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Investor Sentiment and Employment

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Abstract

We develop a multi-country model with moral hazard and noise traders and show that investor sentiment should affect employment growth both domestically and abroad. Using a large sample of international industry-level data, we find strong support for the model's predictions. We show that U.S. investor sentiment has a positive association with labor market conditions around the world, due to spillover effects as well as foreign direct investments from the United States. We also find that U.S. sentiment amplifies the negative effect of local financial crises on job losses, which supports the idea that financial development has a "dark side."

I. Introduction

It is well known that financial development is positively correlated with a country's economic growth (King and Levine (1993a), (1993b), Beck, Levine, and Loayza (2000a), (2000b), and Demirgüç-Kunt and Levine (2001)). Rajan and Zingales (1998), however, identify a specific channel through which finance has a causal effect on growth. They show that industries that rely more on external finance grow disproportionately faster if located in countries with a higher level of financial development. Subsequent studies show that this mechanism also affects employment (Pagano and Pica (2012), Benmelech, Bergman, and Seru (2015)). In this article, we look to shed further light on the link between finance and labor. Drawing on the recent literature that relates investor sentiment with firms'

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investment decisions (see, e.g., Baker and Wurgler (2013)), we explore the role of sentiment in the creation of jobs worldwide.

We develop a multi-country model with moral hazard and noise traders and show that investor sentiment should affect employment growth both domestically and abroad. Using international industry-level data for the period 1970–2003, we find strong support for the model's predictions. Our main result is that higher sentiment among U.S. investors leads to more hiring in foreign labor markets, due to spillover effects as well as foreign direct investments from the United States. These patterns are statistically strong, robust to the inclusion of local and global sentiment, and unlikely to reflect a genuine improvement in the economic outlook or production technology.

We also show that the additional hiring that follows high sentiment turns into greater job losses in times of crisis. This result provides new insight into the view that financial development has a "dark side" because the firms that benefit the most from financial development are also those that are hit the hardest during economic or financial downturns (Braun and Larrain (2005), Kroszner, Laeven, and Klingebiel (2007), and Pagano and Pica (2012)). Finally, we find that U.S. sentiment increases growth in real wages, but only in countries whose workforce exhibits fewer years of schooling. This is consistent with the idea that low-skilled labor is particularly sensitive to financial development (Beck, Levine, and Levkov (2010)) and to the investments of multinational enterprises (Braconier, Norbäck, and Urban (2005)).

The mechanism through which investor sentiment affects labor markets works as follows. In times of high sentiment, U.S. firms increase their real investment (see, e.g., Baker (2009)) and hire more workers (McLean and Zhao (2014)). Building on the fact that U.S. investor sentiment has spillover effects on foreign financial markets (Baker, Wurgler, and Yuan (2012)), we show that high U.S. sentiment also prompts non-U.S. firms to hire more when those firms are located in financially developed countries and operating in industries that rely more on external finance. Sentiment, then, works through (and strengthens) the Rajan and Zingales (1998) channel. In additional tests, we also find that higher U.S. sentiment increases employment growth in countries that receive more foreign direct investments from the United States. This alternative hiring channel reflects the fact that U.S. firms carry out part of their operations outside the national boundaries.

To the best of our knowledge, this is the first article that looks into the effect of investor sentiment on employment in an international setting. The results speak to the vast literature that analyzes the relation between finance and growth.[1] The evidence also lends support to the view that the United States plays a leading

[1]Previous literature unveils a causal link between these two variables using a variety of empirical methods, including country-level data (King and Levine (1993a), (1993b), Demirgüç-Kunt and Maksimovic (1996), Levine and Zervos (1998), and Beck et al. (2000a), (2000b)), natural experiments (Jayaratne and Strahan (1996), Dehejia and Lleras-Muney (2007), Beck et al. (2010), and Benmelech et al. (2015)), and industry-level data (Rajan and Zingales (1998), Braun and Larrain (2005), Kroszner et al. (2007), and Pagano and Pica (2012)). Similarly, a related strand finds that investor sentiment affects firms' investment decisions (Morck, Shleifer, and Vishny (1990), Baker and Wurgler (2000), (2002), Baker, Stein, and Wurgler (2003), Chirinko and Schaller (2001), Baker (2009), Polk and Sapienza (2009), and McLean and Zhao (2014)).

role in the world economy (Harvey (1991), Campbell and Hamao (1992), Kwark (1999), Kim (2001), and Lumsdaine and Prasad (2003)) and financial markets (Albuquerque, Bauer, and Schneider (2009), Baker et al. (2012), and Rapach, Strauss, and Zhou (2013)), especially through foreign direct investments (Nadiri (1991), Caves (1996), and Albuquerque, Loayza, and Servén (2005)).

To derive theoretical guidance, we consider the economy from Pagano and Pica (2012), where a manager-entrepreneur needs to fund a project. However, we introduce three elements of novelty. First, the project is risky and has a binary outcome: repay or default. Second, we replace the banking sector with a stock market. Third, we expand the setting to two countries, which share economic and financial ties. Each economy has its own financial market and a representative firm that carries out part of the operations abroad.

The manager launches an initial public offering (IPO) in the local financial market and caters to a population of investors that includes arbitrageurs and noise traders. Arbitrageurs know the exact probability of default of the project and correctly estimate the expected final cash flow from the stock. Noise traders, instead, estimate the probability of default with a bias, which can be thought of as a form of sentiment. Neither arbitrageurs nor noise traders, though, can verify the firm's cash flow, which creates a moral-hazard issue.

Each country has different types of workers with their own peculiar expertise. These two types of labor are a complement to capital, and both enter the production function of the representative firm. As such, we propose a model of vertical integration, which represents an important motive for cross-border investments (see, e.g., Hanson, Mataloni, and Slaughter (2001), Hummels, Ishii, and Yi (2001), and Braconier et al. (2005)). Upon receiving the funding, then, the manager hires new employees both domestically and abroad. To hire foreign workers, however, the firm can incur additional costs in terms of trade barriers, such as employment protection. The higher these costs, the lower the optimal proportion of foreign labor to be employed.

After starting production, the manager extracts private benefits by appropriating a proportion of the firm's cash flow, then pays the employees and leaves the remainder to the shareholders. In this setting, there are three key variables: the level of development of the financial system, which reduces the moral hazard issue through features such as monitoring ability or investor protection; the profitability of the project, which increases the capacity of the firm to rely on external finance; and investor sentiment, which modifies the price that noise traders are willing to pay for the stock.

When noise traders are optimistic, they underestimate the probability of default of the project. As a consequence, they overestimate the firm's pledgeable income and overpay for the stock. The manager invests part of this money in the firm and hires more employees than would be optimal to maximize profits. Depending on the elasticity of the labor supply, the hiring activity can also lead to an increase in the growth of real wages.

Even though firms get funding in the local financial market, employment growth is also a function of foreign sentiment. We identify two channels. First, if the foreign economy is large enough, foreign sentiment can have spillover effects on sentiment in the local financial market, which affects the hiring decisions

of local firms. This mechanism is especially strong for firms that rely more on equity funding and operate in a developed financial system. Second, foreign sentiment can increase local employment through the activity of foreign firms, such as foreign direct investments. We refer to these as the spillover and the investment channel, respectively.[2]

Interestingly, we find that investor sentiment and economic fundamentals do not affect all firms equally, leading to cross-sectional effects. An increase in sentiment is especially beneficial for firms with speculative projects (i.e., lower profitability and/or a higher probability of default). This is due to the fact that optimism introduces an upward bias in the evaluations of unsophisticated investors, which makes the market willing to fund projects of lower quality. On the contrary, an improvement in economic conditions crowds out speculative firms through an increase in the equilibrium wage.

Finally, we find that investor sentiment should amplify the negative effect of local crises on employment growth. A positive shock in the probability of default of the firm is followed not only by a decrease in the first-best (i.e., optimal) level of employment but also by a decrease in its sentiment-driven component. Therefore, the additional hiring that follows high investor sentiment actually translates into larger layoffs.

In the second part of the article, we take the model's predictions to the data. We study the effect of investor sentiment on labor markets worldwide and identify the United States as the foreign country from the model. The reason for this choice is twofold. First, the United States is a large and highly developed market-based economy that plays a leading role in international markets (Rapach et al. (2013)) and whose investor sentiment has spillover effects on sentiment in other countries (Baker et al. (2012)). Second, U.S. firms typically carry out a nontrivial part of their operations abroad (Nadiri (1991)). Therefore, U.S. sentiment should affect employment in foreign countries through both channels described in the model.

We consider a large panel of international data from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) database, which provides annual industry-level statistics on growth for a large number of countries. Following Pagano and Pica (2012), we choose the 2006 release, which spans the period 1970–2003, because the following ones have more missing observations. We consider only countries for which at least 10 observations are available and only manufacturing industries to reduce the dependence on country-specific factors such as natural resources (Rajan and Zingales (1998)). In total, we include 60 countries and 28 industries.

The model requires the identification of three key parameters: financial development, financial dependence, and investor sentiment. With regard to the first two, we follow Pagano and Pica (2012) and Rajan and Zingales (1998). We primarily define a country's level of financial development as the ratio between stock market capitalization and gross domestic product (GDP), calculated as an average between 1980 and 1995 to allay endogeneity concerns. On the other hand,

[2]This dual mechanism formalizes the intuition that sentiment can propagate across countries through capital flows, on the one hand, and word of mouth and the media, on the other hand (Baker et al. (2012)).

our main definition of an industry's degree of dependence on external finance is the industry's median capital expenditures minus cash flow from operations divided by capital expenditures for U.S. listed firms in the Compustat database, calculated as an average between 1980 and 1990.

