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ABSTRACT

Theory suggests that bank integration (financial integration generally) can magnify or dampen the business cycles, depending on the importance of shocks to firm collateral versus shocks to the banking sector. In this paper, we show empirically that bank integration across U.S. states over the late 1970s and 1980 dampened economic volatility within states. Internationally, however, we find that foreign bank integration, which advanced widely during the 1990s, has been either unrelated to volatility of firm investment spending or positively related to that volatility. The results suggest the possibility that business spending may become more volatile as countries open their banking sectors to foreign entry.

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I. Introduction

"Foreign banker" once had a nasty ring to it, like "carpetbagger" or "loan shark."[1] In the harshest terms, foreign banks were seen as parasites out to drain financial capital from their hosts. In nationalization campaigns, banks were often the first targets, especially when foreign owned. Even after a decade of privatization, governments still own a surprisingly large share of banks assets (La Port et al. 2000). Bank privatization has been held up, in part, by fear of foreign bankers who, in many cases, were the only, or most likely, buyers.

In the U.S., banks from other states were viewed as "foreign," and until the mid-1970s, most states strictly forbid entry by banks from other states. Indeed, even banks from other cities *within* a state were often blocked from opening branches in other cities in the state. Loosely speaking, the hometown bank was local, and banks from anywhere else were foreign.

Times have changed. In the U.S., barriers to entry by out-of-state banks were gradually lowered across the states, and the biggest U.S. banks now operate more or less nationally, with banks or branches in many states. Nations around the world have also lowered barriers to foreign bank ownership, and foreign banks have entered aggressively. Foreign bank ownership in Latin America has increased dramatically in the second half of the 1990s with aggressive acquisitions by Spanish banks in particular. In Chile, the foreign bank share of Chilean bank assets in increased from less than 20 percent in 1994 to more than 50 percent in 1999 (Clarke et al. 2001).

[1] "Carpetbaggers" was a pejorative term for northerners who flocked to the south after the Civil War in search of opportunity, financial or otherwise.

Generally speaking, the first-order effects of relaxed bank entry restrictions have been favorable. Relaxed branching restrictions within states in the U.S. have been associated with increased credit availability, enhanced bank efficiency, and faster economic growth within states (Jayaratne and Strahan, 1996 and 1998). Internationally, the benefits of foreign entry seem to depend on the level of development of the host country, but at least for developing nations, foreign entrants tend to be more efficient than incumbent banks, and the stiffer competition seems to improve overall bank efficiency (Classens et al. 2000). Geert et al. (2001) find that broader financial liberalizations—opening equity markets to foreign investors—is associated with faster economic growth.

Interest lately has turned to the second-order, or stability, effects of foreign bank entry, especially in developing nations where recent crises have raised general concern about financial sector stability, and specific concern about bank stability. In contrast to the first order effects -- where one might expect mostly benefits from entry -- the stability implications of increased entry are less obvious. Vague concerns of several sorts have surfaced. Maybe fickle foreign banks "cut and run" at the first hint of trouble, whereas local banks with long-term ties (or no place to run) may remain stalwart. Foreign bankers may also expedite capital flight during crises. During the Asian crises, depositors did shift funds from finance companies and small banks toward large banks, especially foreign ones. What if foreign banks "cherry pick" the best borrowers, leaving the local banks with the "lemons" and a risky overall portfolio? Evidence thus far suggests these concerns are unfounded. Goldberg, Dages, and Kinney (2000) found that lending by foreign banks in Argentina and Mexico during the 1994-95 crises grew faster than did lending by domestic banks, contrary to the cut and run hypothesis. Looking

across a wider sample of countries, Levine (1999) finds that the foreign share of bank assets is *negatively* correlated with the probability of crises.

Our paper investigates whether foreign bank entry is associated with more or less *economic* volatility, as measured by year-to-year fluctuations in real GDP and investment. Financial crises are the higher profile event, but business cycle fluctuations are much higher frequency and may be an important underlying determinant of financial instability. Moreover, our empirical strategy employs panel data, allowing us to absorb unobserved heterogeneity across countries with fixed effects. We approach the topic with mix of theory and evidence from both the U.S. states and countries. At the theory level, we use the macro-banking model in Holmstrom and Tirole (1997). Morgan, Strahan, and Rime (2002) use an extended (two-state) version of that model to think about the implications of interstate banking within the U.S. on business volatility within states. The main result is that integration (entry by out-of-state banks) is a two-edged sword for economic volatility; integration tends to dampen the effect of bank capital shocks on firm investment in a state, but it amplifies the impact of firm collateral shocks. The net effect of integration on business volatility is therefore ambiguous. The empirical effect, however, has been stabilizing in the United States. MSR find that volatility within states falls substantially as integration with out-of-state banks increases.

Given the useful parallels between bank integration in the U.S. in the late 1970s and 1980s, we first review the theory behind MSR. We then review and extend their empirical findings for the U.S. states, showing that banking integration across states reduced volatility by weakening the link between the health of local banks and the economy. As we describe in Section III, the history of U.S. banking deregulation sets up

an almost ideal empirical laboratory for testing how banking integration affects the economy because we can separate out the exogenous changes in bank ownership using regulatory instruments. Section IV applies a similar set of tests to a panel of about 100 countries during the 1990s, but in the cross-country context regulatory changes are not sufficiently common to allow us to identify the exogenous component of banking integration. Instead, we address the endogeneity problem by constructing instruments reflecting characteristics of groups of countries in the same region, with a common language, or with a similar legal system. The resulting IV estimates allow us to avoid the problem that foreign bank entry may reflect, rather than drive, changes in economic performance. In contrast to the results for U.S. states, however, we find *no* evidence that foreign entry has been stabilizing. If anything, the evidence points tentatively in the other direction.

In our final set of tests, we show that the link between changes in the value of a country's traded equity – a proxy for the value of potential collateral – and its economy becomes stronger with banking integration. Foreign bank entry makes economies more unstable, perhaps, by amplifying the effects of wealth changes; this amplification does not appear to be outweighed by more stable banking. This result contrasts with the U.S. experience where dampening of bank capital shocks made integration stabilizing, and suggests that the specific environment in which banking integration occurs may determine its effects.

II. Foreign Banking and Economic Volatility

How are foreign banking and economic volatility related in theory? Ambiguously, we think, at least if the insights from the interstate banking model in Morgan, Strahan, and Rime (MSR 2002) apply internationally. MSR extend Holmstrom and Tiroles' (HT 1997) macro-banking model by adding another (physical) state, then investigating how the impact of various shocks differs under unit banking regime, where bank entry is forbidden, and interstate banking, where bank capital can flow freely between states. The impact of bank capital shocks (on firm investment) is diminished under interstate banking, but the impact of firm capital shocks is amplified. The net effect, in theory, is ambiguous. We think the insights from that model help in the international context so we review the basic HT model and the MSR extension below. At the end of the section, we discuss the applicability of the model to the topic of *international* bank integration.

