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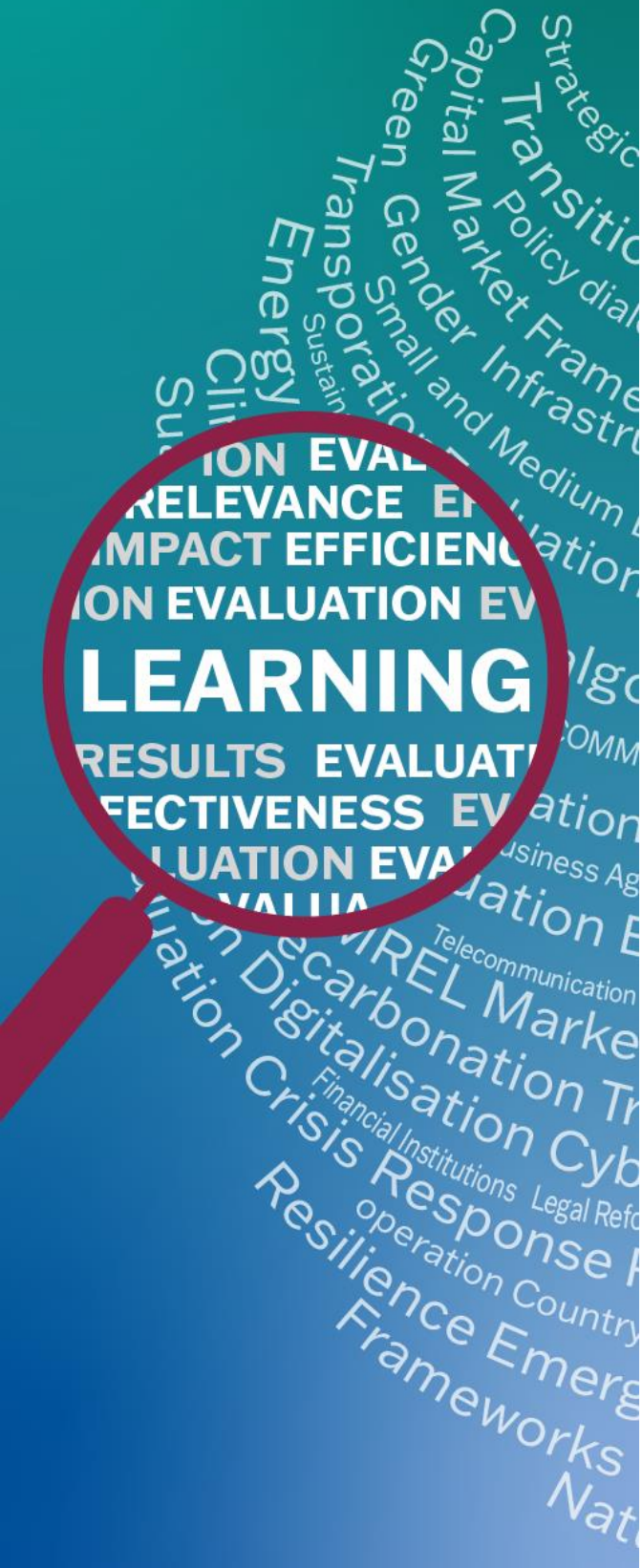
EBRD Independent Evaluation Department

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# An Effective Crisis Response: Lessons from the COVID-19 Experience

## KEY POINTS

- The COVID-19 pandemic created unique challenges for EBRD, prompting rapid adaptation and highlighting the necessity of quick, proactive measures during crises.
- Lessons from the COVID-19 crisis are critical as EBRD expands into Sub-Saharan Africa (SSA), confirming EBRD's approaches are suited to new operational challenges in SSA
- EBRD's Independent Evaluation Department (IEvD) adopted an innovative, real-time evaluation approach, covered immediate outcomes and effectiveness of interventions, providing valuable lessons for managing future crises and ensuring EBRD's continued effective response to stakeholder needs.
- This note offers lessons on foundational elements for crisis preparedness, critical strategic considerations for immediate response, and key elements for sustained strategic response.

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# 1. Introduction: Context and Background

The unprecedented global crisis triggered by the COVID-19 pandemic created a unique stress-testing environment for the European Bank for Reconstruction and Development (EBRD), challenging its operational norms and prompting an expedited response**. The first among its peer international financial institutions (IFIs) to approve a COVID-19 response package, the EBRD took measures proactively, highlighting the necessity of rapid adaptation in times of crisis.** Historical examples have often shown that plagues and crises impose a re-evaluation of established systems and can catalyse the formation of new institutional frameworks.

**In response to the dynamic and demanding needs for timely insights during the pandemic, the EBRD's Independent Evaluation Department (IEvD) also adapted rapidly, by taking an innovative, real-time evaluation approach** modelled on best practices from other multilateral development banks (MDBs), ensuring that core evaluation principles and the OECD-DAC criteria were respected.

- Phase 1 comprised a rapid assessment of the Solidarity Package (SP) by the IEvD that was delivered in January 2022. It focused on single-loop learning to identify any gaps between planned and actual strategies and the immediate results of the interventions. These were used in shaping the EBRD response to the war in Ukraine in February 2022.
- The Phase 2 evaluation was more comprehensive. A counterfactual impact evaluation (CIE) of the SP was carried out in April 2023, and included empirical assessments, sector-wide banking surveys in Egypt and in Uzbekistan, EBRD banker surveys, and interviews to provide deeper insights. These evaluations were designed to support double-loop learning, assessing the longer-term impact of the SP on the banking sector in the countries where EBRD works. The banking sector was chosen for its significant role in the overall response package and its potential to drive broader economic transitions.

**The insights gained from this sequenced, multi-faceted evaluation approach pertain to the immediate outcomes and effectiveness of interventions, covering areas previously unexplored due to limited initial data and timing.** The comprehensive analysis aims to equip decision-makers with valuable lessons for managing future crises, ensuring that the EBRD can continue to respond effectively to the evolving needs of its stakeholders and of the regions it serves. Except for the empirical assessment carried out in Phase 2, jointly with Initiative for Impact Evaluations (3ie), **the details of these evaluations and their findings are not available for public use, which creates a need for this knowledge product.** See Annexes for further information.

**The need to derive and internalize lessons from the COVID-19 health crisis is especially critical as the EBRD considers its strategic expansion into Sub-Saharan Africa (SSA) — a region where health-related crises are common.** The lessons of other institutions' evaluations conducted in SSA during the pandemic are like EBRD's lessons learned. This confirms the value of the lessons learned from EBRD's response, which emphasize readiness, adaptability, and the need for tailored financial and institutional support mechanisms during crises. The lessons also stress the importance of cross-regional learning and collaboration in enhancing the effectiveness of international support in times of global health emergencies, confirming that EBRD's approaches are well suited to the challenges in its new regions of operation.

# 2. Methodological Approach

**This note leverages insights from the evaluation products of EBRD's response to the COVID-19 crisis, delving into the intricate details of managing a crisis effectively. It focuses on the pandemic, which starkly revealed the strengths and limitations of existing crisis management frameworks and offered invaluable lessons for enhancing EBRD's future resilience and responsiveness.**

**By distilling valuable lessons from EBRD's response to the COVID-19 pandemic – examining** what worked well and where improvements could be made -- **this note proposes refinements to enhance future crisis management strategies. It** provides actionable insights for developing more resilient, responsive, and comprehensive frameworks that can guide policymakers and stakeholders in preparing for, responding to, and recovering from crises more effectively, ensuring that interventions are timely and impactful.

This note is organized into three sections, each of which focuses on a different stage of the crisis response, and overlap to some degree.

- Section A: Ex ante: foundational elements for crisis preparedness. This section describes the critical elements that must be in place well before a crisis occurs. It emphasizes the importance of having robust data infrastructure, predictive models for scenario planning, and established networks and partnerships to ensure readiness and an effective response.
- Section B: In itinere: strategic considerations for immediate response. This section delves into the immediate considerations that become paramount as a crisis unfolds. It discusses the need for rapidly prioritizing efforts, identifying and supporting the sectors that are hardest hit, and deploying initial response measures to mitigate impact.
- Section C: Ex post: key elements for sustained strategic response. This section examines the essentials for sustaining and adapting a response as the crisis evolves. It highlights the importance of establishing feedback loops for continuous learning, maintaining agility in response strategies, and ensuring alignment with long-term strategic goals.

# 3. Key Lessons and Insights

## A. Ex ante: foundational elements for crisis preparedness

### Insight 1: To achieve robust crisis preparedness, a strong data infrastructure is necessary for informed decision-making.

- **The absence of a comprehensive database on bank financial information and operational data within the EBRD was a critical gap in readiness.** Future frameworks must ensure access to detailed, real-time financial and operational data across sectors and regions, to facilitate rapid analysis, enabling targeted interventions and the adjustment of strategies in real-time.
    - **Critical gap in data readiness:** the empirical CIE highlighted a significant challenge for EBRD due to the lack of a centralized, comprehensive database on bank financials. It constrained the external validity of the impact evaluation findings, which could only address local average treatment effects.
    - **Importance of real-time data:** the rapid assessment of SP pointed out that real-time financial and operational data are crucial during a crisis. The ability to analyse such data on-the-fly allows for rapid adjustments to strategies based on current realities rather than on outdated or static information. This is especially important in a situation that is evolving quickly and requires financial stability and quick liquidity solutions.

### Insight 2: Effective crisis preparedness requires predictive models and safeguards.

- **The pandemic highlighted the importance of sophisticated predictive models able to simulate a wide range of crisis scenarios**. These models should be designed to anticipate potential impacts and inform the development of responsive mechanisms. They should also track any crisis-related support provided by other stakeholders for an effective resource allocation, which requires collaborating with others outside of EBRD.
    - **Model design and capabilities:** the rapid assessment stressed the need for sophisticated, integrative predictive models that could incorporate real-time data and adjust forecasts based on emerging trends and patterns. The ability to anticipate various crisis scenarios and their potential impacts on different sectors and regions is crucial for crafting effective, responsive strategies.
    - **Tracking and collaboration:** it was noted in both phases of the evaluation that these models should include functionalities to track support measures provided by other stakeholders, including IFIs, government entities, and the private sector. For effective resource allocation during a crisis, it is critical to understand where

support is coming from, how it is being utilized, and where gaps remain. This requires a high degree of interoperability and data-sharing protocols among the various stakeholders. Other evaluations of COVID-19 crisis responses, in particular by the IMF and the World Bank Group, make similar recommendations.

- **Necessity of external collaboration:** the rapid assessment and surveys of EBRD bankers and clients under Phase 2 pointed out that developing and refining these predictive models requires collaboration beyond EBRD's internal teams. Engaging with external experts, academic institutions, and technology partners can bring new insights and enhance the accuracy and relevance of models. These collaborations can also help in understanding the external factors that affect crisis dynamics, which are crucial if models are to simulate realistic scenarios.

## Insight 3: Building networks and partnership frameworks is vital for ensuring readiness in times of crisis.

- **Effective coordination and collaboration with IFIs, government entities, and the private sector proved challenging yet crucial. Future preparations should focus on establishing pre-crisis frameworks for collaboration, including clear roles, responsibilities, and communication channels to ensure a cohesive and unified response.**
  - **Challenges in coordination and collaboration:** both phases of the evaluation revealed that while the EBRD engaged with various IFIs, government bodies, and private sector entities during the crisis, coordination often proved challenging because of differing operational frameworks, priorities, and partner response speeds. The lack of pre-established collaboration protocols often led to delays and inefficiencies in delivering aid and implementing projects.
    - As the first IFI to launch a programme tailored to COVID-19, EBRD had limited opportunities to interact with others. There was little evidence of significant partnerships during the programme implementation phase. There is a unique opportunity to use existing channels of communication with other MDBs/IFIs, and the European Commission to shape a common response in which the complementarity and additionality of each development partner could be better used during the early stages of the crisis and during the implementation phases.
    - Bankers working on SP projects raised concerns that the pricing and tenor of EBRD's package were not attractive to clients; other IFIs were offering better conditions. It is important to assess the relative competitiveness of the programme, by interacting with others directly or through other means.
    - The systematic use of local, national, or regional business networks was limited under the SP. This calls for greater focus on leveraging business networks that can provide information about the private sector and possible new clients.
  - **Establishing pre-crisis collaboration frameworks:** the importance of setting up frameworks for structured collaboration before a crisis was highlighted as a key

lesson in EBRD's evaluation of its COVID-19 crisis response as well as in others' evaluations, notably the EIB and WBG. The frameworks should define clear roles, responsibilities, and communication channels among all involved stakeholders. Establishing these parameters in advance would streamline the activation and coordination of response efforts during emergencies.

- **Communication channels:** the rapid assessment stressed that effective communication channels are the backbone of successful collaboration. The evaluation suggested the need for robust ex-ante communication strategies that ensure that information exchange among partners is timely and accurate. This could include regular updates, coordination meetings, and shared platforms for data and resource sharing, so that the efforts of all parties are consistently aligned.

## B. In itinere: strategic considerations for immediate response

### Insight 4: Implementing demand-driven, adaptive support mechanisms is essential for effective crisis response.

- **The SP effectively addressed the liquidity crisis for existing clients but its alignment with broader private sector needs was less optimal. A more nuanced, demand-driven approach is essential, with mechanisms to rapidly expand support to new clients and sectors, especially those disproportionately affected by the crisis.**
  - **Effectiveness in addressing liquidity needs:** the surveys of EBRD clients provided evidence to confirm the success of the SP in providing immediate liquidity support to EBRD's existing clients. This swift action helped stabilize them during the initial shock of the pandemic, demonstrating the effectiveness of rapid liquidity interventions in crisis scenarios.
  - **Challenges in meeting broader needs:** despite the success in addressing the liquidity needs of existing clients, the SP's alignment with the broader needs of the private sector was identified as suboptimal under the rapid assessment and in surveys of banks that have not received EBRD support. The evidence revealed that many potential new clients and sectors critically impacted by the pandemic did not receive adequate support. This gap highlighted the need for a more inclusive approach in crisis response mechanisms.
  - **Agility in expanding support rapidly:** the rapid assessment and much evidence from the Phase 2 evaluations emphasized the importance of having mechanisms in place that can rapidly expand support to new clients and sectors. This requires both flexible funding arrangements and agile operational capabilities within EBRD to quickly approve and disburse funds to a wider array of beneficiaries.

- **Special attention to disproportionately affected sectors:** the rapid assessment stressed that sectors and clients which are disproportionately affected by the crisis need special attention. Targeted support should be planned based on the severity of impact and the strategic importance of the sector to the broader economy. This involves prioritizing sectors critical for the economy's recovery and future resilience.

## Insight 5: Providing comprehensive support beyond financial assistance is needed in a rapid crisis response.

- **The crisis underscored the value of integrating technical and policy advice in financial support packages. Tailoring advice to specific challenges faced by businesses and sectors—from digital transformation to regulatory changes—can significantly enhance the impact of financial interventions.**
  - **Value of integrating technical and policy advice:** the rapid assessment and the survey with EBRD clients highlighted that financial assistance provided immediate relief and that the integration of technical and policy advice significantly enhanced the overall effectiveness of interventions. The advice helped clients navigate complex challenges that went beyond mere financial issues, including adapting to new market conditions, regulatory changes, and shifts in consumer behaviour due to the pandemic.
  - **Tailoring technical assistance and policy advice to specific needs:** the need for tailored advice was evident as different sectors and businesses faced unique challenges during the crisis. For instance, the rapid push towards digital transformation required not only financial support but also technical guidance on implementing new technologies and training staff. Similarly, the sectors that were strongly impacted by regulatory changes, such as hospitality and travel, benefited significantly from expert policy advice on compliance and strategic adaptation.

## Insight 6: Ongoing enhancement of communication and outreach initiatives makes a positive difference in tackling the crisis effectively.

- **Future crises require a comprehensive communication strategy using multiple channels to ensure broad awareness of available support, tailored to different audiences to maximize engagement and uptake.** Limited outreach and unclear communication about SP components resulted in modest demand.
  - **Challenges with limited outreach and unclear communication:** the rapid assessment and the follow-up surveys during Phase 2 noted that the outreach efforts for the SP were often limited and that communication about the specifics of the available support was unclear. This resulted in modest demand as

potential beneficiaries were either unaware of the available options for support or did not fully understand how to access them.

- **Internal communication**
  - Bankers working on SP projects raised concerns about the lack of clarity about the eligibility criteria for the SP programme during its initial stage. Operational guidance was issued a few weeks after the programme was launched. Earlier communication conveying basic information for bankers to implement the package would be useful (eligibility, scope, etc.). Bankers based in ROs were less informed than bankers based at HQ. Effective dissemination of information across EBRD economies, in local languages if needed, would be useful.
  - Regular effective communication with the EBRD Board of Directors also proved to be important in the SP case.
- **External communication**
  - Limited communication, including social media campaigns on the SP in its early days, may have reduced its visibility and use. Continuing the current active communication strategy on EBRD's positioning as the crisis develops is key.

- **Need for a comprehensive communication strategy:** the importance of a well-planned, comprehensive communication strategy was emphasized particularly in the rapid assessment. Such a strategy should use multiple channels — including digital media, traditional media, direct outreach, and partnerships with industry associations — to disseminate information widely. It should aim to reach a broad audience while also targeting the specific sectors or demographics most in need.

## C. Ex post: key elements for sustained strategic response.

### Insight 7: Developing continuous assessment and dynamic feedback mechanisms is crucial for a sustained strategic response.

- **Real-time feedback loops with stakeholders are essential for adapting strategies to evolving needs. These could involve regular surveys, interviews, and data analysis, enabling timely adjustments to support measures based on direct input from affected entities and sectors.**
  - **Significance of real-time feedback loops:** both phases of the evaluations have consistently pointed to the necessity for real-time feedback mechanisms that allow for an ongoing assessment of crisis response impacts and the evolving needs of affected stakeholders. The ability to gather and process feedback quickly ensures that interventions remain aligned with evolving realities and can be adapted promptly as conditions change.

- Evidence from the rapid assessment indicates the importance of learning and feedback loops. This would help increase the overall agility of the programme over time. The next section describes specific actions.
    - *Loop 1 could consist of platforms for collecting feedback between clients and bankers on a regular basis.*
    - *Loop 2 could consist of an EBRD internal platform to collect and disseminate feedback to bankers and, if possible, generate any flags that could trigger a quick adaptation of the programme if needed.*

- **Dynamic adjustments based on feedback:** the importance of making timely adjustments based on stakeholder feedback was emphasized under the rapid assessment. Adjustments could involve scaling up successful initiatives, reconfiguring financial aid packages, or offering additional non-financial support such as advisory services, depending on the specific feedback received from ongoing assessments.


- **Challenges in implementing feedback mechanisms:** the Phase 2 evaluations in particular highlight challenges in implementing effective feedback mechanisms, such as logistical issues in collecting data and the need for advanced analytical tools to process information swiftly. Recommendations include investing in better data collection and analysis technologies and enhancing staff capacity to use these tools effectively.

## Insight 8: Aligning crisis interventions with long-term strategic objectives is essential for comprehensive support.

- **Crisis interventions should be designed with an eye to the institution's strategic goals, such as promoting gender equality and environmental sustainability.** The SP experience revealed a need for integrating these objectives better, even in urgent response measures, to ensure comprehensive and inclusive support.
    - **Importance of strategic alignment:** the rapid assessment especially stressed the importance of ensuring that crisis interventions align with the broader strategic goals of the institution. This alignment helps ensure that the immediate responses address the urgent needs and also contribute to the institution's long-term objectives, such as promoting sustainable development and equality.
    - **Integration of gender equality and environmental sustainability:** much evaluation evidence highlighted gaps in the integration of gender equality and environmental sustainability in the SP during the COVID-19 response. These insights pointed to the need for a more systematic approach that embeds these priorities in the design and implementation of crisis interventions.

## Insight 9: Capitalizing on digital and sectoral opportunities is one key to success for a sustained strategic response.

- **The accelerated digital transformation across sectors during the crisis, alongside the critical role of healthcare, suggests that future crisis interventions should prioritize support for digital infrastructure and essential services. This includes enhancing access to digital tools for businesses and bolstering the resilience of healthcare and other critical sectors.**
    - **Acceleration of digital transformation:** Both the rapid assessment and evidence from Phase 2 highlighted that the crisis significantly accelerated digital transformation across various sectors. This rapid shift demonstrated the critical need for robust digital infrastructure to support both the continuity of business operations and the delivery of essential services. The importance of digital readiness became evident as those with better digital infrastructure adapted more swiftly and effectively to the challenges posed by the crisis.
    - **Enhancing access to digital tools:** the need to enhance access to digital tools for businesses, particularly SMEs, was clear. Providing these businesses with the necessary digital tools and training can help them remain competitive and resilient in the face of disruptions. Support could include subsidized software, digital training programmes, and grants for digital transformation projects.

**Reflecting on the COVID-19 pandemic, these detailed insights underscore the importance of preparedness, agility, and a holistic approach that marries immediate crisis interventions with the pursuit of long-term strategic goals. Such an approach not only mitigates the impact of current crises but also strengthens overall resilience against future challenges.**

## ACKNOWLEDGMENTS

This note is produced by the staff of EBRD Independent Evaluation Department (IEvD). The author is Dr Natalia Kryg (krygn@ebrd.com), Principal Economist who worked under the guidance of Véronique Salze-Lozac'h, Chief Evaluator, and Gabriele Fattorelli, Director. The note has been peer-reviewed internally by Simona Somma, IEvD Principal Evaluation Manager. Keisuke Taketani, Visualisation Specialist, led on the visual design of this note and Deborah Glassman provided editorial support. Annex 3 of this note was developed by the consultants from International Initiative for Impact Evaluation (3ie) based on IEvD-commissioned impact evaluation conducted in 2022–2023 by Fiona Kastel, Sridevi Prasad, Natalia Kryg, Sebastian Martinez, and Douglas Glandon.

