Gender and Competition in High-Stakes Tasks: Evidence from Bank Lending

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ABSTRACT

We study gender differences in responses to competitive incentives in complex, high-stakes tasks. In a randomized field experiment with a large commercial bank, 50 branches are assigned to a multi-category contest, piece-rate incentives, or a control group for six months, to increase lending to women-owned or -led small and medium enterprises (WSMEs). The intervention targets lending to entrepreneurs operating larger, growth-oriented firms, as we observe USD $34 million in lending to new WSME borrowers across the treatment and control groups. Both incentive schemes increase lending to WSMEs, apparently at little cost to other operations. Notably, female loan officers (55% of our sample) outperform men in both treatments, but particularly under the contest (about double the effect size). Exploring a range of mechanisms using detailed survey data, we do not find consistent support for selection, networks, effort reallocation, or screening behavior as primary drivers. The results provide field evidence that women can respond strongly to competition in complex, real-world settings, with implications for both gender gaps in performance and the design of incentive contracts.

Keywords: WSME finance, banking, gender, financial inclusion, randomized controlled trial, Vietnam

JEL codes: J16, O16, G21, O12

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1 INTRODUCTION

Understanding gender differences in economic behavior is central to both equity and efficiency. If women face barriers to performance or advancement in competitive environments, this may contribute to persistent gender gaps in earnings, leadership, and firm outcomes. At the same time, if these gaps reflect distortions in incentives or organizational design rather than underlying ability, they may lead to inefficient allocation of talent. A large literature studies gender differences in competition, often finding that women are less likely to enter competitive environments in laboratory settings (e.g., NiederleVesterlund2007), and performing relatively worse in direct competition with men. However, there is limited evidence on how women perform under competitive incentives in real-world, high-stakes environments involving complex tasks.

This paper provides field evidence on gender differences in responses to competition in a setting where workers face consequential, multidimensional decisions. We study a randomized experiment conducted with a large commercial bank in Vietnam, a fast-growing emerging economy. Bank branches are randomly assigned to one of three groups: a multi-category contest, piece-rate incentives, or a control group, implemented over a six-month period. The incentives are designed to increase lending to women-owned or -led small and medium enterprises (WSMEs), a segment that is often underserved by emerging market bankss.

Our main finding is that female loan officers respond more strongly than male loan officers to competitive incentives. While both incentive schemes increase lending to WSMEs, the contest generates substantially larger effects among female agents (about double the effect size), leading them to outperform their male counterparts along key performance margins. These effects are economically meaningful and arise in a setting involving high stakes, complex screening decisions, and real financial outcomes. We find no evidence that these gains reflect strategic distortions. Increased lending under the contest does not reduce loan size, crowd out lending to other clients, or lead to higher delinquency rates. This suggests that improved performance reflects genuine increases in effective effort or targeting rather than reallocation across margins.

To shed light on mechanisms, we use detailed survey data to examine a range of candidate explanations, including selection, networks, effort allocation, screening behavior, and motivation. While we do not find consistent evidence supporting any single channel, the results help rule out several leading explanations, including differences in observable experience, exposure to WSME networks, or systematic shifts in time allocation. The pattern of findings is consistent with differential responses to competitive incentives that are not fully captured by standard observable measures.

A large literature studies gender differences in competition, with a primary focus on selection into competitive environments. Seminal work by Niederle and Vesterlund (2007) shows that, conditional on ability, women are significantly less likely than men to enter tournament-style compensation schemes, despite similar performance under piece-rate incentives. Subsequent work attributes these differences to a combination of factors, including confidence, preferences for competition, and social norms, and documents that gender gaps in competitive entry are robust across a wide range of settings (e.g., Niederle, Segal, and Vesterlund (2013); Croson and

Gneezy (2009)). Survey evidence further highlights the role of beliefs and social context in shaping competitive behavior (**NiederleVesterlund2011<empty citation>**). This literature has been influential in explaining gender gaps in labor market outcomes, including sorting into occupations and advancement into competitive, high-reward roles.

While the literature provides strong evidence on entry into competition, there is comparatively less evidence on performance under competition, particularly in real-world settings involving complex, multidimensional tasks. Early experimental work shows that competitive incentives can differentially affect performance across gender, though results depend on context and task structure (Gneezy, Niederle, and Rustichini (2003)). Much of this evidence, however, comes from laboratory or stylized environments with relatively low stakes, raising concerns about external validity. In many economic settings, including financial intermediation, workers must perform tasks that involve screening, client acquisition, and strategic decision-making under uncertainty, where performance depends on multiple margins simultaneously. How gender differences in responses to competition manifest in such environments remains largely unexplored.

This paper contributes to the literature by providing field evidence on gender differences in responses to competitive incentives in a high-stakes, naturally occurring environment. We study a randomized experiment in which workers are exposed to tournament-style and piece-rate incentives in a complex task involving credit allocation. In contrast to prior work emphasizing selection into competition, we focus on performance among workers already engaged in their roles. We show that female agents respond more strongly to competitive incentives and outperform male agents along key performance margins, without evidence of adverse trade-offs in loan size, portfolio composition, or loan quality. These findings complement the existing literature by demonstrating that women can perform strongly under competition in real-world environments and by highlighting the importance of incentive design in shaping gender differences in performance.

2 CONTEXT AND INTERVENTION

In this section, we briefly review the context of SME lending, and lending specifically for women entrepreneurs, in Vietnam. We then present the interventions that we test in this paper, which are intended to overcome constraints to WSME lending.