The marginal effects arising from integration both have to do with how the supply of *un*informed capital responds to changes in the supply of *in*formed (i.e. bank) capital. The intuition is pretty simple. A banking firm operating in two states (One and Two) can import capital from state One to state Two if another of its banks in Two has good lending opportunities but no capital. The infusion of informed bank capital also draws extra *un*informed capital. That capital shifting immunizes firms in state Two from bank capital shocks to some extent. Firms are more exposed to collateral shocks, however. An interstate banking firm will shift lending to state One if firms in state Two suffer collateral damage. The loss of *in*formed bank capital also causes capital flight by *un*informed lenders, more so than in a unit banking arrangement. Hence, collateral shocks get amplified.

The HT model

The HT model is an elegant synthesis of various strands of the macro and intermediation literature. Banks, or intermediaries generally, matter because their monitoring of firms' activities reduces moral hazard--shirking, perquisite consumption--by firm owners. Knowing that intermediaries are monitoring the firms also increases access to capital from uninformed savers. Bankers are prone to moral hazard as well; they will shirk monitoring unless they have sufficient stake in the firm's outcome to justify the monitoring costs. In the end, the level of firm investment spending on projects with given fundamentals depends on the level of bank and firm capital. Negative shocks to either kind of capital are contractionary, naturally, but the contractions are amplified through their effects on the supply of *un*informed capital. The reduction in capital that can be invested in the firm by the bank and by the entrepreneur reduce the maximum amount of future income that the firm can pledge to uninformed investors (without distorting the firms' incentives). The decrease in the pledgeable income reduces the supply of uninformed capital available to the firm.

Interstate Banking

MSR extend the HT model by adding another (physical) state. With interstate banking, we assumed that bank capital is completely mobile across states. With unit banking, bank capital was completely immobile across states. Foreign entry, in other words, was completely prohibited. Even if we relax this restriction, the results remained similar as long as informed capital is relatively less mobile under unit banking. The return on uninformed capital is exogenous and equal across states in either regime. That made sense in the U.S., where savers had access to a national securities market even

under unit banking. That assumption is more arguable in the international context but we stick with it for now. The key results from that extended model are stated and discussed below.

Proposition 1: The negative impact of a bank capital crunch in state 'A' on the amount of uninformed and informed capital invested in state 'A' is smaller with interstate banking than with unit banking. A capital crunch in 'A', for instance, will attract bank capital from state 'B', so firm investment in 'A' falls less than it would under unit banking. Because firm investment falls less, the maximum income they can pledge to informed investors falls by less (than under unit banking); hence there is a smaller reduction in the amount of uninformed capital that firms in state 'A' can attract.

Proposition 2: The negative impact of a collateral squeeze on the amount of uninformed and informed capital invested is *larger* under interstate banking than under unit banking. With interstate banking, for example, the decreased return on bank capital following a collateral squeeze causes bank capital to migrate from state 'A' (where the initial downturn occurred) to state 'B' (which is integrated with 'A'). The bank capital flight from 'A' reduces investment by firms in 'A', which in turn reduces the maximum pledgeable income firms can credibly promise to uninformed investors so the supply of *un*informed capital to firms in state 'A' falls. These amplifying effects are absent under unit banking because bank capital is immobile across states under that regime.

In sum, cross-state banking amplifies the effects of local shocks to entrepreneurial wealth because bank capital chases the highest return. Capital flows in when collateral is high and out when it is low. Integration dampens the impact of variation in bank capital supply. This source of instability becomes *less* important because entrepreneurs are less

dependent on local sources of funding in an integrated market since bank capital can be imported from other states.

Applying HT Internationally

We think the intuition from the interstate banking model in MSR (2002) is helpful in thinking about how *international* banking should affect volatility within nations. In fact, the model may fit better internationally. The distinction between *in*formed and *un*informed capital seems more germane with the distances involved in international lending than with interstate lending in the U.S. The flights of uninformed capital in the model may describe international capital flows in the 1980s and 1990s better than interstate capital flow in the U.S. in the 1970s.

Eichengreen and Bordos' (2002) historical study of financial globalization has "anecdata" consistent with the role of *informed* capital (bank capital) in allowing leverage using uninformed capital. "That overseas investors appreciated … (this) monitoring is evident in the willingness of Scottish savers to make deposit with British branches of Australian banks, and in the willingness of British investors ….to place deposits with Argentine banks (p. 9)." They also note the strict appetite for more monitorable, collateralizable claims by foreign investors. Railways were a favorite, for example, because investors (or their monitors) could easily verify how much track had been laid, and once laid, the track was staked down.

III. Bank Integration and Business Volatility in U.S. States

The U.S. once had essentially 50 little banking systems, one per state. Twenty-five years after states began permitting entry by out-of-state banks, the U.S. banking system is much more national. Entry by out-of-state banks is not exactly the same as

foreign bank entry, but they are not completely different either. The parallels are close enough to revisit what MSR found in their U.S. study before turning to the international data. To maintain the parallels, the U.S. regressions reported in this section are specified as closely as possible to those estimated with international data. For the U.S., we still find negative correlation between "out-of-state" bank share and within state business volatility. Consistent with that result, and the model, we find as well that as bank integration increases, the (positive) link between bank capital growth and business gets weaker. For the U.S., we conclude that bank integration, and the resulting immunization from bank capital shocks, has had a stabilizing effect on state business volatility.

A Brief History of Interstate Banking in the U.S.

The Bank Holding Company (BHC) Act of 1956 essentially gave states the right to block entry by out-of-state banks or bank holding companies. States also had the right to allow entry, but none did until Maine passed a law in 1978 inviting entry or acquisitions by BHCs from other states so long as Maine banks were welcomed into the other states. No states reciprocated until 1982, when Alaska, Massachusetts, and New York passed similar laws.[2] Other states followed suit, and by 1992, all but one state (Hawaii) allowed reciprocal entry.[3] This state level deregulation was codified at the national level in 1994, with the Reigle-Neal Act. That act made interstate banking

[2] As part of the Garn-St Germain Act, federal legislators amended in 1982 the Bank Holding Company Act to allow failed banks and thrifts to be acquired by any bank holding company, regardless of state laws (see, e.g., Kane (1996) and Kroszner and Strahan, 1999).