# Annexes

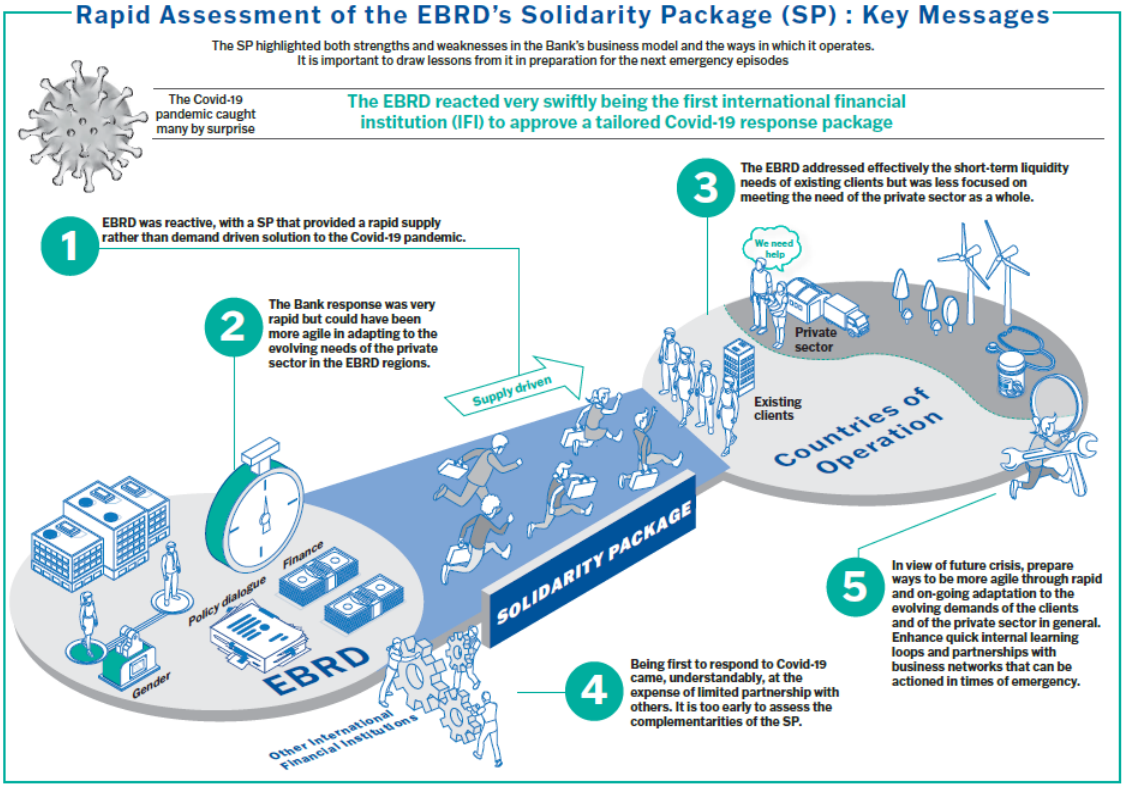
## Annex 1: Phase 1: Rapid Assessment

### Background

This knowledge product focuses on providing early evidence from the implementation of EBRD's response to the COVID-19 pandemic, while identifying emerging lessons and flagging the COVID-19 recovery phase and/or possible future emergency support schemes. It aims to offer insights into the early results of the SP support to the private sector in the Bank's economies, in line with the Bank's mandate.

### Main findings

The overarching message of this rapid assessment is that EBRD's response to the COVID-19 crisis highlighted both the "strengths" and "weaknesses" of the Bank's business model and the ways it operates, beyond the scope of the SP intervention.



Five key messages can be taken from the EvD's rapid assessment:

1. The SP was very reactive in addressing the early needs of EBRD's clients, but its approach was supply- rather than a demand-driven.
2. The Bank's response was very rapid but should have remained more agile over time. The response to the evolving needs of the private sector would have benefited from the adaptation loop mechanism.
3. The SP succeeded in addressing the short-term liquidity needs of Bank clients but no support was provided to other groups in countries and sectors that were affected but not eligible for the Bank's emergency support.
4. The speed of the Bank's response to the crisis came, understandably, at the expense of collaborating with other IFIs.
5. This stress-testing environment showed that there is an urgent need to learn and adjust the Bank's ways of working and develop tools for continued effective business and for extraordinary events, by doing the following, for instance:
    - Remaining agile and responsive to the private sector as a whole.
    - Avoiding missed opportunities to support transition, including cultivating business networks.
    - Having an effective set of tools ready when the next crisis hits.
    - Investing more in monitoring and measuring results.
    - Taking time to draw lessons to learn and adapt.

# Annex 2: Phase 2: Sector-wide surveys

## Context

Designed to evaluate the impact of emergency support to the banking sectors in Uzbekistan and Egypt, a second phase evaluation of EBRD's response to the COVID-19 pandemic SP used surveys to gain insights on the impact of EBRD's interventions to develop a robust crisis response toolkit for future use. These were one among several qualitative methods under the CIE in partnership with Business & Finance Consulting GmbH.

## Methodological context

The survey was conducted between September 23 and December 7, 2022, in two countries where EBRD works -- Egypt and Uzbekistan. The survey sample was designed to be large scale, covering the banking sector in both economies. Based on the consultant's prior experience in BEPS III, an estimated 45 financial institutions were invited to participate, including 26 operating in Egypt and 19 operating in Uzbekistan.

The consultant chose sampling criteria to ensure that participating financial institutions represented at least 95 per cent of each economy's market share and collectively represented at least 90 per cent of each economy's total banking sector assets[1]. The consultant analysed the financial statements of the financial institutions to determine those to include in the survey. At least 50 per cent of the market share in each economy was deemed successful for completed interviews and was met.

## Egypt – background information

A total of eight banks participated in the survey in Egypt, all of which were EBRD clients, reflecting the recommendation from the EBRD regional office overseeing Egypt that only EBRD partner financial institutions be contacted for the survey.

The initial sample targeted for the survey consisted of 26 financial institutions which included 10 "recipient" banks and 16 "non-recipient" banks. Six recipient banks agreed to an online interview or used the Typeform link to complete the survey; four recipient financial institutions did not participate in the survey.

Non-recipient banks in the target sample went from 16 to 14 after two targeted financial institutions merged.

The eight banks participating in the survey represented 71 per cent of the total market share in Egypt, reflecting the participation of the three largest Egyptian banks that collectively cover 65 per cent of

[1] By the time the assignment started in Egypt, two of the recommended financial institutions had merged.

the market share.[2] The ratio of banks responding to the survey was well above the target of 50 per cent.

Whereas the survey response rate in Egypt was lower than in Uzbekistan, coverage in terms of market share was higher, even though most "non-recipient" banks were not contacted. Eighty per cent of Tier 1 banks and 66.7 per cent of the total of overall ABI under the SP participated in the survey.

### Egypt survey samples: target and actual (absolute and in terms of market share)

| | Target sample | Actual sample | Target market share | Actual market share |
|---|---|---|---|---|
| **SP Recipients** | 10 | 6 | | |
| **SP Non-recipients** | 14 | 2 | | |
| **Total** | 26 | 8 | 94% | 71% |

**Egyptian Banking Sector**

- The Central Bank of Egypt indicates that the overall NPL ratio in the Egyptian banking sector declined from 3.6% (as of December 2020) and 3.3% (as of March 2022) to 3.2% (as of the end of November 2022). Additionally, the NPL ratio was 2.4% for the top ten financial institutions operating in the market and 1.9% for the top five.
- The capital-based to risk-weighted assets in financial institutions declined from 21.9% (as of March 2022) to 20.9% (as of June 2022). This ratio was 20.0% and 20.2% for the top ten and top five financial institutions, respectively.
- The ratio of the tier 1 capital to risk-weighted assets in financial institutions decreased from 17.4% (as of July 2022) to 17.1% (as of March 2022). This ratio was 15.9% and 15.8% for the top ten and top five financial institutions, respectively. It should be noted that asset risks remain high due to rising SME exposures and legacy structural issues (related to limited data availability to accurately assess creditworthiness as well as a borrower-friendly legal framework)[3].
- Although profitability has declined due to a squeeze on net interest margins and higher provisions, a 1.2% return on assets indicates overall resiliency. While private-sector financial

[2] Both the Banque du Caire and Ahli United Bank Egypt S.A.E. were included in the initial target list of EBRD client financial institutions. Both answered "no" to Q1, indicating that they did not receive EBRD funding under SP. Their responses are therefore included in the non-recipient section.

[3] Source: Moody's In-depth Issuer, September 2022

institutions generally maintain robust capital buffers, they remain modest for state-owned banks[4].

- The ratio of loans to deposits at financial institutions operating in the Egyptian market decreased from 49.3% (as of March 2022) to 48.6% (as of June 2022). This ratio was 49.5% and 50.0% for the top ten and top five financial institutions, respectively.
- Commercial International Bank, Ahli United Bank and QNB Al Ahli are among the top ten financial institutions operating in Egypt in terms of net profit. Commercial International Bank recorded the highest net profit in the first half of 2022, followed by QNB Al Ahli, Ahli United Bank and Suez Canal Bank[5].
- 28% of survey respondent financial institutions are leaders in the Egyptian market in terms of tier 1 capital, with the National Bank of Egypt (NBE) being the leading banking service provider in Egypt in terms of its tier 1 capital (as of the end of 2021). In 2021, NBE's capital reached approximately USD 7.28 billion, followed by Banque Misr (USD 7.24 billion), Commercial International Bank (USD 3.57 billion) and QNB Al Ahli (USD 2.47 billion)[6].

*Source*: IEvD (2024)

## Egypt - Key Findings

Programme design and implementation:

- The speed of providing EBRD's COVID-19 crisis response support: All SP banks rated this either excellent (50 per cent) or good (50 per cent).
- Adequate EBRD support to bank needs: more than 75 per cent of the SP banks believe that the SP programme was adequate at the beginning of the crisis and over time.
- Appropriate loan structure and pricing conditions under EBRD's support: 75 per cent of the SP banks rated loan structure and pricing as excellent. The remaining 25 per cent rated it satisfactory.
- Interest rates and tenor conditions under EBRD's support: more than 75 per cent of the SP banks rate them as good or excellent.
- Ease of applying and speed of disbursement: SP banks rated the ease of applying higher than the speed of disbursement: 75 per cent rated the ease of applying as excellent compared with 50 per cent rated the speed of disbursement as excellent.
- **Overall usefulness of EBRD's COVID-19 crisis response: all the SP banks rated it as either good (50 per cent) or excellent (50 per cent).**

Programme accessibility and attractiveness:

- **EBRD rejected no Egyptian partner banks for SP support.**

[4] Moody's Issuer In-depth, September 2022
[5] Source: https://dailynewsegypt.com/2022/09/04/13-banks-in-egyptian-market-report-egp-21-778bn-net-profits-in-1h-2022/
[6] https://www.statista.com/statistics/1346945/leading-banks-in-egypt-by-tier-1-capital/

- **Two banks were unaware of the EBRD COVID-19 response support.**

Market conditions during the COVID-19 crisis:

- Of banks that received SP, 75 per cent had creditworthy customers during the pandemic. The same was true for banks that did not receive SP.
- **Of banks that received SP, 75 per cent had liquidity nor equity capital during the pandemic. Banks that did not receive SP experienced similar market conditions.**
- **Fifty per cent of banks that received SP and one bank that did not receive SP experienced a build-up on NPLs during the pandemic.**
- In 75 per cent of the banks that received SP, demand for credit was insufficient.
- SP banks did not face subsequent COVID-19 -related challenges after receiving support from the EBRD.
- **Fifty per cent of non-SP banks faced further COVID-19-related challenges after receiving EBRD support.**
- **At the time of the survey, around 50 per cent of SP and one non-SP bank believed to still need support to overcome the consequences of COVID-19**
- One SP bank believes that the following could help mitigate its current challenges: funding with preferential rates; greater flexibility in the terms and conditions of financing agreements, and greater flexibility in reporting requirements.
- One non-SP bank believes it needs liquidity in terms of foreign currencies.

Additionality of EBRD support:

- Fifty per cent of SP banks received sources of financing from other MDBs and/or banking authorities (non-EBRD funding).
- Only 25 per cent of SP banks were offered support from the national government. The share for non-SP banks is 33 per cent.
- Responses on the use of the support from the bank's parent company, shareholders, and beneficiaries were mixed, particularly for SP banks.
- **Only 25 per cent of SP banks received support from banking authorities in addition to EBRD support.**
- Fifty per cent **of SP banks agree and 50 per cent disagree about whether EBRD's support was more useful in addressing its needs during the COVID-19 crisis than the support received from other sources.**
- There is no conclusive evidence as to whether the financing conditions and terms of EBRD's support were considered more attractive than those from the other sources of support that a single bank received during the COVID-19 crisis.
- **Only 25 per cent of SP banks believe that EBRD support was supplementary to the support offered by other sources during the COVID-19 crisis.**

Impact of EBRD's COVID-19 support on bank resilience:

- **Fifty per cent of SP banks believe that the EBRD support made them more resilient to the immediate shocks triggered by the COVID-19 crisis.**
- There is no conclusive evidence as to whether the EBRD support made the SP banks more resilient to new shocks unrelated to the pandemic.
- **SP banks found the support offered by the EBRD and other MDBs was perceived to be most effective in maintaining financial viability over the following 3 to 6 months (75 per cent of respondents).**
- **Non-SP banks also found the support from the bank's parent company/shareholders was most effective in helping them remain financially viable over the following 3 to 6 months (67 per cent of respondents) in comparison to other sources of support.**

Market conditions after the COVID-19 crisis:

- **SP and non-SP banks flagged weak economic recovery, disorderly inflation and market disruption most often as concerns in the short to medium terms (75 per cent of all responses).**
- Fifty per cent of SP banks also flagged property sector challenges. Around 67 per cent of non-SP banks also believed this to be a significant risk factor.
- Few SP banks were also concerned about: (i) a foreign currency liquidity squeeze, (ii) environmental challenges, or iii) fintech and the integration of IT solutions to strengthen business models.

### Uzbekistan - key findings

Programme design and implementation:

- EBRD's speed providing COVID-19 crisis response support: 67 per cent of SP banks rated it either excellent (50 per cent) or good (17 per cent). None rated it (very) poor.
- EBRD support adequate to bank needs: more than 80 per cent of SP banks believe the SP programme was adequate at the beginning of the crisis as well as over time
- Appropriate loan structure and pricing conditions under EBRD's support. Fifty per cent of the SP banks rated loan structure and pricing as excellent. None rated it below satisfactory.
- Interest rates and tenor conditions under EBRD's support: 67 per cent of SP banks rated them as excellent
- Ease of applying and speed of disbursement: SP banks rated the ease of applying higher than the speed of disbursement: 50 per cent rated ease of applying as excellent while 33 per cent rating the speed of disbursement as excellent
- **Overall usefulness of EBRD's COVID-19 crisis response: 67 per cent of SP banks rated it as excellent. Only one bank rated it as satisfactory. None rated it below satisfactory.**

Programme accessibility and attractiveness:

- **The EBRD rejected no Uzbek banks for SP support.**

- **Only one bank found the EBRD support offer to be unattractive and did not apply.**
- Of respondents that did not receive SP support, 67 per cent did not need EBRD support as they implemented their own response measures.
- **Only one bank was unaware of EBRD's COVID-19 response support.**
- Among non-recipients of EBRD support, there is no conclusive evidence about whether they did not need EBRD support because they received better help from other sources.

Market conditions during the COVID-19 crisis:

- Of banks that received SP, 67 per cent had enough creditworthy customers during the pandemic. For banks that did not receive SP, had insufficient numbers of creditworthy customer.
- **Of banks that received SP, 83 per cent had adequate liquidity during the pandemic. The same was true for equity capital. Banks that did not receive SP experienced similar market conditions.**
- **Sixty-seven per cent of the banks that received SP and 57 per cent of those that did not receive SP experienced a build-up of NPLs during the pandemic.**
- All banks that received SP had sufficient demand for credit.
- Sixty-seven per cent of SP banks faced no further pandemic-caused challenges after receiving support from the EBRD.
- Around one third of all respondents indicated that loan officers were unable to work because they were sick.
- **One third, or 33 per cent, of SP banks faced further COVID-19 challenges after having received EBRD's support.**
- **At the time of the survey, around 20 per cent of both SP and non-SP banks are believed to still need support overcoming COVID-19 consequences.**
- One SP bank stated that it lacked creditworthy customers in the aftermath of COVID-19. For the non-SP banks, the build-up of NPLs was one of the top challenges in the aftermath of COVID-19.
- One SP bank believes long-term financing and consultancy support on compliance and risk management issues could help it mitigate its current challenges. Two non-SP banks believe credit lines to support SMEs, including women entrepreneurs, would help them mitigate today's challenges.

Additionality of EBRD support:

- Sixty-seven per cent of SP banks received financing from non-EBRD MDBs and/or banking authorities.
- Fifty per cent of SP banks received support from the national government. For non-SP banks, the share is 33 per cent.

- Responses on the use of the support from the bank's parent company, shareholders, and beneficiaries are mixed, particularly for SP banks.
- **Only 25 per cent of SP banks received support from banking authorities in addition to EBRD's support. The share is 44 per cent for non-SP banks.**
- **Fifty per cent of SP banks agree and 50 percent disagree as to whether EBRD support was more useful in addressing their needs during the COVID-19 crisis than support from other sources.**
- There is no conclusive evidence about whether EBRD's financing conditions and terms of support were considered more attractive than those received from other sources during the COVID-19 crisis.
- **Eighty-three per cent of SP banks believe that EBRD's support was supplementary to the support offered to them by other sources during the COVID-19 crisis**

Impact of the EBRD's COVID-19 support on bank resilience:

- **Sixty-seven per cent of SP banks believe that EBRD's support made them more resilient to the immediate as well as longer-run shocks triggered by the COVID-19 crisis.**
- They also believe that their banks are more resilient to the new shocks unrelated to the pandemic.
- **SP banks found the support from banking authorities to be most effective in helping them remain financially viable over the next 3 to 6 months (84 per cent of respondents) in comparison to other sources of support.** Still, the support offered by EBRD and other MDBs was perceived to be effective in maintaining financial viability in those banks (67 per cent of respondents).
- **Non-SP banks also found the support from banking authorities to be most effective in helping them remain financially viable over the next 3 to 6 months (89 per cent of respondents) in comparison to other sources of support.**

Market conditions after the COVID-19 crisis:

- **SP and non-SP banks flagged property sector challenges most often as a concern in the short to medium terms (approximately 80 per cent of all responses).**
- Sixty-seven percent of SP banks also flagged high debt leverage in the corporate and government sectors resulting in higher corporate insolvencies, and less government support for banks than anticipated as another major risk factor. Around 40 per cent of non-SP banks also believed this was a significant risk factor.
- A few SP banks were also concerned about: (i) high competition; (ii) currency devaluation risks; (iii) high cost of available resources, and, as a result, expensive products for customers (due to factors not related to Uzbekistan domestic policy, but are a consequence of external events); (iv) possible decrease in remittances from labour migrants; (v) decrease in cash turnover of the their clients due to export-import restrictions.

- Non-SP banks had additional concerns about: (i) capital adequacy and liquidity; (ii) currency devaluation risks; (iii) underdeveloped retail lending in Uzbekistan; (iv) lack of qualitative information on the credit bureau's side, especially on retail clients; (v) a drop in client solvency; (vi) future escalation of the war in Ukraine and the associated sanctions policy.

# Annex 3: Empirical assessment (Phase 2)

### About this output

This report was developed by the consultants from International Initiative for Impact Evaluation (3ie) hired by the IEvD at the EBRD, to design their first ever impact evaluation.

Independently from the rest of EBRD, IEvD evaluates the performance of the Bank's projects and programmes. It has a vested interest in understanding EBRD's products and services to ensure they provide the highest quality, relevant support to their clients, with the overarching aim of supporting private sector development in its countries of operation. IEvD took a multi-pronged approach to examine the EBRD's response programme to the COVID-19 crisis, or Solidarity Package (SP) to draw lessons in preparation for future crises in a timely manner. This included a Rapid Assessment of the SP. This Phase 1 assessment was followed by an innovative counterfactual impact evaluation (CIE) assessment that forms the second phase of the SP evaluation that looks at the impact of the SP on EBRD clients and compares it with a control groups of clients and non-clients of EBRD that have not accessed SP. It is a mixed method approach with an empirical assessment at its core. Other methods supplement this analysis: an in-depth survey of banks in Egypt and Uzbekistan, a survey of EBRD bankers who worked on the SP projects, and semi-structured interviews with industry experts and other stakeholders. 3ie has been contracted to work on the empirical assessment of this counterfactual analysis only (i.e., this study).

### Abstract

We study the beneficiary-level effects of a Solidarity Package (SP) implemented by the European Bank for Reconstruction and Development (EBRD) in response to the Covid-19 pandemic on banks performance and lending in EBRD's countries of operation. We employ a controlled interrupted time series design and find **significant impacts of this emergency liquidity support on lending** for the included treatment banks compared to the comparison group, and **insignificant impacts on other performance-related outcomes**. However, we interpret these results with caution due to **limitations related to underlying data availability and quality**. We outline some recommendations related to data management and analysis, such as ensuring indicators for outcomes of interest are clearly defined and collected at the bank-level, consistently and regularly across banks, as well as for potential comparison banks. This applies to both internal EBRD data sources as well as external ones (e.g., the CapitalIQ Pro database), the utility of which could be enhanced by encouraging clients to report more frequently to these external databases. We also describe the requirements for an impact evaluation and what should be confirmed through an evaluability assessment prior to the start of an evaluation to ensure the impact evaluation is feasible (e.g., along with ensuring proper data availability and monitoring, certain conditions related to the program's conceptualization and implementation must be met).

## Introduction

### Background

On January 30, 2020, the WHO declared COVID-19 a Public Health Emergency of International Concern and characterized the outbreak as a pandemic on 11 March 2020.[7] The pandemic placed a significant strain on nations' economies as most nations took measures to restrict movement and economic activity. This triggered temporary credit difficulties in multiple of EBRD's countries of operations (CoOs), which in turn constrained the ability of countries to preserve their transition efforts made in the sphere of private sector development.[8] Adverse market conditions due to the COVID-19 pandemic created a liquidity gap in the early days of the pandemic between banks and their clients, many of which were small and medium-sized enterprises (SMEs) in need of support from banks to survive the crisis.[9]

EBRD reacted rapidly and was the first international financial institution (IFI) to approve a tailored COVID-19 response package to support the private sector in its CoOs. Already by March 13, 2020, in an attempt to proactively mitigate the negative economic impact of COVID-19 and preserve transition efforts made in the private sector, EBRD approved a Solidarity Package (SP) of €1B in emergency financing to its existing clients. On 23rd April 2020, the emergency liquidity financing under the Resilience Framework (Tier 1) was expanded to €4B. The SP was designed to provide **rapid and targeted support** to EBRD clients (financial institutions, SMEs, corporate and energy developers, sub-sovereign municipal, energy and infrastructure clients), with the main objective of **preserving transition and strengthening resilience of banks, firms, and nations to the crisis.**[10] Tier 1, the Resilience Framework (RF) of the SP, focused primarily on the 'Resilience' and 'Competitive' transition qualities (TQ), in large part by providing emergency liquidity to banks to ensure they had enough funding to remain solvent and could continue to provide loans to businesses and individuals.[11] Existing clients across EBRD's countries of operation were eligible to receive the emergency liquidity support provided that they could demonstrate how COVID-19 crisis had impacted their financial status. Based on a review of EBRD project approval documentation, the emergency liquidity support was anticipated to mitigate adverse effects from COVID-19 on various outcomes

[7] World Health Organization. (n.d.). *Coronavirus disease (covid-19) pandemic*. World Health Organization. Retrieved August 29, 2022, from https://www.who.int/europe/emergencies/situations/covid-19

[8] According to EBRD's terminology, "transition efforts" are measured at the country level using an Assessment of Transition Qualities (ATQs). ATQs rely on various indicators, including aggregate versions of some of the measurable bank-level indicators we examine in this study. For more details on ATQs see EBRD Transition Reports: https://2021.tr-ebrd.com/structural-reform/. "Transition efforts" are also measured at the level of an individual investment project of EBRD using transition impact measurement methodology attached to each project. Those refers to the development outcomes scores such as expected transition impact (ETI) and portfolio transition impact (PTI), which are rigorously assessed and monitored by EBRD Management.

