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The determinants of U.S. banks' international activities

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ABSTRACT

This paper develops a model and structural dynamic estimation of bank behavior to map the relationship between U.S. banks' choices of foreign banking activities, and bank and foreign market traits. This estimation framework is applied to a unique bank-level dataset compiled from regulatory sources, covering U.S. banks' foreign activities in 83 host markets over the 2003–2013 period. Bank traits are better able to explain the evolving patterns of foreign banking than host market characteristics. After controlling for these traits, the post-financial crisis period shows a structural shift away from cross-border claims towards foreign affiliate activities. Structural estimates of foreign market entry costs and regulatory attitudes towards risk are derived. Simulation exercises confirm the strong impact of banks' and regulators' risk stance on bank profits and portfolio composition.

1. Introduction

Global banking has become increasingly prevalent over the past several decades. The average share of foreign banks now reaches 20% in the OECD countries, with some as high as 50% (Claessens and van Horen, 2012). U.S. banks have also become more involved in foreign countries, with their foreign claims rising from 308 billion USD in 1998 to 3.4 trillion USD by 2012. Over this time period, U.S. banks invested an average of 18% of their portfolio in foreign claims.

Beyond its rising magnitude, the composition of this international exposure has changed substantially over the past decade. U.S. banks have noticeably moved away from cross-border claims (whereby U.S. banks acquire foreign assets directly from the U.S.) towards foreign affiliate claims (which are acquired via foreign affiliates established in host countries). In 2003, U.S. banks held only 15 cents in affiliate claims for each dollar in cross-border claims. By 2013, this number has risen to 33 cents per each dollar's worth of cross border claim. A further interesting pattern is that of U.S. banks' foreign affiliate participation. Since 2003, foreign market entries and exits averaged at 3.5 and 3.7 per globally active U.S. bank, respectively. On average, U.S. banks have maintained an affiliate presence in one third of the countries they hold claims in.[1]

In light of these interesting patterns, the goal of this paper is to explore the determinants and characteristics of U.S. banks' foreign activities over the course of the past ten years. The main contribution of this paper is the development and estimation of a dynamic model of banks' decisions concerning which countries to enter, and their choices of the volume and composition of claims to hold there. The model is estimated using a two-step structural dynamic method, which is applied to a newly compiled bank-level dataset on U.S. banks' foreign activities. The estimation procedure is a version of the Bajari et al. (2007) dynamic structural two-step estimation method. The first stage estimates banks' foreign claims volume choices, as well as banks' choices of foreign market entry and exit, as functions of a broad set of bank and host market traits in a reduced-form setting. The second stage then uses the policy function estimates from the first stage to construct banks' discounted sum of expected profits over time, corresponding to banks'

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[1] These foreign banking activities generally bring efficiency and technological improvements to host countries' financial markets (Xu, 2011). However, the volatility arising from financial contagion from parent banks can destabilize host economies during crisis periods (de Haas and van Lelyveld, 2011).

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observed foreign choices as well as a range of alternate choices. Comparing these constructed values of the observed and alternate paths of action, the structural parameters (such as entry costs and banks' and regulators' attitudes towards market risk) are chosen so as to rationalize banks' observed choices. The data set was compiled by merging various regulatory databases, banks' balance-sheet data and host-country macroeconomic indicators. It covers 82 U.S. banks' activities in 83 foreign countries between 2003 Q1 and 2013 Q1.[2]

This paper's approach to the microeconomic modeling of banks' activities has three advantages. Since it is dynamic, it captures the interactions between banks' foreign market entry/exit and claims choices. These dynamic interactions are important: market entry enables banks to hold foreign affiliate claims in that market for many periods to come. This foreign market involvement will then influence banks' future entry and claims choices in other markets as well (via diversification benefits, substitution effects, etc.). By being able to capture these interactions, this method goes beyond the reduced-form and static empirical methods applied in previous related literature (Focarelli and Pozzolo, 2001; Miller and Parkhe, 1998).

The analysis also accounts for banks' choice of the composition of their claims as functions of bank and market traits. This is a step forward since the simultaneous cross-border and foreign affiliate claim choices are interconnected, yet respond to bank and market traits differently. For instance, banks tend to establish foreign affiliates in host markets that have lower taxes, laxer regulatory restrictions on bank activities and a majority of retail clients (Cerutti et al., 2007), as well as substantial transfer risk (Cetorelli and Goldberg, 2008). On the other hand, cross-border claims, which can draw on parent banks' capital base, are more suitable if the host country is less developed or smaller (Lehner, 2009), or if the majority of clients there are low-risk multinationals or sovereigns. Home market conditions are also important in shaping the composition of foreign claims (de Haas and van Lelyveld, 2006; de Haas and van Lelyveld, 2010), especially when there are risks of regulatory arbitrage or financial contagion (Aiyar, 2011; Cetorelli and Goldberg, 2011; Buch, 2003; Magri et al., 2005). Bank traits matter as well: previous literature has highlighted bank size (Focarelli and Pozzolo, 2001) and the health of the balance sheet (Popov and Udell, 2012) as particularly important. In fact, results of the following analysis show that bank traits are better able to explain banks' foreign activities than host market characteristics.