[3] State-level deregulation of restrictions on branching also occurred widely during the second half of the 1970s and during all of the 1980s.

mandatory (i.e., states could no longer block entry), and made interstate banking optional (according to state wishes).[4]

Because states did not deregulate all at once, and because the resulting entry proceeded at different rates, integration happened in "waves" across states (Chart 1). The differences across states and across time provide the cross-sectional and temporal variation that we need to identify the effects of integration within states. The deregulatory events make useful instruments to identify the exogenous component of integration (since actual entry may be endogenous with respect to volatility).[5]

U.S. Data and Empirical Strategy

Our bank integration measure equals the share of total bank assets in a state that are owned by out-of-state BHCs (i.e., BHCs that also own bank assets in other states or countries). To take a simple example, if a state had one stand-alone bank and one affiliated bank of equal size, bank integration for that state would equal ½. We compute our integration variables using the *Reports of Income and Condition* ("Call Report") filed by U.S. banks. Our sample starts in 1976 and ends in 1994. [6]

We measure business volatility using the year-to-year deviations in state *i* employment growth around the expected growth for state *i* (over the 1976-94 period) in year *t*. To estimate expected growth, we first regress employment growth on a set of time fixed effects, a set of state fixed effects, an indicator equal to 1 after interstate

[4] The Reigle-Neal Interstate Banking and Branching Efficiency Act permitted states to opt out of interstate branching, but only Texas and Montana chose to do so. Other states, however, protected their banks by forcing entrants to buy their way into the market.

[5] While we focus here on interstate banking, Jayaratne and Strahan (1996) report that state-level growth accelerated following branching deregulation; Jayaratne and Strahan (1998) show that branching deregulation led to improved efficiency in banking.

deregulation, and our measure of state-level banking concentration (defined below).[7] The residual from this first-stage regression is our measure of the deviation from expected growth for each state and year. We take the square or absolute value of this deviation as our volatility measure.

The mean of our integration measure over all state-years was 0.34, rising from under 0.1 in 1976 to about 0.6 by 1994 (Table 1). Employment grew 2.3 percent per year on average over the sample of state-years. The squared deviation of employment growth from its mean averaged 0.03 percent. The absolute value of deviations in employment growth averaged 1.3 percent.

Other controls and Instruments

Though not an element of the model, we also use banking sector concentration in our regressions. Bank level studies for the U.S. find bank risk taking tends to increase as concentration (and the associated rents, or bank charter value) falls.[8] Safer banks may translate into safer, i.e., less volatile economies (albeit slower growing ones--Jayaratne and Strahan 1996). Bank concentration will also likely affect the political game determining the barriers to out-of-state (or foreign) banking. The rents and inefficiencies associated with concentration will attract new entrants, but of course, the rents provide incumbents with the incentives and funds to defend barriers.[9] For the U.S., Kroszner and

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[6] The Riegle-Neal Interstate Banking and Branching Efficiency Act, passed that year, makes our integration measure incalculable by allowing banks to consolidate their operations within a single bank. Thus, we lose the ability to keep track of bank assets by state and year after 1994.

[7] Business investment would be preferable (in terms of the model), but state-level investment data are not available for the U.S. states (although we will have such data with the international data). Our employment series is the best proxy for overall state economic activity, however.

[8] On the relationship between charter value and risk, see Keeley (1990), Demsetz, Saidenberg and Strahan (1996), Hellman, Murdock and Stiglitz, (2000), and Bergstresser (2001).

[9] This may explain why interstate deregulation began in a reciprocal manner: State A would open its borders to State B only if State B reciprocated.

Strahan (1999) found that states with more concentrated banking sectors were faster to lower barriers to in-state banks that simply wanted to branch into other cities. Since concentration may matter directly for volatility, and indirectly (through its effect on deregulation), we use it both as an instrument and as a control (in some cases). Concentration is measured by the share of assets held by the largest three banks (Table 1).

The rate of integration could depend, in part, on volatility. For example, banks may be more likely to enter a state after a sharp downturns (when volatility is high) to buy up bank assets cheaply. To exclude this endogenous element of integration, we use two instruments based on regulatory changes: 1) an indicator variable for whether or not a state had passed an interstate banking agreement with other states and 2) a continuous variable equal to zero before interstate banking, and equal to the log of the number of years that have elapsed since a state entered an interstate banking arrangement with other states. Our third (potential) instrument is banking concentration in each state, although we use that variable selectively (see Table notes).[10] All the specifications include year dummy variables and state dummies.

Results

All of coefficients on integration are negative and statistically significant (Table 2). The IV coefficient estimates are much larger than the OLS estimates, implying that the stabilizing influence of integration is larger (if less precisely estimated) when we parcel out the endogenous component of integration.[11] The magnitudes are economically

[10] In the first stage models, both regulatory instruments have very strong explanatory power. These regressions are available on request.

[11] One might object that interstate banking deregulation itself may be determined, in part, by the volatility of a state's business cycle. For example, perhaps political pressure for opening a state's banking system to

important. For example, between 1976 and 1994, the average share of a state's assets held by multi-state bank holding companies rose by about 0.5. According to our regression coefficients in the OLS model, the 0.5 increase in integration across states was associated with 0.4 percentage point decline in business volatility (Table 2, Column 5). The exogenous component of the increase in integration – that is, the increase stemming from deregulation – was about 0.25 over the sample.[12] Even with this smaller measure, we would still conclude that integration led to a 0.5 percentage point decline in volatility, a large drop relative to the unconditional mean for business volatility of 1.3 percent.

Our model suggests that the stabilizing effect of integration arise because of better diversification against bank capital shocks. If capital falls in state 'A', affiliated banks in state 'B' will be happy to supply more to take advantage of good investment opportunities. Thus, we should observe weaker link between bank capital growth and business growth within a state as integration increases, and we do (Table 3). Bank capital and state employment growth are positively correlated, but the correlation weakens as integration increases. If we take the case of the level of integration at the beginning of our sample (0.1), the coefficients suggest that a one standard deviation increase in bank capital growth (0.084) would be associated with an increase in employment growth of 1.3 percent. In contrast, using the mean level of integration at the end of our sample (0.6), a

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out-of-state competition intensifies during economic downturns (when volatility is high). To rule out the possibility that endogenous deregulation drives our IV results, we have also estimated the model after dropping the 3 years just prior to deregulation as well as the year of deregulation itself. In these specifications, the coefficient increases in magnitude (i.e. becomes more negative), and its statistical significance increases across all three measures of volatility.

[12] We report a Hausman specification test in Table 2 comparing the OLS and IV models. This test fails to reject that hypothesis that the two models differ, although with the large number of fixed effects the test has low power.

standard deviation increase in capital would be associated with an increase in employment of just 0.4 percent.[13]

Thinking Globally

Our analysis of U.S. data suggests quite strongly that bank integration across states has had a stabilizing influence on economic activity within states. The regulatory history of state-level deregulation over a relatively long period offered an almost ideal way to explore integration's effects on business cycles because we could sort out integration stemming from endogenous forces – such as banks' appetite to enter new states when the incumbent banks are weak – from integration stemming from policy changes. We also have accurate and consistent measures of both state-level economic activity and banking integration over a long span of time. This long, balanced panel lets us absorb all sorts of confounding variables by including year and state fixed effects. Even without these fixed effects, of course, confounding omitted variables are much less of a problem when comparing New York and New Mexico than it would be in comparing Chile and China. Cross-country studies also suffer from measurement problems for observable variables, particularly the measure of integration (described below).