[9] Ascertained from various background project approval documents (e.g., EBRD Project Board Document for Resilience Framework – Asaka Bank (opid: 52238) (BDS20-039r1a1))

[10] Retrieved from multiple EBRD Internal Documents including: EBRD Operations Committee Secretariat (2020). *Memorandum on Solidarity Package Guidelines*

[11] EBRD Operations Committee Secretariat (2020). *Memorandum on Solidarity Package Guidelines*

including liquidity, lending, non-performing loans, asset quality, and capital.[12] These outcomes and their selection are described in more detail in Section II.a Data. Additional information about the Solidarity Package and its associated theory of change can be found in **Appendix 1**.

As noted by many EBRD banks who received support under the Resilience Framework of the SP, adverse market conditions due to the COVID-19 pandemic created a liquidity gap between them and their clients.[13] Many of these clients were SMEs, who would have most likely needed support from EBRD banks to survive the crisis Banks were likely to face liquidity constraints due to a sharp reduction in revenues (depositors withdrawing their savings), less demand, disruption of the supply chain, and/or difficulties to renew expiring credit/bond facilities due to lower appetite by local commercial banks/investors.[14] For example, Acharya and Steffen (2020) noticed a "dash for cash" in the US which placed a strain on the creditors of those funds (banks). Decreased liquidity can lead to fewer and smaller loans to businesses that need them to continue functioning, lower return on assets (profitability), and depleted capital buffers.

The banking sector plays an important role in economic resilience by encouraging the accumulation of savings and allocating these funds to the most productive investments, which supports innovation and economic growth.[15] In particular, banks play an essential role in the economy by supplying funding to businesses and households. The COVID-19 pandemic was expected to increase the need for this essential funding and impact a bank's ability to supply the credit needed, resulting in financial instability and various negative downstream effects on businesses, countries, and individuals' health and well-being (Acharya and Steffen, 2020; Borio, 2020). In response, many central banks and governments implemented policy interventions aimed at facilitating the flow of credit to firms, both directly and through banks (Minoiu, Zarutskie and Zlate, 2021).

Furthermore, as noted by the European Central Bank, "during crises, the number of loans that cannot be paid back increases." Compared to past crises, there were factors around the COVID-19 crisis that may make non-performing loan (NPL) resolution more likely than in the past (e.g., banks have higher capital buffers) while other factors could make it more challenging (e.g., government debt is higher, banks are less profitable).[16] In a 2020 report for the Vienna Initiative, EBRD anticipated that the COVID-19 pandemic would lead to an increase in NPLs in the banking sector in EBRD COOs; however, only after COVID-19 forbearance measures were to expire.[17] High levels of NPLs are problematic because they impair bank balance sheets, depress credit growth, and delay

[12] Ascertained from the 9 Resilience Framework project approval documents (e.g., EBRD Project Board Document for Resilience Framework – BM Egypt Solidarity Loan (opid: 52056) (BDS20-039R1); EBRD Project Board Document for Resilience Framework – Ipak Yuli Bank (opid: 52198) (DARS_52198_2020-06-15_11-11))
[13] Ascertained from various background project approval documents (e.g., EBRD Project Board Document for Resilience Framework – Asaka Bank (opid: 52238) (BDS20-039r1a1))
[14] EBRD Operations Committee Secretariat (2020). *Memorandum on Solidarity Package Guidelines*
[15] European Commission. (2017, Oct 16). *Banking sector and financial stability.* Retrieved August 29, 2022, from https://ec.europa.eu/info/sites/default/files/file_import/european-semester_thematic-factsheet_banking-sector-financial-stability_en_0.pdf
[16] Ratnovski, L. (2020, May 27). *Covid-19 and non-performing loans: Lessons from past crises.* European Central Bank. Retrieved August 29, 2022, from https://www.ecb.europa.eu/pub/economic-research/resbull/2020/html/ecb.rb200527~3fe177d27d.en.html
[17] Cloutier, E. & Wee J. (2020). *NPL monitor for the CCESEE region: Special edition: H1 2020*. EBCI Vienna Initiative. Retrieved November 18, 2022 from https://vienna-initiative.com/assets/Uploads/2020/ba52f4480e/NPL-Monitor-2020-H1-v2.pdf

economic recovery. While NPLs may not increase significantly or immediately due to forbearance measures, this was a concern cited by bankers in the SP project approval documents. For example, for the BM Egypt Solidarity Loan (OPID: 52056) there was mention that "in the context of COVID-19, we expect: an increase in non-performing loans ("NPLs"), mitigated by sufficient capital buffers above the regulatory requirement", as well as initiatives introduced by the Central Bank (e.g., to postpone repayments for retail and corporate clients and restructure facilities). They also cited concerns that liquidity and asset quality would decrease as sub-borrowers will struggle to pay their loans to the banks.[18]

Emergency liquidity assistance can serve as one essential response to alleviate these issues. For instance, during the euro-crisis, various liquidity assistance measures prevented loan growth from becoming even more negative (Gibson *et al.*, 2020). The European Central Bank has also noted that banks' resilience during the pandemic (i.e., no significant deterioration in asset quality) has been largely due to stimulus and government support measures.[19] Appendix 1 outlines how EBRD, through the SP, focused on addressing these problems faced by banks during the COVID-19 pandemic, to ultimately try to prevent transition reversal in its CoOs.

### Literature

This paper contributes to the broad array of literature examining the impact of government support and policy initiatives on financial intermediation (Paravisini, 2008; Aït-Sahalia *et al.*, 2012; Demirgüç-Kunt, Pedraza and Ruiz-Ortega, 2021) and firms (Igan, Mirzaei and Moore, 2022). A brief scan of the literature revealed a paucity of impact evaluations that focus on the effect of such policy initiatives in lower and middle-income countries, therefore this review of the literature is almost entirely comprised of studies similar to EBRD's CoOs that occurred in different settings. One such study, by Demirgüç-Kunt, Pedraza and Ruiz-Ortega (2021), examines the impact of policy announcements (e.g., liquidity support, borrower assistance and monetary easing) on bank stocks globally and primarily find an increase in returns of bank stocks, but exclusively in developed countries with no impact detected in low-income countries. Similarly, Ait-Shalia, et al. (2012) find that financial sector policies in response to the global financial crises decreased interbank risk premia, while bailing out or letting banks fail led to an increase in risk premia. With regards to firms, Igan, et al. (2022) illustrate fiscal policies (such as tax measures, loan guarantees, business grants or wage subsidies) have a positive effect on efficiency, profitability, liquidity, and survival of firms in the most pandemic-prone sectors.

Many other studies have examined governmental responses to financial crises as well, with mixed results on the effect of policy on macroeconomic performance (Claessens, Klingebiel and Laeven, 2005; Reinhart and Rogoff, 2009; Taylor and Williams, 2009). Bordo and Duca (2021) provide an overview of US-based policy tools (e.g., SBA's PPP, the large-scale grant-making program for small businesses, and the Fed's Corporate Credit Facilities, especially the SMCCF) and how they were generally successful in limiting the negative impact of COVID-19 on the economy, particularly on businesses and employment (Bordo and Duca, 2021).

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[18] Source: EBRD Project Board Document for Resilience Framework – BM Egypt Solidarity Loan (opid: 52056) (BDS20-039R1)

[19] Bank, E. C. (2022, February 16). *"The banks are not complacent*". European Central Bank - Banking supervision. Retrieved August 29, 2022, from https://www.bankingsupervision.europa.eu/press/publications/newsletter/2022/html/ssm.nl220216.en.html

There is some evidence of the positive impact on credit, employment, and on-lending of loan guarantee schemes, which are typically targeting specific bank's clients (small businesses) (e.g., Barrot *et al.*, 2019; De Marco, 2020; Altavilla *et al.*, 2021) and funding for lending schemes like the European Central Bank's Long-Term Refinancing Operations (LTRO), which are typically earmarked and closely monitored for on-lending (e.g., Jasova, Mendicino and Supera, 2018; Andrade *et al.*, 2019; Gibson *et al.*, 2020; Carpinelli and Crosignani, 2021). Paravisini (2008) studies a similar on-lending program of the Inter-American Development Bank in Argentina and also finds that banks increase lending in response to additional external financing. Schiozer and Oliveira (2016) do not focus on the impact of a specific policy intervention but shed some light on the relationship between liquidity and lending in a market in crisis and find that while negative shocks to liquidity cause a significant decrease in bank lending, positive liquidity shocks do not necessarily promote new lending and have only a very small effect on the loan supply.

**While these studies evaluate various policy instruments, very few examine the provision of emergency liquidity, and nearly none focus on support in lower and middle-income countries.** This study primarily contributes to this scarce existing literature around effects of unrestricted liquidity support to banks on bank performance (Demirgüç-Kunt et al., 2021) and lending (Minoiu, et al., 2021). While Demirgüç-Kunt et al. (2021) examine various policy interventions on stock prices, Minoiu, et al. (2021) examine a specific policy, namely the Main Street Lending Program (MSLP), and find that it increased banks' willingness to lend to large and small firms (that banks are more likely to renew maturing loans and originate new ones, and less likely to tighten standards). In this paper, we analyze the impact of a specific liquidity support package provided by EBRD to various banks around the world on their lending and performance, which are believed to contribute to strengthened resilience (and the prevention of transition reversal) in the countries in which those firms operate.

### Research question

We assess how the SP Tier 1 Resilience Framework support impacted bank performance-related outcomes in the period following the intervention (specifically in the 27 months after signing, as most support was signed over in Q2 of 2020 and the most recent time period for which data were available as of the cut-off date for this evaluation was Q3 of 2022). In particular, we examine: 1) the difference between treatment and control in the level of the lending/performance outcome directly after the intervention period begins, and 2) the difference between treatment and control in the slope of the lending/performance outcome variable in the post-intervention compared to pre-intervention periods. This evaluation was focused on the banking industry, as the majority of the Tier 1 financing was given to banks - around 40% of the total SP's ABI in new investments went to clients in the banking sector. This figure is the highest among Tier 1 financing (74%). While there were multiple rounds of SP funding (Tier 1, 2 and 3), we focus on Tier 1 since Tiers 2 and 3 were not directly related or perceived to be related to COVID-19 (see Appendix 1a program description for details).

***This evaluation did not attempt to explore the heterogeneity of treatment effects at the country or economy level due to sample size constraints.*** The primary research question assessed through this evaluation is:

***What was the impact of EBRD's Tier 1 liquidity support on bank performance-related outcomes during the COVID-19 pandemic?***

As mentioned in the background section, EBRD project approval documentation indicates that this emergency liquidity support would affect liquidity, lending, non-performing loans, profitability, and

capital. As outlined in the EBRD Management's SP Results Framework, the Tier 1 Resilience Framework funding is theorized to contribute to the resilience of EBRD's countries of operation through various bank-level and economy-level indicators. EBRD's Compendium of Indicators (COI) together with the specific RF indicators review outlines the specific indicators, including those we examine, which map to the transition qualities of EBRD's CoOs. Furthermore, rationales provided in project approval documents indicate that liquidity, lending, NPLs, and capital would be affected by COVID-19 and thus ideally would be improved by the SP support. Further details on the specific outcomes employed to answer this research question and their selection are described in the data section, with more details on the program and theory of change provided in Appendix 1.

The rest of the paper is organized as follows. We provide an overview of the methods with a description of the data in Section II, present the results of our analysis in Section III, and a discussion of the results and opportunities for future work in Sections IV and V.

## Methods

We employed **controlled interrupted time series (CITS)** to assess the impact of EBRD's Tier 1, as it controls for bank-level time invariant characteristics as well as time-varying characteristics common to treatment and comparison banks.

We restrict our final sample based on the availability of each outcome variable, keeping only those banks with at least one instance of the outcome after the SP was disbursed, and three instances prior. Our control group was then restricted to banks in the countries that exist in the final sample of Tier 1 SP banks for each outcome. We also dropped banks that did not receive the SP in the same defined intervention period as the majority of the other banks.

The analysis included two separate comparison groups. The first group was EBRD banks that had contracts signed from 2017 onwards ("recently active") and that did not receive Tier 1 SP funding. The second group was non-EBRD banks that are operating in the same countries as Tier 1 banks as well as EBRD banks that did not receive the Tier 1 SP funding. Additional details on the decisions made in constructing the analytic sample and comparison banks as well as other methodological considerations can be found in **Appendix 2**.

## Data

We employ data from two sources, EBRD's internal client and project data and the S&P Capital IQ Pro [link]. A description of the outcome variables and covariates from these datasets (as well as the theorized direction of impact on each outcome) is provided in **Table 1**.

S&P Capital IQ Pro hosts an extensive amount of data on the financials of companies and financial institutions globally. It provides an external, consistent, objective source of outcome data for both the treatment and control groups. By using external verified providers, as opposed to individual countries' banking authorities or internally gathered data, we are able to ensure that our outcomes and covariates are consistently calculated for all banks across countries. This ensures that the outcomes incorporated in this analysis are objectively measured and unbiased. In addition, we can ensure that the indicators are consistently measured for all countries as the external databases have published methodologies for how each indicator was determined. Internally gathered data on the other hand, may be calculated differently by each banker or in each department, and does not exist for a potential comparison group (non-EBRD banks).

We obtained quarterly data from Q1 2017- Q3 2022 on the outcomes listed in Table 1 and covariates listed in **Appendix Table 3** for all banks in all EBRD countries of operation.[20] Once the outcome data were downloaded and processed, they were merged to the EBRD bank data and assessed for missingness. Based on our review of EBRD's existing theory of change and indicator documentation, as well as through conversations with bankers and a broad review of literature, we determined the variables described in **Table 1** as important outcomes likely to be impacted by the SP.[21] For example, lending appears in in EBRD's SP Result Framework Indicators Review as the "No./ Vol. of sub-loans through partner banks in local currency", while the other indicators such as capital adequacy ratio appear in the exact same terms as the S&P ("capital adequacy ratio of banking sector").[22] Lending is also an important indicator in EBRD's Resilience Transition Quality theory of change, in which it is theorized that EBRD liquidity support contributes to increased lending which is likely to contribute to greater resilience of the economic sector.

These outcomes were also chosen from within the potential realm of relevant indicators in EBRD's documentation due to their availability in the external database.

**Table 1.** Outcomes assessed in this impact evaluation and theorized pathways to impact

| Outcome | Indicator name | Description | Theorized pathway to impact |
|---|---|---|---|
| Lending | Gross Loans to Customers | Loans and finance leases held for investment or held for sale, net of unearned discount and gross of loss reserves. Does not include accrued interest on loans. | Tier 1 SP will provide banks w/ sufficient liquidity to then **increase** lending. |
| Liquidity coverage ratio (LCR) | Liquid assets/total deposits & borrowings | High quality liquid assets as a percent of net cash outflows over a thirty-day period as defined by local regulatory requirements.<br>This indicates a bank's ability to cover its debts and not default. | Tier 1 SP will provide banks w/ an influx of funding which is likely to **increase** liquidity. However, there may be a tradeoff between the LCR and lending. |
| Return on average assets (ROAA) | SP Return on average assets | Net income as a percent of average assets.<br>ROAA tells us how effectively an organization is taking earnings | Tier 1 SP will support bank's ability to **increase** number of loans and improve profitability. |

[20] Including all countries listed here: https://www.ebrd.com/where-we-are.html

[21] Source: Theory of Change templates from EBRD FI Impact team, September 2022 versions.; EBRD Compendium of Indicators as at September 2022; EBRD Solidarity Package Resilience Framework; EBRD Evaluation Department (2022). *Rapid Evaluation of the Solidarity Package – Technical Notes* (EvD ID: SS21-164).

[22] EBRD's Solidarity Package Resilience Framework Indicators Review lists the indicators that are expected to be affected by the SP and are to be monitored.

| | | | |
|---|---|---|---|
| | | advantage of its base of assets. It is often bolstered through increased lending. | |
| Return on average equity (ROAE) | SP Return on average equity | Net income as a percent of average equity.<br>ROAE tells us how effectively an organization is taking earnings advantage of its base of equity (assets minus liabilities). | Tier 1 SP will support bank's ability to **increase** number of loans and improve profitability. |
| Non-performing loans (NPL) ratio | Non-performing loans/Total loans | Nonperforming loans, net of guaranteed loans, as a percent of loans before reserves.<br>A lower NPL ratio indicates that outstanding loans present a lower risk to the bank. | Tier 1 SP will provide banks w/ enough liquidity to then increase lending (total loans) and thereby **decrease** the NPL ratio. |
| Capital adequacy ratio (CAR) | Total capital ratio | Capital as a percent of total risk-weighted assets of a bank.<br>A higher CAR (anywhere above 10.5%[23]) is generally expected to be safer and indicates a bank is more well protected against shocks. However, at any point above the minimum CAR, there begins to be a trade-off between protection against shocks and a more efficient use of assets. | Tier 1 SP will provide banks w/ an influx of funding which is likely to **increase** capital. However, there may be a trade-off between the CAR and a more efficient use of assets – in the form of lending or/and ROAA and ROAE for instance.[24],[25] |

EBRD's internal client and project data used for this study contains detailed information on 3,442 firms and 602 financial institutions that were EBRD clients at any point from 1999 to the present

[23] Nickolas, S. (2021). *What Is the Minimum Capital Adequacy Ratio Under Basel III?* Investopedia. https://www.investopedia.com/ask/answers/062515/what-minimum-capital-adequacy-ratio-must-be-attained-under-basel-iii.asp

[24] Elliott, D. (2013). *Higher Bank Capital Requirements Would Come at a Price*. Brookings. Retrieved February 1, 2023 from https://www.brookings.edu/research/higher-bank-capital-requirements-would-come-at-a-price/

[25] Buehler, K., Samandari, H., and Mazingo, C. (2009). *Capital ratios and financial distress: lessons from the crisis*. McKinsey Working Papers on Risk. Retrieved February 1, 2023 from https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/risk/working%20papers/15_capital_ratios_and_financial_distress.pdf

(according to the "Op Signing Date").[26] 162 of these financial institutions received at least one round of SP financing and 35 of these clients received emergency liquidity funding under Tier 1 Resilience Framework.

EBRD's data includes details related to the country of origin, amount, and timing of past EBRD financing, as well as receipt of the SP. It is primarily used to indicate which banks from the S&P database are EBRD clients and which received the SP and when, though data on the amount of past funding is included in the analysis of EBRD-only banks.

Capital IQ Pro included 3,233 banks in these countries of operation, with varying degrees of missingness. 296 of these exist in EBRD data. **Figure 1** provides an illustrative example of the final sample for one outcome variable of interest, lending. While 35 banks received Tier 1 funding, only 32 of those merge to the S&P data, and **only 15 of those are not missing any data** when we aggregate up to yearly values (after dropping the banks missing more than 3pre/1post and the 3 banks with the intervention not provided in 2020).

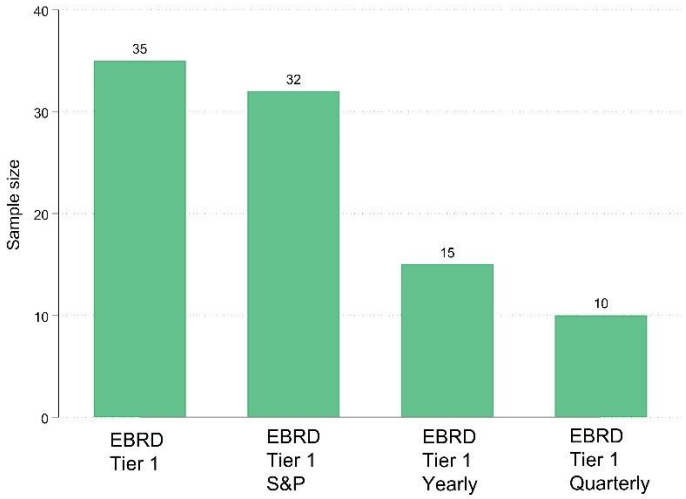



Figure 1. Data cascade for lending, starting with EBRD Financial Institutions that received Tier 1 SP support.

For example, only 14 of the 32 Tier 1 banks were not missing any outcome data, while 8 of the 32 were already missing data on the lending outcome for all 23 quarters, with the rest missing at least 12 quarters of data, primarily in the post-intervention period.

The final sample sizes and countries included for each outcome variable are presented in **Appendix 2 Figure 3**.

Due to the amount of missing data, we decided to perform analysis on the yearly level, with sensitivity checks on quarterly complete case and imputed model in Appendix 3. The number of banks in our final sample for each of these iterations of analysis is also outlined in the appendix.

[26] Data Sources: 1) Report OSP117: TIMS All Stock Ever Signed as of 13th May 2022. Source: EBRD Business Performance Navigator (2023); 2) Reports OSP312: Annual Bank Investment 1994-2021 Month Ends. Source: EBRD Business Performance Navigator (2023); 3) Data from EBRD Risk Department as at April 2022 reporting. Source: EBRD Risk Department databases (2023); 4) Data from EBRD Operational Strategy and Planning Department as at April 2022 reporting. Source: EBRD OSP Department databases (2023).

While we ideally prefer to employ more granular quarterly data, the yearly analysis allows us to keep more banks in our sample and still provides a robust estimation of the average level of each outcome throughout a given year. Our assumption in employing the yearly data is that we would still see an increase in the average of each outcome throughout a given year, even if the outcome is typically employed as a short-term indicator (e.g., LCR).