2.1 Context: Bank Lending and Women Entrepreneurs in Vietnam

Vietnam has been one of the world's fastest-growing economies in recent decades, driven by inward foreign direct investment and export promotion that followed the end of central planning in the late 1980s and the advent of meaningful Doi Moi reforms in the early 1990s (OECD 2021). The primary focus of Vietnam's economy has transitioned steadily over time, centering on agricultural exports in the 1990s and labor-intensive manufacturing products such as apparel in the early 2000s. Today, electronics account for half of the country's export value (ibid.). Vietnam's transition into

value-added production has leveraged its relatively advanced education sector. This has generated opportunities for MSMEs, with entry rates of around 100,000 enterprises annually in recent years.[1]

In Vietnam, these structural changes have been paralleled by government efforts to promote SMEs, though these have seen mixed success. Vietnam's initial entrepreneurship and SME policies date back to 2001, when a law was created that defined SMEs,[2] and established an SME development agency. In 2017, a new SME Law was introduced, which covered topics such as taxation, innovation, value chain development, and access to finance. In terms of finance, the Law aimed to facilitate easier access to finance for SMEs by incentivizing banks to allocate at least 30% of their loans to SMEs, with additional tax incentives for startups. Additionally, provincial credit guarantee funds were established, though their effectiveness varies across regions. Private sector initiatives, such as tech startup funds and sector-specific support schemes, have also contributed, particularly for SMEs in emerging sectors like technology and innovation. However, Vietnam still has a significant informal sector, and thus far efforts to formalize informal enterprises have seen mixed success (OECD 2021).

Despite such progress, a significant credit gap persists, especially for women-owned SMEs. According to the General Statistics Office of Vietnam (Viet Nam 2015), MSMEs account for over 98% of all businesses in Vietnam and contribute around 40% of the country's gross domestic product (GDP). However, access to finance remains a significant challenge, particularly for smaller firms. Women-owned SMEs, which represent about 21% of all formal enterprises, are often underserved by banks. These businesses frequently receive less funding and face higher rejection rates for loans, often because of insufficient collateral or perceptions of higher risk.

There has been greater attention to women's SME development since the late 2010s. This has started with efforts by banks to clearly measure lending to women entrepreneurs and then to participate in programs to enhance credit access and human capital of women entrepreneurs.

2.2 Intervention Design

We have partnered with a leading Vietnamese commercial bank to test incentives to increase WSME lending, which were agreed with management in the bank's SME Division to have two main characteristics. First, we agreed on a main outcome of interest: maximizing the *number* of new borrowing WSME customers.[3] Second, we agreed to compare the relative effects of a straightforward piece-rate incentive against a more competitive performance pay system, which

[1] Premia TNC. "Vietnam SME: The Road to Business Success." 4 October 2023. https://premiatnc.com/vn/blog/vietnam-sme/.

[2] Vietnam's SME definitions were updated in the 2018 SME Law, and include definitions based on employees, capital, and revenue. In terms of employees, enterprises with up to 10 employees are considered micro, those with 11–100 (agriculture, forestry, fishery, industry, and construction) or 11–50 (trade and services) are considered small, and those with 101–200 (agriculture, forestry, fishery, industry, and construction) or 51–100 (trade and services) are considered medium.

[3] This paper reports on the results of the phase of this intervention implemented from February to July 2024. There was an earlier attempt to conduct the same experiment in July–December 2023, which faced implementation challenges that prevented effective execution of the intervention. These challenges were addressed in the reported phase.

we call the “contest.” As a result, we designed our study to include two treatment groups and a control group.

The bank, and specifically the SME Division, had prior experience with performance pay incentives. About 50% of lending agents’ pay is based on fixed salary, about 25% is based on performance pay according to Key Performance Indicators (KPIs) focusing on overall portfolio size and quality, and about 25% is based on various incentive programs, which included our program. The other incentive programs typically employ piece-rate rewards for products sold. This could include loans, but also other products such as business accounts, payroll products, business credit cards, trade credit products, and so on. The typical piece rate in these other programs is D500,000 (approximately $20). There were no other incentive programs that specifically targeted women entrepreneurs for regular lending, around and during the time of this study.

2.2.1 Lending Agent Incentives

Incentives within each of the two main treatments were calibrated to result in approximately the same budgets for each of the two treatment arms. Ensuring exactly the same budget was not possible, given that the budget for Treatment 1 was fixed by design whereas the budget for Treatment 2 was dependent on the actual number of WSME loans secured in treated branches.

Treatment 1: The Multi-Category Contest. The contest was designed to optimize competition between lending agents in seeking new WSME clients. It was motivated by the observation that complex tasks with uncertainty in outcomes are often compensated through performance pay mechanisms. At the same time, the contest was designed to be inclusive, in that it offered a schedule of awards, and included subcategories for newer lending agents (“rookies”), and more experienced lending agents who had little prior lending. This inclusive approach was designed to mitigate uneven distribution of effort in winner-take-all contests. At the same time, it offered a convex award schedule, offering outsize rewards to the top performers. Lending agents competed with a large group of agents from other branches in their branch’s group, not just agents within their branch, to mitigate the potential for social tension or collusion.

Hence, the contest has three main categories, which we describe in more detail below. The *ex ante* design of the contest is summarized in Table 1, which is based on available awards, and staff numbers estimated as of December, 2023. In practice, the actual monthly staff numbers could evolve during the intervention phase from February, 2024 to July, 2024. We report relative to averages of the monthly staff numbers over the intervention period.

- **Top WSME lending agents:** This award is for the agents who brought in the most new and inactive (no active loan balance in past 6 months) WSME borrowers in a group, in a focal month. All post-probation lending agents were eligible.

