Deep Financial Integration and Volatility

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We investigate the relationship between financial integration and output volatility using firm- and aggregate-level data. Theory makes ambiguous predictions and cross-country empirical studies cannot identify robust effects. We utilize a novel panel dataset of firm-level foreign ownership shares to construct a measure of “deep" financial integration for regions. We document a strong positive relationship between firm-level foreign ownership and volatility which survives aggregation and carries over to regional GDP. Using an exogenous de-jure measureof integration based on financial regulations which harmonized EU security markets, we find that regions that integrated more experienced higher volatility.

The global recession and financial crisis of 2007-2009 have focused attention on the relationship between financial integration and macroeconomic volatility. Although there has been extensive research on this question, there is no consensus given the ambiguity of theoretical results and the lack of robust empirical evidence.

We employ a novel empirical approach: we investigate the relationship between financial integration and output growth volatility, at the firm and aggregate-levels, employing an extensive firm-level data combined with official region-level data for the period 1996-2006. Our data set encompasses 16 European countries, 100+ regions and 4+million unique firms, covering the universe of listed firms and most of incorporated privately held firms.

Starting from the micro-level using direct observations on foreign ownership over time we first study the relation between foreign ownership and firm-level volatility. We investigate this relationship cross-sectionally and dynamically, with controls for unobserved firm-level heterogeneity. We find a significant positive relation between foreign ownership and firm-level volatility in both frameworks. The effect is economically significant: if the largest owner of a given firm is a foreign company, sales growth is 20 percent more volatile than the mean.

Next, we “aggregate our way up" to regions within countries by 1) calculating a weighted average of firm-level foreign ownership, which we call “deep" financial integration, and 2) aggregating the output of firms by region and calculating regional volatility. Aggregate results may differ from firm-level results due to either aggregation of ownership or aggregation of output, or both. To explore this issue we aggregate the data in several steps. We first regress the volatility of the typical firm; i.e., median volatility in each region, on regional deep integration and, next, we regress volatility of regional aggregated output on deep integration in order to explore if the relation between ownership and volatility carries over to the aggregated data. Finally, we combine our firm-level dataset with official macroeconomic (regional) data from Eurostat and regress volatility of region-level GDP per capita on our measure of deepfinancial integration that is constructed from firm-level observations. The micro-level patterns carry over to the macro-level and are robust to using our aggregation or actual “macro-regional" data from Eurostat, validating our methodology. The macro-level estimates from the regional analysis are economically significant. After removing the effect of other regressors, the estimated coefficient to financial integration explains around 12 percent of the variation in regional volatility over time.

This is the first integrated investigation of the relationship between firms' Foreign financing through securities and real volatility at the micro and macro levels. Our approach can resolve two key issues in the literature. The first issue is the serious identification problem that plagues cross-country studies. Using country-year fixed effects in our region-level regressions fully absorbs all country specific shocks and policy changes that will simultaneously determine financial integration and GDP volatility. The second issue is potential reverse causality and the channel through which financial integration affects real volatility. The macro and finance literatures deliver ambiguous predictions regarding the effect of foreign finance on firm and aggregate volatility. A strong correlation between foreign ownership and firm-level volatility at the micro-level that survives at the macro-level is the key finding of this paper, which helps inform about the channel through which foreign finance affects volatility.

Our measure of financial integration is based on firm-level foreign ownership and hence captures foreign direct investment (FDI) and equity financing. The effect of foreign finance on volatility might differ based on the type of financing. Equity financing, with returns that are contingent on performance, might be better for risk diversification while debt financing might be more available to small firms that cannot raise capital by other means. At the regional level, we use a measure of financial integration based on regulatory changes to harmonize segmented EU financial markets.

To construct our exogenous de-jure measure, we exploit the differential timing across countries of the implementation of these regulatory changes which we combine with cross-regional variation in social capital. The variation in this quasi-natural experiment rests on the fact that all EU member countries were required to adopt the financial regulations but did so at different points in time. Thus, we have country-time variation in country-level financial integration. Region-time variation, which is the dimension of our analysis, comes from the assumption that the de-facto implementation of the country-level financial regulatory changes at the regional-level differs depending on region-level social capital.

The reduced form regressions of regional volatility on de-facto regional financial ntegration show a strong positive effect of the financial integration on the volatility. We also run an IV specification. We find that a one-standard deviation change in the instrument results in an increase in regional financial integration of about 35 percent while the second-stage estimates imply that financial integration may explain about a third of the variation in volatility across regions.

We uncovered a strong, highly significant, positive association between firm level volatility and foreign ownership. A firm whose largest owner is foreign is 20 percent more volatile. The positive association between foreign ownership and volatility carries over to the regional-level where our results imply that financial integration can explain up to 15 percent of the variation in aggregate volatility. Our results hold in both static and dynamic regressions with firm and region-fixed effects and are robust to using a broader structural measure of financial integration. We argue that country-level studies deliver ambiguous results due to omitted variables such as country- and industry-level shocks,

which we control for.

Our results suggest that some foreign investors purchase small stakes in domestic companies for the purpose of diversification. Because such investors are diversified, they are relatively more willing to purchase shares of high-volatility firms. However, large fractions of foreign investment are due to investors -often other firms- taking majority stakes in domestic companies. Because majority owners control production, our results also suggest that the causal effect of foreign ownership on volatility to a large extent is due to foreign controlling majority owners being willing to engage in more risky production.

Our results do not imply that financial integration is undesirable because of higher volatility. Foreigners invest in high return-high variance projects which are likely to increase growth and volatility can be seen as a side-effect. Further, theory suggests that financial integration reduces consumption volatility because capital income, and possibly wage income, gets smoothed via diversification. A promising area for future research is to examine this question using combined micro and macro data.