These two variables are crucial to establish causality between finance and growth. Rajan and Zingales (1998) find that financial development helps industries relying on external finance grow disproportionately faster because financial markets and institutions alleviate issues of asymmetric information. The value of this contribution lies in the fact that it suggests a specific mechanism through which finance should affect growth.

Pagano and Pica (2012) build on this methodology and document a similar effect for employment. To understand the magnitude, manufacturing industries that lie at the 75th and 25th percentiles of financial dependence (textiles vs. nonmetal products) exhibit a growth differential in employment that is 0.19% higher if they are located in a country at the 75th percentile of financial development (Ireland) rather than in a country at the 25th percentile of financial development (Panama).

To define investor sentiment, we follow McLean and Zhao (2014) and proceed in two ways. Our primary specification is Baker and Wurgler's (2006) index of investor sentiment, which captures changes in asset demand not explained by fundamentals. As such, it represents the closest empirical proxy to the definition of sentiment we propose in the model. Alternatively, we consider the University of Michigan consumer sentiment index (see, e.g., Carroll, Fuhrer, and Wilcox (1994)).

Consistent with the spillover hypothesis, we find that a 1-standard-deviation increase in sentiment in the U.S. stock market is followed by higher employment growth in industries located in foreign countries. In particular, U.S. sentiment amplifies the effect of financial development and financial dependence by roughly two-thirds per year. For example, the differential in employment growth between the textiles and nonmetal products industries rises to 0.33% if located in Ireland rather than in Panama, that is, 0.14% higher than in the absence of sentiment. This finding is robust to a variety of alternative definitions of financial development, financial dependence, and investor sentiment; different econometric specifications and sample periods; and alternative explanations such as aggregate stock market liquidity.

Next, we test the model's prediction that investor sentiment should amplify the negative consequences of local crises on employment. For this purpose, we consider the list of country-level banking crises from Laeven and Valencia (2010). Conditioning on the previous year's level of U.S. investor sentiment, we find that a local banking crisis indeed prompts a significant drop in employment growth. In keeping with the theoretical predictions, the effect takes place through the Rajan and Zingales (1998) channel. In particular, we find that the effect is concentrated around Organisation for Economic Co-operation and Development (OECD) countries, which suggests that the interaction of sentiment and crises is particularly severe for countries that share strong economic and financial ties.

Investor sentiment should also affect foreign employment through the investment channel. To test this hypothesis, our primary candidate is U.S. foreign direct

investments because they allow investors to exercise a certain degree of influence and control (at least 10%) over the company, including employment decisions. We find empirical support for our expectations. The effect of U.S. investor sentiment on foreign employment growth is stronger if the country attracts a higher level of U.S. foreign direct investments. The results are robust to controlling for U.S. imports and do not hold for U.S. portfolio investments (i.e., minor U.S. stakes in foreign companies).

Next, we identify the trade costs of foreign labor as the degree of employment protection of the country, measured by the labor market indices on employment laws, the power of unions, and the protection of workers during collective disputes from Botero, Djankov, La Porta, and Lopez-de-Silanes (2004). The trade-off between local and foreign labor from our model implies that when these indices are low, it should be optimal to hire more foreign workers. Consistent with this line of reasoning, we find that the effect of U.S. sentiment on foreign employment through the investment channel is confined to countries that exhibit a below-median score on these three dimensions.

The model predicts that local sentiment should also have an impact on the hiring activity of local firms. To introduce local sentiment in the analysis, we consider country-level indicators of consumer confidence from the OECD and the returns on the country-specific Morgan Stanley Capital International (MSCI) equity indices, both orthogonalized to U.S. sentiment and local real value-added growth. In keeping with the theoretical predictions, we find that an increase in local sentiment is followed by higher employment growth in the local labor market, especially for industries relying more on external finance and located in financially developed countries. The effect of local sentiment then perfectly coexists with that of U.S. sentiment.

One potential concern is that the results may reflect the level of sentiment of global financial markets rather than U.S.-specific investors. To address this issue, we construct two measures of global sentiment. In the spirit of Baker et al. (2012), we aggregate the two sets of local sentiment indicators across the G7 countries, excluding the United States. We find that global consumer sentiment and global stock returns have no significant impact on labor markets worldwide, whereas the coefficients of U.S. and local sentiment are robust to the inclusion of either measure.

The fact that U.S. sentiment affects employment in a similar way to U.S. or local fundamentals deserves further attention. To make sure that we are capturing a genuine sentiment effect, we go on to test the model's cross-sectional predictions on firms with speculative projects. Following Baker and Wurgler ((2006), (2007)), we define such firms as those with highly subjective valuations. Therefore, we identify industries with low market capitalization; low dividend-to-price ratios; high stock return volatility; and extreme values of the ratios of book to market, earnings before interest and taxes (EBIT) to price, and earnings before interest, taxes, depreciation, and amortization (EBITDA) to price. We find that the positive effect of U.S. sentiment on employment growth is largely confined to these industries. The results, then, lend support to the sentiment hypothesis.

Finally, we provide some evidence that U.S. sentiment also has a positive association with growth in real wages. In particular, we find two additional patterns.

First, the effect is asymmetric over the business cycle because it is concentrated in periods of economic growth. Sentiment then seems to affect frictional labor because workers are more likely to seek better jobs when employment opportunities increase. Second, we find that the effect of U.S. sentiment on wages takes place in countries whose workforces exhibit fewer years of schooling. This is consistent with the idea that finance affects labor by increasing wages, especially for low-skilled workers (Beck et al. (2010)).

Overall, however, we find that U.S. sentiment does not affect labor productivity or capital intensity, which suggests that sentiment has a stronger impact on employment than on wages. This result speaks to Pagano and Pica (2012), who show that an increase in financial development prompts firms to expand output by raising both labor and capital, rather than replacing the former with the latter by switching to more capital-intensive technologies. We find that an analogous effect takes place following an increase in U.S. sentiment.

The rest of the article is organized as follows: Section II introduces the model. Section III presents the data. Section IV shows the empirical results. Section V concludes.

II. Model

We consider the economy from Pagano and Pica (2012), where a manager-entrepreneur needs to fund a project. However, we modify the original setting in three ways. First, the project is risky. Second, we replace the banking sector with a stock market, where the manager launches an IPO to fund the project.[3] Third, we expand the setting to two countries, which we denote by 1 and 2, respectively. Each economy has a different type of labor, a separate financial market, and a unit mass of identical firms that carry out part of their operations in the other country.

The economy in country 1 works as follows: Upon receiving external funding, the manager hires workers and starts production. Workers, as insiders, can observe the firm's cash flow, but shareholders cannot, which creates a moral-hazard problem. In particular, the manager can appropriate a fraction $1-\lambda_1$ of the firm's operating profits. Therefore, λ_1 can be thought of as a measure of the level of development of the financial system the firm operates in, such as monitoring ability or investor protection in country 1.

Production is stochastic and depends on parameter $\tilde{\theta}_1$, which represents the profitability of the project. Without loss of generality, we consider a binary outcome, where profitability is equal to θ_1 with probability $1-\pi_1$ and equal to 0 with probability π_1 so that the expected value is $\bar{\theta}_1 \equiv (1-\pi_1)\theta_1$. If the project is profitable, then the manager pays workers, extracts private benefits, and leaves the remainder to shareholders.

The revenues of the representative firm are generated by the Cobb–Douglas production function:

$$\tilde{y}_1 = \tilde{\theta}_1 K_1^{1-\alpha_1-\alpha_2} L_{11}^{\alpha_1} L_{12}^{\alpha_2}, \tag{1}$$

[3]Note that the arguments that follow would hold for SEOs as well, but we use the IPO setting for ease of exposition.

where K_1 is the firm's capital, given by the sum of the manager's initial wealth, which consists of assets A_1 and the amount of equity funding F_1; L_{11} is the firm's demand for domestic labor, and L_{12} is the firm's demand for labor in country 2. The manager solves the following (see Appendix A):

$$\max_{L_{11},L_{12}} E(\tilde{B}_1) \quad = \quad (1-\lambda_1)(E(\tilde{y}_1) - w_1 L_{11} - c_{12} w_2 L_{12}), \tag{2}$$

subject to the participation constraint $E(\tilde{B}_1) \geq A_1$, where $E(\tilde{B}_1)$ represents the manager's expected private benefit; w_1 and w_2 represent the competitive wages of domestic and foreign workers, respectively; and $c_{12} \geq 1$ captures trade barriers that might increase the cost of foreign labor, such as the differences in regulatory frameworks between the two countries.

The first-order conditions yield the following trade-off between domestic and foreign labor: It is optimal to hire more local workers when they are more productive and/or when foreign labor is more expensive. The expected private benefit for the manager can be expressed as $(1-\lambda_1)\phi_1 K_1$, where ϕ_1 represents the profit per dollar invested. The complement $\lambda_1 \phi_1 K_1$ represents pledgeable income (i.e., expected cash flow to external financiers). Note, then, that the capacity of the firm to rely on external finance increases with the profitability of the project.

Investors are risk neutral and can be either arbitrageurs or noise traders, whose populations are of mass δ_1 and $1-\delta_1$, respectively. The difference between these two groups is that arbitrageurs know the exact probability of default of the project, whereas noise traders estimate it with a bias (i.e., $\pi_1^{'} \neq \pi_1$).