But how general are the state-level results? Do the good experiences of U.S. states translate naturally into good experiences when emerging economies open their markets to foreign banks? Clearly the environments differ substantially. For example, the U.S. has a well-developed financial market with a legal system that makes contract writing and enforcement relatively easy. In emerging economies, explicit contracting is

[13] Peek and Rosengren (2000) find that when Japanese banks faced financial difficulties in the 1990s, they reduced their lending in California, leading to a decline in credit availability there. This finding is consistent with our results, although it emphasizes the downside of integration. While integration insulates

more difficult. Collateral shocks therefore may matter more outside the U.S. where weaker contract enforcement makes lenders insist on higher collateral requirements or, more generally, greater levels of entrepreneurial equity holding per dollar lent (Eichengreen and Bordo, 2002).

The country experience with foreign bank entry also offers some data advantages over the state-level experience. First, we can measure both GDP growth and investment growth at the country level, rather than having to rely on employment growth. We also have better ability to sort out the effects of different shocks. As the MSR model shows, the effects of banking integration depend on the relative importance of different kinds of financial shocks. In the U.S. states, we showed that the impact of changes local bank capital declined as states integrated with the rest of the country, but we could not control for shocks to collateral because measures of these shocks are not available at the state level. This omission is potentially serious because the model predicts that integration will *amplify*, rather than *dampen*, the effects of collateral shocks. Luckily, when looking across countries there is at least the possibility of sorting out these two kinds of shocks because we can observe changes in the market value of all traded equity in the stock market (a proxy for changes in the value of collateral or entrepreneurial wealth), and, at the same time, we can measure change in the health (capital) of the country's banking system.

IV. International Evidence

We now consider how banking integration affects business cycles using countries rather than states. We use similar empirical specification, although we do exploit data

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an economy from shocks to its own banks, it simultaneously exposes an economy to banking shocks from the outside.

advantages where they exist. The challenges with international data involve 1) greater cross-country heterogeneity, 2) measuring integration accurately, and 3) potential endogeneity between business volatility and foreign bank entry.

Cross-country Heterogeneity

Our panel data allow us to eliminate much of the cross-country heterogeneity with country-level fixed effects. That is a distinct advantage of our approach over recent papers relating predetermined measure of financial structure and regulation to subsequent economic growth and stability (Demirguc-Kunt et al. 2002, Levine 1999, Claessens et al. 2001). We were able to construct a wide, though unbalanced, panel for nearly 100 countries, although the time period that we can look at, from 1990 to1997, is quite short (see Table 4). Many foreign countries began opening their markets to foreign banks during this period, however, so we do have enough time series variation within countries to include a country fixed effects.

Measuring Banking Integration and Volatility

We measure integration by the share of bank assets in a country held by banks with at least 50% foreign-bank ownership. The series was constructed by Beck, Demirguc-Kunt, and Levine (2000) using the IBCA Bankscope database. In contrast to our state measure of integration, foreign-bank ownership share does not *fully* capture the integration process because it does not include the effects of a country's banks reaching out into new markets. Our measure of state-level integration did incorporate *all* ownership ties between banks. This was possible with U.S. data because all banks during our sample operated within a single state, and, for each bank we could observe the identity of the banking company controlling it. Thus, we were able to compute the share

of banks in a state controlled by a bank holding company with assets outside the state. In contrast, the best measure of foreign integration -- foreign ownership of a country's banks -- does not incorporate integration in which banks headquartered in one country own substantial bank assets outside that country. So, for example, a country like Spain, with it largest banks holding significant assets in Latin America, does not appear to be well integrated with the rest of the world. Despite this limitation, foreign ownership is the best measure we have, and it probably represents the bulk of integration for smaller, and less developed countries that do not have banks large enough to expand internationally.[14]

Table 5 reports the foreign share data by year and region. The data suggest large increases in banking integration in Asia, Eastern Europe, and the non-industrialized portion of the Western Hemisphere (Table 5). In contrast, Africa and Middle Eastern countries experienced little trend in integration during the 1990s.

We measure country volatility on a yearly basis the same as for the U.S. states, except that we consider both overall volatility in real GDP growth and the volatility in growth of real investment spending. For each series, we first construct a measure of unexpected growth by regressing GDP growth (investment growth) on a set of time fixed effects, a set of country fixed effects, our measure of banking integration, and the other control variables (described below). As before, volatility equals the square or absolute value of the residuals from this first-stage growth regression for each country and year. Note that by controlling for banking integration in the first-stage regression, we implicitly allow the growth rate to increase (or decrease) as a country opens itself up to foreign

[14] To partially account for this measurement issue, we have also estimated our models without the Industrial Countries listed in Table 4. We find similar results to those reported in Table 7 below.

bank entry. Thus, there is no chance that we will confuse an accelerated growth rates following banking integration with an increase in GDP volatility.[15]

Table 6 reports the summary statistics for our integration and volatility measures across countries and time. For banking integration, the average share of bank assets controlled by foreign banks equals 0.192. Real GDP growth averages 2.85% per year, with an average squared deviation from the conditional mean growth of 0.43% and an average absolute deviation of 4.39%. These measures of average volatility are about three-and-a-half times as large as volatility of the U.S. states. Real investment has both a higher mean growth rate and greater volatility than overall GDP growth. Average investment grew by 7.68% per year, with volatility of 4.77% (squared deviations) and 16.07% (absolute deviations).

As in the state-level regressions, we include banking concentration both as an instrument and as a regressor in our model, although we vary the specifications because of the potential endogeneity of concentration. As noted above, an advantage of the country-level analysis over the state-level analysis is that we now can control for *real* integration (as opposed to financial integration), equal to the trade share of each country, (imports+exports)/GDP. Because the country-level data introduces more heterogeneity, we control for the effects of exchange rate volatility by adding the absolute value of the change in the real exchange rate for a given country relative to the dollar. Following

[15] The models in Aghion et al. (1999) and Caballero Krishnamurthy (2001) suggest that the more severe credit constraints in emerging market countries may slow growth *and* increase volatility. Their models suggests that foreign bank entry might reduce volatility via an "efficiency channel" whereby the increased competition resulting from foreign bank entry relaxes those constraints, causing growth to accelerate and volatility to decline. Our assumption of perfect competition even without foreign entry essentially rules out a reduction in volatility via increased efficiency (Norman Loayza gets credit for this point).