  - *Group 1*: There were 10 potential awards each month across treated urban branches, which was designed with 9% odds of winning. In practice, on average, there were 110 eligible lending agents, leading to average monthly odds of 9%. Average award value was about $82 and increased with rank (Table **??**).
  - *Group 2*: There were 5 potential awards each month across treated rural branches, which was designed with 7% odds of winning. In practice, on average, there were 91 eligible lending agents, leading to average monthly odds of 6%. There was an average award value of about $104 that also increased with rank.

- **Most improved WSME lending agents:** This award is also for the agents who brought in the most new and inactive WSME borrowers, but limited to the pool of agents with at least 366 days of continuous tenure at Vietnam Prosperity Bank as of the first day of the month, and a low volume of WSME lending over the previous year (maximum of 2 WSME loans in the past 12 months).
  - *Group 1*: There were 5 potential awards per month, which was designed for a success rate of 10%. However, in practice, only 8 lending agents were eligible on average, leading to a 60% expected success rate.[4] The average award amount was about $72 and increased with rank.
  - *Group 2*: There were 3 potential awards per month, with a designed success rate of 11%. In practice, there were on average 16 eligible lending agents per month, leading to an expected success rate of 19%. The average award amount was about $80.

- **Best new WSME lending agents:** This award for most new WSME borrowers is limited to agents who have 365 days or less of continuous tenure at Vietnam Prosperity Bank as of the first day of the month and have passed the typical 2-month probation period.
  - *Group 1*: There were 5 potential awards each month in this category, with a designed success rate of 12%. In practice, on average there were 54 eligible rookies per month, leading to a 9.3% monthly expected success rate. The average award amount was about $72.
  - *Group 2*: There were 3 potential awards per month, with a designed success rate of 8%. In practice, there were on average 45 eligible lending agents per month, leading to an expected success rate of 6.7%. The average award amount was about $80.

Candidates were eligible to win all awards for which they qualified. For instance, a high-performing lending agent with less than 365 days of tenure could win an award in both the "Top winners" category and the "Best new WSME lender" category. This means that the probability of winning was additive for staff in the second two categories.

[4] The high potential success rate in this category owes largely to substantial departures of qualifying agents in this category from the bank prior to the start of the study. Despite the high potential success rate, few awards were actually given in this category, as most eligible staff had exited the partner bank.

Table 1: Awards Available and Expected Odds of Winning by Group

Number of Awards Available			Expected Odds of Winning		
Top Winners	**Most Improved Lenders**	**Best New WSME Lenders**	**Top Winners**	**Most Improved Lenders**	**Best New WSME Lenders**
Group 1 (4 branches)					
10	5	5	0.09	0.10	0.12
Group 2 (12 branches)					
5	3	3	0.07	0.11	0.08

Source: Authors.

Furthermore, all categories are only applicable to staff who had at least one WSME loan to a new client in the month, so the award numbers are potential, as an award could go unrewarded if there are no qualifying agents. At the same time, ties could lead to more agents receiving an award than planned, if enough agents qualify for the last award slot in a given category. We report on realized awards in Section 3.2.4.

The contest was conducted among lending agents across all branches *within* each group (i.e., within Group 1 or within Group 2). This "pooled, inclusive contest" approach has several advantages:

1. It makes all the contest categories feasible. For instance, some individual provincial branches may not have new lending agents, so the "Best new WSME lender" category would not be meaningful if it were restricted to the branch level.

2. It reduces social tensions within branches, as there are no explicit within-branch contests (though branch staff still compete with each other because they are all part of the same group).

3. It reduces the chances of collusion between lending agents, which has been shown to reduce the effectiveness of relative incentives (e.g., Bandiera, Barankay, and Rasul 2005).

The multi-category contest design was meant to reduce the discouragement effects from winner-take-all designs with heterogeneous participants (Baye, Kovenock, and Vries 1993; Baik 1994; Gradstein 1995). We employ a convex award schedule within each award category, with relatively smaller gaps between award amounts as we go down the table of awards, which has been shown to be theoretically optimal (Lazear and Rosen 1981; Moldovanu and Sela 2001). The full monthly award schedule is presented in Table **??** in the Appendix. Ties in performance lead to prize crowd-out; for example, if two agents tie for first place, then they receive the first-place award, but then there is no second-place award.

We also introduced a random draw incentive, whereby in each of the four (treatment x group) combinations there is an end-of-phase lottery to draw an iPhone. The odds for each lending agent in

this draw were directly proportional to the number of WSME loans they had issued in the quarter—that is, calculated as the proportion of WSME loans they had issued in their (treatment x group) cohort. For example, if Group 1/Treatment 1 has 150 new WSME loans, and Agent A sells 1 loan, (s)he has 1/150 odds for the iPhone, while Agent B with 6 loans has 6/150 odds.

Treatment 2: The Piece Rate. Lending agents received a fixed piece rate of D2 million (approximately $80) for each WSME loan they issued. This is about four times as generous as the typical piece rate offered in other lending agent incentive programs run by the partner bank's SME Division.

2.2.2 Branch and Manager Incentives

The focus of our interventions is on testing variation in pecuniary incentives at lending agent level. Designing these same manager-level incentives into both treatments is meant to keep the focus of comparison between the treatments on the differing levels of *inter-agent competition* in our two treatments. However, to ensure cooperation and participation from branch-level staff and branch managers, and incentivize alignment at all levels, we also include identical contest incentives in *both* treatment arms that were awarded to branches and branch managers. This is intended to align incentives between agents and their managers and thereby make it more likely that managers will clearly communicate the incentive scheme to their agents and support the scheme with the agents under their supervision.