We consider a stock market from Hong and Sraer (2013), in which investor j solves the following:

$$\max_{n_{1j}} \left(n_{1j}(E_j(\tilde{v}_1) - p_1) - \frac{1}{2}\frac{n_{1j}^2}{\gamma_1} \right), \tag{3}$$

where n_{1j} is the number of shares traded by investor j; $E_j(\tilde{v}_1)$ is investor j's subjective evaluation of the firm's cash flow, equal to $\bar{v}_1(\pi_1)$ for arbitrageurs and $\bar{v}_1(\pi_1^{'})$ for noise traders; p_1 is the stock price; and γ_1 captures transaction costs.[4]

The ratio between the two evaluations reduces to a function of the ratio between the probability of survival estimated by noise traders $(1-\pi_1^{'})$ and the (correct) probability estimated by arbitrageurs $(1-\pi_1)$. This represents a measure of local investor sentiment because a ratio greater (less) than 1 implies an upward (downward) bias in the estimate of the probability of survival of the firm.

If the two economies are integrated, sentiment can propagate from one country to the other through noneconomic mechanisms such as word of mouth and the media (Baker et al. (2012)). We acknowledge this channel in our setup and refer to it as a spillover effect. As a result, we define sentiment in country 1 as the sum of an idiosyncratic component, s_1, and a foreign component, $\rho_1 s_2$, where ρ_1 reflects the degree to which optimism in country 2 affects optimism in country 1.

[4] A type of transaction cost that is characterized by such a convex function is the bid–ask spread because larger trades are typically associated with more unfavorable price movements.

The first-order condition yields investor j's optimal stock demand $n^*_{1j} = \gamma_1(E_j(\tilde{v}_1) - p_1)$. Given unit stock supply, the equilibrium price is as follows:

$$p^*_1 = S_1\lambda_1\phi_1 K_1 - \frac{1}{\gamma_1}, \tag{4}$$

where $S_1 \equiv ((s_1 + \rho_1 s_2)(1-\delta_1) + \delta_1)$, and $S_1 > 1$ ($S_1 < 1$) implies optimistic (pessimistic) noise traders (i.e., positive (negative) sentiment). Therefore, a positive bias in noise traders' evaluations also inflates the equilibrium price. In turn, this also affects the firm's equilibrium level of capital and labor and the manager's private benefit.

It is instructive to express labor demand (either domestic or foreign) as the sum of the following two components:

$$\hat{L}_1(K^*_1) = \hat{L}_1(K^*_1)|_{S_1=1} + \Delta\hat{L}_1|_{S_1\neq 1}, \tag{5}$$

where the former represents the firm's first best, based on the project's true probability of default, whereas the latter represents the deviation from the efficient level of employment due to investor sentiment (see Appendix B for details):

$$\Delta\hat{L}_1|_{S_1\neq 1} = (S_1 - 1)\frac{\lambda_1\phi_1}{1-\lambda_1\phi_1}\hat{L}_1(K^*_1)|_{S_1=1}. \tag{6}$$

Then, high sentiment ($S_1 > 1$) leads the firm to seek an employment level above the first best, whereas low sentiment ($S_1 < 1$) has the opposite effect.

The dynamics just described symmetrically apply to country 2, whose firms hire L^*_{21} and L^*_{22}. Then, the labor market equilibrium in the two countries implies $L_1(w^*_1) = L^*_{11} + L^*_{21}$ and $L_2(w^*_2) = L^*_{22} + L^*_{12}$, where we define labor supply as a generic upward-sloping function of local wages, as in Pagano and Pica (2012).

The breakdown of investor sentiment into a local and a foreign component yields interesting insight into how sentiment affects labor, as follows (see Appendix C for details):

Proposition 1. Higher foreign sentiment leads to higher employment growth in the local labor market due to spillover effects and investments from foreign firms.

$$\frac{dL^*_1}{ds_2}\frac{s_2}{L^*_1} = \frac{s_2\rho_1(1-\delta_1)\dfrac{\lambda_1\phi_1}{1-\lambda_1\phi_1 S_1} + \dfrac{L^*_{21}}{L^*_{11}}s_2(1-\delta_2)\dfrac{\lambda_2\phi_2}{1-\lambda_2\phi_2 S_2}}{1 + \dfrac{1}{\epsilon_1}\dfrac{1-\alpha_2-S_1\lambda_1\phi_1(1-\alpha_1-\alpha_2)}{(1-\alpha_1-\alpha_2)(1-\lambda_1\phi_1 S_1)} + \dfrac{L^*_{21}}{L^*_{11}}\left(1 + \dfrac{1}{\epsilon_1}\dfrac{1-\alpha_2-S_2\lambda_2\phi_2(1-\alpha_1-\alpha_2)}{(1-\alpha_1-\alpha_2)(1-\lambda_2\phi_2 S_2)}\right)} > 0. \tag{7}$$

The magnitude of the spillover effect is captured by the first addend. It depends on parameter ρ_1 and becomes stronger if the country has high financial development (λ_1) and if the local firm relies more on external finance (ϕ_1). The magnitude of the investment effect, instead, is captured by the second addend and depends on the size of investment that country 1 receives from country 2 (L^*_{21}). Note also that ϵ_1 is the elasticity of domestic labor supply, so high (low) elasticity implies a larger (smaller) effect on employment than on wages. On the other hand:

Proposition 2. Higher idiosyncratic sentiment leads to higher employment growth in the local labor market.

$$(8)\quad \frac{dL_1^*}{ds_1}\frac{s_1}{L_1^*} = \frac{s_1(1-\delta_1)\dfrac{\lambda_1\phi_1}{1-\lambda_1\phi_1 S_1}}{1+\dfrac{1}{\epsilon_1}\dfrac{1-\alpha_2-S_1\lambda_1\phi_1(1-\alpha_1-\alpha_2)}{(1-\alpha_1-\alpha_2)(1-\lambda_1\phi_1 S_1)}+\dfrac{L_{21}^*}{L_{11}^*}\left(1+\dfrac{1}{\epsilon_1}\dfrac{1-\alpha_2-S_2\lambda_2\phi_2(1-\alpha_1-\alpha_2)}{(1-\alpha_1-\alpha_2)(1-\lambda_2\phi_2 S_2)}\right)} > 0.$$

Similarly to the spillover channel, the effect of local sentiment becomes more pronounced for countries with high financial development and firms that rely more on external finance.

Investor sentiment and economic fundamentals have opposite effects on the quality of firms that have access to equity funding. We define π_1^c as the maximum probability of default that the market is willing to bear, and we derive the following (see Appendix D for details):

Proposition 3. An increase in local fundamentals improves the quality of firms in the financial market through an increase in wages, whereas an increase in sentiment grants funding to firms with a higher probability of default:

$$(9)\quad \frac{d\pi_1^c}{dA_1} \propto (-1)\left(\frac{dw_1}{dA_1}\frac{\alpha_1}{w_1}+\frac{dw_2}{dA_1}\frac{\alpha_2}{w_2}\right) < 0,$$

$$(10)\quad \frac{d\pi_1^c}{dS_1} \propto \frac{1-\alpha_1-\alpha_2}{\theta_1 S_1}\left(1-\frac{\alpha_1}{1-\alpha_1-\alpha_2}\frac{dw_1}{dS_1}\frac{S_1}{w_1}-\frac{\alpha_2}{1-\alpha_1-\alpha_2}\frac{dw_2}{dS_1}\frac{S_1}{w_2}\right) > 0.$$

Finally, we look into how investor sentiment affects labor in times of crisis. We first show the following (see Appendix E):

Proposition 4. An increase in the probability of default is followed by a decrease in the equilibrium rate of employment growth:

$$(11)\quad \frac{dL_1^*}{d\pi_1}\frac{\pi_1}{L_1^*} = \frac{\dfrac{\pi_1}{1-\pi_1}\dfrac{1}{(1-\alpha_1-\alpha_2)(1-\lambda_1\phi_1 S_1)}}{1+\dfrac{1}{\epsilon_1}\dfrac{1-\alpha_2-S_1\lambda_1\phi_1(1-\alpha_1-\alpha_2)}{(1-\alpha_1-\alpha_2)(1-\lambda_1\phi_1 S_1)}+\dfrac{L_{21}^*}{L_{11}^*}\left(1+\dfrac{1}{\epsilon_1}\dfrac{1-\alpha_2-S_2\lambda_2\phi_2(1-\alpha_1-\alpha_2)}{(1-\alpha_1-\alpha_2)(1-\lambda_2\phi_2 S_2)}\right)} < 0.$$

Because the effect is entirely driven by local labor demand, we find the following:

Proposition 5. The presence of high investor sentiment amplifies the real effects of crises, leading to further job losses:

$$(12)\quad \frac{dL_{11}^*|_{S_1\neq 1}}{d\pi_1} = \underbrace{\frac{dL_{11}^*|_{S_1=1}}{d\pi_1}\frac{1-\lambda_1\phi_1}{1-S_1\lambda_1\phi_1}}_{<0} + \underbrace{L_{11}^*|_{S_1=1}(S_1-1)\lambda_1\frac{\partial\phi_1}{\partial\pi_1}}_{<0} < 0.$$

Then, a shock in the probability of default prompts a decrease in both the first best and the sentiment-driven component of employment when sentiment is high ($S_1 > 1$). For foreign sentiment, the effect increases with parameters λ_1 and ϕ_1 and therefore works through the spillover channel.