Levine (forthcoming), we also add a measure of the level of financial development in a country and year (the ratio of total liquid liabilities to GDP).[16]

As in the state-level approach, all regressions include both fixed country effects and fixed year effects. The country effects are especially important in the cross-country models because they eliminate many of the unobservable differences in economic conditions, institutions, regulations, taxation, law, corruption, culture, and other factors that may simultaneously affect volatility and foreign entry.

Potential Endogeneity: Constructing Instruments for Integration

It is perhaps even harder to argue that foreign bank entry is exogenous to economic conditions in a country than it is in the state-level context, so instrumenting becomes even more important than before. Our set of instrumental variables exploits linguistic, institutional, and geographic differences across countries. The idea is simple: a Spanish bank will be more likely to enter countries where Spanish is the primary language; an American bank will be more likely to enter countries in the Western Hemisphere; a British bank will be more likely to enter countries with similar legal and regulatory institutions. Therefore, if American banks are well positioned to enter new markets abroad because, for example, they are well capitalized, then English-speaking countries experience more (exogenous) entry than, say, French-speaking countries.

Accordingly, we first grouped countries along three dimensions: primary language (English, French, German, Arabic, Spanish/Portuguese, and other), legal origin (English, French, German, Scandinavian, and Socialist), and region (Table 4). For each country, we then compute the *average* of a series of characteristics related to the

[16] Denizer at al. (2002) find that GDP volatility and financial development are negatively related.

likelihood that foreign banks enter a country in the group. To make sure that these group means are exogenous, we *exclude* the characteristics of the country itself. The group characteristics include the following: the ratio of bank assets to GDP (a measure of financial depth), the average bank capital-asset ratio (a measure of bank financial strength), and the average share of foreign ownership (a measure of how much entry has already occurred within the group). In addition, we include the size of the country's banking system relative to total banking assets held by all countries in the group.

The results from the first-stage regressions of foreign bank share on these group characteristics indicates that we are able to build a good instrument that will allow us to estimate the effects of integration in an IV model, even controlling for country and time effects. For example, the p-value testing the joint significance of the set of instruments excluded from the model in the first stage regressions is less than 0.01. The regional averages turn out to be more powerful predictors of entry than either language or law. Countries in region where banks are well-capitalized on average experience significantly more foreign entry than countries in regions where banks are poorly capitalized on average. Entry is also higher in countries located in regions with large banking systems (relative to GDP), and in countries whose banking system is small relative relative to the entire region.

Results

Table 7 contains the results for volatility of real GDP growth, and Table 8 contains the results based on volatility of real investment growth. Panel A includes all countries; Panel B includes only the non-industrial countries in the Western Hemisphere.

In each Panel we report eight specifications, four using the squared deviations of growth to measure volatility and four using the absolute deviations of growth. These four specifications include the fixed-effects OLS, and three IV models, one which includes the full set of instruments, one that deletes banking concentration from the instrument set as a possibly endogenous variable, and one that includes concentration as a right-hand-side variable in the model.

In contrast to the U.S. experience, these results are consistent with a zero or positive link between foreign banking (i.e. banking integration) and economic volatility. We do not estimate a single negative coefficient on the foreign bank share variable that is significant at the 10% level or better in any of 32 specifications. In contrast, we find a positive and significant coefficient on foreign banking in 15 of 32 specifications. This positive effect is most evident in Panel B of Table 8, where we include only the non-industrial Western Hemisphere countries, and where we look at volatility of investment. In all eight of these specifications, the results suggest that greater banking integration is associated with more, not less, volatility.

Tables 7 and 8 report the Hausman specification test that compares coefficients of consistent (but not necessarily efficient) IV models with the more efficient (but not necessarily consistent) OLS model. The test *never* rejects the consistency of the OLS models. Although the magnitude of the effects of integration do change with the estimation technique, we *never* observe a change of sign in the coefficient on banking integration in comparing OLS with IV. If we look only at these eight OLS specifications, the coefficient on banking integration is positive in six of eight specifications, with statistical significance at the 10 percent level for five of these cases.

Why are country results so different from the U.S. results? Our model suggests that integration heightens the impact of firm collateral shocks on spending. Perhaps foreign banks respond more elastically to collateral shocks than domestic banks because they are better able to reinvest funds outside the country. To investigate, we regress the real growth of GDP and investment on proxies for shocks to entrepreneurial collateral (the return on the stock market in the country during the preceding year) and shocks to the banking system (the growth rate of bank capital in the country). We then interact these two capital variables with the foreign bank share.

The results (Table 9, columns 1 and 4) confirm that the two capital variables are positively correlated with GDP and investment spending growth, as one would expect. More interesting is the positive coefficient on the collateral-foreign bank share interaction, that positive sign suggests that the impact of firm capital shocks is indeed amplified by the presence of foreign banks. The amplification is much more pronounced in the investment regressions than the overall GDP growth regressions, which seems sensible since lower collateral value has a direct impact of firms' ability to borrow.

V. Conclusions

The theory behind this paper suggests that bank integration is a two-edge sword in terms of business cycle variability. Integration can magnify the impact of firm collateral shocks because integrated banks have the opportunity to shift their capital elsewhere during downturns. Shocks to the banking system itself, however, become less important in an integrated world because the integrated banks can import banking resources from abroad to fund good, local projects.

Our data suggest that the cutting edge of the sword depends on where one looks. Bank integration across U.S. states over the late 1970s and 1980 appears to have dampened economic volatility within states. That dampening suggests that the benefit of integration in the U.S. has been to diminish the impact of bank capital shocks, and indeed, we find that employment growth and bank capital growth became *less* correlated with shocks to the local banking sector with integration. Internationally, we find that foreign bank integration is either unrelated to volatility of firm investment spending, or *positively related.* That suggests that the amplifying effect of integration on firm capital shocks dominate and, in fact, we find that GDP growth and investment growth became *more* sensitive to changes in stock market wealth, whereas as the effect of shocks to the banking sector did not change significantly.

Even though our model admits conflicting effects from integration, and even though our ancillary regressions (where we interact integration with bank capital or firm collateral) are consistent with those conflicting effects, we are less confident about our international results. The international data are noisier, for one, and we have less of it (eight years versus eighteen for the U.S.). Another concern is that our window on the world--the 1990 to 1997 period—is partly obscured by sweeping transitions and episodic financial crises, especially in emerging economies, that may confound the effects of integration, or may even motivate it. Fixed effects and instruments help with those problems to some degree, but not completely.