The between-branch contest incentives consisted of top lending awards at the branch level, awarded on a quarterly basis. For Group 1 (urban) branches, there were 3 branch-level awards each quarter, with values ranging from approximately $200 up to $600, depending on a branch's level of performance in the quarter. This means the chances of winning were 3/8 (37.5% could be awarded) per quarter in Group 1 branches. In Group 2 branches, there were 7 awards, with values ranging from $80 to $320, so that 7/24 = 29.2% could receive an award per quarter. These awards are summarized in Appendix Table **??**. These branch-level awards were announced to all staff in treatment branches.

The contest incentives also consisted of top lending awards at the branch manager level, which were awarded on a quarterly basis (e.g., two times in each group during the studied intervention, for a total of four awards). The amount of the reward is $200 each time. The chances of winning are proportional to the number of branches in a group, in each quarter—that is, 1/8 in Group 1 (12.5%) and 1/24 (4.2%) in Group 2. These awards are summarized in Appendix Table **??**. The branch manager incentives were provided secretly (private announcement only).

2.2.3 Defining Our Study's Main Outcome of Interest

A qualifying credit product application needed to be the first credit product for a new WSME client with the partner bank in one of the following categories:

- Normal term loans, including both collateralized loans and uncollateralized loans;
- Overdraft credit facilities that allow clients to take out more from their bank accounts than they have, up to an agreed-upon limit.

This excludes certain SME credit products such as business credit cards or trade credit.

The new WSME client also had to fit the following specific characteristics:

- Be categorized as what the partner bank terms a “Micro” borrower, which means having annual revenue below about $2.5 million;
- Qualify as what the bank categorizes as a “woman enterprise” (WE), which means the enterprise is woman-owned (at least 50%) or woman-led (at least 50% of company directors are women).

Agents were credited for WSME loans in the month in which the loan application was submitted. For a loan to contribute to the final count for the agent (and their branch) in a particular month, loan approval had to be secured by the 14th day of the month following the application month. If approval occurred on the 15th or later of the subsequent month, the loan was assigned to the loan count for that month after the original focal month. Actual loan disbursement might not occur until subsequent months, but this does not affect the month to which the loan was assigned. Awards were finalized by the end of the month following each focal month.

2.2.4 Overall Award Amounts

The realized amounts of awards were relatively balanced between the two treatment arms, in spite of the fact that the piece-rate allocation was particularly dependent on actual lending. Overall, a total of $18,740 was spent for the contest, and $20,680 was spent on the piece-rate treatment arm.

2.2.5 Scoring Adjustment for Contest Intervention to Account for Variation in Supply of WSMEs Between Provinces

Scoring rules varied slightly between the two branch groups based on the assumption that lending opportunities were relatively more balanced across branches within branch Group 1 than within branch Group 2.

In Group 1, loans were weighted uniformly between branches (e.g., 1 loan in branch A counted the same as 1 loan in branch B, for award purposes). In Group 1 the branches are located in high-density urban areas and economic zones, so we assumed that there is a steady supply of WSMEs across all locations.

However, in Group 2, for both monthly individual awards and quarterly branch and manager awards, the total number of successful loan applications by new WSME clients were adjusted based on a provincial WSME supply index. The provincial WSME supply index was calculated as the ratio of the province’s proportion of women-owned enterprises to the province with the highest

proportion of women-owned enterprises, based on the 2020 Vietnam Enterprise Census. This correction aimed to account for the significant variation in the supply of WSMEs across provinces, which can range from 12% to 38%. This was intended to level the playing field, by giving more credit to Group 2 lending agents who sold a WSME loan in a province with a relatively low proportion of WSMEs, compared to a Group 2 lending agents in a province with a relatively high proportion of WSMEs.

2.2.6 Communication

Communication about each intervention was designed to be as equal as possible across the two treatment arms, so that differences in outcomes between treatments cannot be attributed to differential information sets of the agents. The bank provided information about the interventions in advance of each phase. Then, every 2 weeks, the bank provided email updates to all staff (lending agents and managers) on the progress of WSME lending performance at the branch level, along with a "leaderboard" for the top performers at the lending agent level within each group. Namely, staff at Group 1 branches only see results from Group 1, and staff at Group 2 branches only see results from Group 2.

This communication approach, particularly the mid-month update on progress within the month, should reduce uncertainty about performance, which should improve the effectiveness of the interventions (Lazear and Rosen 1981; Delfgaauw et al. 2014). Staff could also update their beliefs about their relative performance through learning about the actual award winners in the end-of-month updates.

3 RESEARCH DESIGN

In this section, we describe our research design. First, we describe the experimental design. Then we report on the actual allocation of treatment, through balance checks. Finally, we describe our econometric frameworks for analyzing treatment effects at the agent level.

3.1 Experimental Design

Our study is conducted in the 50 branches of the bank that conduct Micro (as defined by the partner bank) WSME lending. Ten of these branches (five each in the major urban centers of Hanoi and Ho Chi Minh City) focus exclusively on Micro SME lending. These branches tend to be larger, with a larger number of sales agents divided into a small number of teams, under team managers and an overall branch manager. The other 40 branches, sometimes called "provincial," target both Micro and "Upper" SME clients (though our incentives are always exclusively targeted at Micro SME clients in both sets of branches).

We allocate the branches into two groups. Group 1 includes the 10 specialized Micro SME branches, along with 3 high-performing provincial branches. Group 2 includes the remaining 37 provincial branches. We implement the interventions and stratify treatment *within* these groups.