## Empirical models

### Controlled interrupted time series (CITS)

Since multiple timepoints are available for each bank's outcome values, we used controlled interrupted time series (CITS) to assess the impact of SP for Tier 1 banks. A simple interrupted time series (ITS) design employs the continuation of pre-treatment trends as the counterfactual for the observed post-treatment trends and avoids biases that may exist due to between group differences. However, it does not account for simultaneous events occurring that may cause a change in the post-period trends that is not due to the intervention. The CITS design strengthens the ITS by incorporating a control group comparison into the before-after design that accounts for other events that may occur over the same period as the intervention which affect our outcome of interest (Lopez Bernal, Cummins and Gasparrini, 2018). This design allow us to control for other time-variant confounders (e.g., seasonality and market fluctuations) by comparing to a control group undergoing similar changes, as well as comparing multiple periods before and after the intervention.

Below is the regression equation used for a controlled interrupted time series.

$$Y_{ti} = \beta_0 + \beta_1 T_{ti} + \beta_2 X_{ti} + \beta_3 T_{ti} X_{ti} + \beta_4 G_i + \beta_5 G_i T_{ti} + \beta_6 G_i X_{ti} + \beta_7 G_i X_{ti} T_{ti} + \epsilon_{ti}$$

**Equation 1**. Segmented regression equation for slope change with a control series. Source: Adapted from Linden et al. 2011[27] by Bernal et al. 2018[28]

$Y_t$ is the outcome variable at time $t$, $T$ is a variable representing the time since the start of the study and $X$ is a dummy variable indicating the pre- or post-intervention period. There are two time variables in a CITS design: the time T since the start of the study, and t, the time interval of the data for a given unit. $\beta_0$ represents the intercept at $T$=0 for the intervention group, $\beta_1$ is the change in outcome associated per time unit increase (representing the underlying pre-intervention trend), $\beta_2$ is the level change following the intervention in the intervention group and $\beta_3$ indicates the slope change following the intervention (using the interaction between time and intervention: $TX_t$ ). $G$ represents the intervention group ($G = 1$) or control group ($G = 0$). $\beta_4$ represents the difference in intercept at $T$=0 between the intervention and control group, and $\beta_5$ represents the slope difference between the intervention and control group in the pre-intervention period. $\beta_6$ represents the difference between the change in level of the outcome in the control and intervention group associated with the intervention directly after the intervention period begins. $\beta_7$ represents the difference between the change in slope of the outcome in the control and intervention group associated with the intervention in the post-intervention compared to pre-intervention periods. Therefore, both $\beta_6$ and $\beta_7$ are the parameters of interest for the measures of effect.

[27] Linden, A. and J.L. Adams, Applying a propensity score-based weighting model to interrupted time series data: improving causal inference in programme evaluation. J Eval Clin Pract, 2011. 17(6): p. 1231-8
[28] Lopez Bernal et al. 2018. Op cit.

For the CITS design to be valid, we need a clearly defined intervention time period. We used signing dates from EBRD's intervention dataset to establish when each treatment bank received the intervention. Signing dates indicate when treatment banks may have changed their behavior due to receiving the intervention, even if they ultimately do not receive or use the funding. By using signing dates, we are also not including any banks that may have been eligible for the program but were not approved by EBRD's Board. While we could have theoretically also employed the actual disbursement dates, the first signing date is a strong enough indication of the commitment to receive funding that it is likely to change behavior at that point. Furthermore, since the disbursements occurred so soon after signing (often within the same quarter), there would be very few changes to the intervention period, especially in the yearly analysis. The average time between signing and disbursement for the first round of Tier 1 financing that 35 EBRD banks received was only 43 days, or slightly over a month. Only two banks had a disbursement date in a different year than the signing date.

For the models that are presented in this analysis, we aggregated banks' outcome indicators to the yearly level by averaging the quarterly values and ran all analyses at this level for reasons mentioned in in the data section. We also ran sensitivity analyses for each outcome that kept the dataset at the quarterly level where we imputed missing values or conducted a complete case analysis in Appendix 3. We also ran these analyses using difference-in-difference and matched CITS models. These sensitivity analyses can be found in **Appendix 3**.

Each model used bank-year panel-level specifications. Each model controlled for country, as well as baseline assets and time-varying loans received by banks and specified robust standard errors. For the within EBRD analyses, the analyses included the same covariates as the full sample analysis and also controlled for EBRD-specific covariates, such as amount of past EBRD funding, number of past EBRD operations, and if the bank received a non-Tier 1 tranche of SP. For the matched controlled interrupted time series, the analyses controlled for time-varying loans received to banks in addition to country. The within EBRD matched controlled interrupted time series controlled for these same covariates in addition to the EBRD-specific covariates. A full description of the covariates included in the models can be found in **Appendix 2 Table 3.**

## Results

### Descriptive Statistics (Unmatched)

At baseline, EBRD Tier 1 banks are generally larger and perform better than non-Tier 1 banks. **Table 2** depicts some key indicators and covariates at baseline. Descriptions of the outcomes and expected direction of impact on the outcomes is provided **in Table 1**, while descriptions of the covariates can be found in Appendix 1. On average at baseline, Tier 1 banks have higher gross loans, ROA, ROE, total assets, and total loans received. Tier 1 banks have a lower average NPL ratio than non-EBRD banks (fewer non-performing loans to total loans), which indicates that any outstanding loans present a lower risk to the bank. Tier 1 also has the lowest CAR. Below a certain threshold, a higher CAR is generally expected to be safer as it indicates that the bank is more well protected against shocks. However, after exceeding the minimum requirement to be deemed "secure" (above

10.5% in most countries[29]), there is a trade-off between increasing CAR and a more efficient use of assets – in the form of lending or ROA or ROE, for instance (see Table 1 for details and sources). Tier 1 had lower levels of liquidity in the pre-period as well, but similar to CAR, there is a trade-off involved in increasing LCR when the bank is already liquid enough to cover its debts. In general, this aligns with our expectations that Tier 1 banks will perform better at least in part due to criteria required for banks to receive SP funding, which is outlined in Appendix 1 (e.g., having strong business fundamentals and high probability that after recovery of the market they will be able to repay their loan and their liquidity will be adequate for the next 1-1.5 years). In general, EBRD banks are likely to be healthier than other market players that might not be meeting EBRD's minimum risk criteria required to engage with EBRD.

EBRD non-Tier 1 banks tend to perform similarly to the non-EBRD sample, though in some indicators they are closer to Tier 1 banks on average (e.g., NPL Ratio and CAR), indicating this may be a better comparison group. However, EBRD non-Tier 1 banks also tend to have far less past EBRD funding and operations, indicating that EBRD banks that received the SP have stronger or more frequent interactions with EBRD. Therefore, we control for those indicators in our EBRD-only model.

**Table 2**. Descriptive statistics by treatment and comparison groups at baseline (in 2019). The non-EBRD banks include the non-Tier 1 banks.

| **Outcome Indicators** | EBRD Tier 1 Banks | EBRD non-Tier 1 Banks | Non-EBRD Banks |
|---|---|---|---|
| Gross Loans (000s EUR) | 14,626,001 | 3,577,109 | 3,759,334 |
| ROAA (%) | 1.63 | 1.19 | 1.95 |
| ROAE (%) | 13.88 | 10.33 | 9.64 |
| LCR (%) | 35.88 | 32.78 | 48.23 |
| NPL Ratio (%) | 4.59 | 5.29 | 7.38 |
| CAR (%) | 17.84 | 17.37 | 28.18 |
| **Covariates** | | | |
| Loans Received (000s EUR) | 2,130,343 | 374,421 | 247,220 |
| Bank Size (000s EUR) | 24,139,126 | 8,703,004 | 4,578,022 |
| Past EBRD Funding (EUR) | 303,188,384 | 140,374,368 | |

[29] Nickolas, S. (2021). *What Is the Minimum Capital Adequacy Ratio Under Basel III?* Investopedia. https://www.investopedia.com/ask/answers/062515/what-minimum-capital-adequacy-ratio-must-be-attained-under-basel-iii.asp

| | | |
|---|---|---|
| Past EBRD Operations (#) | 9.90 | 5.99 |

*Note: the observations included for each covariate fluctuates slightly based on availability of data in 2019 and is larger than the sample for most outcomes. The covariates summary stats are for the full sample available in 2019, before restricting the sample based on outcome variable data missing in multiple periods pre/post and therefore may vary in the analysis for each outcome.

The changes in our outcomes of interest over time are depicted in **Figure 2** below. Generally, the treatment and comparison groups had similar trends over time for each outcome variable, except for the lending and capital ratio outcomes in the pre-intervention period (see **Figure 2**).

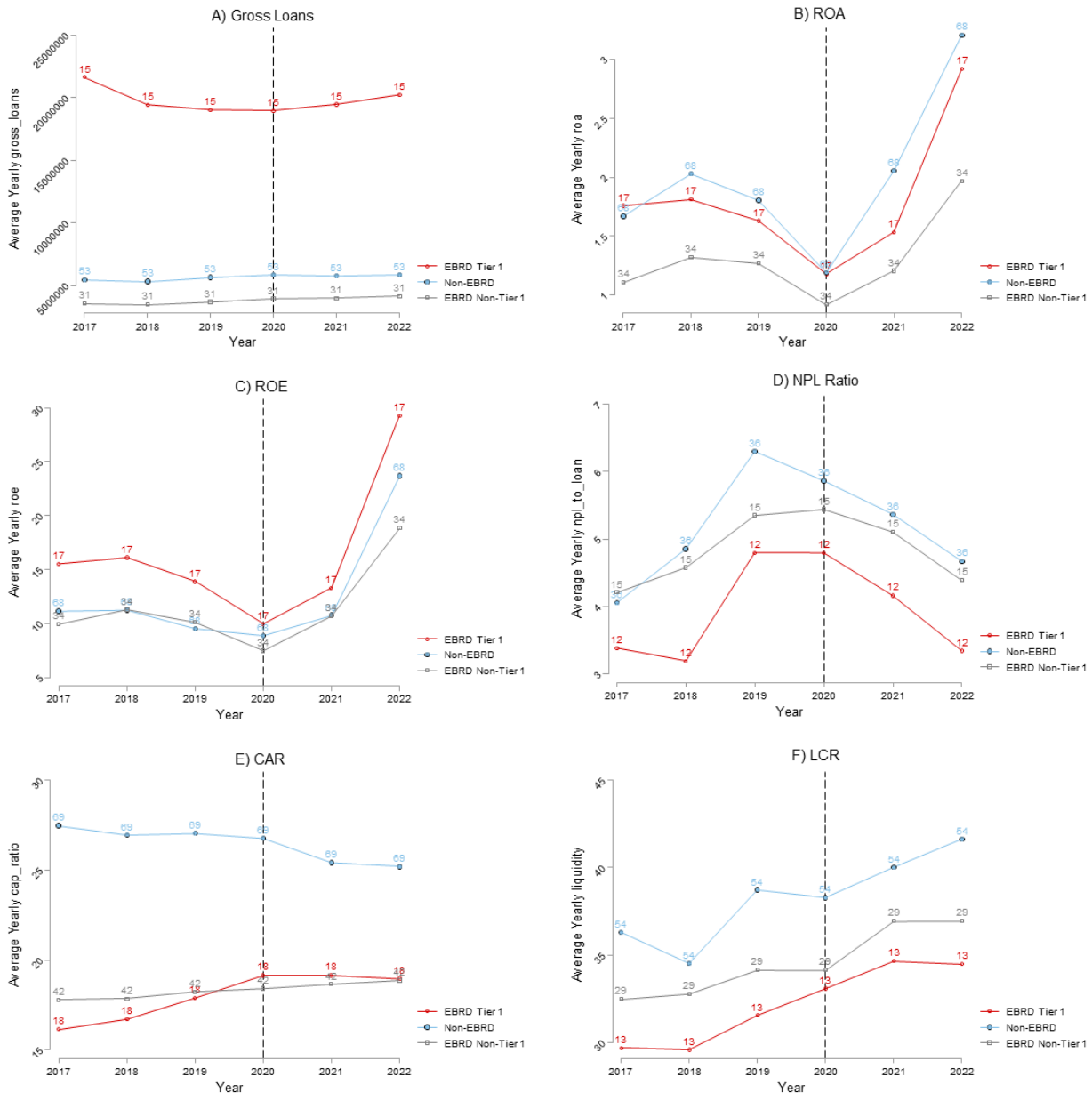



Figure 2. Trends over time for each outcome variable (from top left to right: gross loans, ROA, ROE, NPL ratio, capital adequacy ratio, liquidity). The red line depicts EBRD Tier 1 banks, the blue line is Non-EBRD banks, and the grey line is EBRD non-Tier 1 banks.

### Tier 1 EBRD vs. Non-Tier 1 (EBRD + non-EBRD)

We first present the results assessing the impact of emergency liquidity support to Tier 1 banks compared to non-EBRD banks and non-Tier 1 EBRD banks.

### CITS

**Table 3** illustrates the results of the yearly CITS specification controlling for baseline assets, country, and time-varying loans received. Sensitivity/validity checks (quarterly imputed and complete case in

**Appendix 3**) all depict similar results. **There was no statistically significant impact on return on assets, return on equity, NPL ratio, liquidity coverage ratio, and the capital adequacy ratio over time in the treatment group relative to the control group. Of all analyzed outcomes, the SP had a statistically significant impact only on lending.** Compared to the comparison group, the treatment group increased their average lending by 1.6 billion euros (SE: 627,777,300) after having received the emergency liquidity support, which is equivalent to an 8% increase over baseline lending for the Tier 1 banks. This is a relatively large and meaningful increase in lending that is attributable to the SP support.

**Table 3.** Tier 1 vs. non-Tier 1 banks: Controlled interrupted time series for each outcome variable controlling for baseline assets, country, and time-varying loans received to banks

| | (1) Yrly: CITS Loans (000sEUR) | (2) Yrly: CITS ROA (%) | (3) Yrly: CITS ROE (%) | (4) Yrly: CITS NPL Ratio (%) | (5) Yrly: CITS CAR (%) | (6) Yrly: CITS LCR (%) |
|---|---|---|---|---|---|---|
| Change since start | 100,925.21 | 0.06 | -0.46 | 0.97* | -0.03 | 1.03 |
| | (62,920.87) | (0.13) | (1.05) | (0.42) | (0.29) | (0.65) |
| Base level diff (TvC) | 762,263.06 | 0.38 | 2.98 | -0.03 | -5.31* | -5.10 |
| | (2,285,303.87) | (0.29) | (1.96) | (0.73) | (2.24) | (3.77) |
| Base slope (TvC) | -1,094,584.33 | -0.11 | -0.36 | -0.23 | 0.70 | -1.16 |
| | (936,649.38) | (0.15) | (1.16) | (0.53) | (0.43) | (1.82) |
| Avg change in level (2020) | 93,849.53 | -0.67* | -2.76 | -1.12* | -0.07 | -0.23 |
| | (125,974.19) | (0.30) | (2.77) | (0.49) | (0.49) | (0.99) |
| Post-pre avg change in trend | -15,519.77 | 0.71*** | 7.33*** | -1.54* | -0.39 | 0.43 |
| | (121,538.16) | (0.15) | (1.35) | (0.62) | (0.41) | (0.72) |
| Post-pre change in level (TvC) | 1,037,215.04 | 0.06 | -2.94 | 0.70 | 0.81 | 2.87 |
| | (591,606.80) | (0.34) | (2.99) | (0.58) | (0.68) | (2.51) |
| Post-pre change in trend (TvC) | 1,624,850.18** | 0.23 | 3.17 | 0.07 | -0.33 | 0.60 |
| | (627,777.26) | (0.26) | (2.46) | (0.76) | (0.64) | (2.25) |
| Loans received | -0.73*** | -0.00 | 0.00 | -0.00 | 0.00* | 0.00*** |
| | (0.07) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Bank size | 0.68*** | -0.00 | 0.00 | -0.00 | -0.00* | -0.00* |
| | (0.01) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Constant | -1,141,083.53*** | 1.42*** | 7.12*** | 3.59** | 18.09*** | 39.84*** |
| | (129,615.18) | (0.33) | (1.94) | (1.18) | (0.98) | (5.16) |
| Baseline Tier 1 Mean | 20,032,843.48 | 1.73 | 15.16 | 3.79 | 16.92 | 30.28 |
| Tier 1 Obs | 15 | 17 | 17 | 12 | 18 | 13 |
| Control Obs | 84 | 102 | 102 | 51 | 111 | 83 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## CITS graphs

These graphs illustrate the CITS design with country, base assets, and net loans received as covariates. They also clarify the intuition behind the CITS compared to pre/post or other analyses. For example, if we were to compare the ROA results before vs. after the intervention for the treated banks, there would appear to be a large increase in ROA. However, when we include a control group, this effect is muted, and we do not detect a significant impact. CITS also controls for the change in trends before and after, thereby depicting a change over time, not just the average of the points pre/post (as is the case for the DID analysis in the appendix). This is especially evident in the gross

loans graph. On average, the lending before the SP looks higher than after; however, while gross loans were declining before, they are increasing after, while the control group's trends did not change notably. Therefore, we see a positive effect using the CITS design, which accounts for changes in both levels and trends.

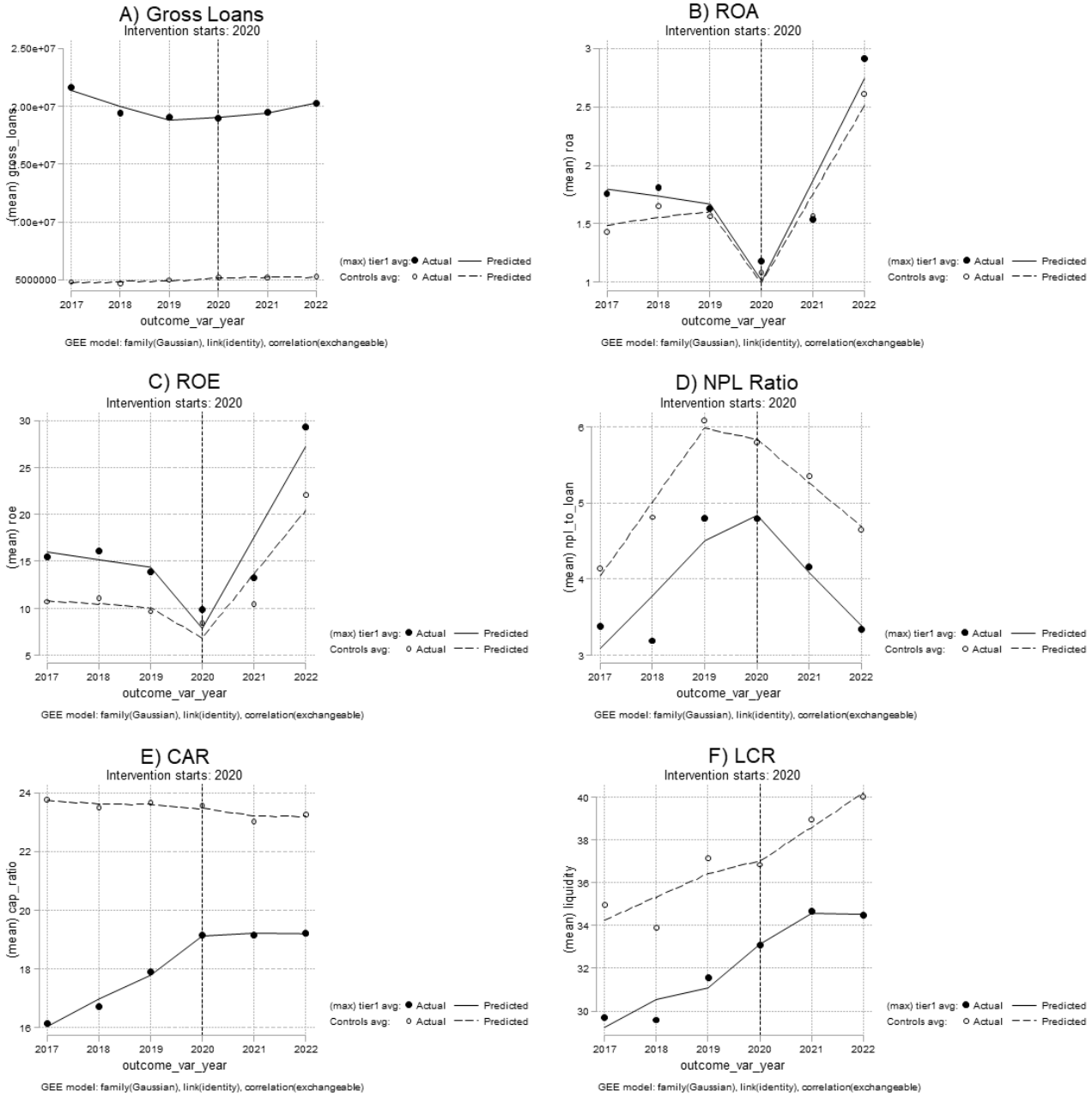



Figure 3. CITS event study plots. Dotted lines indicate the trends for the control group.

### Tier 1 EBRD vs. Non-Tier 1 EBRD (within-EBRD analysis)

For this set of analyses, our comparison group consisted of any EBRD client that was active since 2017 and did not receive Tier 1 funding.

## CITS

**Table 4** illustrates the results of our yearly CITS specification for the EBRD only comparison group (covariates: base assets, country, time-varying loans received, amount of past EBRD funding, number of past EBRD operations, received a non-Tier 1 tranche of SP). Compared to non-Tier 1 EBRD banks, Tier 1 EBRD banks on average had significantly increased lending after the intervention. There was no detectable effect of the SP on other bank outcomes (ROA, ROE, NPL ratio, CAR, LCR). Compared to non-Tier 1 EBRD banks, Tier 1 banks increased their average lending by 1.56 billion euros (SE: 621,116,000) after having received the emergency liquidity support, equivalent to a 7.75% increase over the average baseline lending.