With those qualifiers, policymakers and central bankers should be aware of the possibility that business spending may become more volatile as they open their banking sectors to foreign entry. The first-order (growth and efficiency) effects of foreign bank

entry are almost certainly positive, but the second-order (volatility) effects are less clear.[17]

[17] The first- and second-order effects may be related, as well. Foreign bank entry implies increased competition for domestic banks, and hence, more efficient credit markets. from foreign bank entry may reduce

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Table 1
Summary Statistics for U.S. State-Level Panel Data
1976-1994

	N	Mean	Standard Deviation
Share of State Bank Assets owned by Multi-State Bank Holding Companies (Banking Integration)	931	0.34	0.28
Employment Growth	931	0.023	0.023
Squared Deviation of Employment Growth from Expected Employment Growth	931	0.0003	0.0006
Absolute Deviation of Employment Growth from Expected Employment Growth	931	0.013	0.012
Share of State Bank Assets held by Three Largest Banks (Banking Concentration)	931	0.376	0.210

Table 2
Panel Regression relating volatility of U.S. State-Level Employment Growth
To Banking Integration
1976-1994

	Dependent Variables:							
	Squared Deviation of Growth from Expected Growth				Absolute Deviation of Growth from Expected Growth			
Banking Integration	-0.0003* (0.0002)	-0.0013* (0.0004)	-0.0011* (0.0004)	-0.0011* (0.0004)	-0.008* (0.0003)	-0.022* (0.007)	-0.021* (0.007)	-0.021* (0.007)
Banking Concentration	-	-	-	-0.0004 (0.0004)	-	-	-	-0.003 (0.007)
Within R^2	0.05	0.01	0.01	0.01	0.07	0.03	0.04	0.04
Total Observations	931	931	931	931	931	931	931	931
Number of States	49	49	49	49	49	49	49	49
Hausman χ^2 Test	-	8.14	2.05	-	-	5.08	0.33	-
Estimation Technique	OLS	IV	IV*	IV	OLS	IV	IV*	IV

All regressions contain both year and state fixed effects. A '*' denotes statistical significance at the 10 percent level.

Banking integration equals the share of a state's bank assets that are owned by multi-state bank holding companies.

In the IV models, the instrumental variables are an indicator equal to 1 after a state allows out-of-state bank holding companies to purchase their banks, the log of the number of years that have elapsed since this regulatory change, and the market share of the largest three banks in the state (banking concentration). In the IV* model, we drop concentration from the list of instruments.

The sample includes DC but not South Dakota or Delaware. The latter two states are dropped because their banking systems are dominated by national credit card banks.

The Hausman Test compares the model with the one preceding it. So, for example, the test in column 3 compares the coefficients in column 3 with the coefficients in column 2.

Table 3
How US State Employment Growth Responds Local Bank Capital Shocks
1976-1994

	Dependent Variable Employment Growth	
Growth in State Bank Capital	0.0578*	0.1718*
	(0.0066)	(0.0141)
Banking Integration	-	-0.0001
		(0.0101)
Growth in State Bank Capital * Banking Integration	-	-0.2127*
		(0.0236)
Within R^2	0.5001	0.5435
Number of Observations	931	931
Number of States	49	49
Estimation Technique	OLS	IV

All regressions contain both year and state fixed effects. A '*' denotes statistical significance at the 10 percent level.

Banking integration equals the share of a state's bank assets that are owned by multi-state bank holding companies.

In the IV models, the instrumental variables are an indicator equal to 1 after a state allows out-of-state bank holding companies to purchase their banks, and the log of the number of years that have elapsed since this regulatory change.

The sample includes DC but not South Dakota or Delaware. We drop the latter two states because their banking systems are dominated by credit-card banks that serve the whole country.

Table 4
List of Countries by Region

Africa	Asia	Eastern Europe	Industrial Countries	Middle East	Western Hemisphere
Algeria	Bangladesh	Belarus	Australia	Bahrain	Argentina
Benin	Hong Kong	Bulgaria	Austria	Egypt	Bahamas
Botswana	India	Croatia	Belgium	Israel	Bolivia
Cameroon	Indonesia	Cyprus	Canada	Kuwait	Brazil
Congo	Malaysia	Czech Republic	Denmark	Lebanon	Chile
Ivory Coast	Nepal	Estonia	France	Saudi Arabia	Colombia
Kenya	Pakistan	Hungary	Germany	UAE	Costa Rica
Lesotho	Papua New Guinea	Kazakhstan	Greece		Dom. Republic
Madagascar	Philippines	Latvia	Ireland		Ecuador
Mali	Taiwan	Lithuania	Italy		El Salvador
Mauritius	Singapore	Poland	Japan		Guatemala
Morocco	China (Taiwan)	Romania	Luxembourg		Guyana
Namibia	Thailand	Russia	Netherlands		Honduras
Nigeria	Vietnam	Slovak Republic	Norway		Mexico
Rwanda		Slovenia	Portugal		Neth. Antilles
Senegal		Turkey	Spain		Nicaragua
Sierra Leone		Ukraine	Sweden		Panama
South Africa			Switzerland		Paraguay
Swaziland			UK		Peru
Tanzania			USA		Uruguay
Tunisia					Venezuela
Uganda					
Zambia					
Zimbabwe					

Table 5
Trends in Median Foreign-Bank Market Share, by Region
1990-1997

	Africa	Asia	Eastern Europe	Industrial Countries	Middle East	Western Hemisphere
1990	18.2%	12.4%	3.6%	3.2%	5.5%	11.7%
1991	11.8%	13.4%	9.1%	4.9%	4.8%	14.5%
1992	23.1%	15.0%	2.8%	4.1%	4.9%	21.7%
1993	28.2%	15.6%	4.4%	3.7%	5.5%	19.9%
1994	23.6%	18.4%	6.9%	3.8%	5.6%	17.9%
1995	29.0%	21.2%	8.8%	3.6%	6.2%	20.0%
1996	22.3%	24.1%	10.4%	3.6%	6.3%	21.1%
1997	20.7%	32.9%	9.8%	2.9%	9.1%	23.0%

Medians are based on the percentage of each country's banking assets held by banks controlled by a foreign company, where control means that the foreign company owns at least 50% of the bank's equity.

Table 6
Summary Statistics for Cross-Country Panel Data
1990-1997

	N	Mean	Standard Deviation
Share of a Country's Bank Assets Controlled by a Foreign Bank (Banking Integration)	498	0.192	0.222
Real GDP Growth	498	0.0285	0.0634
Real Growth in Investment	516	0.0768	0.1877
Squared Deviation of GDP Growth from Expected GDP Growth	498	0.0043	0.0141
Absolute Deviation of GDP Growth from Expected GDP Growth	498	0.0439	0.0494
Squared Deviation of Growth in Investment from its Expected Value	516	0.0477	0.0972
Absolute Deviation of Investment from its Expected Value	516	0.1607	0.1480
Share of a Country's Bank Assets Controlled by Largest Three Bank (Banking Concentration)	498	0.639	0.216
Total Liquid Liabilities divided by GDP (Financial Development)	498	0.525	0.344
Absolute value of percent change in Real Exchange Rate (Terms of Trade Shock)	498	0.070	0.081
Imports+Exports divided by GDP (Real Integration)	498	0.388	0.267

Expected growth rates are computed as the predicted value from a regression of GDP growth (capital growth) on a time effect and a country effect.