A. Testable Implications

The model generates a number of testable implications. We first focus on the impact of foreign sentiment on employment through the spillover channel. From Proposition 1, we derive the following:

Hypothesis 1. Higher foreign sentiment leads to an increase in local employment growth. The effect increases with the level of financial development of the country and the degree of financial dependence of the firm.

From Propositions 4 and 5, we derive the following:

Hypothesis 2. Following high foreign sentiment, the impact of a local crisis on employment growth becomes more severe. The effect increases with the degree of development of the financial system and the degree of financial dependence of the firm.

Hypotheses 1 and 2 provide a link with Rajan and Zingales (1998), who predict that financial development helps financially dependent firms overcome asymmetric-information issues and get more funding. This is also the primary mechanism through which foreign sentiment affects local employment in our model.

Using Proposition 1, we then move on to the investment channel:

Hypothesis 3. Higher foreign sentiment leads to an increase in local employment growth. The effect increases with the magnitude of the investment that the local economy receives from the foreign country and therefore decreases with the cost of local labor.

From Proposition 2, we derive the following:

Hypothesis 4. Higher idiosyncratic sentiment leads to an increase in local employment growth. The effect increases with the level of financial development of the country and the degree of financial dependence of the firm.

Hypotheses 3 and 4 formalize the argument proposed by previous literature that sentiment can propagate across countries through capital flows and that local sentiment is relevant to local firms in a number of non-U.S. countries (Baker et al. (2012)).

Finally, from Proposition 3, we derive a cross-sectional test on the quality of firms:

Hypothesis 5. Investor sentiment and economic fundamentals have different cross-sectional implications. An improvement in fundamentals benefits firms with good projects, whereas an increase in sentiment grants funding to firms with speculative projects.

From Proposition 1, we derive a test on wages:

Hypothesis 6. Higher investor sentiment leads to an increase in the growth of real wages.

Hypothesis 5 predicts that the cross-sectional effects of U.S. sentiment from Baker and Wurgler ((2006), (2007)) should also shape the creation of jobs

worldwide. Hypothesis 6 speaks to Beck et al. (2010), suggesting that finance affects workers' wages also through investor sentiment.

Next, we take this set of hypotheses to the data.

III. Data

In the empirical analysis that follows, we study the effect of investor sentiment on labor markets worldwide and define the United States as the foreign country from the model. We consider a panel of international data from the UNIDO Indstat-3 database, which provides annual industry-level statistics on growth for a large number of countries. Following Pagano and Pica (2012), we consider the 2006 release, which spans the period 1970–2003, because the following ones have more missing observations.[5] We include countries for which at least 10 observations are available and consider only manufacturing industries to reduce the dependence on country-specific factors, such as natural resources (Rajan and Zingales (1998)). In total, we include 60 countries and 28 industries.[6]

The data set provides annual industry-level growth rates in employment and real wages across countries, for a total of 43,293 and 42,033 observations, respectively. Table 1 presents some summary statistics. The average annual employment growth in the full sample is 2.02%, and the average wage growth is 1.81%. The industry breakdown reveals some dispersion in average growth rates. Employment growth varies considerably across sectors, from −1.28% for tobacco to 5.09% for plastic products. The range for growth in real wages, on the other hand, is from 1.12% for metal products to 2.70% for tobacco. To allay the concern that some outliers could affect our results, we follow Rajan and Zingales (1998) in our analysis and winsorize growth in both employment and real wages in two alternative ways. First, we cut the distribution at the 1st and the 99th percentiles. Second, we constrain the distribution to be between −1 and 1.

Following McLean and Zhao (2014), we define U.S. sentiment in two ways. Our primary specification is Baker and Wurgler's (2006) index of investor sentiment, which is defined as the "propensity to speculate" and captures changes in asset demand not explained by fundamentals. As such, it represents the closest empirical proxy to our definition of sentiment from the model. We pick the version of the index expressed in levels. This measure is based on a number of sentiment proxies suggested in previous literature, including the closed-end fund discount, the New York Stock Exchange (NYSE) share turnover, the number and average first-day returns on IPOs, the equity share in new issues, and the dividend premium. The second definition of sentiment is the University of Michigan consumer sentiment index, which is a survey based on a minimum of 500 phone interviews conducted across the United States each month. The questions asked

[5]We thank Marco Pagano for graciously sharing the data.

[6]The countries we consider are as follows: Australia, Austria, Bangladesh, Barbados, Belgium, Bolivia, Canada, Chile, Colombia, Costa Rica, Cote d'Ivoire, Cyprus, Denmark, Ecuador, Egypt, Fiji, Finland, France, Germany, Greece, Honduras, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Korea, Kuwait, Malaysia, Mauritius, Mexico, Morocco, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Panama, Paraguay, Philippines, Portugal, Singapore, South Africa, Spain, Sri Lanka, Swaziland, Sweden, Trinidad and Tobago, Tunisia, Turkey, United Kingdom, Uruguay, Venezuela, and Zimbabwe.

TABLE 1

Sample Statistics: Industry-Level Growth in Employment and Real Wages

Table 1 reports the sample statistics for industry-level annual growth in employment and real wages, from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. The data set includes 28 manufacturing industries and 60 countries. The sample period is 1970–2003.

	Employment			Real Wages		
Industry	Mean	Std. Dev.	Frequency	Mean	Std. Dev.	Frequency
Apparel	0.0283	0.2282	1,613	0.0176	0.1902	1,570
Beverages	0.0168	0.1438	1,680	0.0194	0.1945	1,618
Electrical machinery	0.0316	0.2060	1,590	0.0191	0.1861	1,547
Food products	0.0274	0.1298	1,697	0.0146	0.1832	1,650
Footwear	−0.0046	0.2322	1,535	0.0137	0.2105	1,492
Furniture	0.0294	0.2232	1,607	0.0128	0.2006	1,551
Glass and glass products	0.0141	0.2277	1,547	0.0227	0.2171	1,505
Industrial chemicals	0.0208	0.2888	1,649	0.0247	0.2475	1,603
Iron and steel	0.0194	0.2551	1,482	0.0163	0.2280	1,444
Leather	0.0023	0.2070	1,541	0.0122	0.2120	1,494
Machinery	0.0369	0.2721	1,590	0.0177	0.2134	1,547
Metal products	0.0222	0.1519	1,650	0.0145	0.1830	1,607
Non-ferrous metal	0.0272	0.2506	1,268	0.0246	0.2199	1,223
Nonmetal products	0.0176	0.1511	1,546	0.0197	0.1892	1,503
Other chemical products	0.0279	0.1225	1,580	0.0230	0.1752	1,537
Other manufacturing	0.0184	0.3212	1,655	0.0189	0.2275	1,608
Paper products	0.0244	0.1803	1,694	0.0177	0.1935	1,645
Petroleum and coal	0.0100	0.3950	968	0.0150	0.2422	943
Plastic products	0.0509	0.1680	1,561	0.0189	0.1898	1,517
Pottery	0.0236	0.4328	1,467	0.0230	0.3434	1,415
Printing	0.0217	0.1401	1,575	0.0187	0.1790	1,531
Professional equipment	0.0507	0.2706	1,381	0.0200	0.2196	1,346
Refineries	0.0223	0.3321	1,351	0.0157	0.2741	1,308
Rubber products	0.0054	0.2601	1,599	0.0154	0.2317	1,556
Textiles	−0.0001	0.1669	1,669	0.0146	0.1901	1,623
Tobacco	−0.0128	0.2022	1,487	0.0270	0.2311	1,431
Transport equipment	0.0192	0.2443	1,628	0.0190	0.2066	1,583
Wood products	0.0152	0.2055	1,683	0.0112	0.1976	1,636
Total	0.0202	0.2364	43,293	0.0181	0.2145	42,033

cover a number of areas, including personal finances, business conditions, and inflation.

One concern is that sentiment may reflect, at least in part, the state of the economy. As a first step to address this issue, we include the version of Baker and Wurgler's (2006) index orthogonalized to business-cycle indicators, namely, industrial production growth; growth in consumer durables, nondurables, and services; and a dummy variable for National Bureau of Economic Research (NBER) recessions. Because the U.S. economy is integrated with the rest of the world, the orthogonalization allays the concern that the index might pick up economic conditions in foreign countries. Similarly, we orthogonalize consumer sentiment to the same set of economic indicators. We also express both indices in rank order, by adding the minimum value of the series to all observations, to make them nonnegative so that the coefficients of our interaction terms have an unambiguous interpretation.

Finally, we consider two measures of local (i.e., non-U.S.) sentiment. First, we include country-level indicators of consumer confidence from the OECD.[7] Second, we use local stock returns, defined as the returns on country-specific MSCI equity indices, which allows us to include non-OECD countries too.

[7]Note that the consumer sentiment index introduced previously is essentially the U.S. version of the OECD consumer confidence indicator.

Because these measures tend to exhibit positive and significant correlation with U.S. sentiment as well as local fundamentals (specifically, real value-added growth), we orthogonalize them to the effect of both to make sure we identify the idiosyncratic level of optimism or pessimism of local investors.

IV. Empirical Results

We present our empirical results as follows: First, we analyze the joint effect of U.S. investor sentiment on employment growth through the spillover channel. Second, we discuss our findings on the amplification effect of U.S. sentiment on job losses during crises. Third, we consider the investment channel. Fourth, we introduce local sentiment in the analysis. Fifth, we address the concern that the results may be driven by a general improvement in economic fundamentals. Finally, we present our analysis of the growth in real wages.