**Table 4**. Tier 1 vs. non-Tier 1 banks (within-EBRD): Controlled interrupted time series for each outcome variable, controlling for EBRD covariates, baseline assets, country, and time-varying loans received to banks

| | (1) Yrly: CITS Loans (000sEUR) | (2) Yrly: CITS ROA (%) | (3) Yrly: CITS ROE (%) | (4) Yrly: CITS NPL Ratio (%) | (5) Yrly: CITS CAR (%) | (6) Yrly: CITS LCR (%) |
|---|---|---|---|---|---|---|
| Change since start | 68,615.41 | -0.07 | -0.83 | 0.73 | 0.23 | 0.40 |
| | (120,752.08) | (0.07) | (0.94) | (0.40) | (0.26) | (1.25) |
| Base level diff (TvC) | -52,832.03 | 0.13 | 0.38 | 0.20 | 0.02 | 5.01 |
| | (2,352,162.28) | (0.23) | (1.81) | (0.97) | (0.89) | (4.39) |
| Base slope (TvC) | -1,048,984.60 | 0.01 | 0.03 | -0.01 | 0.54 | -0.51 |
| | (963,082.07) | (0.10) | (1.06) | (0.49) | (0.42) | (2.21) |
| Avg change in level (2020) | 178,750.23 | -0.38 | -2.74 | -0.30 | 0.50 | 0.84 |
| | (312,295.83) | (0.22) | (2.88) | (0.53) | (0.38) | (1.52) |
| Post-pre avg change in trend | 39,031.72 | 0.68*** | 7.74*** | -1.34 | 0.05 | 1.53 |
| | (94,280.03) | (0.16) | (1.99) | (0.69) | (0.32) | (1.28) |
| Post-pre change in level (TvC) | 936,939.92 | -0.21 | -3.01 | -0.09 | 0.10 | 1.77 |
| | (676,437.68) | (0.27) | (3.09) | (0.59) | (0.59) | (2.99) |
| Post-pre change in trend (TvC) | 1,556,027.37* | 0.25 | 2.78 | -0.11 | -0.86 | -0.52 |
| | (621,116.00) | (0.27) | (2.86) | (0.81) | (0.56) | (2.47) |
| Loans received | -0.76*** | 0.00 | -0.00 | -0.00 | 0.00* | 0.00*** |
| | (0.13) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Bank size | 0.67*** | 0.00 | 0.00 | -0.00 | -0.00** | 0.00 |
| | (0.02) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Past EBRD funding received | 0.00 | -0.00* | -0.00** | -0.00 | -0.00 | -0.00*** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Past EBRD operations | 116,702.39* | 0.03 | 0.27 | 0.05 | 0.06 | -0.74 |
| | (46,530.16) | (0.02) | (0.16) | (0.16) | (0.09) | (0.64) |
| Constant | -1816058.86** | 1.16* | 4.08 | 3.16* | 15.29*** | 52.44*** |
| | (657,885.51) | (0.48) | (3.75) | (1.42) | (2.05) | (13.51) |
| Baseline Tier 1 Mean | 20,032,843.48 | 1.73 | 15.16 | 3.79 | 16.92 | 30.28 |
| Tier 1 Obs | 15 | 17 | 17 | 12 | 18 | 13 |
| Control Obs | 23 | 23 | 23 | 12 | 28 | 22 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## Robustness Checks

In addition to the yearly controlled interrupted time series analysis, various other specifications were employed as robustness checks, including different cuts of the data (quarterly complete and imputed data) and different or adjusted models (difference-in-difference and matched interrupted time series).

As outlined in Appendix 3 Tables 9 and 11, the CITS using quarterly complete case and quarterly imputed data depict very similar results as the yearly analysis. Regardless of the way we adjust for missing observations (aggregating up to yearly, dropping any banks missing any quarter, or imputing banks that are missing a quarter with the average for the year), we find positive and significant effects on lending, indicating the results are robust to different ways of adjusting for missing data. While we don't include these results in our primary analysis due to the reduced sample size, we are still able to detect an effect, likely due to the availability of more observations before and after the intervention in the quarterly specifications.

The magnitude and direction of our lending results also remain the same in the yearly matched CITS models for the full sample control (Appendix 3 Table 5) and EBRD-only control groups (Appendix 3 Table 6), though the results are no longer significant. It is possible we can no longer confidently detect an effect in this specification due to a decrease in the sample size when matching. This specification was constrained due to the small number of potentially relevant covariates available to match on and the small size of our sample, which limited our ability to match on both country and base assets and instead only enabled matching on one covariate at a time.

While the variations in how we deal with missing data and adjust our control group (within-EBRD vs. all non-Tier 1 banks and employing matching methods) are consistent with our primary results, when we run the CITS on a transformed outcome (the natural log of lending), the results become insignificant and close to zero (though still slightly positive, except for the quarterly imputed model). Appendix 3 Table 7 depicts this log transformed version of the analysis (yearly DID and CITS on yearly and quarterly versions of data), with Appendix 3 Figure 4 illustrating how flat the trend is when we perform this transformation. Typically, a log transformation is done to adjust for outliers and heteroskedasticity (where the variance in the model residuals increase at higher levels of the fitted values) in the data. In our dataset, the lending outcome was skewed to the right, indicating that there were a small number of banks that accounted for the largest lending levels whereas most of the banks had lower lending values. To account for these outliers, we used a log-transformed model. We ran additional exploratory analyses to check the validity of this model. When we plotted the change in lending between pre- and post-intervention periods, we noticed that there was only a single outlier, and we were not seeing the same skewedness in the data. Additionally, when we conducted visual checks for heteroskedasticity on our log-transformed model results, we observed that heteroskedasticity appeared to worsen. For these reasons, our findings from the log-transformed model may not be appropriate.

We also performed a difference-in-difference (DID) analysis for all and within-EBRD comparison groups. The results for the yearly DID are in Appendix 3 Tables 3 and 4, with the quarterly complete case and imputed DID in Appendix 3 Tables 8 and 10. This is the only specification in which our lending results are of a similar magnitude in the opposite direction; however, they are insignificant. Furthermore, unlike the other robustness checks described which build on or make slight adjustments to the primary analysis, this check uses an alternative estimation method as it employs an entirely different model. While we cannot conclude anything about the effect of the SP on the banks in our sample using this model as the results are insignificant, the potential discrepancy and

reasons for why we might see results that are different when using a different statistical model are explored in the discussion. This is not as much of a robustness check as the others described here as it is an exploration of the differences between similar identification strategies (that are traditional employed in different sectors), since we had the relevant data needed to employ either.

Ultimately, while our CITS results do appear to be relatively robust, the fact that we lose significance in some variations illustrates how sensitive our analysis is, likely due to the small sample size. Future analysis should be performed on a larger scale, ideally with more banks with complete data and more covariates (e.g., for matching) to improve the confidence of these results. A measurement study directly comparing difference-in-difference to controlled interrupted time series would also be a valuable contribution to the field of impact evaluation.

### Discussion

Overall, we found that the CITS analyses identified significant impacts on lending for the included treatment banks compared to the comparison group, with insignificant impacts on all other performance-related outcome variables.

We find a significant impact of the SP on bank lending for the banks in the analytic sample, indicating that funds from the SP were used by banks to increase their lending (over time) by 1.6B EUR compared to non-Tier 1 EBRD banks and compared to non-EBRD banks (relative to before the SP, all other things remaining equal). This should be interpreted as a local average treatment effect (LATE), given the small size of the analytic sample of banks (i.e., those that received the Tier 1 intervention and had sufficient outcome data), which may not be generalizable to EBRD's full roster of bank clients or the banking sector more broadly.

Nevertheless, this is a sizeable increase in lending of 8% compared to the average baseline lending for Tier 1 banks in the sample. This is consistent with the intent and expectation of this support and aligns with what past studies examining the effect of similar liquidity support measures have found. For example, Minoiu, Zarutskie and Zlate (2021) determined that certain liquidity measures in response to the COVID-19 pandemic (e.g., the Main Street Lending Program) successfully facilitated the flow of credit to firms, while Gibson et al. (2020) showed emergency liquidity assistance prevented growth in loans from decreasing even more during crises, and Paravisini (2008) found increased external financing of financially constrained banks in Argentina (while not in a time of crisis) also increased their lending. Our findings contribute to this literature by providing another example of emergency liquidity support that appears to have increased lending in recipient banks. As further theorized in EBRD's theory of change documentation, this increased lending may also ultimately, albeit in a small way, contribute to increased economic resilience.

At the same time, we suggest caution in the interpretation of these results, for several reasons. First, the small sample size due to gaps in data availability in S&P Capital IQ limited the statistical power of this analysis. The results also do not withstand all of our sensitivity checks. While the magnitude and direction remain the same for lending in the quarterly imputed and complete case models, as well as the matched models, the log lending results are insignificant and close to zero. The matched results are also no longer significant, likely due to a decrease in our sample size. The small size of our sample limited our ability to match on both country and base assets and instead only enabled matching on one covariate at a time.

Furthermore, the difference in difference (DID) results in Appendix 3 (Tables 3 and 4) were the most inconsistent compared to all the other sensitivity checks, though also inconclusive. The parallel

trends assumption that is required for DID to be valid was not clearly met, further decreasing our confidence in those results. However, the inconsistencies between our CITS and DID sensitivity checks illustrate the advantage of being able to look at the change in trends, as we do in CITS. CITS with segmented regression is better able to accommodate violations of the parallel trends assumption than difference-in-difference designs. DID only looks at the differences in the average *level* of the outcome before compared to after in the treatment compared to the control group. In the DID design, we lose the nuance that comes from being able to assess the trends over time. CITS adds the advantage of allowing us to also look at the change in s*lope* between pre-intervention and post-intervention rather than just looking at a level change. This difference in interpretations is clearly illustrated in the average trends for lending depicted in **Figure 3**, which shows that lending was decreasing in the treatment banks at the intervention time and then started to increase after the intervention. In the DID, this resulted in showing that lending was decreasing in the treatment banks compared to the comparison banks. However, when we look at the changes in slope pre-intervention and post-intervention for treatment and comparison, we are able to see that there is an increase in lending after the intervention in the treatment banks compared to the control banks.

While we detected significant effects of the SP on lending, it appears that there is no impact of the SP on the other performance-related measures. **The insignificant result in the other outcomes indicates we cannot conclude there was an impact of SP on those measures.** This could be due to a variety of factors, including the limitations mentioned above related to data availability. It is also possible that there is no effect of the SP on those measures, perhaps because they are too distal from the SP. Some of the changes in these outcomes may actually flow through increased lending and therefore may only appear later or/and too weakly for us to be able to detect. For example, NPLs and ROA directly rely on gross loans (as mentioned in Table 1). There are also a variety of trade-offs between some of these measures (e.g., a decrease in CAR could occur with an increase in lending if the alternative to lending is setting aside more funds).

Despite the limitations of this analysis (e.g., issues with data availability), this work makes an important contribution to the field. This paper presents empirical evidence in line with the literature that certain liquidity support can lead to increased lending in recipient banks and provides an example of this effect in banks operating in low and middle-income countries. Furthermore, as one of the first impact evaluations within this sector that leverages controlled interrupted time series, we were able to demonstrate that this is a viable method and could be used in future banking sector evaluations, particularly with larger samples.

While this study includes some discussion of EBRD's theory of change in Appendix 1, there is potential to elaborate on the theorized causal mechanisms for each type of support EBRD provides, including through consultation with those directly involved in delivering and receiving each type of support (to help document specific expected mechanisms through which various types of EBRD interventions are expected to have an effect, the types of measures that would best capture the targeted outcomes, the expected time frame/duration for those changes to be observed, external or confounding factors that may also affect the targeted outcome, etc.).

The extent to which this SP support may have mitigated potential negative effects of the COVID-19 pandemic is also not entirely clear even for lending, since the average levels of lending among the control banks were not appreciably affected by COVID (i.e., **Figure 2** illustrates that average lending remained relatively constant for the 2-3 years before and 2 years after the COVID pandemic began). Future research could further explore any phenomena or factors that affected banks during the pre-

COVID period, which might explain the apparent deterioration in bank performance indicators in the 2-3 years prior to March 2020 (see **Figure 2**).

### Conclusion

Overall, this analysis found that there were some significant impacts on lending from the emergency liquidity support that EBRD provided to their clients. Though this is a local average treatment effect and cannot be generalized to the rest of the Tier 1 treatment sample, this does indicate that the SP likely played a role in the increase in lending experienced. These findings contribute to the scarce existing literature on the influence of liquidity assistance and find similar significant, positive effects on lending. The strength of this work is that this is one of the first impact evaluations within this sector and this analysis has demonstrated that controlled interrupted time series is a viable method for these types of evaluations. This also demonstrates that additional work that assesses the impact of liquidity support on bank performance outcomes in low and middle-income countries is needed.

## VI. Recommendations

In order to continue developing the evidence base on financial institutions in low and middle-income countries, we have outlined some recommendations for future attempts at performing an impact evaluation (at EBRD and in the banking sector generally).

### A note on evaluability

The extent to which a program can (or should) be rigorously evaluated – if at all – depends on certain conditions related to the program's conceptualization and implementation as well as the attributes of the available data. Starting with the conceptualization, programs should be designed based on a deliberate and evidence-informed assessment of the problem. The program design should be informed by available evidence on what works to address the problem, taking into account the context in which the program is to be implemented. The targeted outcome(s) should be clearly defined, measurable, and limited in number. The extent to which the intervention was implemented as planned should be reasonably well understood and documented. Data should be available in sufficient quantity and quality, with common (or at least comparable) data sources for both intervention and comparison areas. If one or more of these conditions are not met, attempting to evaluate may be infeasible and/or may produce inaccurate or meaningless results. These conditions are described in further detail vis-à-vis EBRD's SP in **Appendix 4**.

Planning an evaluation prospectively is always encouraged to ensure these conditions can be met (e.g., developing clearly defined intervention and theory of change, and collecting data). Extensive data collection is not necessarily required when there are reliable external resources such as CapitalIQ Pro, assuming they include the indicators of interest outlined in the theory of change. The development of an evaluation can also benefit from a greater understanding of the existing studies and gaps in the literature. We performed a cursory literature review for this study, but a more in-depth systematic review or evidence gap map would provide far more insight on what impact evaluations exist in this realm and what needs to be evaluated.

### A note on data management and use

Throughout the evaluability assessment and the analysis, we identified some specific challenges EBRD is likely to face when conducting an impact evaluation, particularly related to data management. If addressed, this can speed up the process and rigor of future evaluations. The details of the data diagnosis we performed and EBRD-specific challenges identified can be found in

Appendix 4 Table 13. As an example, there were inconsistencies in bank names across EBRD databases and within the existing EBRD to S&P crosswalk. This could be addressed by cleaning up the unique IDs used by banks (and continually updating these in a centralized crosswalk) so that they can easily be mapped to S&P and Orbis. In general, ensuring consistent naming practices with any changes in names or dates updated in all relevant databases, a central database to maintain the consistently measured bank-level outcomes and covariates of interest organized by bank, not just operation or country.

Furthermore, it is important to ensure indicators for outcomes of interest are being clearly defined and collected regularly at the bank-level, consistently across banks and for potential comparison banks. This can occur internally, and/or by encouraging banks to report bank-level information on a quarterly basis to S&P Capital IQ Pro or other reliable external databases. This can be a general request or can include the identification of banks that are missing quarterly data in S&P and reaching out to them individually.

Finally, encouraging communication across departments and bankers in EBRD, and providing training/capacity building is likely to be beneficial, not just for future impact evaluations, but all forms of client-level analysis. For example, having a centralized database storing key indicators for all operational EBRD and potential comparison banks (from S&P CapitalIQ Pro and internal data that is consistently measured across banks) with a dedicated individual or group to ensure this is kept up to date on a quarterly basis could provide considerable value to not only EvD but individual bankers to enable regular monitoring of their banks as well. While some of this is already occurring, particularly analyses on the country-level, bringing in bank-level data is likely to provide more nuanced insights, and enable future impact evaluations.

# References

Acharya, V.V. and Steffen, S. (2020) 'The Risk of Being a Fallen Angel and the Corporate Dash for Cash in the Midst of COVID', *The Review of Corporate Finance Studies*, 9(3), pp. 430–471. Available at: https://doi.org/10.1093/rcfs/cfaa013.

Aït-Sahalia, Y., Andritzky, J., Jobst, A., Nowak, S. and Tamirisa, N. (2012) 'Market response to policy initiatives during the global financial crisis', *Journal of International Economics*, 87(1), pp. 162–177. Available at: https://doi.org/10.1016/j.jinteco.2011.12.001.

Altavilla, C., Ellul, A., Pagano, M., Polo, A. and Vlassopoulos, T. (2021) 'Loan Guarantees, Bank Lending and Credit Risk Reallocation', *SSRN Electronic Journal* [Preprint]. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3963246.

Andrade, P., Cahn, C., Fraisse, H. and Mésonnier, J.-S. (2019) 'Can the Provision of Long-Term Liquidity Help to Avoid a Credit Crunch? Evidence from the Eurosystem's LTRO', *Journal of the European Economic Association*, 17(4), pp. 1070–1106. Available at: https://doi.org/10.1093/jeea/jvy020.

Barrot, J.-N., Martin, T., Sauvagnat, J. and Vallee, B. (2019) 'Employment Effects of Alleviating Financing Frictions: Worker-Level Evidence from a Loan Guarantee Program', *SSRN Electronic Journal* [Preprint]. Available at: https://doi.org/10.2139/ssrn.3409349.

Bertrand, M., Duflo, E. and Mullainathan, S. (2004) 'How Much Should We Trust Differences-in-Differences Estimates?', *The Quarterly Journal of Economics*, 119(1), pp. 249–275.

Bordo, M.D. and Duca, J.V. (2021) 'An overview of the Fed's new credit policy tools and their cushioning effect on the COVID-19 recession', *Journal of Government and Economics*, 3, p. 100013. Available at: https://doi.org/10.1016/j.jge.2021.100013.

Borio, C. (2020) *The prudential response to the Covid-19 crisis*. (BIS management speeches). Available at: https://www.bis.org/speeches/sp200630a.htm#:~:text=The%20prudential%20response%20to%20the%20Covid%2D19%20crisis%20has%20been,flowing%20and%20support%20the%20economy.

Carpinelli, L. and Crosignani, M. (2021) 'The design and transmission of central bank liquidity provisions', *Journal of Financial Economics*, 141(1), pp. 27–47. Available at: https://doi.org/10.1016/j.jfineco.2020.06.025.

Claessens, S., Klingebiel, D. and Laeven, L. (2005) 'Crisis Resolution, Policies, and Institutions', in *Systemic Financial Crises: Containment and Resolution*. Cambridge University Press, p. 406. Available at: https://books.google.com/books?hl=en&lr=&id=-9YgAwAAQBAJ&oi=fnd&pg=PA169&ots=pfXUaHSdFb&sig=goMspAbUpGos_4C1EXYHmgGC2HA#v=onepage&q&f=false.

De Marco, F. (2020) 'Public Guarantees for Small Businesses in Italy during COVID-19', *SSRN Electronic Journal* [Preprint]. Available at: https://doi.org/10.2139/ssrn.3604114.

Demirgüç-Kunt, A., Pedraza, A. and Ruiz-Ortega, C. (2021) 'Banking sector performance during the COVID-19 crisis', *Journal of Banking & Finance*, 133, p. 106305. Available at: https://doi.org/10.1016/j.jbankfin.2021.106305.

Gibson, H.D., Hall, S.G., Petroulas, P., Spiliotopoulos, V. and Tavlas, G.S. (2020) 'The effect of emergency liquidity assistance (ELA) on bank lending during the euro area crisis', *Journal of International Money and Finance*, 108, p. 102154. Available at: https://doi.org/10.1016/j.jimonfin.2020.102154.

Igan, D., Mirzaei, A. and Moore, T. (2022) 'A Shot in the Arm: Stimulus Packages and Firm Performance during COVID 19'.

Jasova, M., Mendicino, C. and Supera, D. (2018) 'Rollover Risk and Bank Lending Behavior: Evidence From Unconventional Central Bank Liquidity', *SSRN Electronic Journal* [Preprint]. Available at: https://doi.org/10.2139/ssrn.3216733.

Lopez Bernal, J., Cummins, S. and Gasparrini, A. (2018) 'The use of controls in interrupted time series studies of public health interventions', *International Journal of Epidemiology*, 47(6), pp. 2082–2093. Available at: https://doi.org/10.1093/ije/dyy135.

Minoiu, C., Zarutskie, R. and Zlate, A. (2021) 'Motivating Banks to Lend? Credit Spillover Effects of the Main Street Lending Program', *Finance and Economics Discussion Series*, 2021(077), pp. 1–76. Available at: https://doi.org/10.17016/FEDS.2021.078.

Paravisini, D. (2008) 'Local Bank Financial Constraints and Firm Access to External Finance', *The Journal of Finance*, 63(5), pp. 2161–2193.

Reinhart, C.M. and Rogoff, K.S. (2009) *This Time Is Different: Eight Centuries of Financial Folly*, *This Time Is Different*. Princeton University Press. Available at: https://doi.org/10.1515/9781400831722.

Schiozer, R.F. and Oliveira, R. de F. (2016) 'Asymmetric transmission of a bank liquidity shock', *Journal of Financial Stability*, 25, pp. 234–246. Available at: https://doi.org/10.1016/j.jfs.2015.11.005.

Taylor, J.B. and Williams, J.C. (2009) 'A Black Swan in the Money Market', *American Economic Journal: Macroeconomics*, 1(1), pp. 58–83. Available at: https://doi.org/10.1257/mac.1.1.58.

# Appendices

## Appendix 1: Solidarity Package Overview and Theory of Change

### a. Program Description

The Solidarity Package (SP) was designed to provide **rapid and targeted support** to EBRD clients (financial institutions, SMEs, corporate and energy developers, sub-sovereign municipal, energy and infrastructure clients) with the main objective of **preserving transition and strengthening resilience of banks, firms, and nations to the crisis.** Support included emergency liquidity assistance (loans) (approved by EBRD within a month to enable speedy on-lending to businesses and individuals), working capital, payment deferrals, trade finance, fast track restructuring and various policy and advisory interventions. The SP "targeted all sectors of the economy, but especially those badly affected by the crisis, including financial institutions, SMEs and corporate sectors such as automotive and transport providers, agribusiness, and medical supplies."[30] While the objective of the SP to "preserve transition" and "prevent transition reversals" could be achieved through various avenues, the majority of the SP project targeted the Resilient and Competitive transition qualities "due to the nature of the COVID-19 crisis and the need for liquidity support through the Resilience Framework".[31] By providing targeted loans and policy advice in Tiers 2 and 3, the SP also aimed to support the Inclusive, Green, and Integrated TQs, in addition to Resilience and Competitive TQs. These were primarily extensions of loans for existing frameworks. For example, loans to banks that could be on-lent to women-led MSME's under certain initiatives contribute to women's economic inclusion by supporting access to finance and providing business advisory and skills development services. Trade financing under the TFP also was intended to support the Integrated TQ by helping banks to cover more and longer tenor trade finance transactions. Tier 1 project approval required statements on the impact of COVID-19 as a justification to receive funding. While this requirement was not removed for tiers 2 and 3 and many of the project approval documents for tier 2 and 3 do mention COVID-19 as background information on the country and to clarify that it would *not* negatively impact the borrowers' ability to repay the loan, there was no explicit mention of the impact of COVID-19 as a rationale for tier 2 and 3. Tier 1 project approvals on the other hand, required two sections discussing the impact of COVID-19 on the borrower. This forms part of the basis for our justification to only focus on tier 1, as elaborated on below.

There have been two phases of the SP, as follows:

- **Phase I (SP1)** was approved by EBRD's Board on 13 March 2020. In phase I, the SP consisted of €1B in financing to existing clients meeting criteria approved by the Board (with up to €25M allowance per bank to be repaid in two years and up to €100M if no objection is given by board). Long-term financing beyond 2 years was provided to clients that needed balance sheet restructuring.