Table 7
Panel Regressions Relating Volatility of Country Real-GDP Growth
To Banking Integration
1990-1997

Panel A: All Countries

	Dependent Variables							
	Squared Deviation of Growth from Expected Growth				Absolute Deviation of Growth from Expected Growth			
Banking Integration	0.0083	0.0413	0.0381	0.0388	0.0477*	0.2633*	0.2031*	0.2038*
	(0.0077)	(0.0289)	(0.0323)	(0.0343)	(0.0271)	(0.1063)	(0.1154)	(0.1229)
Real Integration	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Financial Development	0.017	0.017	0.017	0.018	0.061	0.066	0.065	0.070*
	(0.011)	(0.011)	(0.011)	(0.011)	(0.039)	(0.042)	(0.040)	(0.041)
Terms of Trade Shock	0.024*	0.024*	0.024*	0.024*	0.103*	0.100*	0.101*	0.098*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.024)	(0.026)	(0.025)	(0.025)
Banking Concentration	-	-	-	0.0012	-	-	-	0.0212
				(0.0073)				(0.0262)
Within R^2	0.0747	0.0326	0.0404	0.0388	0.0964	0.0200	0.0222	0.0237
Number of Observations	498	498	498	498	498	498	498	498
Number of Countries	87	87	87	87	87	87	87	87
Hausman χ^2 Test	-	1.40	0.05	-	-	4.39	1.00	-
Estimation Technique	OLS	IV	IV*	IV	OLS	IV	IV*	IV

All regressions contain both year and country fixed effects. A '*' denotes statistical significance at the 10 percent level.

Banking integration equals the share of a country's bank assets that are owned by foreign banks, where the foreign bank must own at least 50% of the local bank. Real integration equals the ratio of total imports plus exports to GDP. Banking concentration equals the market share of the country's three largest banks.

In the IV models, the instrumental variables include the following: banking concentration, the average ratio of bank assets to GDP in countries in the same group ("group" defined below), the average bank capital-asset ratio for all countries in the same group, the average share of foreign ownership for all countries in the same group, and the size of the countries banking system relative to the group. For each of these instruments, we construct group averages, where countries are grouped along three dimensions: primary language (English, French, German, Arabic, Spanish/Portuguese, and other), legal origin (English, French, German, Scandinavian, and Socialist), and region (defined in Table 4). Also, note that for each of the averages we do not include the value for the country itself, only the other countries within the group are used. In the IV* model, we drop concentration from the list of instruments.

The Hausman Test compares the model with the one preceding it. So, for example, the test in column 3 compares the coefficients in column 3 with the coefficients in column 2. The models in columns 3 and 4 (7 and 8) are not nested, so the test is not available.

Table 7
Panel Regressions Relating Volatility of Country Real-GDP Growth To Banking Integration
1990-1997

Panel B: Western Hemisphere, non-industrial countries only

	Dependent Variables							
	Squared Deviation of Growth from Expected Growth				Absolute Deviation of Growth from Expected Growth			
Banking Integration	-0.0213 (0.0232)	-0.0279 (0.0235)	-0.0286 (0.0235)	-0.0253 (0.0241)	-0.0013 (0.0699)	-0.0226 (0.0706)	-0.0195 (0.0706)	-0.0309 (0.0727)
Real Integration	0.0007* (0.0004)	0.0007* (0.0004)	0.0007 (0.0004)	0.0006 (0.0004)	0.0008 (0.0012)	0.0008 (0.0012)	0.0008 (0.0012)	0.0010 (0.0013)
Financial Development	-0.027 (0.036)	-0.031 (0.036)	-0.032 (0.036)	-0.039 (0.038)	-0.0053 (0.1093)	-0.0181 (0.1096)	-0.0162 (0.1096)	-0.0016 (0.1145)
Terms of Trade Shock	0.018 (0.029)	0.017 (0.029)	0.017 (0.029)	0.020 (0.030)	0.106 (0.088)	0.104 (0.088)	0.104 (0.088)	0.097 (0.089)
Banking Concentration	-	-	-	-0.0111 (0.0169)	-	-	-	0.0266 (0.0509)
Within R^2	0.1428	0.1420	0.1419	0.1472	0.0999	0.0989	0.0992	0.1011
Number of Observations	112	112	112	112	112	112	112	112
Number of Countries	18	18	18	18	18	18	18	18
Hausman χ^2 Test	-	3.78	0.37	-	-	4.27	1.73	-
Estimation Technique	OLS	IV	IV*	IV	OLS	IV	IV*	IV

All regressions contain both year and country fixed effects. A '*' denotes statistical significance at the 10 percent level.

Banking integration equals the share of a country's bank assets that are owned by foreign banks, where the foreign bank must own at least 50% of the local bank. Real integration equals the ratio of total imports plus exports to GDP. Banking concentration equals the market share of the country's three largest banks.

In the IV models, the instrumental variables include the following: banking concentration, the average ratio of bank assets to GDP in countries in the same language group, the average bank capital-asset ratio for all countries in the same language group, the average share of foreign ownership for all countries in the same language group, and the size of the countries banking system relative to the group. We do not construct instruments grouped along either regional or legal origin lines because all countries in these regressions are in the same region, and almost all of the countries in this region have a legal system originating from the French system. In the IV* model, we drop concentration from the list of instruments.

The Hausman Test compares the model with the one preceding it. So, for example, the test in column 3 compares the coefficients in column 3 with the coefficients in column 2. The models in columns 3 and 4 (7 and 8) are not nested, so the test is not available.

Table 8
Panel Regressions Relating Volatility of Country Real Growth in Investment To Banking Integration
1990-1997

Panel A: All Countries

	Dependent Variables							
	Squared Deviation of Growth from Expected Growth				Absolute Deviation of Growth from Expected Growth			
Banking Integration	0.1795*	0.2428	0.1802	0.1560	0.2548*	0.4812*	0.3039	0.2809
	(0.0505)	(0.1807)	(0.2074)	(0.2178)	(0.0805)	(0.2909)	(0.3310)	(0.3462)
Real Integration	0.0004	0.0003	0.0004	0.0005	0.0006	0.0004	0.0005	0.0007
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0010)	(0.0012)	(0.0009)	(0.0013)
Financial Development	0.028	0.031	0.028	0.032	0.076	0.085	0.078	0.090
	(0.071)	(0.071)	(0.072)	(0.072)	(0.113)	(0.115)	(0.114)	(0.114)
Terms of Trade Shock	0.1488*	0.1483*	0.1488*	0.1448*	0.2380*	0.2360*	0.2376*	0.2270*
	(0.0446)	(0.0448)	(0.0447)	(0.0450)	(0.0712)	(0.0720)	(0.0713)	(0.0717)
Banking Concentration	-	-	-	0.0328	-	-	-	0.0843
				(0.0475)				(0.0756)
Within R^2	0.1086	0.1053	0.1086	0.1097	0.1242	0.1075	0.1234	0.1278
Number of Observations	516	516	516	516	516	516	516	516
Number of Countries	92	92	92	92	92	92	92	92
Hausman χ^2 Test	-	0.13	0.38	-	-	0.66	1.26	-
Estimation Technique	OLS	IV	IV*	IV	OLS	IV	IV*	IV

All regressions contain both year and country fixed effects. A '*' denotes statistical significance at the 10 percent level.