A. Spillover Channel

Rajan and Zingales (1998) show that industries that rely more on external finance grow disproportionately faster if located in countries with a higher level of financial development because the services that the financial sector provides help firms overcome asymmetric-information issues. In our moral-hazard model, this is also the primary mechanism through which sentiment affects employment growth. In light of this, we start the empirical analysis by looking into the effect of U.S. sentiment on foreign labor through the spillover channel.

We also expect this mechanism to be particularly important because the United States plays a leading role in international markets (Rapach et al. (2013)), and U.S. investor sentiment has spillover effects on sentiment in other countries (Baker et al. (2012)). From an econometric perspective, this is the most conservative specification, in that it allows us to use a large set of joint fixed effects and exploit the full sample.[8] From a theoretical perspective, we are implicitly assuming away foreign investments and idiosyncratic sentiment.[9] In the rest of the analysis, however, we relax both constraints and show that this does not affect the results.

Our baseline regression is a modified version of the test equation from Pagano and Pica (2012), with the addition of investor sentiment:

$$\begin{aligned} (13) \qquad y_{cit} \;=\; & \beta_0 + \beta_1 \text{SHARE}_{cit-1} + \beta_2(\text{FD}_c \times \text{ED}_i) + \beta_3(S_{t-1} \times \text{ED}_i) \\ & + \beta_4(S_{t-1} \times \text{FD}_c \times \text{ED}_i) + \mu_{ct} + \mu_i + \epsilon_{cit}, \end{aligned}$$

where y_{cit} represents winsorized employment growth in country c, sector i, at time t; SHARE_{cit-1} denotes the industry's share of employment growth in the manufacturing sector in the previous year; S_{t-1} is Baker and Wurgler's (2006) index of investor sentiment, orthogonalized to business-cycle indicators and lagged 1 year; FD_c is our main specification for the level of financial development of country c; ED_i is our main specification for the degree of dependence on

[8] Unfortunately, data on capital flows and local sentiment indicators are only available for a subset of countries and a shorter sample period.

[9] This amounts to imposing the restrictions $L_{21} = 0$ in equation (7) and $s_1 = 0$ in equation (8).

external finance of firms in sector i; and μ_{ct} and μ_i are country–year and sector fixed effects, respectively. Standard errors are clustered by country.

Note that economic fundamentals are captured by three sets of variables in this setup. First, the interaction term $FD_c \times ED_i$ reflects the higher economic growth that financially dependent industries exhibit when located in economies with higher financial development. Second, the inclusion of the industry's share of employment growth allows us to control for the convergence effect of industry size over time (Rajan and Zingales (1998)). Third, country–year fixed effects capture time-varying country-level economic fundamentals, such as local business cycles.

The main variable of interest is the triple-interaction term between investor sentiment, financial development, and financial dependence. Hypothesis 1 predicts $\beta_4 > 0$, whereas Pagano and Pica's (2012) effect implies $\beta_2 > 0$. We also include an interaction term between sentiment and financial dependence to analyze the effect of sentiment on financially dependent firms without conditioning on financial development.

The estimates are provided in column 1 of Panel A in Table 2. Consistent with Pagano and Pica (2012), we find that the interaction term between a country's level of financial development and an industry's degree of financial dependence is positive and significant (0.0287, t-statistic 2.47). To understand the magnitude of the effect, we consider the industries that lie at the 75th and the 25th percentile of financial dependence (textiles versus nonmetal products). The estimates imply that in a country at the 75th percentile of financial development (Ireland), the differential in employment growth between these industries should be 0.19% higher than in a country at the 25th percentile of financial development (Panama). Because the average annual growth rate of employment is 2.07%, this is a large number.

However, we find that this effect becomes even stronger when we condition the analysis on the previous year's level of U.S. investor sentiment. Consistent with Hypothesis 1, the interaction term between investor sentiment, financial development, and financial dependence is positive and significant (0.0214, t-statistic 3.04). In particular, a 1-standard-deviation increase in sentiment makes the differential in employment growth between the textiles and nonmetal products industries 0.33% higher when they are located in Ireland rather than Panama. Sentiment, then, amplifies the effect of financial development and financial dependence on employment growth by 0.14% (i.e., an increase of approximately two-thirds).

Note that the coefficient of the interaction term between sentiment and financial dependence is negative and significant, which implies that investor sentiment may actually decrease employment growth in financially dependent industries located in countries with low financial development. Therefore, employment growth in a financially dependent industry can experience a substitution effect between countries with high and low financial development.

For example, consider the United Kingdom and Indonesia, two countries that lie, respectively, above the 75th percentile and below the 25th percentile of financial development, and electrical machinery (i.e., an industry that lies above the

TABLE 2

Investor Sentiment, Financial Development, and Financial Dependence

Table 2 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of employment in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for U.S. listed firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and U.S. investor sentiment (SENTIMENT), defined as Baker and Wurgler's (2006) index, orthogonalized to U.S. business-cycle indicators, normalized to have 0 mean and unit variance and lagged 1 year; an interaction term between U.S. investor sentiment, financial development, and financial dependence; and an interaction term between U.S. investor sentiment and financial development. The specifications include country–year and industry fixed effects (FE) in column 1; country–industry and year FE in column 2; industry–year and country FE in column 3; country, year, and industry FE in column 4; country–year, industry-year, and country–industry FE in column 5; and country, year, industry, industry–year, and country–industry FE in column 6. In Panel A, we winsorize the 1% tails of the employment-growth distribution. In Panel B, we constrain employment growth to be between −1 and 1. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. Heteroscedasticity-robust *t*-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Winsorized Employment Growth (1%)

	1	2	3	4	5	6
SHARE	−0.1696***	−1.0983***	−0.1647***	−0.1693***	−1.2105***	−1.1961***
	(−4.44)	(−7.41)	(−4.18)	(−4.42)	(−6.46)	(−6.69)
FD × ED	0.0287**		0.0291**	0.0286**		
	(2.47)		(2.59)	(2.44)		
ED × SENTIMENT	−0.0072**	−0.0064*		−0.0072**		
	(−2.14)	(−1.87)		(−2.14)		
FD × ED × SENTIMENT	0.0214***	0.0215***	0.0224***	0.0215***	0.0210***	0.0219***
	(3.04)	(3.02)	(3.00)	(3.04)	(2.86)	(2.92)
FD × SENTIMENT		0.0016	0.0017	0.0021		0.0015
		(0.32)	(0.35)	(0.42)		(0.30)
Country–year FE	Yes	No	No	No	Yes	No
Industry FE	Yes	No	No	Yes	No	Yes
Country–industry FE	No	Yes	No	No	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
Industry–year FE	No	No	Yes	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	Yes
No. of obs.	43,293	43,293	43,293	43,293	43,293	43,293
Adj. R^2	0.0070	0.0050	0.0554	0.0538	0.2890	0.1132

Panel B. Winsorized Employment Growth (−1, 1)

SHARE	−0.1796***	−1.2224***	−0.1823***	−0.1806***	−1.3040***	−1.3342***
	(−4.50)	(−6.87)	(−4.16)	(−4.50)	(−6.40)	(−6.24)
FD × ED	0.0283*		0.0270*	0.0279*		
	(1.95)		(1.96)	(1.92)		
ED × SENTIMENT	−0.0079**	−0.0078**		−0.0080**		
	(−2.19)	(−2.09)		(−2.23)		
FD × ED × SENTIMENT	0.0225***	0.0208**	0.0220**	0.0225***	0.0217***	0.0211**
	(2.88)	(2.56)	(2.58)	(2.87)	(2.64)	(2.50)
FD × SENTIMENT		0.0041	0.0042	0.0043		0.0040
		(0.47)	(0.48)	(0.50)		(0.45)
Country–year FE	Yes	No	No	No	Yes	No
Industry FE	Yes	No	No	Yes	No	Yes
Country–industry FE	No	Yes	No	No	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
Industry–year FE	No	No	Yes	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	Yes
No. of obs.	43,614	43,614	43,614	43,614	43,614	43,614
Adj. R^2	0.0047	0.0047	0.0602	0.0607	0.3852	0.1143

75th percentile of financial dependence). In the absence of sentiment, the total effect of financial development and financial dependence on employment growth in the electrical machinery industry is –0.44% for Indonesia, and 1.12% for the

United Kingdom, for an overall difference of 1.56%. Following a 1-standard-deviation increase in sentiment, however, the employment growth differential becomes even more pronounced, up to 2.01% (i.e., 0.45% higher).

For robustness, in columns 2–6 of Table 2 we test alternative fixed-effects specifications, and we also introduce an interaction term between sentiment and financial development where possible. The coefficient of our main interaction term between investor sentiment, financial development, and financial dependence is still positive and significant with country–industry and year fixed effects (0.0215, t-statistic 3.02); industry–year and country fixed effects (0.0224, t-statistic 3.00); country, industry, and year fixed effects (0.0215, t-statistic 3.04); country–year, industry–year, and country–industry fixed effects all together (0.0210, t-statistic 2.86); and country, year, industry, industry–year, and country–industry fixed effects (0.0292, t-statistic 2.92), as in Kroszner et al. (2007). The coefficient of the interaction term between sentiment and financial development, instead, where present, always lies outside of the rejection region. In Panel B of Table 2, we repeat the analysis by winsorizing employment growth between −1 and 1 and obtain similar estimates.

