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The effect of foreign lending on domestic loans: An analysis of US global banks☆

Edith X. Liu[a,*], Jonathan Pogach[b]

[a] Federal Reserve Board of Governors, 20th and Constitution NW, Washington, DC 20551, USA
[b] Federal Deposit Insurance Corporation, 550 17th St NW, Washington, DC 20429, USA

HIGHLIGHTS

- We use confidential data to study the effect of foreign lending on domestic loans.
- We instrument for foreign lending using bank exposure and foreign GDP growth.
- A 1% increase in foreign lending leads to a 0.6% growth in domestic loans.
- When capital is tight, foreign lending comes at the cost of domestic loans.
- Bank lending exhibits similar complementarities as real investment of multinationals.

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ABSTRACT

This paper examines the effect of foreign lending on the domestic lending for US global banks. We show that greater foreign loan growth complements, rather than detracts from, domestic commercial lending. Exploiting a confidential data (FFIEC 009) on international loan exposure of US banks, we estimate that a 1% increase in foreign office lending is associated with a 0.6% growth in domestic commercial lending, suggesting complementarity across these lending channels. However, when capital raising is tight during the Global Financial Crisis of 2008, we find that foreign lending did come at the expense of domestic lending.

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1. Introduction

As of September 2014, US bank loans to non-bank borrowers outside of the US totaled $4.9 trillion US dollars (BIS, 2015). Given the large volume of cross-border loans, the impact of foreign lending may have a significant impact on the financing and growth of the US domestic economy. This paper examines US global banks and asks: does foreign lending come at the expense of domestic lending?

To understand the cross-border lending decision of global banks, it is natural to adopt the framework used for analyzing foreign and domestic real investment decisions of multinational industrial firms.[1] However, the lack of available data on the geographical location of bank lending has posed a significant challenge. To this end, we exploit a confidential dataset (FFIEC 009) of US bank's foreign country exposure and apply the methodology of Desai et al. (2009) to identify the relationship between foreign and

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* Corresponding author.
E-mail addresses: edith.x.liu@frb.gov (E.X. Liu), jpogach@fdic.gov (J. Pogach).

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[1] Papers in the industrial literature include those at the macroeconomic level such as Feldstein (1995) and those at the industry level, such as Arndt et al. (2010).

domestic lending when both are simultaneously decided.[2] Specifically, we construct a bank-specific exposure-weighted foreign GDP growth (also innovations to GDP growth) to instrument for foreign lending of each bank, and use the cross-sectional variation across US global banks for identification.

Our results show that US global banks treat foreign and domestic lending more as complements than substitutes, where we estimate that a 1% increase in foreign lending corresponds to 0.6% increase in domestic loan volume. This finding mirrors the real investment complementarity found with multinational industrial firms in Desai et al. (2009). We view our result as the funding side counterpart of real investment made by multinational firms, and as potentially capturing the finances that support the production side complementarities. Finally, we find that the relationship reverses when bank funding conditions tighten, thus supporting the hypothesis that when capital constraints bind then banks will necessarily trade off lending. This paper contributes to the literature on how banks allocate loan decisions across countries and relates lending patterns of global banks to those observed from real investment made by multinational firms.

2. Model and empirical design

Consider a global bank that lends in the US ("Domestic") and abroad ("Foreign"). Faced with costs, r_D and r_F, to operate foreign and domestic loans[3], the bank chooses respective loans volumes given by L_D and L_F. The bank solves the following optimization problem, with revenue function $R(Q(L_D, L_F), y_F)$ and bank specific foreign lending condition, y_F[4]:

$$\max_{L_D, L_F} R\left(Q\left(L_D, L_F\right), y_F\right) - r_D L_D - r_F L_F.$$

At the optimum, both first order conditions (FOC) on L_D and L_F must be satisfied simultaneously:

$$\frac{\partial R}{\partial Q}\frac{\partial Q}{\partial L_D} = \boldsymbol{G}(L_D, L_F, y_F) = r_D \tag{1}$$

$$\frac{\partial R}{\partial Q}\frac{\partial Q}{\partial L_F} = \boldsymbol{H}(L_D, L_F, y_F) = r_F \tag{2}$$

where operating costs, r_D and r_F, are parameters in the bank's decision problem. Eqs. (1) and (2) demonstrate that L_D and L_F are determined simultaneously. Therefore, a basic OLS estimate that relates changes in foreign and domestic lending, β in the below specification, is likely to suffer from simultaneity bias:

$$\%\Delta DomesticLending_{it} = \alpha + \beta(\%\Delta ForeignLending)_{it} + \gamma\theta_{it-1} + \varepsilon_{it} \tag{3}$$

where $\%\Delta DomesticLending_{it}$ is the change in domestic C&I Loans for bank i,[5] $\%\Delta ForeignLending_{it}$ is the change in foreign office lending,[6] and θ_{it-1} are lagged bank specific balance sheet controls.