We present summary statistics on lending in the 12 months prior to the pilot intervention, in Table 2. The average lending agent in Group 1 sells 0.19 Micro WSME loans per month, whereas the average Group 2 lending agent sells 0.13 per month. Average monthly lending volumes are $8,484 and $9,221, respectively. We can also observe that lending to non-WSMEs in the Micro category is about three to five times as large.

Table 2: Agents' Average Lending Performance in 12 Months Prior to Intervention Period, by Group

Variable	Group 1 (Urban)			Group 2 (Provincial)		
	No.	Mean	SE	No.	Mean	SE
Number of new Micro WE loans (/month)	2,916	0.19	0.01	1,959	0.13	0.01
Number of new Micro non-WE loans (/month)	2,916	0.88	0.05	1,959	0.52	0.03
Number of new non-Micro WE loans (/month)	2,916	0.01	0.00	1,959	0.04	0.01
Volume of new Micro WE lending ($/month)	2,916	8,484	753	1,959	9,221	762
Volume of new Micro non-WE lending ($/month)	2,916	37,358	2,477	1,959	33,221	1,864
Volume of new non-Micro WE lending ($/month)	2,916	1,110	403	1,959	8,270	1,289

SE = standard error, WE = woman enterprise.
Exchange rate: $1 = D25,000.
Note: Agent-level performance from July 2022 to June 2023, before the pilot intervention phase, represents the number of agent-month observations, i.e., it is the sum of the number of active agents in each of the 12 months. During this period, in Group 1, the monthly minimum number of agents is 198 (July, 2022) and the monthly maximum number of agents is 265 (June, 2023). In Group 2, the equivalent numbers are 127 (July, 2022) and 190 (June, 2023).
Source: Authors' calculations.

Within each group, branches are divided approximately into thirds, for the two treatment arms (piece rate and multi-category contest), and the control.[5] The interventions ran for 6 1-month segments from February to July 2024. Namely, the contest intervention "reset" at the end of each month, with each agent's count returning to zero at the start of the next contest month. Meanwhile, piece rates are awarded on a continual basis.

3.1.1 Randomization

A matched pair randomized design was used. This design first stratified branches by group. For the pilot, within each group, the branches were sorted in order based on administrative data on the number of WSME loans over the 12-month period from April 2022 to March 2023. In Group 1, branches were put in triplets of ascending rank (e.g., those ranked 1–3, 4–6, etc.). Within each triplet, branches were randomly assigned to each of the three arms (Control, Treatment 1, or Treatment 2). In Group 2, the branches were grouped in sets of nine based on the order of ranking

[5] This RCT was cross-randomized with an RCT testing a different set of interventions, which ran partly in parallel. In what follows, we report on the randomization with respect only to the current RCT, not the full cross-randomized design. Where relevant, we control for the presence of any other randomized treatment interventions.

of numbers of WSME loans (e.g., those ranked 1–9, 10–18, etc.). Within each set of nine, three branches were randomly assigned to each of the three arms. Branches were then re-randomized for the phase considered in this study. Re-randomization was conditional on the prior allocation; i.e., each branch was allocated to a new treatment arm.

We present balance checks in Appendix Table **??**. Balance checks allow us to verify that the randomization was successful in producing statistically balanced treatment and control groups, so that differences between them represent real treatment effects rather than differences in group selection. To do so, we compare agent-level averages of variables between the two treatment arms and control (the first and second column, for T1 and T2, respectively, in consecutive rows) and between T1 and T2 (the third and fourth column), across 12 months from July, 2022, to June, 2023, through t-tests. We report on the p-value of the t-tests; if p-val. > 0.05 then we fail to reject the null hypothesis that the two groups being compared are statistically balanced. We focus on lending outcomes including the number of loans in a number of categories, then separated by gender (including the number of new micro-loans to women SMEs, our target intervention outcome), and the number of female lending agents. While the selected variables provide good coverage of lending outcomes and gendered staffing levels, they do not address secondary business outcomes like differences in lending volumes or other product sales, and they do not address potential differences in baseline attitudes or behaviors of lending agents or branch managers, among others. However, they are still reasonably comprehensive and confirming balance across this set of variables provides reassurance that the randomization was successful.

Table **??** shows there is no evidence of imbalance between the two treatment arms, or between the two treatment arms and the control, based on the selected balancing variables. Nearly all p-values are above 0.2 and many are above 0.5, indicating strong balance in all comparisons. This confirms that the randomization was successful, so the treatment effect analysis can provide insights on the true effect of the interventions.

3.2 Sample and Summary Statistics

3.2.1 Sample

Our study focuses on agents who have passed the bank's initial 2-month probation period for new agents and who have SME lending activity. Hence all summary statistics are based on eligible agents. In any given month, approximately 550 eligible lending agents and their managers are divided across the 50 branches. The urban branches tend to have much larger staff allocations, with about 22 lending agents per branch on average, while provincial branches are typically much smaller, with about 6 staff on average. So, although Group 1 only has 13 branches, it actually has a larger staff allocation, about 60% of the lending agents. Through the randomization design, we exclude about a third of agents in the control group. So, overall, about 370 staff directly participated in the interventions in any month during the study period.

3.2.2 Lending Agents and Managers

Summary statistics on lending agents are presented in Table 3. A majority (57%) of agents are women. The average number of years worked at the bank is just over 2 years, though there is significant dispersion. Notably, the minimum experience is 2.1 months, consistent with our censoring agents still on 2-month probation, who are ineligible for our study incentives. The average lending agent is 28 years old.

