly, this calculation considers only first-time EGF loans. According to MINICOM, the total cost of loans from 2016 to 2022 was RWF 6.4 billion (USD 5.16 million), suggesting that the increase in tax revenues associated with the EGF surpassed the total costs of the programme in less than five years. Remarkably, this implies that **the tax revenues covered the programme's costs within a timeframe shorter than the programme's duration** (2016-2022).

FIGURE 4. Estimated impact of the EGF on firm performance comparison group: constructed from propensity score matching



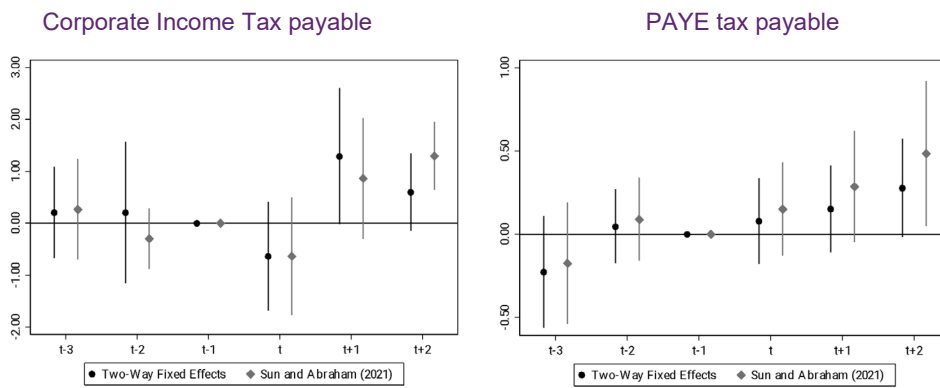
The figures above show the estimated impact of obtaining the EGF in percentages (for business revenue, employment, and total exports) or percentage points (for the probability of exporting). Time "t" refers to when an EGF loan was first obtained. Similarly, the coefficient at time "t+2" refers to the effect of the EGF two years after receiving the loan. The periods from t-3 to t-1 are 'placebo' periods, 1-3 years before the loan was disbursed, so there should not be a 'treatment effect' in these years (if there were, we would worry that the match to the comparison group was not good enough). The coefficients plotted are at the 95% confidence interval. The comparison group is obtained using propensity score matching, which includes firms above P10 of the treatment distribution. The effects are estimated using two-way fixed effect regression and following the correction for treatment heterogeneity of Sun and Abraham (2021). For more details on the estimation, see Section A1 of the Technical Appendix. Source: administrative data, RRA and BRD.

FIGURE 5. Estimated impact of the EGF – heterogeneity by size and sector
comparison group: constructed from propensity score matching



The figures above show the estimated impact of obtaining the EGF in percentages (for business revenue, employment) or percentage points (for the probability of exporting). The first column separates the impact for firms above median revenues (smaller firms) and firms with above median revenues (larger firms). The second column separates the impact for firms in the coffee sector (approximately 20% of recipients, see Appendix A8 for more information) and firms in other sectors. Time "t" refers to when an EGF loan was first obtained. Similarly, the coefficient at time "t+2" refers to the effect of the EGF two years after receiving the loan. The periods from t-3 to t-1 are 'placebo' periods, 1-3 years before the loan was disbursed, so there should be zero 'treatment effect' in these years. The coefficients plotted are at the 95% confidence interval. The comparison group is obtained using propensity score matching, which includes firms above P10 of the treatment distribution. The effects are estimated using the correction for treatment heterogeneity of Sun and Abraham (2021). For more details, see Section A1 of the Technical Appendix. Source: administrative data, RRA and BRD.

FIGURE 6. Estimated impact of the EGF on firm taxes paid



The figures above show the estimated impact of obtaining the EGF in percentages (for both CIT payable and PAYE tax payable). Time "t" refers to when an EGF loan was first obtained. Similarly, the coefficient at time "t+2" refers to the effect of the EGF two years after obtaining the subsidised loan. The periods from t-3 to t-1 are 'placebo' periods, 1-3 years before the loan was disbursed, so there should not be a 'treatment effect' in these years (if there were, we would worry that the match to the comparison group was not good enough). The coefficients plotted are at the 95% confidence interval. The comparison group is obtained using propensity score matching, which includes firms above P10 of the treatment distribution. The effects are estimated using traditional two-way fixed effect regression and following the correction for treatment heterogeneity of Sun and Abraham (2021). For more details on the estimation, see Section A1 of the Technical Appendix. Source: administrative data, RRA and BRD.

FIGURE 7. Aggregate impact of the EGF on tax revenues

	Estimated impact	Estimated impact per beneficiary	Total estimated impact (all 80 beneficiaries)
Corporate income tax	↑ 80%	↑ RWF 17 million	↑ RWF 1.3 billion
PAYE tax	↑ 30%	↑ RWF 1.2 million	↑ RWF 100 million

The table above shows the estimated impact of the EGF on tax revenues. Column 1 shows the effect on firm-level CIT and PAYE tax payables as a percentage. Column 2 translates these effects into monetary amounts (RWF) using the tax payable of EGF recipients. Column 3 provides the total estimated impact of the EGF beneficiaries on tax revenues.

Next steps: door-to-door marketing campaign

Our preliminary results suggest large potential effects of subsidised access to credit through the EGF on business revenues, employment, and the probability of exporting. In addition, we find significant positive effects on tax revenues, which point to the fiscal sustainability of the programme. While we view these results as encouraging for the potential of the EGF, our estimation depends on informative but potentially imperfect comparison groups, which may not be fully comparable with EGF recipients. In addition, the number of recipients has been relatively low, compared to initial targets, with particularly limited take-up among SMEs - the firms that exhibit the greatest gains from the EGF, according to the above analysis.

To address this, as a next step, we will conduct a randomised door-to-door marketing campaign for Rwanda's Export Credit Guarantee Facility (ECGF): a related programme aimed at alleviating financial constraints for exporters, potential exporters and firms in export value chains by lowering collateral requirements. The campaign will address both of the issues described above, potentially fostering take-up and improving targeting of the ECGF, while simultaneously providing the tools for a rigorous 'gold-standard' impact evaluation of the programme.

In the campaign, we will first identify a large pool of high-promise potential ECGF recipients using administrative data and pre-screening surveys. Next, we will conduct a door-to-door outreach campaign offering tailored information and application assistance to randomly selected firms from this pool of high-promise firms. The randomised nature of the campaign will also enable us to assess the impact of the ECGF in a highly rigorous manner, as the control group (those who do not get the outreach campaign) is an on-average perfect match for treated firms (those who do) – meaning the only difference between the two is that the treated firms will be more likely to take up the ECGF. Therefore, we can be confident that any difference between the two groups seen after the loan is disbursed is due to or caused by the ECGF loan. Such rigorous evaluation has become the gold standard worldwide, with results informing evidence-based decision-making by policymakers and donors.

In addition to accessing administrative data, the research team will conduct surveys with firms in both treatment and control groups in the year or two following the outreach campaign. The surveys will solicit firms' feedback on the ECGF, inform potential ways to improve the programme's future design, and collect additional information to complement the administrative data for the full impact evaluation analysis.

This programme will also help identify the ideal targeting strategy of the ECGF (e.g. established exporters or potential new exporters, firms in export value chains, smaller or larger firms) and identify potential barriers to adoption. It will help expand access to firms that are currently under-represented among beneficiaries, including SMEs, women-owned enterprises, and youth-owned businesses. Finally, this randomised door-to-door campaign will be leveraged to assess the effects of the programme on firms in different stages of the value chain, including suppliers of exporting companies.