Levine and Zervos (1998) find that measures of market liquidity are positively correlated with growth. One possible objection to these results, then, is that investor sentiment may actually reflect the level of liquidity in the financial market. In unreported tests, however, we find that the results are unchanged when controlling for the level of liquidity of the U.S. stock market (defined as in Pástor and Stambaugh (2003)). The results are also robust to a variety of alternative measures of financial development, and they become even stronger when we predetermine our measures of financial development and financial dependence in 1980 and estimate the regressions in the post-1980 period.[10]

The empirical evidence lends support to Hypothesis 1.

B. Financial Crises

Previous literature shows that financial development may have a dark side. Braun and Larrain (2005) find that the more financially dependent industries are hit harder in recessions but that this effect is less severe in countries with high accounting standards and in industries with more tangible assets. Kroszner et al. (2007) find that sectors that are heavily dependent on external finance suffer a much sharper contraction of value-added growth in countries with a higher degree of financial development. Pagano and Pica (2012) find that a similar effect carries over to employment growth, which slows down significantly more in financially dependent industries during financial crises.

In line with these results, our model suggests that crises may have a stronger negative effect on employment in the presence of investor sentiment. In particular, crises are followed by a decrease in both the optimal and the sentiment-driven component of employment. Therefore, in Hypothesis 2, we argue that the "easy" hiring that follows high sentiment may translate into layoffs under financial downturns, thus leading to greater job losses. In particular, the impact of foreign

[10]See the Supplementary Material.

sentiment on local crises should be higher for economies that are highly integrated. We test this hypothesis in the following analysis.

We consider the list of country-level banking crises from Laeven and Valencia (2010) and add three extra terms to equation (13):

$$\begin{aligned}(14)\quad y_{cit} &= \beta_0 + \beta_1 \text{SHARE}_{cit-1} + \beta_2(\text{FD}_c \times \text{ED}_i) + \beta_3(\text{FD}_c \times \text{ED}_i \times \text{CRISIS}_{ct}) \\ &\quad + \beta_4(S_{t-1} \times \text{FD}_c \times \text{ED}_i) + \beta_5(S_{t-1} \times \text{FD}_c \times \text{ED}_i \times \text{CRISIS}_{ct}) \\ &\quad + \beta_6(S_{t-1} \times \text{ED}_i) + \beta_7(S_{t-1} \times \text{ED}_i \times \text{CRISIS}_{ct}) + \mu_{ct} + \mu_i + \epsilon_{cit},\end{aligned}$$

namely, a triple-interaction term between financial development, financial dependence, and the crisis dummy; a quadruple-interaction term between investor sentiment, financial development, financial dependence, and the crisis dummy; and a triple-interaction term between investor sentiment, financial dependence, and the crisis dummy. Hypothesis 2 implies $\beta_5 < 0$. Following Pagano and Pica (2012), we also estimate these equations separately in the subsamples of OECD and non-OECD countries. In light of the argument on financial market integration, we expect the results to be stronger in the OECD subsample.

The estimates are presented in Panel A of Table 3. In column 1, we find that the coefficient of the quadruple-interaction term is negative but not significant in the full sample (t-statistic −0.50). In column 2, however, the coefficient is negative and significant in the subsample of OECD countries, in which a 1-standard-deviation increase in investor sentiment amplifies the negative effect of a financial crisis on the employment-growth differential between industries at the 75th and 25th percentiles in terms of financial dependence and located in countries at the 75th and 25th percentiles in terms of financial development, by 0.18% (t-statistic −2.95). Because the growth differential between such industries during normal periods with no sentiment is 0.19%, the joint impact of the crisis and investor sentiment completely erodes this advantage. In column 3, on the other hand, this mechanism is not at work for non-OECD countries (t-statistic 0.24).

Because we consider banking crises, we reestimate equation (14) using our alternative measure of financial development based on the banking sector (i.e., total private credit over GDP). The results are similar. In column 4 of Table 3, the coefficient of the quadruple-interaction term is negative but not significant for the full sample (t-statistic −1.06). In column 5, however, the coefficient is negative and significant for OECD countries (t-statistic –3.01). In column 6, this result does not hold for non-OECD countries (t-statistic 1.12). The estimates are analogous in Panel B when we winsorize employment growth between −1 and 1.

These empirical patterns suggest that investor sentiment is an important channel through which banking crises can affect employment. The same countries that benefit the most from U.S. sentiment are also the ones that are hit the hardest in crisis periods.

The findings lend support to Hypothesis 2 and specifically to the idea that finance has a dark side (Braun and Larrain (2005), Kroszner et al. (2007)). We document a detrimental effect on employment growth, as in Pagano and Pica (2012), but our results differ from theirs in two ways. First, we find strong, rather than mild, statistical evidence for the negative effect of financial crises on

TABLE 3

Investor Sentiment and Financial Crises

Table 3 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of employment in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average) in columns 1–3 and as total domestic credit over GDP (1980–1995 average) in columns 4–6, and the industry's degree of financial dependence (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and U.S. investor sentiment (SENTIMENT), defined as Baker and Wurgler's (2006) index, orthogonalized to U.S. business-cycle indicators, normalized to have 0 mean and unit variance and lagged 1 year; an interaction term between U.S. investor sentiment, financial development, and financial dependence; an interaction term between U.S. investor sentiment, financial dependence, and a banking-crisis dummy, defined as the list of country-level banking crises from Laeven and Valencia (2010); and an interaction term between U.S. investor sentiment, financial development, financial dependence, and the banking crisis dummy. All specifications include country–year and industry fixed effects (FE). We consider the full sample in columns 1 and 4, Organisation for Economic Co-operation and Development (OECD) countries in columns 2 and 5, and non-OECD countries in columns 3 and 6. In Panel A, we winsorize the 1% tails of the employment-growth distribution. In Panel B, we constrain employment growth to be between −1 and 1. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. Heteroscedasticity-robust *t*-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Winsorized Employment Growth (1%)

	Stock Market Cap			Total Domestic Credit		
	Full	OECD	Other	Full	OECD	Other
	1	2	3	4	5	6
SHARE	−0.1004***	−0.0090	−0.1344***	−0.1032***	−0.0149	−0.1286***
	(−4.88)	(−0.50)	(−4.79)	(−5.55)	(−0.84)	(−5.30)
FD × ED	−0.0062*	−0.0036	−0.0076	−0.0084	−0.0035	−0.0162**
	(−1.78)	(−0.79)	(−1.52)	(−1.59)	(−0.47)	(−2.13)
ED × SENTIMENT	0.0661***	0.0857***	0.0552***	0.0500***	0.0400***	0.0687***
	(5.70)	(5.02)	(4.16)	(8.52)	(6.80)	(8.83)
FD × ED × SENTIMENT	0.0208***	0.0143	0.0222**	0.0140**	0.0049	0.0385**
	(2.89)	(1.44)	(2.62)	(2.08)	(0.62)	(2.63)
ED × SENTIMENT × CRISIS	−0.0085	0.0200**	−0.0197	−0.0060	0.0233**	−0.0507
	(−0.58)	(2.52)	(−0.87)	(−0.47)	(2.03)	(−1.72)
FD × ED × CRISIS	−0.0012	0.0463	−0.0359	−0.0078	0.0056	−0.0232
	(−0.03)	(1.29)	(−0.68)	(−0.67)	(0.74)	(−0.57)
FD × ED × SENTIMENT × CRISIS	−0.0243	−0.1126***	0.0169	−0.0126	−0.0373***	0.0959
	(−0.50)	(−2.95)	(0.24)	(−0.69)	(−2.88)	(1.26)
Country–year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	43,293	18,758	24,535	45,533	18,758	26,775
Adj. R^2	0.0019	0.0016	0.0036	0.0013	0.0041	0.0042

Panel B. Winsorized Employment Growth (− 1, 1)

SHARE	−0.1054***	−0.0129	−0.1398***	−0.1176***	−0.0188	−0.1460***
	(−5.00)	(−0.72)	(−4.85)	(−5.36)	(−1.08)	(−5.10)
FD × ED	−0.0069*	−0.0036	−0.0085	−0.0087	−0.0035	−0.0166**
	(−1.84)	(−0.79)	(−1.60)	(−1.59)	(−0.46)	(−2.08)
ED × SENTIMENT	0.0651***	0.0877***	0.0529***	0.0504***	0.0406***	0.0677***
	(4.90)	(5.13)	(3.29)	(8.33)	(6.89)	(7.12)
FD × ED × SENTIMENT	0.0218***	0.0143	0.0234**	0.0143**	0.0048	0.0389**
	(2.73)	(1.42)	(2.47)	(2.03)	(0.60)	(2.46)
ED × SENTIMENT × CRISIS	−0.0063	0.0202**	−0.0165	−0.0026	0.0255*	−0.0482
	(−0.42)	(2.07)	(−0.71)	(−0.19)	(1.89)	(−1.56)
FD × ED × CRISIS	0.0031	0.0499	−0.0319	−0.0053	0.0068	−0.0164
	(0.08)	(1.32)	(−0.59)	(−0.45)	(1.01)	(−0.37)
FD × ED × SENTIMENT × CRISIS	−0.0288	−0.1178***	0.0128	−0.0186	−0.0423***	0.0928
	(−0.56)	(−2.82)	(0.18)	(−1.06)	(−3.01)	(1.12)
Country–year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	43,614	18,807	24,807	45,927	18,807	27,120
Adj. R^2	0.0010	0.0010	0.0021	0.0005	0.0029	0.0024

employment. Second, we show that the investor-sentiment effect dominates that of financial development and financial dependence alone.