To address this simultaneity bias, we construct an exogenous variable to instrument for foreign lending and follow a two stage least squares (2SLS) estimation.[7] Following Desai et al. (2009), we define our instrument, Z_{it}, to be the change in foreign GDP, weighted by the bank's own lagged country exposures:

$$Z_{it} = \sum_{j=1} w_{ij,t-1} z_{jt} \tag{4}$$

where z_{jt} is the GDP growth for country j, $w_{ij,t-1} = \frac{X_{ij,t-1}}{\sum_j X_{ij,t-1}}$, and $X_{ij,t-1}$ is the country exposure of bank i in country j. Then, with our instrument, we run a 2SLS, where the regressions in each stage are specified as follows:

$$\%\Delta ForeignLending_{it} = a + b * Z_{it} + c\theta_{it-1} + \omega_{it} \tag{5}$$

$$\%\Delta DomesticLending_{it} = \alpha + \beta * [\%\Delta \widehat{ForeignLending}_{it}] + \gamma\theta_{it-1} + u_{it}. \tag{6}$$

While the above model takes the perspective of a bank's lending decision to illustrate the simultaneity bias, our identification comes from ex-ante cross-sectional differences in the foreign country exposures across US banks, and the assumption that changes in foreign GDP is exogenous to the US banks. Indeed, our identification requires that a bank's foreign lending vary with their exposure to a high GDP growth country as compared to a low GDP growth country. While the positive correlation between foreign lending and foreign GDP growth can be interpreted as being driven by productivity shocks or changes in loan demand, our framework can also accommodate alternative explanations for this association. For example, a country-specific decline in loan servicing cost could also induce higher GDP growth and more foreign lending into that country. For our identification strategy to be valid, we simply require that our foreign country GDP growth instrument be exogenous to the bank, and that it is correlated with the bank's foreign lending.

3. Data

Our data is based on the confidential regulatory filing FFIEC 009 (CEX)[8] that requires all US banks with $30 million or more in foreign claims to report their exposure by country. We aggregate foreign holdings to the bank holding company (BHC) level and match balance sheet variables using the bank regulatory filing Y9C. Finally, we source real GDP growth data from both World Bank (WB) and the Penn World Tables (PWT).[9] Our final sample covers the period of 1986–2011, excludes bank–year observations from offshore financial centers, and winsorsizes around outliers.[10]

We find that while foreign office loan volumes of US banks are concentrated in OECD countries and Latin America, considerable exposure differences across global banks remain. In 2012, the top countries by foreign office loan volume were United Kingdom (31%), Japan (17%), Mexico (7%), Australia (5%), Canada (5%), and Germany (5%), South Korea (4%) and Brazil (4%).

[2] We assume that banks make lending decisions first, and then funds are raised to service all loans. If funds are raised first and funding is fixed, then by construction, foreign lending comes at the expense of domestic lending.

[3] Since the bank raise funding as one entity, funding costs are the same across domestic and foreign lending. Therefore, r_D and r_F differ in the cost of operating loans at home and abroad.

[4] We assume that global US banks face the same domestic lending conditions so that y_F can be thought of as a bank's foreign lending conditions relative to the common domestic one.

[5] We use Commercial and Industrial (C&I) loans because it is most comparable with the investment framework for multinational firms. When we use US residential mortgage loans, we find no statistically significant relationship.

[6] We use Foreign Office lending, rather than Cross-Border or Total Foreign lending, because it is most closely resembles foreign direct investment of multinational industrial firms.

[7] Our results do not address a separate and related question regarding the self-selection to become global. We focus on only banks that has been global through our entire sample to alleviate this bias. Further, bank balance sheet controls are included to reduce the impact of risk characteristics on the bank's operational decision.

[8] For a detailed description of FFIEC 009, see Cetorelli and Goldberg (2012).

[9] WB provides better coverage of countries in the CEX, while PWT provides PPP-adjusted GDP data that more closely follows the methodology in Desai et al. (2009).

[10] We define outliers as observations where domestic lending or foreign office lending changed by −50% or +100%. We define offshore financial centers from IMF report 2006.