Table 3: Summary Statistics for Lending Agents

Variable	Obs	Mean	SD	Min.	Max.
Gender (female = 1)	554	0.57	0.50	0	1
Tenure (months)	554	24.91	25.68	2	215
Age	553	27.96	5.00	21	64

Max. = maximum, Min. = minimum, Obs = observations, SD = standard deviation.
Note: Agent-level characteristics as of June 2023, before the pilot intervention phase.
Source: Authors' calculations.

There are 87 managers divided across the branches. Typically, the provincial branches have a single branch manager, while the urban branches tend to have multiple teams of sales staff with team managers, supervised by a branch manager.

Summary statistics on managers are presented in Table 4. In contrast to agents, only 18% of managers are women. The average tenure at the bank is about 7 years. The average manager is 37 years old.

Table 4: Summary Statistics for Managers

Variable	Obs	Mean	SD	Min.	Max.
Gender (female = 1)	87	0.18	0.39	0	1
Tenure (months)	87	83.42	65.11	4	232
Age	87	36.87	4.72	29	50

Max. = maximum, Min. = minimum, Obs = observations, SD = standard deviation.
Note: Manager-level characteristics as of June 2023, before the pilot intervention phase.
Source: Authors' calculations.

3.2.3 Loans

We present summary statistics on loans *during* the intervention period in Table 5, broken down by group. This includes loans in both treatment arms and the control. Overall, we observe the allocation of $34 million in approved loan amounts for 584 loans. We observe 376 loans for $19 million in Group 1, and 208 loans for $15 million in Group 2. The average approved loan size is $50,337 in the urban branches and $72,906 in the provincial branches. The average loan contract term (tenure) is 2–2.5 years, with a longer average loan length in urban areas. Average interest rates are in the 11% range, slightly higher in provincial branches, but in line with SME lending rates at the time. Non-delinquency, defined as not having had a loan payment at least 10 days overdue,

approaches 98% across both groups. A total of 50%–60% of loans are in normal, secured lending, with a large minority share in unsecured lending and 5%–10% in overdrafts.

Table 5: Characteristics of Loans During Intervention Period, by Group

	Group 1 (Urban)	Group 2 (Provincial)
Number of loans	376	208
Total approved amount ($)	18,926,615	15,164,435
Average loan size, approved amount ($)	50,337	72,906
	(92,932)	(191,527)
Average loan terms (months)	29.42	22.44
	(27.70)	(25.44)
Average interest rate (%)	10.75	11.79
	(3.29)	(3.91)
Share of loans without delinquency (%)	97.70	97.70
Share of overdrafts (%)	4.79	9.13
Share of normal lending—secured (%)	60.91	49.52
Share of normal lending—unsecured (%)	34.30	41.35

Exchange rate: $1 = D25,000.
Notes: Characteristics of 584 loans, from both treatment and control branches. Standard deviation is in parentheses.
Source: Authors' calculations.

The distribution of loans is broken down by sector in each group in Table 6. Across numerous markets, WSMEs tend to cluster in certain sectors such as retail, food and beverages, hospitality, and fashion. On the other hand, lending may be attracted to more capital-intensive sectors, or sectors where banks have more familiarity.

We observe that the largest proportions of loans are in the wholesale and retail sectors, with 43% and 51%, respectively. However, in the urban branches, this is followed by transport and logistics, and manufacturing. In the provincial branches, manufacturing is second-ranked, followed by construction. Hence it is notable that some of the most important lending sectors remain similar across the two groups of branches.

Table 6: Distribution of Loans by Sector, by Group

Group 1: Urban Branches			Group 2: Provincial Branches		
Industry	**Freq.**	**%**	**Industry**	**Freq.**	**%**
Wholesale and retail; motorbike, automobile, and engine repairing services	161	42.82	Wholesale and retail; motorbike, automobile, and engine repairing services	106	51.21
Transportation and logistics	62	16.49	Manufacturing	36	17.39
Manufacturing	50	13.30	Construction	19	9.18
Others	103	27.39	Services and hospitality	12	5.77
			Others	35	16.83

Freq. = frequency.
Notes: Distribution of loan sectors across 584 loans from both treatment and Control branches in Group 1 (376 loans) and Group 2 (208 loans).
Percentages denote share of total loans within each group.
Source: Authors' calculations.

3.2.4 Realized Awards

We reported the awards available *ex ante* in Section 2.2.1. However, in practice, fewer or more awards could be provided than available. Fewer could be provided if there were not enough eligible winners (e.g., not enough lending agents, in a sub-category, with at least one qualifying loan). More could be provided than planned if there were ties for the last award slot.[6]

We report on the available awards against the realized awards in Table **??**. Here we can observe that the expected awards to "Top Winners" and "Best New WSME Lenders" were generally awarded. Significantly fewer tended to be awarded in the first month (February, 2024), but in subsequent months there were almost always as many prizes awarded as available. Indeed, in Group 2, two extra "Top Winners" prizes were awarded in months 2-6, and one extra prize was awarded in two different months in Group 1. However, it is also notable that fewer "Most Improved Lenders" awards were realized than planned. Most striking is that there were 0 awards across all months for this category in Group 2. In Group 1 there were also fewer awards than available, and in month 3 all 5 prizes were awarded.

3.2.5 Data and Temporal Variation

The analysis utilizes administrative data, including outcomes that were aggregated monthly throughout the study period. Administrative data were collected beginning April 2022 through the end of 2025 from internal records maintained by the partner bank, and relevant subsets of temporal coverage are used for the analysis. In particular, some descriptive analyses such as summary statistics and balance checks include pre-intervention data (prior to pilot phase) from mid-2022 to mid-2023. All of the main regression tables are based on 18 months of data, 12 pre-treatment (February, 2023 to January, 2024) and 6 during-treatment (February, 2024 to July, 2024). We also report on some post-treatment outcomes measured in 2025, e.g., for loan delinquency analysis.