C. Investment Channel

Baker et al. (2012) show that capital flows represent a key mechanism through which sentiment propagates across countries. Similarly, our model predicts that the effect of foreign sentiment on local employment is proportional to the investment that the local country receives from the foreign one. We refer to this as the investment channel.

To test this hypothesis, our primary candidate is foreign direct investments. Such investments allow investors to exercise a certain degree of influence and control (at least 10%) over the company, including employment decisions, and constitute an important means for U.S. firms to contribute to foreign growth (Nadiri (1991), Caves (1996), and Albuquerque et al. (2005)). Furthermore, the mechanism of vertical integration inherent in our model is a key driver of foreign direct investments. Multinational enterprises outsource a substantial amount of production to their foreign affiliates to exploit the peculiar input characteristics of host countries (Hanson et al. (2001)), especially where less-skilled labor is relatively cheap (Braconier et al. (2005)). As a result, vertical integration has grown significantly and steadily since the 1970s (Hummels et al. (2001)).

We consider three data sets of U.S. foreign direct investments from the Bureau of Economic Analysis: a general one, which reports the position of direct investment abroad on a historical-cost basis (FDI), available from 1983 and expressed in USD billions, and two labor-specific ones, which include the direct investment in employment at majority-owned nonbank foreign affiliates (FDIL) and the direct investment in employment in all nonbank foreign affiliates (FDIL2), both available from 1998 and expressed in millions of employees. Due to the later start of the series, our sample size unfortunately shrinks in each of these data sets.

We begin our analysis following a conservative approach. Our baseline specification is an augmented version of equation (13):

$$\begin{aligned}(15)\quad y_{cit} &= \beta_0 + \beta_1 \text{SHARE}_{cit-1} + \beta_2(\text{FD}_c \times \text{ED}_i) + \beta_3(S_{t-1} \times \text{ED}_i) \\ &\quad + \beta_4(S_{t-1} \times \text{FD}_c \times \text{ED}_i) + \beta_5(S_{t-1} \times \text{ED}_i \times \text{FDI}_{ct}) + \mu_{ct} + \mu_i + \epsilon_{cit},\end{aligned}$$

where we add an interaction term between U.S. sentiment, financial dependence, and U.S. foreign direct investments. Hypothesis 3 implies $\beta_5 > 0$. From an econometric perspective, this test allows us to control for a battery of fixed effects, which is important to allay the concern that foreign direct investments might be partly driven, for example, by local business cycles. From a theoretical perspective, we are implicitly assuming that the profitability of firms is equal across countries (i.e., $\phi_1 = \phi_2$ in equation (7)). Again, we relax this assumption in the analysis that follows.

The results are presented in Table 4. We find that the coefficient of the interaction term between sentiment, financial dependence, and FDI is positive and significant all throughout. To understand the magnitude, in countries that receive 1 standard deviation of U.S. foreign direct investments (20.48 USD billions), manufacturing industries that lie at the 75th and 25th percentiles of financial dependence exhibit an increase in the employment-growth differential between 0.07%

TABLE 4

Investor Sentiment, Financial Dependence, and Investments in Foreign Countries

Table 4 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of employment in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and U.S. investor sentiment (SENTIMENT), defined as Baker and Wurgler's (2006) index, orthogonalized to U.S. business-cycle indicators, normalized to have 0 mean and unit variance and lagged 1 year; an interaction term between U.S. investor sentiment, financial development, and financial dependence; an interaction term between U.S. investor sentiment, financial dependence, and U.S. foreign direct investments (FDI), defined as the U.S. direct investment position with respect to a foreign country on a historical-cost basis, expressed in USD billions and lagged 1 year, from the Bureau of Economic Analysis; and an interaction term between U.S. investor sentiment and financial development. The specifications include country–year and industry fixed effects (FE) in column 1; country–industry and year FE in column 2; industry–year and country FE in column 3; country, year, and industry FE in column 4; country–year, industry–year, and country–industry FE in column 5; and country, year, industry, industry–year, and country–industry FE in column 6. In Panel A, we winsorize the 1% tails of the employment-growth distribution. In Panel B, we constrain employment growth to be between −1 and 1. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. Heteroscedasticity-robust *t*-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Winsorized Employment Growth (1%)

	1	2	3	4	5	6
SHARE	−0.1083**	−1.4237***	−0.1080**	−0.1085***	−1.5480***	−1.5328***
	(−2.64)	(−6.48)	(−2.54)	(−2.65)	(−6.12)	(−6.31)
FD × ED	0.0129		0.0135	0.0128		
	(1.41)		(1.55)	(1.38)		
ED × SENTIMENT	−0.0174***	−0.0168***		−0.0176***		
	(−3.08)	(−2.91)		(−3.11)		
FD × ED × SENTIMENT	0.0226***	0.0143*	0.0187*	0.0223***	0.0100	0.0101
	(2.72)	(1.75)	(1.97)	(2.72)	(1.18)	(1.09)
ED × SENTIMENT × FDI	0.0001**	0.0003*	0.0004**	0.0001**	0.0002***	0.0004**
	(2.24)	(1.78)	(2.33)	(2.55)	(3.19)	(1.98)
FD × SENTIMENT		−0.0129	−0.0141	−0.0147		−0.0126
		(−0.85)	(−0.87)	(−0.96)		(−0.77)
Country–year FE	Yes	No	No	No	Yes	No
Industry FE	Yes	No	No	Yes	No	Yes
Country–industry FE	No	Yes	No	No	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
Industry–year FE	No	No	Yes	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	Yes
No. of obs.	22,947	22,947	22,947	22,947	22,947	22,947
Adj. R^2	0.0097	0.0014	0.0438	0.0445	0.3064	0.1297

Panel B. Winsorized Employment Growth (−1, 1)

	1	2	3	4	5	6
SHARE	−0.1137**	−1.5865***	−0.1252**	−0.1150***	−1.6512***	−1.6955***
	(−2.66)	(−5.86)	(−2.55)	(−2.68)	(−6.11)	(−5.66)
FD × ED	0.0056		0.0061	0.0055		
	(0.41)		(0.49)	(0.40)		
ED × SENTIMENT	−0.0208***	−0.0188**		−0.0209***		
	(−3.01)	(−2.67)		(−3.01)		
FD × ED × SENTIMENT	0.0308***	0.0206*	0.0246**	0.0306***	0.0164*	0.0145
	(3.46)	(1.93)	(2.29)	(3.40)	(1.86)	(1.29)
ED × SENTIMENT × FDI	0.0001**	0.0003*	0.0005**	0.0001**	0.0002**	0.0005**
	(2.02)	(1.73)	(2.45)	(2.36)	(2.51)	(2.07)
FD × SENTIMENT		−0.0120	−0.0131	−0.0133		−0.0116
		(−0.72)	(−0.75)	(−0.77)		(−0.66)
Country–year FE	Yes	No	No	No	Yes	No
Industry FE	Yes	No	No	Yes	No	Yes
Country–industry FE	No	Yes	No	No	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
Industry–year FE	No	No	Yes	No	Yes	Yes
Country FE	No	No	Yes	Yes	No	Yes
No. of obs.	23,113	23,113	23,113	23,113	23,113	23,113
Adj. R^2	0.0074	0.0016	0.0499	0.0524	0.4041	0.1308

and 0.35% following a 1-standard-deviation increase in U.S. sentiment. The coefficient of the interaction term between sentiment, financial development, and financial dependence is also positive and significant in all specifications, which implies that the spillover and the investment channel are both simultaneously at work. We find similar results for FDIL and FDIL2 (unreported).

Note that the magnitude of the spillover effect in Table 4 is similar to the estimates from Table 2. For example, in the baseline specification (i.e., column 1, Panel A), the coefficient of the triple-interaction term between sentiment, financial development, and financial dependence is 2.26 (t-statistic 2.72) for equation (15) and 2.14 (t-statistic 3.04) for equation (13). This is important to allay the concern that equation (13) might suffer from an omitted-variable bias and thus capture the overall effect of U.S. sentiment (i.e., equation (7) as a whole) rather than the effect of the spillover channel only (i.e., the first addend of equation (7)).

The model predicts that it is optimal to invest less in foreign labor when it is more costly. As a result, the effect of the investment channel should be weaker in countries where labor costs are high. To test this prediction, we consider the cross-country labor market indices on employment laws, the power of unions, and the protection of workers during collective disputes from Botero et al. (2004). In particular, we split the sample above and below the median values of these indices. The results are presented in Table 5. Consistent with the theoretical conjecture, we find that the investment channel is at work only in countries that exhibit a low score on all three dimensions. Conversely, the spillover channel is operational in all subsamples because it is based on financial market integration rather than investments.

An alternative channel through which U.S. sentiment can propagate across countries is trade, specifically U.S. imports. To test whether this is the case in our data, we set up a horse race between each of the three specifications of foreign direct investments introduced previously and the panel of cross-country U.S. imports from the U.S. Census Bureau, available from 1985 and expressed in USD billions.

The results are presented in Table 6. We find that trade has a significant and positive effect on employment when included on its own (column 1). To get a sense of the magnitude, in countries that receive 1 standard deviation of U.S. imports (29.09 USD billions), manufacturing industries that lie at the 75th and 25th percentiles of financial dependence exhibit a growth differential in employment that is 0.12% higher following a 1-standard-deviation increase in U.S. sentiment.