Since the estimation is structural, it enables the identification of parameters (such as entry costs and risk aversions) for which the reduced-form literature uses rough empirical proxies. Getting structural estimates of these attitudes towards risk is a step forward, in light of evidence that regulatory strictness matters: a lax bank-regulatory environment in the home country gives banks a competitive advantage in global banking, while a strict regulatory environment in the host market limits domestic and cross-border bank activity (Fidrmuc and Hainz, 2013; Chen and Liao, 2011). Results in this paper show that regulators have become more risk averse since the financial crisis, and confirms that banks have done so as well (de Haas and van Horen, 2010). The analysis also estimates the host-market specific fixed entry costs (brick and mortar expenses as well as administrative fees) that banks have to pay upon market entry, and the scrap value of these costs that banks can recover upon exit. These entry costs form barriers to banks' foreign market entry (Lehner, 2009), and as such, can significantly affect the pattern of global banking. The following analysis shows that entry costs have grown substantially since 2008.

The paper contributes to a growing volume of literature by examining the effect of the recent financial crisis on banks' lending activities (Cotugno et al., 2013; Kleimeier et al., 2013; Ivashina and Scharfstein, 2010). Previous work has found that U.S. banks' foreign activities have fallen significantly in the aftermath of the crisis (Cetorelli and Goldberg, 2009; Cetorelli and Goldberg, 2011). This paper's findings add to the picture by implying that the post-crisis reduction in foreign activities is the result of banks' response to deteriorating balance sheet and host market conditions. After controlling for the changes in bank and market traits over the crisis period, there is evidence of a shift in the composition of foreign banking: banks have shifted significantly away from cross-border loans towards foreign affiliate activities since the financial crisis.

The paper proceeds as follows. Section 2 presents the model and characterizes banks' optimal domestic and foreign claims choices as a Markov perfect equilibrium. Section 3 describes the data and discusses the estimation method. Section 4 describes the results of the estimation. Section 5 presents simulation exercises. Section 6 concludes.

2. Model

The dataset that the model is ultimately estimated on specifies the volumes of claims and liabilities at the level of bank-host country pairs, but does not break them down by type (e.g. loans or bonds as types of claims, or deposits as a type of liability). Nonetheless, for expositional purposes the following model treats loans, bonds and deposits as separate types of claims and liabilities, each with its own traits. The estimable claims equations described in Section 3 can be thought of as composites of the various types of assets detailed in the model below.

2.1. Setup and notation

This section describes the model of a bank's foreign market entry/exit choices, as well as its decision on the volumes of loans to extend and deposits to take on. Let $j = 1 \ldots J$ denote bank j. Each bank j is owned by shareholders, whose goal is to maximize the lifetime discounted sum of mean–variance utilities on the bank portfolio.[3] Shareholders make foreign market entry/exit, as well as loan/deposit volume choices at the beginning of each period t. There are a total of T periods such that $t = 1 \ldots T$. The bank can operate in any of I countries, such that $i = 1 \ldots I$. In what follows, the time indices t, the country indices i and bank indices j are suppressed.

In each country, there are several markets m available to the bank. Let $m = 1$ denote the home (source-country) market. In each host (foreign) country, there are two markets available to the bank. First, the bank's headquarters can extend cross-border loans directly from the home market to any host country. Let $m = 2$ denote this cross-border loan market. Alternatively, the bank can make foreign affiliate (local) loans in the host country by establishing an affiliate there. Let $m = 3$ denote this foreign affiliate market. In each of the $I - 1$ foreign countries, the bank can engage in two markets: cross-border and foreign affiliate. Since by definition, there is no cross-border loan market in the bank's home, there are a total of $2 \cdot (I - 1) + 1$ markets available. In addition to making loans, the bank also has the option to take deposits in all markets. Foreign affiliate offices receive funding from their parent via internal capital markets (Cetorelli and Goldberg, 2009;

[2] The number of banks for which bank-level data is available is limited by regulatory reporting requirements. Only U.S. banks with claims in any given country in excess of 1% of total assets, or 20% of capital, are required to report foreign exposure.

[3] The mean–variance formulation, also employed by (Buch et al., 2010), is appropriate since evidence shows that banks look for higher returns and diversification opportunities in host markets (Focarelli and Pozzolo, 2005).