3.2.6 Sample Selection

In practice, some branch-level sales agents are not involved in lending. Particularly in urban branches, some agents are assigned to roles that are focused on cultivating existing clients rather than seeking out new ones. As these agents are essentially ineligible for the incentives that we are testing, we exclude from our analysis all agents who *never* issue an SME loan (male or female) during our study period of 18+ months. This selection criterion reduces the number of lending agents by about 30%.

Our sample is focused on outcomes for our eligible lending categories—new and inactive borrowers. We exclude the category of existing, active borrowers from consideration, as their loans were not eligible for incentive rewards to loan agents.

[6] In practice, our budget was flexible enough to allow a slightly larger number of awards, where necessary.

3.3 Empirical Methodology

Agent-level treatment effects are estimated using standard linear panel models with ordinary least squares. We begin by estimating a pooled treatment specification that captures the average effect of being exposed to any incentive intervention, irrespective of treatment type. We then extend the analysis to estimate disaggregated treatment effects that separately identify the impacts of the contest and piece-rate treatments. Finally, we present heterogeneity analysis.

3.3.1 Pooled Treatment Effects Specification

The pooled treatment model provides an overall estimate of the average effect of exposure to any treatment.

Specifically, we estimate:

$$Y_{ibt} = \beta D_{\text{Treatment},b,t} + \gamma' X_{ibt} + \alpha_i + \lambda_t + \varepsilon_{ibt}, \tag{1}$$

where:

- i indexes individual lending agents,
- b indexes bank branches,
- t indexes month time periods,
- Y_{ibt} denotes the outcome of interest for agent i in branch b at time t,
- $D_{\text{Treatment},b,t}$ is a dummy equal to 1 if branch b is assigned to any treatment (contest or piece rate) at time t, and 0 otherwise,
- X_{ibt} is a vector of time-varying controls, which consist of dummies for lagged branch treatment in the t-7 pilot period in all specifications and add the interaction of the lagged treatment with whether the branch is urban or agent is female in corresponding heterogeneous treatment effect runs described in Equation 3,
- α_i are agent fixed effects,
- λ_t are time fixed effects, and
- ε_{ibt} is the idiosyncratic error term, clustered at the branch level to account for correlation in unobserved shocks within branches over time.

The coefficient β captures the pooled average treatment effect of participating in any incentive intervention, relative to control branches. This specification provides a parsimonious summary measure of the overall treatment impact before disaggregating by specific treatment arm.

3.3.2 Disaggregated Treatment Effects Specification

We next distinguish between the two treatment types—contest and piece rate—by estimating separate coefficients for each. The model is specified as:

$$Y_{ibt} = \beta_1 D_{\text{Contest},b,t} + \beta_2 D_{\text{PieceRate},b,t} + \gamma' X_{ibt} + \alpha_i + \lambda_t + \varepsilon_{ibt}, \tag{2}$$

where the variables are defined as above. The coefficients β_1 and β_2 identify the average treatment effects of the contest and piece-rate interventions, respectively.

3.3.3 Heterogeneous Treatment Effects

To explore heterogeneity in treatment impacts, we extend our analysis by interacting the treatment indicators with key agent- and branch-level characteristics. Specifically, we examine whether the treatment effects differ between (i) agents working in *rural* versus *urban* branches and (ii) *male* versus *female* loan agents. The heterogeneous effects are estimated using the following specification:

$$Y_{ibt} = \beta_1 D_{\text{Treatment},b,t} + \beta_2 D_{\text{Treatment},b,t} \times Z_{ib} + \gamma' X_{ibt} + \alpha_i + \lambda_t + \varepsilon_{ibt}, \tag{3}$$

where Z_{ib} is an indicator for the relevant subgroup characteristic, such as being located in a rural branch or being a female loan agent. The interaction term captures how the treatment effect varies with the characteristic of interest.

We estimate this model both for the pooled treatment indicator and for disaggregated treatments (contest and piece rate) separately. After estimation, we use the `lincom` command in Stata to compute the linear combination of coefficients corresponding to the subgroup-specific treatment effects (termed “lincom” in tables), and to obtain the associated standard errors. This allows us to formally test hypotheses such as whether the treatment effect for rural branches differs from that for urban branches, or whether the effect for female agents differs from that for male agents.

The resulting estimates provide insight into the heterogeneity of behavioral responses to incentive interventions, shedding light on how context and agent characteristics shape the effectiveness of performance-based incentives.

4 RESULTS

4.1 Treatment Effects

We begin by briefly summarizing the overall treatment effects. Both the contest and piece-rate incentives increase lending to women-owned or -led firms relative to the control group. The magnitude of these effects is economically substantial, consistent with improved targeting of underserved borrowers.

4.2 Gender Differences in Responses to Competition

We produce an agent-level result for heterogeneity in treatment effects by gender of the agent, in Tables 7 (number of loans) and 8 (volume). Our findings refute the patterns in the prior literature. We find quite strong evidence that female loan agents *outperform* male loan agents (the linear combination of coefficients estimate is 0.105, nearly a 50% increase relative to the control mean of 0.19, which is significant at 5%). When we disaggregate by treatment arm, we find that the female agents actually particularly *outperform* under the contest, with a very large linear combination coefficient of 0.146 (about 77% of the control mean) under the contest. There are substantial effects for the piece rate, too, but they are not statistically significant.