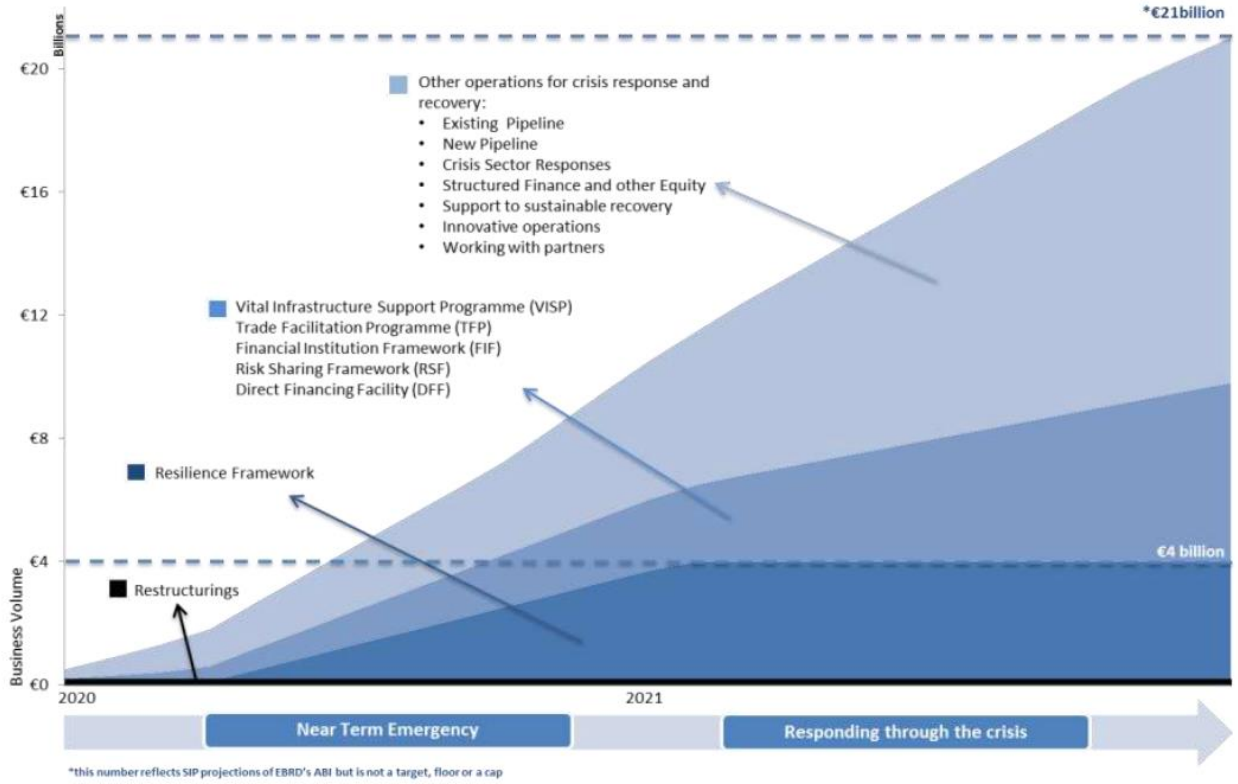
[30] European Bank for Reconstruction and Development (EBRD). (n.d.). *The EBRD's coronavirus Solidarity Package*. Retrieved August 15, 2022, from https://www.ebrd.com/what-we-do/coronavirus-solidarity

[31] Retrieved from pg. 11 of EvD Rapid Assessment of the Solidarity Package_Technical Notes_with_link sheet v1

- **Phase II (SP2)** was approved by the Board on 23 April 2020. In phase II, the total funding provided by EBRD was increased to €4B for Tier 1 and overall €21B under all three Tiers of SP (for Tier 1 still with up to €25M per bank, but with tenor up to 3 years, and small changes in the number of days for the board to provide no-objection for up to €100M).

There are three tiers of the SP focused on different initiatives, as follows:

- **Tier 1**, the new Resilience Framework (RF), is focused on providing existing EBRD clients with emergency liquidity assistance.
- **Tier 2** included funding under various buckets of existing initiatives and one new initiative for existing and new clients. These include DFF (direct financing facility), FIF (financial intermediaries framework), TFP (trade facilitation program), RSF (risk sharing framework), new VISP (vital infrastructure support), and policy dialogue
- **Tier 3** further expanded on this by providing funding for ongoing businesses and new clients.




**Appendix Figure 1.** Timeline of the components delivered within the Solidarity Package**.** Source: [EBRD Memo on SP Phase 2]

Criteria to receive funding from EBRD under the SP included having strong business fundamentals and being temporarily affected by crisis (individual bankers used existing pricing process and data on banks' risk and financials to determine eligibility). Applicants needed to mention how COVID-19 negatively impacted (or would impact) them and why financing was needed, while also having a high probability that after recovery of the market they will be able to repay their loan and that their liquidity will be adequate for the next 1-1.5 years (as demonstrated by a financial projection model).

There was inconsistency in how these eligibility criteria were interpreted and then applied, which led to variation between the selected banks. For instance, Tier 2 and 3 support includes standard market offerings provided by EBRD prior to SP that were re-packaged as SP during the intervention time period. All business conducted in 2020/2021 was deemed by EBRD to be part of the SP under these tiers. For Tiers 2 and 3, some of the signing dates for these projects pre-date the COVID-19 crisis and the introduction of the Solidarity Package. For these projects, we do not know when their SP-specific contracts were signed.. During discussions with EBRD employees and bankers, it became unclear whether each operation that was labelled as Tier 2 or 3 had COVID reasoning, with all other funding criteria being essentially the same as previously. In addition to conversations with bankers, the project approval documents for Tier 2 programs that were provided to us by EBRD did not include COVID-19 as rationale for why the funding was needed. Furthermore, in a survey of EBRD bankers, only 27% note that their clients perceived the support under Tiers 2 or 3 to be related to COVID-19 financing offered by the bank, while the rest did not or were not sure about the distinction.

Financial institution operations were also required to have a transition impact and COVID-19 impact rationale (with the intermediary goal being to help the client remain solvent and operational with continued commercial lending in line with comparable players). For financial institutions, the RF aimed to ensure resilience and preserve competition; the rationale for this required details about the client retaining solvency and remaining an active and effective market player (Resilient), and that the client's commercial lending is at least on par with the market (Competitive). For Tiers 2 and 3, this rationale included funding initiatives focused on supporting areas such as equity (Inclusive), energy efficiency (Green), and foreign trade (Integrated). There were certain exclusions related to military, tobacco/hard liquor, insurance, investment firms, etc. (client must be in the same country as the financial institution, must be financially viable and in compliance with laws).

### b. Theory of change

The goal of the Solidarity Package was to prevent "transition reversals" in EBRD's countries of operation (CoOs).[32] Tier 1, the SP Resilience Framework (RF), focused primarily on the Resilience and Competitive transition qualities (TQs), in large part by providing emergency liquidity to banks, ensuring they have enough funding to remain solvent and continue to provide loans to businesses and individuals.[33] Tier 2 expanded the focus of the SP to address not only the Resilient and Competitive TQs but also the Green, Inclusive, and Integrated TQs by providing targeted loans to be used primarily for existing green, equity-focused, and/or trade financing initiatives.

3ie acknowledges that the intervention was developed in a time of emergency and not necessarily with the intent of assessing the attributable impact of the package on specific outcomes of interest. As such, the SP Theory of Change (ToC) was still in development at the time the package was rolled out and, indeed, when this evaluation was being conducted. Consequently, and for a variety of reasons, not all components of the SP are equally evaluable. Though it is beyond the scope of this work, a formal evaluability assessment of the SP would be informative to elaborate the justifications provided here for focusing specifically on Tier 1 of the SP; it would also be a useful reference during

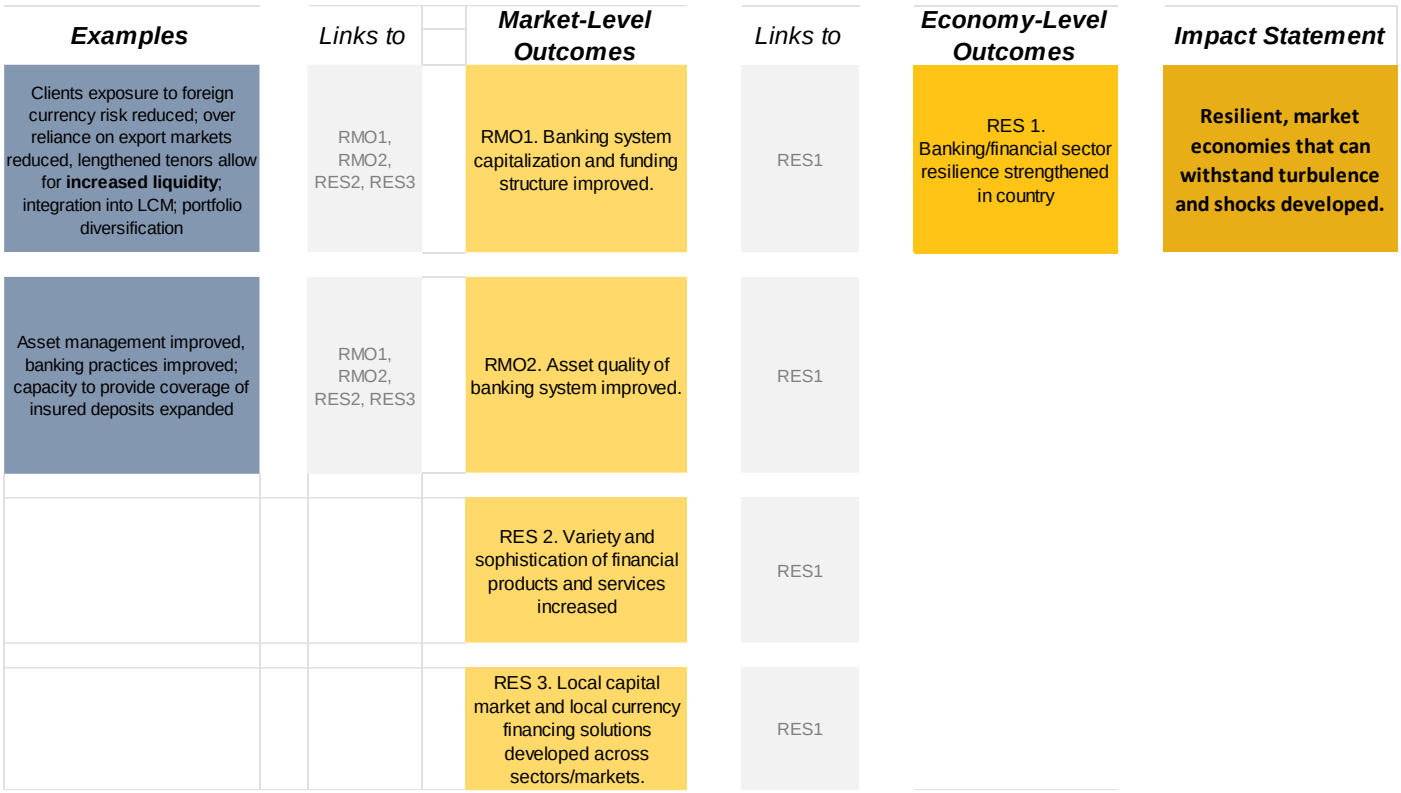
[32] Retrieved from EBRD Internal document: EvD Rapid Assessment of the Solidarity Package_Technical Notes_with_link sheet v1

[33] Retrieved from EBRD Internal document:11 Solidarity Package Guidelines Resilience FW guidelines - OpsCom submission

the design phase of future EBRD programmes with a planned or anticipated ex post evaluation of causal impact.

In order to summarize the potential pathways to impact for the intervention being evaluated (Tier 1 of the SP), 3ie excerpted the components of EBRD's overarching ToC that are relevant to Tier 1, along with the associated descriptions and rationales provided in project approval documents. This ToC represents the inferred logical causal reasoning based on what can be observed from EBRD's background documents. The following section outlines what can be observed (through project documents) as intended logical pathways to impact, without an extensive literature review. These observations guide the selection of the outcome variables included in this impact evaluation. Appendix Figure 2 contains the aspects of a ToC that EBRD has been developing for its existing services that apply to the RF of the SP. Most of the pieces have been extracted from EBRD's existing Resilience ToC, with the "Measurable Indicators" added in by 3ie to illustrate which aspects within the pathway can be empirically measured in this analysis. As outlined in the Rapid Assessment and SP Results Framework, there is a particular focus on the Resilience TQ for the Resilience Framework. EBRD's Compendium of Indicators (COI) also outlines specific indicators that map outcomes to the transition qualities. For example, indicators from the COI that are relevant to this analysis (and measurable) include the number, volume, size, and share of loans extended/disbursed by partner financial institutions (References in the COI: 58, 121, 126, 131, 134, 139, 140), which link to RES1 in the EBRD ToC, "strengthened resilience including capitalization and sustainable funding structure of banking sector". Further relevant indicators from the Results Framework shared by EBRD include volume of sub-loans, share of NPLs, share of loans, capital adequacy ratio, and return on assets.

| *Intervention* | *Activity* | *Links to* | *Client Outputs* | *Measurable Indicators* | *Examples* | *Links to* | *Client-Level Outcomes* | *Measurable Indicators* |
|---|---|---|---|---|---|---|---|---|
| **EBRD COVID-19 Solidarity Package Lending to FIs -** Providing conditional short-term financing and risk sharing to support resilience | A1. Extending loans | RCO1, RCO3 | RCO1. Financial products/services offered developed/expanded | **Gross Loans (to Customers)** | Local currency lending | ROU1, ROU2, ROU3 | ROU1. Resiliency of end-beneficiaries against financial shocks and volatily strengthened | **Liquidity Coverage Ratio (LCR)** |
| | | | RCO3. Debts restructured/ balance sheets refinanced/ NPLS reduced | **Ratio of non-performing loans (NPLs) to gross loans** | Reduction of NPL ratio and of NPL stock | ROU1, ROU2 | ROU2. Financial and operational performance improved | **Capital Adequacy Ratio, ROE, ROA** |




**Appendix Figure 2.** Subset of the updated EBRD ToC for Resilience TQ developed by EBRD Management, adjusted to include "Measurable Indicators" relevant to the SP.

3ie also created a streamlined ToC outlining the theorized pathways of impact of the parts of the SP that address liquidity on financial institutions (Tier 1 – RF), with an emphasis on the specific indicators to be considered in the analytical model(s) and how they are likely to interact. This ToC can be found in the Annex of Interim Output 3 (IO-3). The main difference between that ToC and Figure 2 is that it more explicitly theorizes potential connections between the measurable indicators and also ties in and discusses the Competitive TQ in more detail. While this ToC provided a valuable starting point to discuss the intervention and how it was expected to create an impact, the rationale behind the pathways between indicators is not based on an extensive literature review (due to time constraints) and rather outlines 3ie's observation of the expected impact and most relevant indicators in EBRD's background documents. This ToC is included in the appendix to document this process and is primarily meant to provide additional background and rationale around the intervention so that we can proceed with the relevant outcome indicators for the impact evaluation.

This counterfactual analysis will use the measurable bank-level indicators in Figure 2 to estimate the attributable impact of the SP. The impact estimates measured through this evaluation are, in turn, theorized to contribute to preserving transition, though these country-level contributions cannot be empirically evaluated. As outlined in the definition of Assessments of Transition Qualities (ATQs) used by EBRD Management, EBRD's country-level ATQs rely on aggregate versions of the measurable bank-level indicators in the ToC to measure financial stability and transition quality in EBRD's

COOs.[34] In particular, the EBRD Transition Report defines the ATQs as "composite indices combining information from many indicators and assessments in a consistent manner. The underlying indicators within each ATQ are constructed using a wide range of sources."[35] For instance, within the Resilience ATQ there is a financial stability component (making up 70% of resilient ATQ) and banking sector health and intermediation sub-component, which is determined by composite indicators such as CAR, ROA, and NPL ratios. Therefore, an increase in an individual bank's CAR can increase the composite CAR which in turn influences the resilient TQ and overall TQ of a country.

However, as noted in a recent IEvD assessment of the evaluability of TQs (June 2020, SS20-160), ATQs are not sufficient to fully capture transition. This is particularly the case in the event of crisis, where the shock-absorption elements of the ATQs are not clear. 3ie acknowledges the limitations of the ATQs and may theorize on the potential pathways of SP contribution to TQ in the final report, but ultimately, an evaluation of the intermediate outcomes and ATQs is beyond the scope of this impact evaluation. Since the intervention is at the bank level, the pathway from the intervention to bank-level outcomes is more direct than the pathway from the SP to country-level outcomes, which is influenced by many other factors that cannot be controlled for. The focus on bank-level outcomes is described further in the methodology section.

3ie also consulted with EBRD staff from the Banking and Risk Departments to clarify their specific understanding of how the SP intervention was intended to affect various outcomes of interest. There was a general concurrence that the market was not as adversely affected by COVID as anticipated (NPLs did not increase), in part because of extensive support from governmental regulatory and monetary policy (e.g., forbearance measures).[36] The SP intervention was also considered to be very small in comparison to the full array of comparable support provided to the recipient organizations. However, any impact of the SP was most likely to be seen in the change in **liquidity** (e.g., Liquidity Coverage Ratio, Loan-to-Deposit, Liquid Assets to Total Assets, short-term funding ratios).[37] A follow-up survey with bankers confirmed that both liquidity and more so lending are likely to be most affected by the SP, at least as observed by bankers who worked on the SP projects.

The project approval documents further indicate that liquidity, lending, NPLs, and capital would be affected by COVID and thus ideally would be mitigated by the SP support. For instance, in the approval for Egypt Solidarity Loan 52056 there is mention that "in the context of COVID-19, we expect: an increase in non-performing loans ("NPLs"), mitigated by sufficient capital buffers above the regulatory requirement". They also cited concerns that liquidity and asset quality would decrease as sub-borrowers will struggle to pay their loans to the banks.[38] More specifically, EBRD SP Guidance documents, as well as each FI project approval document mentioned the goal and rationale for the receiving the RF support, is "to help the client remain **solvent** and operational (Resilient TQ) with

[34] European Bank for Reconstruction and Development (EBRD). (n.d.). *Transition Report 2021-22*. European Bank for Reconstruction and Development (EBRD). Retrieved August 15, 2022, from https://2021.tr-ebrd.com/structural-reform/

[35] European Bank for Reconstruction and Development (EBRD). (n.d.). *Transition Report 2021-22*. European Bank for Reconstruction and Development (EBRD). Retrieved August 15, 2022, from https://2021.tr-ebrd.com/structural-reform/

[36] Meetings with Cagatay Bircan and Marko Bikicki (indicated SP was more of a cautionary insurance liquidity measure)

[37] Correspondence with Vlad Andrianov and Laurence Wilson in the EBRD Risk Department

[38] Retrieved from EBRD project approval document: BDS20-039R1 ADD 7 from RF - BM Egypt Solidarity Loan - 52056

continued commercial **lending** at least in line with the market and comparable players (Competitive)". Further support for how the RF would promote resilience included mention of **capital ratios** and the client's needs to remain solvent, and rationale for maintaining competition included the client's plans to **on-lend** the funds to SMEs.[39]

[39] Retrieved from Solidarity Package Guidelines Resilience FW Guidelines and EBRD project approval documents

# Appendix 2: Extended Methods

## a. Outcome data

We had access to two potential external datasets: S&P CapitalIQ and Orbis. We attempted to combine the datasets to improve our sample size but noticed that Orbis was missing data for nearly every 4th quarter. Furthermore, the Orbis and S&P outcomes were not sufficiently similar for certain outcomes and banks for us to be confident in the interchangeability for all outcomes. Considering this uncertainty and the fact that our sample size would not have been increased much (if at all), we only employed the S&P data. Descriptions of the data and outcome variables employed can be found in Table 1 of the text.

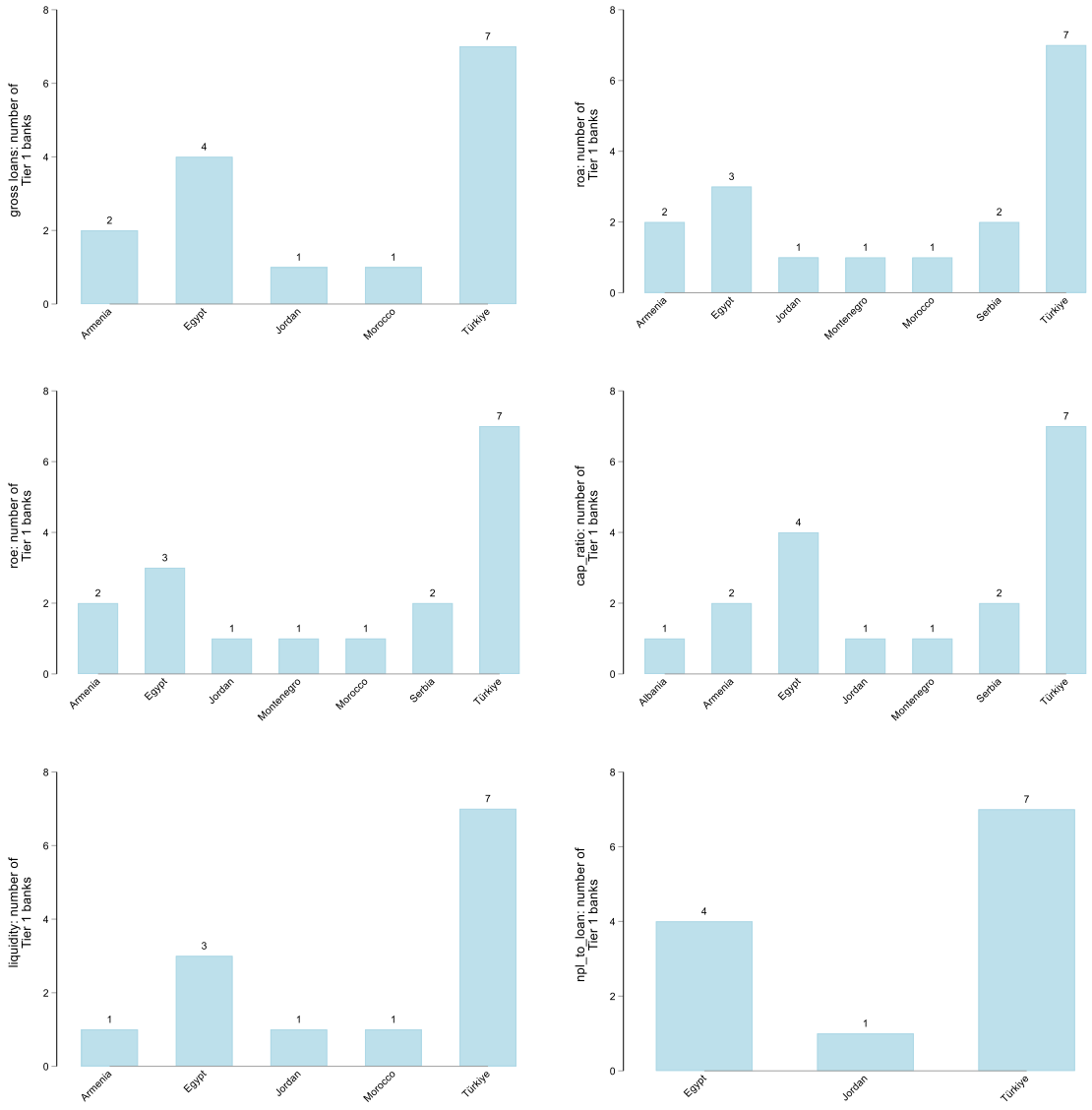
## b. Treatment analytic sample

Our data is available quarterly from 2017-2022, which is aggregated up to yearly by taking the average of the quarters per year per bank. In order to ensure we have enough data point for our analyses, we first drop any banks missing more than one quarter after the intervention period and three periods (quarters) prior to treatment.