Banking integration equals the share of a country's bank assets that are owned by foreign banks, where the foreign bank must own at least 50% of the local bank. Real integration equals the ratio of total imports plus exports to GDP. Banking concentration equals the market share of the country's three largest banks.

In the IV models, the instrumental variables include the following: banking concentration, the average ratio of bank assets to GDP in countries in the same group ("group" defined below), the average bank capital-asset ratio for all countries in the same group, the average share of foreign ownership for all countries in the same group, and the size of the countries banking system relative to the group. For each of these instruments, we construct group averages, where countries are grouped along three dimensions: primary language (English, French, German, Arabic, Spanish/Portuguese, and other), legal origin (English, French, German, Scandinavian, and Socialist), and region (defined in Table 4). Also, note that for each of the averages we do not include the value for the country itself, only the other countries within the group are used. In the IV* model, we drop concentration from the list of instruments.

The Hausman Test compares the model with the one preceding it. So, for example, the test in column 3 compares the coefficients in column 3 with the coefficients in column 2. The models in columns 3 and 4 (7 and 8) are not nested, so the test is not available.

Table 8
Panel Regressions Relating Volatility of Country Real Growth in Investment To Banking Integration
1990-1997

Panel B: Western Hemisphere, non-industrial countries only

	Dependent Variables							
	Squared Deviation of Growth from Expected Growth				Absolute Deviation of Growth from Expected Growth			
Banking Integration	0.2820* (0.0869)	0.2841* (0.0877)	0.2827* (0.0878)	0.2670* (0.0901)	0.4398* (0.1674)	0.4364* (0.1691)	0.4389* (0.1692)	0.4107* (0.1738)
Real Integration	0.0012 (0.0016)	0.0013 (0.0016)	0.0013 (0.0016)	0.0016 (0.0016)	0.0034 (0.0030)	0.0034 (0.0030)	0.0034 (0.0030)	0.0041 (0.0031)
Financial Development	0.118 (0.136)	0.119 (0.136)	0.118 (0.136)	0.148 (0.142)	0.0010 (0.2620)	-0.0010 (0.2624)	0.0005 (0.2625)	0.0504 (0.2739)
Terms of Trade Shock	0.374* (0.109)	0.374* (0.109)	0.374* (0.109)	0.361* (0.111)	0.6055* (0.2107)	0.6051* (0.2108)	0.6054* (0.2108)	0.5842* (0.2136)
Banking Concentration	-	-	-	0.0489 (0.0631)	-	-	-	0.0828 (0.1217)
Within R^2	0.3130	0.3129	0.3130	0.3179	0.2817	0.2817	0.2200	0.2856
Number of Observations	112	112	112	112	112	112	112	112
Number of Countries	18	18	18	18	18	18	18	18
Hausman χ^2 Test	-	0.03	0.13	-	-	0.02	0.15	-
Estimation Technique	OLS	IV	IV*	IV	OLS	IV	IV*	IV

All regressions contain both year and country fixed effects. A '*' denotes statistical significance at the 10 percent level.

Banking integration equals the share of a country's bank assets that are owned by foreign banks, where the foreign bank must own at least 50% of the local bank. Real integration equals the ratio of total imports plus exports to GDP. Banking concentration equals the market share of the country's three largest banks.

In the IV models, the instrumental variables include the following: banking concentration, the average ratio of bank assets to GDP in countries in the same language group, the average bank capital-asset ratio for all countries in the same language group, the average share of foreign ownership for all countries in the same language group, and the size of the countries banking system relative to the group. We do not construct instruments grouped along either regional or legal origin lines because all countries in these regressions are in the same region, and almost all of the countries in this region have a legal system originating from the French system. In the IV* model, we drop concentration from the list of instruments.

The Hausman Test compares the model with the one preceding it. So, for example, the test in column 3 compares the coefficients in column 3 with the coefficients in column 2. The models in columns 3 and 4 (7 and 8) are not nested, so the test is not available.

Table 9
How Real GDP Growth and Real Capital Formation Growth Respond to Banking and Collateral Shocks
1990-1997

	Dependent Variables					
	Real GDP Growth			Real Growth in Investment		
Growth in Real Bank Capital	0.0301*	0.0254	0.0363	0.0698	0.0460	0.0592
	(0.0167)	(0.0216)	(0.0257)	(0.0519)	(0.0804)	(0.0962)
Real Return on Stock Market	0.0242*	0.0124	-0.0112	0.1565*	0.0440	-0.0607
	(0.0118)	(0.0146)	(0.0201)	(0.0366)	(0.0542)	(0.0754)
Banking Integration	-	-0.1272	0.0130	-	0.0857	-1.6607*
		(0.1845)	(0.2479)		(0.6865)	(0.9281)
Growth in Bank Capital*Banking Integration	-	0.06607	-0.0372	-	0.2342	-0.0157
		(0.1036)	(0.1066)		(0.3853)	(0.3995)
Return on Stock Market*Banking Integration	-	0.1712*	0.3290*	-	0.9394*	1.4923*
		(0.0895)	(0.1262)		(0.3331)	(0.4730)
Within R^2	0.1513	0.2330	0.2472	0.4125	0.4544	0.4739
Number of Observations	188	175	181	189	176	182
Number of Countries	30	30	30	31	31	31
Estimation Technique	OLS	IV	IV*	OLS	IV	IV*

All regressions contain both year and country fixed effects. A '*' denotes statistical significance at the 10 percent level.

Banking integration equals the share of a country's bank assets that are owned by foreign banks, where the foreign bank must own at least 50% of the local bank.

In the IV models, the instrumental variables include the following: banking concentration, the average ratio of bank assets to GDP in countries in the same group ("group" defined below), the average bank capital-asset ratio for all countries in the same group, the average share of foreign ownership for all countries in the same group, and the size of the countries banking system relative to the group. For each of these instruments, we construct group averages, where countries are grouped along three dimensions: primary language (English, French, German, Arabic, Spanish/Portuguese, and other), legal origin (English, French, German, Scandinavian, and Socialist), and region (defined in Table 4). Also, note that for each of the averages we do not include the value for the country itself, only the other countries within the group are used. In the IV* model, we drop concentration from the list of instruments.