Table 7: Heterogeneity in the Effects of Treatment by Agent Gender, Number of WSME Loans

	(1)	(2)
Pooled treatment (Male)	0.035	
	(0.035)	
Pooled treatment x Female	0.069*	
	(0.036)	
T1—Contest (Male)		0.055
		(0.039)
T2—Piece rate (Male)		0.024
		(0.042)
T1 x Female		0.090
		(0.062)
T2 x Female		0.052
		(0.040)
Lincom est. T + (T x Female)	0.105 **	
Lincom SE T + (T x Female)	(0.049)	
Lincom est. T1 + (T1 x Female)		0.146 *
Lincom SE T1 + (T1 x Female)		(0.076)
Lincom est. T2 + (T2 x Female)		0.076
Lincom SE T2 + (T2 x Female)		(0.051)
N.	10,010	10,010
R^2	0.157	0.157
Control variables	Lagged treatment	Lagged treatment
FE	Month-by-year, Staff ID	Month-by-year, Staff ID
Cluster	Branch ID	Branch ID
Model	OLS	OLS
Mean control group	0.190	0.190

est. = estimated, FE = fixed effects, ID = identifier, N. = number, OLS = ordinary least squares, SE = standard error, T = Treatment, T1 = Treatment 1, T2 = Treatment 2
Notes: Model includes month-by-year and staff ID fixed effect and branch ID cluster. In heterogeneous effects specifications "Lagged treatment" also includes interaction of lagged treatment with Female. Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.
Source: Authors' calculations.

The patterns are somewhat different for volume. Effects on volume have less statistical significance, in part due to noise in the data. The piece-rate coefficient on volume for female loan

agents is about 73% the value of the control mean, but it is not significant (although the interaction term indicates a significant difference from male agents).

Table 8: Heterogeneity in the Effects of Treatment by Agent Gender, Volume of WSME Loans (USD)

	(1)	(2)
Pooled treatment (Male)	-4,115	
	(5,640)	
Pooled treatment x Female	8,435	
	(5,649)	
T1—Contest (Male)		-382
		(10,227)
T2—Piece rate (Male)		-6,301
		(5,108)
T1 x Female		478
		(9,695)
T2 x Female		13,599**
		(6,285)
Lincom est. T + (T x Female)	4,320	
Lincom SE T + (T x Female)	(5,098)	
Lincom est. T1 + (T1 x Female)		96
Lincom SE T1 + (T1 x Female)		(4,927)
Lincom Est. T2 + (T2 x Female)		7,298
Lincom SE T2 + (T2 x Female)		(6,111)
N.	10,010	10,010
R^2	0.081	0.081
Control variables	Lagged treatment	Lagged treatment
FE	Month-by-year, Staff ID	Month-by-year, Staff ID
Cluster	Branch ID	Branch ID
Model	OLS	OLS
Mean control group	9,750	9,750

est. = estimated, FE = fixed effects, ID = identifier, N. = number, OLS = ordinary least squares, SE = standard error, T = Treatment, T1 = Treatment 1, T2 = Treatment 2
Notes: Model includes month-by-year and staff ID fixed effect and branch ID cluster. In heterogeneous effects specifications "Lagged treatment" also includes interaction of lagged treatment with Female. Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.
Source: Authors' calculations.

These findings indicate that gender differences arise not from baseline performance, but from differential responses to competitive environments. In a setting involving complex screening and client acquisition tasks, female agents appear particularly responsive to contest-based incentives.

4.3 Robustness and Additional Margins

We find no evidence that the observed performance gains reflect distortions along other margins. In particular, increased lending under the contest does not reduce average loan size, crowd out lending to non-WSME clients, or lead to higher delinquency rates. These findings suggest that the observed effects reflect genuine improvements in performance rather than strategic reallocation.

5 MECHANISMS

To better understand the sources of the observed gender differences, we examine several classes of mechanisms using survey data collected from lending agents.

First, we consider selection and observable characteristics, including education, experience, and role type. We find no systematic differences that can account for the stronger response of female agents.

Second, we examine networks and exposure to WSME clients. Measures of networking intensity, participation in relevant associations, and baseline exposure to women entrepreneurs do not differ substantially across gender in ways that explain the results.

Third, we analyze effort allocation and strategy. While both male and female agents report reallocating time toward client acquisition under incentives, we do not find consistent evidence that female agents disproportionately shift effort toward WSMEs.

Fourth, we consider screening behavior, including rejection rates and reasons for loan denial. We do not observe systematic gender differences in screening margins that would explain the observed performance gap.

Finally, we examine motivation and performance priorities. While there is some suggestive evidence of differences in stated priorities, these do not provide a consistent explanation for the treatment effects.

Taken together, these results help rule out several leading explanations based on observable characteristics, networks, effort reallocation, and screening behavior. The remaining evidence is consistent with differential responses to competitive incentives that are not fully captured by standard measures.

6 CONCLUSION

This paper provides field evidence on gender differences in responses to competitive incentives in a high-stakes, real-world setting. We find that female agents respond more strongly to contest-based incentives and outperform their male counterparts in a complex task environment.

These findings contribute to the literature on gender and competition by showing that women can perform strongly under competition in naturally occurring settings, in contrast to evidence from laboratory experiments on competitive entry. More broadly, the results highlight the importance of incentive design in shaping performance and suggest that competitive schemes may help unlock underutilized talent without generating adverse trade-offs.

Understanding the mechanisms underlying these responses remains an important direction for future research. While our analysis helps rule out several leading explanations, further work is needed to identify the underlying drivers of differential responses to competition in real-world environments.

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