We then focused on banks that received the SP in the same quarter/year as most other Tier 1 banks. For the yearly analysis this intervention period was 2020, and for the quarterly analysis this was Q2 of 2020. We excluded any banks that did not receive the SP in that period.

Finally, for the yearly analysis we drop any banks that are missing the outcome variable of interest in any year.

**Appendix Figure 3.** Final sample size of tier 1 banks for each outcome, by country (for the yearly analysis).


gross loans: number of Tier 1 banks
Armenia
Egypt
Jordan
Morocco
Türkiye
roa: number of Tier 1 banks
Armenia
Egypt
Jordan
Montenegro
Morocco
Serbia
Türkiye
roe: number of Tier 1 banks
Armenia
Egypt
Jordan
Montenegro
Morocco
Serbia
Türkiye
cap_ratio: number of Tier 1 banks
Albania
Armenia
Egypt
Jordan
Montenegro
Serbia
Türkiye
liquidity: number of Tier 1 banks
Armenia
Egypt
Jordan
Morocco
Türkiye
npl_to_loan: number of Tier 1 banks
Egypt
Jordan
Türkiye

Appendix Table 1. Sample sizes for each specification (EBRD vs. all)

| Cap_ratio | |
|---|---|
| Yearly Sample | |
| cits_tier1 | 18 |
| cits_control | 111 |
| Quarterly | |
| cits_tier1_nomi | 9 |
| cits_control_nomi | 56 |
| cits_tier1_impute | 14 |
| cits_control_impute | 111 |
| DID Yearly | |
| did_tier1 | 20 |
| did_control | 111 |

| Lending | |
|---|---|
| Yearly Sample | |
| cits_tier1 | 15 |
| cits_control | 84 |
| Quarterly | |
| cits_tier1_nomi | 10 |
| cits_control_nomi | 53 |
| cits_tier1_impute | 11 |
| cits_control_impute | 84 |
| DID Yearly | |
| did_tier1 | 16 |
| did_control | 84 |

| Liquidity | |
|---|---|
| Yearly Sample | |
| cits_tier1 | 13 |
| cits_control | 83 |
| Quarterly | |
| cits_tier1_nomi | 7 |
| cits_control_nomi | 54 |
| cits_tier1_impute | 9 |
| cits_control_impute | 83 |
| DID Yearly | |
| did_tier1 | 14 |
| did_control | 83 |

| NPL Ratio | |
|---|---|
| Yearly Sample | |
| cits_tier1 | 12 |
| cits_control | 51 |
| Quarterly | |
| cits_tier1_nomi | 8 |
| cits_control_nomi | 36 |
| cits_tier1_impute | 9 |
| cits_control_impute | 51 |
| DID Yearly | |
| did_tier1 | 13 |
| did_control | 51 |

| ROA | |
|---|---|
| Yearly Sample | |
| cits_tier1 | 17 |
| cits_control | 102 |
| Quarterly | |
| cits_tier1_nomi | 11 |
| cits_control_nomi | 73 |
| cits_tier1_impute | 12 |
| cits_control_impute | 102 |
| DID Yearly | |
| did_tier1 | 18 |
| did_control | 102 |

| ROE | |
|---|---|
| Yearly Sample | |
| cits_tier1 | 17 |
| cits_control | 102 |
| Quarterly | |
| cits_tier1_nomi | 11 |
| cits_control_nomi | 75 |
| cits_tier1_impute | 12 |
| cits_control_impute | 102 |
| DID Yearly | |
| did_tier1 | 18 |
| did_control | 102 |

Appendix Table 1 illustrates the final sample sizes for each model. The yearly CITS generally have the largest sample sizes, due to the significant amount of missing values in the quarterly data, further depicting the benefit of running the analysis using yearly data.

### c. Covariates

We included the covariates outlined in Appendix Table 2 in the analysis. The covariates that exist in the EBRD data were only included in the EBRD-only analysis since they do not exist for other comparison banks. We calculate the total assets at baseline (2019, prior to the pandemic), as is consistent with the literature (e.g., Igan et al., 2022). While differences in baseline characteristics are implicitly accounted for in the CITS model, including base assets as a proxy for the size of the bank provides an extra level of assurance that we control for the significant differences we see in the size of banks between the treatment and control groups. Covariates are typically controlled for at baseline, but we include receipt of loans over time to account for how funding may have changed over time, and particularly around the time of the intervention (due to COVID-19).

We also considered including specific country forbearance measures and firm ownership, as also appeared in the literature.[40,41] However, country forbearance measures from the University of Oxford's COVID-19 Government Response Tracker required additional extensive cleaning so the receipt of loans from the S&P Capital IQ was used to control for lending received during COVID instead. In addition, the forbearance measures would have remained constant within each country and would be accounted for in the country fixed effects models that we ran. Ownership was not included since all the Tier 1 banks in our sample (and nearly all banks) had the same ownership status (stock corporation).

**Appendix Table 2. Covariates included in the models**

| Variable | Data Source | Database code | Definition | Transformation |
|---|---|---|---|---|
| Country | Capital IQ S&P Pro (and EBRD data) | SP_country_name | Country of operation | Integer (country_int) |
| Total EBRD funding | EBRD data | total_client_abi | Total volume of lending from EBRD; only included in EBRD-only analysis | Sum of ABI for all operations and tranches received by bank |
| Total EBRD operations | EBRD data | no_client_ops | Total number of past operations a client has had with EBRD | Count of the number of prior operations with EBRD |
| Total assets | Capital IQ S&P Pro | 275808 | All assets owned by the company as of the date indicated, as carried on the balance sheet and defined under the indicated accounting principles | Total assets in 2019 |

[40] Brown, M. and R. De Haas. Foreign banks in emerging Europe. Economic Policy, 2012. p. 57-98.
[41] De Haas, R., Ferreira, D., and Taci, A. What determines the composition of banks' loan portfolios? Evidence from transition countries. Journal of Banking and Finance, 2010. 34: p. 388-398.

| | | | | |
|---|---|---|---|---|
| Receipt of loans | Capital IQ S&P Pro | 273673 | Net loans and advances made to banks after deducting any allowance for impairment | None (time-varying from 2017-2022) |

### d. Comparison group selection

For the comparison group, we kept only non-EBRD and non-Tier 1 banks that were in the same countries as our final sample of Tier 1 banks for each outcome.

For the within EBRD analyses, we only included non-Tier 1 EBRD banks and only those that were active (received funding from EBRD) at least once since 2017. We also limited these to the countries in the final sample of Tier 1 banks.

In both specifications, we also exclude banks that are missing any year of outcome data to ensure consistency in our final sample of estimates available over time.

### e. Model specifications

#### i. Unit of analysis

Since there were multiple banks within the treatment groups, we used a panel-level ITS model (xtitsa package in Stata) to account for between-bank differences. Compared to other ITS models where the treatment group is aggregated to one value at each timepoint before running the regression, this method allows us to retain the bank-level granular data at each timepoint. By using panel specifications, we are able to incorporate different autocorrelation structures and account for both between-group and within-group variation.

Due to the issues with missingness in our outcome variables (described above), we decided to perform yearly analysis, with quarterly complete case and imputed as a sensitivity check indicating no large differences. In the quarterly complete case, the data is at the quarterly level but we drop any banks missing any quarter of data. For the quarterly imputed specification, we first impute any missing quarters with the average value of the outcome that year, and then drop any banks missing all four quarters of at least one year. In the quarterly analysis we also had to drop any banks with the SP signed outside of Q2 of 2020, which resulted in the yearly analysis enabling us to maintain the largest sampling of banks. The benefit of still including the quarterly analysis as a sensitivity check is that CITS relies on multiple time points pre and post the intervention, and there are less points pre/post in the yearly analysis.

#### ii. Matching procedure

We used coarsened exact matching (CEM package in Stata) to identify matched units to use in the matched CITS analyses. Unlike other matching methods (such as Mahalanobis or propensity score), researchers have to first decide on the matching bandwidth before running the algorithm and then check for balance between the groups after the algorithm has finished. While exact matching allows researchers to match treated units to control on exact covariate values, the datasets used often do not have sufficient observations to successfully match each treatment unit to its exact comparison

unit, especially for continuous variables. CEM mitigates these issues through how the matching algorithm is implemented. CEM coarsens each covariate into strata that are then used to identify exact matches and then the original (uncoarsened) values of the covariate remain in the dataset. The algorithm provides bounds on the maximum imbalance based on the coarsening decisions that the user makes ex ante. This ensures that the user can adjust both the number of strata and the amount of imbalance within the same algorithm rather than having to manually check ex post. There is a trade-off within this decision as increasing the number of strata (narrower bins for that covariate value) reduces the bounds for maximum balance on that variable but could decrease sample size (if sufficient matched units are not found within for each narrower bin). Since baseline asset size is a continuous covariate value, we decided to use CEM to identify matches.

# Appendix 3: Supplementary Results

## Difference-in-difference (DID)

We first used difference-in-difference to assess the impact of the SP. For this model, we included country fixed effects. Below is the regression equation used for difference-in-difference.

$$Y_{it} = \beta_0 + \beta_1 D_t + \beta_2 X_i + \beta_3 (D * X)_{it} + u_{it}$$

**Appendix Equation 1**. Difference-in-difference equation. Source: 3ie

$Y$ is the outcome variable for bank *i* at time *t*, $D$ is a variable representing time and $X$ is a dummy variable indicating the treatment group. $\beta_0$ represents the baseline average, $\beta_1$ is the change in outcomes pre-intervention to post-intervention for the control group, $\beta_2$ is the difference in outcomes between the treatment and control prior to the intervention and $\beta_3$ is the difference in the differences pre-intervention and post-intervention for treatment and control (using the interaction between time and intervention: $(D * X)$. $\beta_3$ is our estimate of impact. We specify bank-level fixed effects and clustered standard errors, as recommended in Bertrand, Duflo, and Mullainathan (2004) (Bertrand, Duflo and Mullainathan, 2004).

### Full Sample Comparison DID

**Appendix Table 3** illustrates the DID results for each outcome variable with fixed effects and time-varying loans received.

**Appendix Table 3.** Difference-in-difference analyses for each outcome variable with time-varying covariates

| | (1) Yrly: DID Loans (000sEUR) | (2) Yrly: DID ROA (%) | (3) Yrly: DID ROE (%) | (4) Yrly: DID NPL Ratio (%) | (5) Yrly: DID CAR (%) | (6) Yrly: DID LCR (%) |
|---|---|---|---|---|---|---|
| Post-pre diff | 383,431.15** | 0.19 | 3.11* | 0.25 | -0.54 | 3.30* |
| | (145,762.21) | (0.15) | (1.34) | (0.38) | (0.80) | (1.46) |
| Post-pre change (TvC) | -1,125,195.32 | 0.02 | 0.14 | -0.06 | 2.45* | -0.24 |
| | (2,436,977.60) | (0.24) | (2.82) | (0.54) | (1.06) | (2.21) |
| Loans received | 0.26 | 0.00 | 0.00 | -0.00 | 0.00* | 0.00** |
| | (0.15) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Constant | 7,015,683.77*** | 1.50*** | 10.15*** | 4.83*** | 22.36*** | 32.32*** |
| | (234,024.52) | (0.09) | (1.16) | (0.20) | (0.35) | (0.98) |
| Baseline Tier 1 Mean | 19,395,878.41 | 1.69 | 14.92 | 3.82 | 16.97 | 30.23 |
| Tier 1 Obs | 16 | 18 | 18 | 13 | 20 | 14 |
| Control Obs | 84 | 102 | 102 | 51 | 111 | 83 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## Within EBRD DID

**Appendix Table 4** are the same as the above specification, but only for EBRD banks.

| | (1) Yrly: DID Loans (000sEUR) | (2) Yrly: DID ROA (%) | (3) Yrly: DID ROE (%) | (4) Yrly: DID NPL Ratio (%) | (5) Yrly: DID CAR (%) | (6) Yrly: DID LCR (%) |
|---|---|---|---|---|---|---|
| Post-pre diff | 414,809.22 | 0.19 | 3.11* | 0.25 | -0.54 | 3.30* |
| | (278,542.07) | (0.15) | (1.34) | (0.38) | (0.80) | (1.46) |
| Post-pre change (TvC) | -1,127,221.30 | 0.02 | 0.14 | -0.06 | 2.45* | -0.24 |
| | (2,470,865.09) | (0.24) | (2.82) | (0.54) | (1.06) | (2.21) |
| Loans received | 0.17 | 0.00 | 0.00 | -0.00 | 0.00* | 0.00** |
| | (0.13) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Constant | 10,372,545.40*** | 1.50*** | 10.15*** | 4.83*** | 22.36*** | 32.32*** |
| | (582,986.25) | (0.09) | (1.16) | (0.20) | (0.35) | (0.98) |
| Baseline Tier 1 Mean | 19,395,878.41 | 1.69 | 14.92 | 3.82 | 16.97 | 30.23 |
| Tier 1 Obs | 16 | 18 | 18 | 13 | 20 | 14 |
| Control Obs | | | | | | |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## Matched CITS

To account for how characteristics such as bank size may have affected the comparability of our comparison groups to our treatment group, we conducted matched controlled interrupted time series. Tier 1 EBRD banks tended to be larger than the comparison banks, so we created matched comparison group using baseline values for total assets. Coarsened exact matching was used to identify matched pairs with multiple controls per treatment bank (Blackwell, et al., 2010).

### Full Comparison Group Matched CITS

**Appendix Table 5** illustrates the results of the CITS models with matching on baseline assets.

**Appendix Table 5.** Controlled interrupted time series matched on baseline assets for each outcome variable, controlling for country and time-varying loans received to banks

| | (1) CITS Loans (000sEUR) | (2) CITS ROA (%) | (3) CITS ROE (%) | (4) CITS NPL Ratio (%) | (5) CITS CAR (%) | (6) CITS LCR (%) |
|---|---|---|---|---|---|---|
| Change since start | 97,682.80 | 0.06 | 0.01 | 0.60*** | 0.14 | 0.30 |
| | (188,613.52) | (0.11) | (0.86) | (0.16) | (0.23) | (0.53) |
| Base level diff(TvC) | 2,555,268.49 | 0.26 | 3.64 | 0.17 | -5.68* | -3.32 |
| | (3,848,944.06) | (0.24) | (2.02) | (0.65) | (2.24) | (4.17) |
| Base slope(TvC) | -895,362.01 | -0.10 | -0.68 | 0.07 | 0.55 | -0.32 |
| | (729,093.31) | (0.13) | (0.99) | (0.33) | (0.43) | (2.13) |
| Avg change in level(2020) | 769,433.17 | -0.75* | -4.25 | -0.71* | -0.05 | 1.93 |
| | (779,717.87) | (0.30) | (2.52) | (0.28) | (0.36) | (1.13) |
| Post-pre avg change in trend | -680,285.17 | 0.64*** | 6.73*** | -1.13*** | -0.50 | 1.28 |
| | (552,959.92) | (0.12) | (1.22) | (0.25) | (0.36) | (0.72) |
| Post-pre change in level(TvC) | -406,968.41 | 0.09 | -1.88 | 0.37 | 0.72 | 0.04 |
| | (887,740.75) | (0.34) | (2.75) | (0.39) | (0.62) | (2.30) |
| Post-pre change in trend(TvC) | 1,245,888.58 | 0.16 | 2.45 | -0.24 | -0.58 | 0.02 |
| | (711,884.33) | (0.25) | (2.46) | (0.50) | (0.64) | (2.43) |
| Constant | -3789036.89*** | 1.55*** | 7.32*** | 3.02*** | 17.72*** | 39.47*** |
| | (825,570.17) | (0.30) | (1.87) | (0.88) | (0.94) | (4.63) |
| Baseline Tier 1 Mean | | | | | | |
| Obs | | | | | | |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

*Note: The model assessing the change in loans controls for baseline values of loans received to banks*

### Within EBRD Matched CITS

**Appendix Table 6** presents the results of the controlled interrupted time series after matching for baseline assets with EBRD-only banks as the comparison group.

**Appendix Table 6.** Matched controlled interrupted time series for each outcome variable, controlling for EBRD covariates (total number and amount of past operations, number of SP support packages received), country, and time-varying net loans to banks

| | (1) CITS Loans (000sEUR) | (2) CITS ROA (%) | (3) CITS ROE (%) | (4) CITS NPL Ratio (%) | (5) CITS CAR (%) | (6) CITS LCR (%) |
|---|---|---|---|---|---|---|
| Change since start | -171,315.48 | -0.11 | -1.17 | 0.70* | 0.29 | 0.14 |
| | (304,993.48) | (0.07) | (0.84) | (0.34) | (0.22) | (1.02) |
| Base level diff(TvC) | 2,774,031.01 | 0.14 | -0.69 | 0.46 | 0.64 | 3.12 |
| | (9,182,978.24) | (0.26) | (2.11) | (1.44) | (0.94) | (6.41) |
| Base slope(TvC) | -1168733.53 | -0.01 | 0.37 | -0.54 | 0.37 | -0.10 |
| | (1,118,631.34) | (0.12) | (1.08) | (0.70) | (0.42) | (4.15) |
| Avg change in level(2020) | 1,851,094.85 | -0.25 | -1.49 | -0.41 | 0.22 | 2.95 |
| | (1,469,770.99) | (0.22) | (2.66) | (0.47) | (0.39) | (1.82) |
| Post-pre avg change in trend | -90,317.63 | 0.63*** | 7.60*** | -1.39* | -0.03 | 1.22 |
| | (279,511.40) | (0.14) | (1.71) | (0.63) | (0.26) | (1.18) |
| Post-pre change in level(TvC) | -1867069.61 | -0.29 | -3.68 | 0.69 | 0.28 | -1.03 |
| | (1,973,727.15) | (0.35) | (3.20) | (0.57) | (0.72) | (4.24) |
| Post-pre change in trend(TvC) | 1,133,809.42 | 0.30 | 1.50 | 0.45 | -0.90 | -0.65 |
| | (1,003,179.57) | (0.31) | (2.92) | (1.01) | (0.62) | (4.75) |
| Constant | -20957336.83 | 1.19** | 3.57 | 3.40* | 15.99*** | 52.01*** |
| | (11855971.70) | (0.41) | (3.28) | (1.49) | (1.90) | (12.97) |
| Baseline Tier 1 Mean | | | | | | |
| Obs | | | | | | |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## Log lending analyses

### DID and CITS

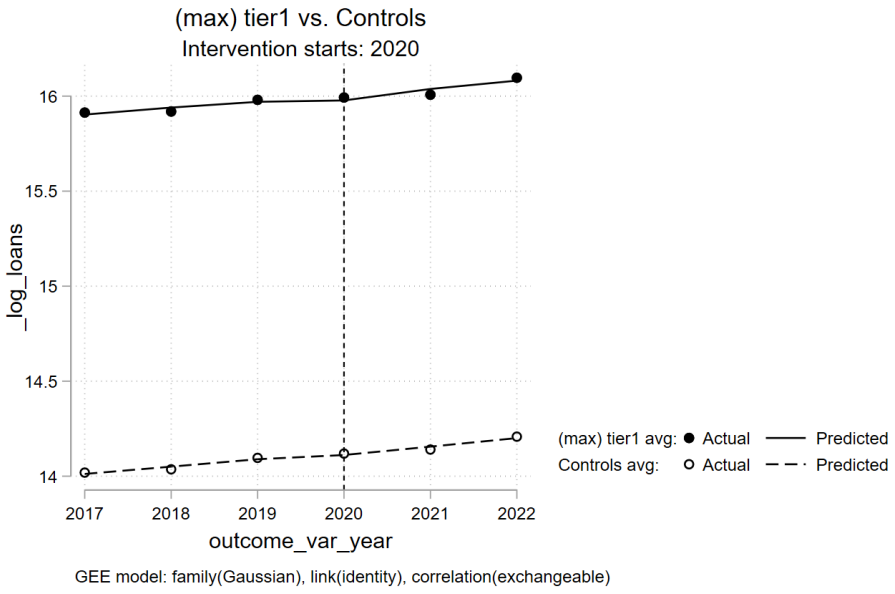
**Appendix Table 7** depicts the log transformed DID and CITS results.

| | (1) Yrly: DID | (2) Yearly: CITS | (3) Qrtly: CITS no mi | (4) Qrtly CITS: impute |
|---|---|---|---|---|
| Post-pre diff | 0.11* | | | |
| | (0.04) | | | |
| Post-pre change (TvC) | -0.05 | | | |
| | (0.10) | | | |
| Change since start | | 0.04 | -0.00 | 0.01 |
| | | (0.02) | (0.01) | (0.00) |
| Base level diff (TvC) | | 0.54* | 0.48 | 0.63* |
| | | (0.22) | (0.28) | (0.26) |
| Base slope (TvC) | | -0.01 | 0.01 | 0.00 |
| | | (0.04) | (0.01) | (0.01) |
| Avg change in level(2020) | | -0.01 | | |
| | | (0.02) | | |
| Post-pre avg change in trend | | 0.00 | 0.01 | 0.01 |
| | | (0.02) | (0.01) | (0.00) |
| Post-pre change in level (TvC) | | 0.00 | | |
| | | (0.04) | | |
| Post-pre change in trend (TvC) | | 0.02 | 0.01 | -0.02 |
| | | (0.03) | (0.02) | (0.01) |
| Loans received | 0.00* | 0.00 | 0.00 | 0.00 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Bank size | | | | |
| Constant | 14.33*** | 13.64*** | 12.59*** | 13.65*** |
| | (0.02) | (0.04) | (0.21) | (0.05) |
| Baseline Tier 1 Mean | 15.97 | 15.94 | 15.80 | 15.90 |
| Tier 1 Obs | 16 | 15 | 10 | 11 |
| Control Obs | 84 | 84 | 53 | 84 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

**Appendix Figure 4** visualizes the CITS on log-transformed lending for the treatment and control groups.



### Quarterly complete case analyses

We also ran analyses using quarterly data. In **Appendix Table 8** and **Appendix Table 9**, we conducted analyses using a complete case sample where any banks missing outcome or covariate analyses were dropped.

### DID

**Appendix Table 8** provides the DID quarterly complete case results for each outcome.

| | (1) Qrtly: DID Loans (000sEUR) | (2) Qrtly: DID ROA (%) | (3) Qrtly: DID ROE (%) | (4) Qrtly: DID NPL Ratio (%) | (5) Qrtly: DID CAR (%) | (6) Qrtly: DID LCR (%) |
|---|---|---|---|---|---|---|
| Post-pre diff | 139,303.07 | 0.18 | 3.06* | 0.34 | 0.14 | 4.01* |
| | (193,320.84) | (0.16) | (1.44) | (0.34) | (1.10) | (1.62) |
| Post-pre change (TvC) | -3,367,344.69* | 0.12 | 0.72 | -0.29 | 2.97* | 0.14 |
| | (1,303,278.95) | (0.24) | (2.93) | (0.49) | (1.28) | (2.37) |
| Loans received | -0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00*** |
| | (0.65) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Constant | 8,881,533.46*** | 1.65*** | 10.72*** | 4.59*** | 21.93*** | 30.75*** |
| | (470,671.98) | (0.08) | (0.86) | (0.19) | (0.44) | (0.77) |
| Baseline Tier 1 Mean | 18,723,611.67 | 1.73 | 15.40 | 4.10 | 16.37 | 28.27 |
| Tier 1 Obs | | | | | | |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

### CITS

**Appendix Table 9** provides the CITS quarterly complete case results for each outcome.

| | (1) Qrtly: CITS Loans (000sEUR) | (2) Qrtly: CITS ROA (%) | (3) Qrtly: CITS ROE (%) | (4) Qrtly: CITS NPL Ratio (%) | (5) Qrtly: CITS CAR (%) | (6) Qrtly: CITS LCR (%) |
|---|---|---|---|---|---|---|
| Change since start | 1,306.43 | 0.03 | -0.06 | 0.31** | -0.03 | 0.36* |
| | (18,876.00) | (0.03) | (0.21) | (0.11) | (0.10) | (0.18) |
| Base level diff (TvC) | 3,117,451.35 | 0.59* | 6.13** | 1.64 | -5.44 | -7.69 |
| | (2,107,371.07) | (0.28) | (2.15) | (0.93) | (3.09) | (4.88) |
| Base slope (TvC) | -417,607.68 | -0.04 | -0.36 | -0.11 | 0.29* | 0.35 |
| | (220,119.02) | (0.03) | (0.26) | (0.15) | (0.15) | (0.57) |
| Avg change in level (2020q2) | 242,189.53 | -1.17*** | -5.99* | -0.82* | 0.77 | -1.21 |
| | (210,423.04) | (0.33) | (2.38) | (0.40) | (0.74) | (0.98) |
| Post-pre avg change in trend | -27,236.07 | 0.22*** | 2.17*** | -0.53** | -0.06 | 0.24 |
| | (58,834.11) | (0.04) | (0.37) | (0.20) | (0.19) | (0.23) |
| Post-pre change in level (TvC) | -16,202.95 | 0.14 | -3.43 | 0.70 | 1.51 | -1.21 |
| | (408,912.11) | (0.40) | (2.64) | (0.46) | (0.99) | (1.77) |
| Post-pre change in trend (TvC) | 381,077.83* | 0.12 | 1.73* | 0.11 | -0.31 | -0.43 |
| | (166,819.87) | (0.09) | (0.72) | (0.24) | (0.24) | (0.70) |
| Loans received | -0.55 | -0.00 | -0.00 | 0.00* | 0.00 | 0.00*** |
| | (0.35) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Bank size | 0.68*** | -0.00 | 0.00 | -0.00* | -0.00 | -0.00* |
| | (0.01) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Constant | 84,450.86 | 1.36*** | 7.37*** | 0.08 | 17.77*** | 33.81*** |
| | (216,112.14) | (0.30) | (1.70) | (0.67) | (1.39) | (6.80) |
| Baseline Tier 1 Mean | 19,268,032.53 | 1.96 | 17.99 | 4.01 | 16.53 | 28.95 |
| Tier 1 Obs | 10 | 11 | 11 | 8 | 9 | 7 |
| Control Obs | 53 | 73 | 75 | 36 | 56 | 54 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## Quarterly imputed analyses

To address the missing data issue, we imputed missing outcome values within the quarterly data. We imputed values by taking the average of the quarterly values within each year.

## DID

**Appendix Table 10** presents the difference-in-difference quarterly imputed analyses for each outcome variable.

| | (1) Qrtly: DID Loans (000sEUR) | (2) Qrtly: DID ROA (%) | (3) Qrtly: DID ROE (%) | (4) Qrtly: DID NPL Ratio (%) | (5) Qrtly: DID CAR (%) | (6) Qrtly: DID LCR (%) |
|---|---|---|---|---|---|---|
| Post-pre diff | 340,231.78* | 0.11 | 2.49* | 0.24 | -0.35 | 3.33* |
| | (146,063.19) | (0.13) | (1.21) | (0.32) | (0.72) | (1.33) |
| Post-pre change (TvC) | -2,222,667.08 | 0.09 | 0.71 | -0.19 | 2.33* | 0.13 |
| | (1,595,566.22) | (0.23) | (2.62) | (0.48) | (1.06) | (2.06) |
| Loans received | -0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00* |
| | (0.17) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Constant | 7,445,829.25*** | 1.55*** | 10.73*** | 4.76*** | 22.47*** | 32.46*** |
| | (193,693.77) | (0.06) | (0.74) | (0.13) | (0.28) | (0.81) |
| Baseline Tier 1 Mean | 19,271,738.49 | 1.64 | 14.44 | 3.95 | 17.05 | 30.31 |
| Tier 1 Obs | | | | | | |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

## CITS

**Appendix Table 11** presents the quarterly imputed values for the CITS models for each outcome.

| | (1) Qrtly: CITS Loans (000sEUR) | (2) Qrtly: CITS ROA (%) | (3) Qrtly: CITS ROE (%) | (4) Qrtly: CITS NPL Ratio (%) | (5) Qrtly: CITS CAR (%) | (6) Qrtly: CIT LCR (%) |
|---|---|---|---|---|---|---|
| Change since start | 23,410.39 | 0.00 | -0.18 | 0.25** | 0.03 | 0.28 |
| | (14,548.62) | (0.03) | (0.20) | (0.09) | (0.06) | (0.15) |
| Base level diff (TvC) | 2,261,714.93 | 0.53 | 4.75* | 0.23 | -4.74* | -9.82* |
| | (2,325,107.75) | (0.29) | (2.32) | (0.91) | (2.33) | (4.51) |
| Base slope (TvC) | -373,034.29 | -0.03 | -0.26 | -0.06 | 0.18 | 0.21 |
| | (230,047.17) | (0.03) | (0.24) | (0.13) | (0.12) | (0.53) |
| Avg change in level (2020q2) | 133,193.44 | -0.90*** | -4.97** | -0.75* | 0.08 | -0.56 |
| | (137,901.17) | (0.26) | (1.86) | (0.29) | (0.46) | (0.81) |
| Post-pre avg change in trend | -13,979.74 | 0.22*** | 2.11*** | -0.43** | -0.16 | 0.16 |
| | (38,931.94) | (0.04) | (0.31) | (0.16) | (0.12) | (0.19) |
| Post-pre change in level (TvC) | -649,498.55 | -0.04 | -3.55 | 0.51 | 1.17 | 0.12 |
| | (887,323.54) | (0.34) | (2.27) | (0.38) | (0.83) | (2.41) |
| Post-pre change in trend (TvC) | 661,138.87 | 0.10 | 1.45* | 0.05 | -0.16 | -0.54 |
| | (337,897.04) | (0.08) | (0.72) | (0.21) | (0.18) | (0.71) |
| Loans received | -0.28*** | -0.00 | -0.00 | -0.00 | 0.00 | 0.00** |
| | (0.07) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Bank size | 0.67*** | -0.00 | 0.00 | -0.00 | -0.00* | -0.00* |
| | (0.01) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Constant | -1428718.73*** | 1.42*** | 7.55*** | 3.08** | 18.11*** | 39.27*** |
| | (146,584.67) | (0.33) | (1.95) | (1.17) | (0.92) | (4.99) |
| Baseline Tier 1 Mean | 19,529,350.86 | 1.91 | 16.84 | 3.79 | 17.36 | 31.39 |
| Tier 1 Obs | 11 | 12 | 12 | 9 | 14 | 12 |
| Control Obs | 84 | 102 | 102 | 51 | 111 | 102 |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

# Appendix 4: Conditions for conducting an impact evaluation

To determine the impact of an intervention, we want to measure the changes in relevant outcomes that are attributable to EBRD's crisis intervention during the pandemic (as compared to business as usual). Ideally, the outcomes from a participant group that received the intervention are compared to the same group had they not received the intervention (i.e., the counterfactual). Program impact is measured as the difference in outcomes between these two states of being. Realistically, it is impossible to observe these states for the same units of observation at the same time, so evaluators will select a comparison group to represent the "**control" state**. However, the validity of estimated **impacts depends on how the control group was selected.** In the case of EBRD, banks were selected into receiving the SP and had to demonstrate that they were eligible to receive the funding. The reasons for which some EBRD clients received the SP may be because those banks are fundamentally different from non-SP or non-EBRD banks in ways that could also influence the outcome (such as the number of loans they disburse). In order to be able to assess impact of the SP, a valid counterfactual needs to be employed (comparison banks that are most similar on observable factors to EBRD banks that received the SP), as well as a quasi-experimental design that controls for other biases and confounding, such as those that exist between potential control and treatment groups.

However, the viability of an impact evaluation is also **dependent on the data available**. In order to construct a valid counterfactual, we need to identify the attributes that would influence a bank's eligibility for the treatment and also could affect the estimated changes in outcomes over time. These attributes need to be present for all banks in the sample to ensure that we are able to identify appropriate comparison banks. Outcome data needs to also be present for all banks and ideally, for the same number of data points for all banks. This outcome data must be consistently measured for all banks. By having the same outcome measured for all banks pre- and post-intervention, we are able to establish trends for the treatment banks compared to the control banks. We can then measure the change in outcomes post-intervention between the two groups, controlling for baseline trends, to assess impact.

**Sample size considerations** also affect our ability to assess impact. We need a sufficient sample size to detect any statistically significant differences between the intervention and comparison groups. Since only a few banks in each country received the SP, a cross-country analysis was not feasible.

Overall, our ability to assess impact is determined by our ability to construct a valid counterfactual and the data availability. **Even with a valid counterfactual and by including all countries in the dataset, we still run the risk that we may not see any statistically significant impact. Null results are still valuable and provide an opportunity for learning.**

Below, we have compiled a table of the conditions necessary for an impact evaluation and a summary of our observations at the evaluability stage of the analysis.

**Appendix Table 12**. Condition necessary for impact evaluations and observations about EBRD's SP and data assessment

| Condition | Description | Observations |
|---|---|---|
| Intervention | A clearly defined intervention, with a known time and duration as well as clearly defined eligibility criteria | Tier 1 (emergency liquidity under the Resilience Framework) is the only component of the SP that is substantively different from "business as usual" EBRD support. Tier 2 and 3 support includes standard market offerings provided by EBRD prior to SP that were re-packaged as SP during the intervention time period. All business conducted in 2020/2021 was deemed by EBRD to be part of the SP under these tiers. For Tiers 2 and 3, some of the signing dates for these projects pre-date the COVID-19 crisis and the introduction of the Solidarity Package. For these projects, we do not know when their SP-specific contracts were signed.<br><br>Tier 1 also was the only component of the SP that was a new intervention for financial institutions. Though the VISP program in Tier 2 was new, this evaluation is focused on the interventions provided to banks. In the SP |

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|---|---|---|
| | | sample, no financial institutions received VISP funding.<br><br>Criteria to receive funding from EBRD under the SP included having strong business fundamentals and being temporarily affected by crisis (individual bankers used existing pricing process and data on banks' risk and financials to determine eligibility). Applicants needed to mention how COVID-19 negatively impacted (or would impact) them and why financing was needed, while also having a high probability that after recovery of the market they will be able to repay their loan and that their liquidity will be adequate for the next 1-1.5 years (as demonstrated by a financial projection model). There was inconsistency in how these eligibility criteria were interpreted and then applied, which led to variation between the selected banks. For instance, during discussions with EBRD employees and bankers, it became unclear whether each operation that was labelled as Tier 2 or 3 had COVID reasoning, with all other funding criteria being essentially the same as previously. In addition to conversations with bankers, the project approval documents for Tier 2 programs that were provided to us by EBRD did not include COVID-19 as rationale for why the funding was needed. The COVID-19 crisis was mentioned as background information or in the risks section, but the funding was not explicitly tied to providing COVID-19 relief. However, the project approval documents for the Resilience Framework included two separate sections where the applicant had to indicate COVID-19 need: 1) impact of COVID-19 and rationale for inclusion in the resilience framework and 2) impact of COVID-19 on the borrower. As described above, all business conducted in 2020/2021 was deemed by EBRD to be part of the SP under Tiers 2 and 3. However, by the signing dates in EBRD's datasets, there were 15 non-SP banks that had operations begin at the same time as the SP. It is unclear why |

| | | |
|---|---|---|
| | | some of these programs were not considered to be SP if all business was considered to be related to the SP. |
| Outcome(s) | One or more clearly defined, observable, and measurable outcomes of interest | Based on the current draft of the SP Compendium of Indicators, the SP has 55 'long-term outcomes' and 85 'short-term outcomes', spanning six broad and diverse "transition quality" categories (Competitive, Green, Inclusive, Integrated, Resilience, Well-Governed).<br><br>Measurable outcomes relevant to this analysis include liquidity, lending, and solvency. Other relevant outcomes were identified in other theory of change documentation and EBRD project approval documents, as outlined in Appendix 1. |
| Problem diagnosis | A proposed programme or intervention should be developed based on a sound analysis of a particular social or development need and the binding constraints and root causes (i.e., to ensure the solution matches the problem) | Given the urgency of responding to the COVID-19 pandemic, it likely was not possible to fully take stock of the financial challenges EBRD clients were already facing or were likely to face in the coming months. This was also difficult due to the limitations of EBRD's data and client diagnostics mechanisms. It is not clear whether or to what extent it could have been anticipated that governments and other institutions would provide support to mitigate or alleviate liquidity and credit issues for banks and SMEs. As of the time of this evaluation, it is clear that governments around the world enacted substantial measures to address most or all of the same anticipated constraints that EBRD targeted through the Solidarity Package. |
| Theory of change | A sound, well-constructed theory of change explaining expected causal pathways linking inputs, outputs, and outcomes, including a description and key assumptions associated with each causal step | The SP ToC is still in development. Existing documentation provides limited explanation of how each component of the program is expected to produce change. Some key assumptions are documented. Both the description of change pathways and assumptions are somewhat obscured by the "many-to-many" causal linkages in the ToC. |

| | | |
|---|---|---|
| Sufficient dose and duration | The intervention should be of a sufficient scope, scale, and duration to theoretically produce the intended effect within the time frame of observation | SP's long-term outcomes of interest are primarily at the country and economy levels; we would not expect to see changes in these given that the SP intervention is very small in comparison to the full array of comparable support provided to the recipient organizations. For these long-term outcomes as well as bank-level long term outcomes, we would not expect to see changes given that may well take more than 2 years to observe, even with a sufficiently large intervention "dose", yet SP commenced in Q1-2 2020. Outcome data is available up to Q3 of 2022. |
| Counterfactual | A clearly defined hypothetical counterfactual, operationalized using a credible identification strategy | Two comparison groups were constructed as proxies for the counterfactual. For the first comparison, SP banks were compared to non-SP EBRD banks. Given recent clarification that everything EBRD did in 2020/2021 was included under the SP, this indicates that there are not any comparison banks operating in EBRD during the SP. When comparing pre-COVID operations to SP operations, the Tier 1 program was substantially different. However, for Tiers 2 and 3, there is no appropriate counterfactual within EBRD as the comparison banks received the same intervention. A controlled interrupted time series (ITS) comparing non-SP EBRD banks to SP EBRD banks is not possible as we do not have a sufficient comparison group (only 15 non-SP banks are present in the sample that were signed when the SP intervention was ongoing). An uncontrolled ITS may not show a change in the outcome trends for the Tier 2 and 3 banks as there wasn't a change from business as usual. To account for this, our non-SP EBRD comparison banks includes any bank that had EBRD funding from 2017 onwards and did not receive Tier 1 SP funding. We include controls for the total amount of EBRD funding to account for any differences that these variables may have on the outcomes of interest. |

| | | |
|---|---|---|
| | | The second comparison was between EBRD and non-EBRD banks. There may also be systemic differences between EBRD-supported banks and non-EBRD banks. From interviews with EBRD bankers, banks that received the SP may have been healthier than non-EBRD banks. This difference in financial health could introduce selection bias into the counterfactual, which we attempt to control for by including a country covariate and in our matching models.<br><br>In most countries, governments also provided forbearance measures that addressed similar constraints as the SP. This could affect the counterfactual as all banks would have access to programmes similar to the SP. We attempt to control for this with a variable for funding received. |
| Data quality | Reasonably accurate, complete data, with minimal or no systematic bias | There have been some inconsistencies in the data provided by EBRD (outlined in more detail in Appendix Table 13), including dates of disbursement prior to the COVID-19 pandemic, FI's that are labelled as SMEs on EBRD's website, observations with different client names that are actually the same, and operations that are matched to multiple client names.<br><br>The EBRD data is on the tranche level (but op id is the most granular unique ID). This means that there are 162 participating FI clients, which have multiple operations, and some operations have multiple tranches (sometimes in the same year). There is an operation ID and client ID, but no tranche indicator. Tranches were discovered when we realized that there were duplicate operations. Outcome data is only available on the client level, so we had to determine how to deal with clients that receive vastly different amounts of SP funding at different times (for e.g., we summed up total |

| | | |
|---|---|---|
| | | past funding received and use the first signing date as the relevant intervention period).<br><br>Outcome data was extracted from CapitalIQ S&P and Orbis and matched to EBRD's financial institutions. These are credible external sources of information on bank performance; however significant gaps in the data have been observed and further documentation on how the variables are constructed was necessary to ensure both sources can be combined, and even then, data gaps persisted, and outcomes did not match perfectly so we excluded Orbis. There is also likely to be some measurement error since matching banks relies partially on EBRD crosswalks and partially on manual searches which could result in incorrect matches or banks that exist in the S&P but have not been matched (for e.g., due to different naming standards or to changes in names). |
| Data sufficiency | Sufficient data to enable statistical comparison of outcomes between intervention and comparison groups | For ITS, it is recommended to have at least 3 data points before and after an intervention.<br><br>Outcome data from Capital IQ S&P and Orbis is sparse. There are very few intervention banks that have sufficient outcome data on a quarterly basis, which resulted in much smaller sample sizes than hoped and resulted in a focus on yearly analysis rather than quarterly.<br><br>Often, banks did not have enough data availability in the post period, so future work looking at longer term impacts could be performed once a few more quarters have passed and there is more data filled in. |

**Appendix Table 13.** Data Diagnostic

| Action Required | Description | Observations | 3ie Response |
|---|---|---|---|
| 1.1 Confirm data availability and format | Request codebook and/or data sample before contract | Datasets did not have a codebook | 3ie received S&P codebook from EBRD and EBRD followed up with S&P and Orbis customer service |
| 2.1 Assess availability of outcome data | Outcome indicators need to exist for correct observational level and time (longitudinal) | Initial data provided by EBRD did not have outcome variables | 3ie downloaded outcome variables from S&P Global and Orbis |
| 2.2 Ensure outcome indicators created in a replicable way | Outcome variables need to be replicable (consistent and exist for control group) | Probability of default (only plausible longitudinal outcome variable provided) determined internally, by each banker using indicators they personally received from banks | 3ie determined outcome variables would be needed – requested from EBRD |
| 2.3 If missing data, assess availability of alternative sources | Consider what it will take to collect and clean outcome/covariate data | EBRD mentioned potential external sources or banking authorities, would require 3ie to download and assess | S&P and Orbis identified as potential viable source, EBRD provided log in details |
| 3.1 Confirm understanding/meaning of data | Confirm structure, definitions and values/range of variables make sense. | EBRD data was on operation-level rather than bank-level; Data also had incorrect signing dates | 3ie assessed different ways to collapse the dataset to match bank-level of outcome data; Signing date issues still in progress |
| 3.3 Check for duplicates | If there are duplicate units (e.g., banks), confirm whether they should be removed or combined | EBRD dataset had duplicate operations per bank | Confirmed that the unit of observation is an operation's tranche but no unique tranche ID; some client names changed over time |
| 3.4 Merge datasets | Confirm various internal datasets can be merged and there are no inconsistencies across datasets | Some datasets were unclear – cancellations and new signing dates ended up not being relevant | 3ie followed up with EBRD on meaning of cancellations sheet and determined it was not relevant to the final dataset. |
| 4.1 Collect data | Identify and become familiar with data source | It was unclear how to navigate and download relevant variables for intervention and control group | 3ie spent time in S&P learning the platform and testing downloads. EBRD provided 3ie with a helpful walk-through of Orbis that sped up the process. |
| 4.2 Confirm meaning of data | Confirm definitions and ranges of variables make sense | Some variables had same name in diff categories, and diff values across data sources | 3ie/EBRD followed up with S&P and Orbis customer service to confirm definitions and inconsistent values |
| 4.3 Merge to internal data | Track down a crosswalk and confirm names/IDs are accurate and can be matched | EBRD dataset did not have ID numbers that matched to either S&P or Orbis ID numbers | 3ie used EBRD's cross-walk for S&P data; For Orbis, 3ie created cross-walk on platform; still had to manually match many banks |
| 4.4 Assess Missingness | Create a data cascade of final sample size once have minimum viable data | Of those banks that matched, many observations were missing | 3ie assessed how many banks were missing data, and for how many quarters before and after the SP. This process is repeated for all outcome variables. |