However, the effect vanishes when we alternatively introduce FDI, FDIL, and FDIL2 (columns 2–4), whose coefficients are positive and highly significant. In particular, the growth differential mentioned previously is equal to 0.11% for FDI, which then explains away the effect of import also in terms of magnitude, and equal to 0.29% and 0.26%, respectively, for FDIL and FDIL2. Consistent with our model's predictions, then, the investment channel is still significant after controlling for the trade channel.

Next, we relax the assumption that the profitability of firms is equal across countries and estimate a simpler specification without joint fixed effects. As a result, we can no longer control, for instance, for unobserved, time-varying, country-level variables. However, the results from the previous tests suggest that

TABLE 5

Investor Sentiment, Investment in Foreign Countries, and Labor Market Conditions

Table 5 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of employment in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and U.S. investor sentiment (SENTIMENT), defined as Baker and Wurgler's (2006) index, orthogonalized to U.S. business-cycle indicators, normalized to have 0 mean and unit variance and lagged 1 year; an interaction term between U.S. investor sentiment, financial development, and financial dependence; and an interaction term between U.S. investor sentiment, financial dependence, and U.S. foreign direct investments (FDI), defined as the U.S. direct investment position with respect to a foreign country on a historical-cost basis, expressed in USD billions and lagged 1 year, from the Bureau of Economic Analysis. The specifications include country–year and industry fixed effects (FE). The sample is split along three labor market characteristics from Botero et al. (2004): the employment laws index, the power of unions, and the protection of workers during collective disputes. Columns 1, 3, and 5 report the estimates for the countries whose score is above the median value, and columns 2, 4, and 6 report the estimates for the countries below the median. In Panel A, we winsorize the 1% tails of the employment-growth distribution. In Panel B, we constrain employment growth to be between −1 and 1. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. Heteroscedasticity-robust *t*-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Winsorized Employment Growth (1%)

	Employment Laws		Unions' Power		Workers' Protection	
	≥ Median	< Median	≥ Median	< Median	≥ Median	< Median
	1	2	3	4	5	6
SHARE	−0.0721	−0.1624**	−0.0892**	−0.1534*	−0.0897**	−0.1765*
	(−1.56)	(−2.12)	(−2.11)	(−1.84)	(−2.22)	(−1.83)
FD × ED	0.0136	0.0209*	−0.0005	0.0237**	0.0209**	0.0017
	(0.37)	(1.86)	(−0.04)	(2.16)	(2.22)	(0.12)
ED × SENTIMENT	−0.0400***	−0.0194*	−0.0191**	−0.0274**	−0.0239***	−0.0172*
	(−3.55)	(−2.01)	(−2.51)	(−2.34)	(−2.93)	(−1.80)
FD × ED × SENTIMENT	0.1347**	0.0211*	0.0307*	0.0286**	0.0313**	0.0225*
	(2.77)	(2.04)	(1.77)	(2.26)	(2.73)	(1.74)
ED × SENTIMENT × FDI	0.0003	0.0001**	0.0003	0.0001**	0.0002	0.0001**
	(1.28)	(2.41)	(1.09)	(2.86)	(0.73)	(2.35)
Country–year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	9,377	10,026	12,322	7,081	12,046	7,357
Adj. R^2	0.0127	0.0110	0.0115	0.0117	0.0099	0.0133

Panel B. Winsorized Employment Growth (−1, 1)

SHARE	−0.0767	−0.1677**	−0.0944**	−0.1626*	−0.0964**	−0.1764
	(−1.56)	(−2.02)	(−2.11)	(−1.80)	(−2.23)	(−1.72)
FD × ED	0.0124	0.0131	−0.0183	0.0216*	0.0217*	−0.0117
	(0.35)	(0.79)	(−1.04)	(1.77)	(2.03)	(−0.52)
ED × SENTIMENT	−0.0390***	−0.0277*	−0.0194**	−0.0393**	−0.0237***	−0.0285*
	(−3.62)	(−2.00)	(−2.65)	(−2.29)	(−2.90)	(−1.81)
FD × ED × SENTIMENT	0.1327**	0.0342**	0.0405***	0.0419**	0.0336***	0.0408**
	(2.76)	(2.54)	(3.05)	(2.45)	(2.97)	(2.37)
ED × SENTIMENT × FDI	0.0003	0.0002*	0.0002	0.0001*	0.0001	0.0001*
	(1.17)	(2.08)	(0.98)	(2.12)	(0.54)	(1.91)
Country–year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	9,445	10,042	12,395	7,092	12,077	7,410
Adj. R^2	0.0088	0.0092	0.0079	0.0104	0.0088	0.0073

this specification should not bias our analysis in any obvious way. Besides, we orthogonalize our measures of sentiment to economic fundamentals.

Note that if a country structurally relies on foreign capital, then foreign investors may have an incentive to invest more in that country (Bekaert, Harvey, and Lundblad (2011)). To account for a country's reliance on foreign capital, we

TABLE 6
Investor Sentiment, Investment in Foreign Countries, and Trade

Table 6 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of employment in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and U.S. investor sentiment (SENTIMENT), defined as Baker and Wurgler's (2006) index, orthogonalized to U.S. business-cycle indicators, normalized to have 0 mean and unit variance and lagged 1 year; an interaction term between U.S. investor sentiment, financial development, and financial dependence; an interaction term between U.S. investor sentiment, financial dependence, and U.S. trade, defined as U.S. imports from the U.S. Census Bureau, expressed in USD billions and lagged 1 year; and an interaction term between U.S. investor sentiment, financial dependence, and U.S. foreign direct investments, from the Bureau of Economic Analysis, lagged 1 year, and alternatively defined as the U.S. direct investment position with respect to a foreign country on a historical-cost basis (FDI), expressed in USD billions; U.S. direct investment in employment at majority-owned nonbank foreign affiliates (FDIL), expressed in millions of employees; and the U.S. direct investment in employment at all nonbank foreign affiliates (FDIL2), expressed in millions of employees. The specifications include country–year and industry fixed effects (FE). In Panel A, we winsorize the 1% tails of the employment-growth distribution. In Panel B, we constrain employment growth to be between −1 and 1. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. Heteroscedasticity-robust *t*-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
Panel A. Winsorized Employment Growth (1%)				
SHARE	−0.1069***	−0.0774**	−0.0371	−0.0149
	(−3.04)	(−2.50)	(−0.71)	(−0.29)
FD × ED	0.0135	0.0117	0.0142	0.0053
	(1.28)	(1.11)	(0.59)	(0.23)
ED × SENTIMENT	−0.0208**	−0.0240***	−0.0306**	−0.0339**
	(−2.60)	(−3.08)	(−2.12)	(−2.48)
FD × ED × SENTIMENT	0.0162	0.0137	−0.0002	0.0053
	(1.01)	(0.85)	(−0.01)	(0.22)
ED × SENTIMENT × IMPORT	0.00012*	0.00003	0.00001	0.00002
	(1.93)	(0.63)	(0.01)	(0.33)
ED × SENTIMENT × FDI		0.00016**		
		(2.54)		
ED × SENTIMENT × FDIL			0.03174***	
			(2.76)	
ED × SENTIMENT × FDIL2				0.03262***
				(3.14)
Country–year and industry FE	Yes	Yes	Yes	Yes
No. of obs.	18,750	17,337	3,957	4,164
Adj. R^2	0.0111	0.0113	0.0204	0.0215
Panel B. Winsorized Employment Growth (−1, 1)				
SHARE	−0.1153***	−0.0805**	−0.0426	−0.0173
	(−3.14)	(−2.50)	(−0.78)	(−0.33)
FD × ED	0.0056	0.0035	0.0186	0.0080
	(0.36)	(0.23)	(0.75)	(0.33)
ED × SENTIMENT	−0.0294***	−0.0326***	−0.0413**	−0.0447**
	(−2.69)	(−2.96)	(−2.13)	(−2.43)
FD × ED × SENTIMENT	0.0235	0.0232	0.0045	0.0107
	(1.32)	(1.39)	(0.16)	(0.40)
ED × SENTIMENT × IMPORT	0.00017**	0.00006	0.00001	0.00004
	(2.06)	(0.95)	(0.16)	(0.51)
ED × SENTIMENT × FDI		0.00018**		
		(2.43)		
ED × SENTIMENT × FDIL			0.04275**	
			(2.51)	
ED × SENTIMENT × FDIL2				0.04281***
				(2.78)
Country–year and industry FE	Yes	Yes	Yes	Yes
No. of obs.	18,898	17,474	3,988	4,195
Adj. R^2	0.0082	0.0085	0.0164	0.0174

control for country-level net foreign direct investments (net FDI), defined as the difference between FDI made abroad by a given country and FDI received from foreign countries. The reason is that if FDI inflows are consistently greater than FDI outflows, the country has a strong need for foreign capital to grow, as opposed to a country that also has a comparable amount of FDI outflows. We consider the series of net FDI from the International Monetary Fund's Balance of Payments database, supplemented by data from the United Nations Conference on Trade and Development and official national sources, expressed in USD billions.

In the following test, we also consider portfolio investments as an additional measure of capital flows. The main difference from foreign direct investments is that they do not entail active management of the firm because their only purpose is the pursuit of financial gain. Specifically, we retrieve data on U.S. portfolio investments (PI) from the International Monetary Fund's Coordinated Portfolio Investment Survey, available from 1997 and expressed in USD billions. Unfortunately, this is a much shorter panel with more missing observations.[11]

Our test equation becomes the following:

$$\begin{aligned}(16)\quad y_{cit} \;=\;& \beta_0 + \beta_1 \mathrm{SHARE}_{cit-1} + \beta_2(\mathrm{FD}_c \times \mathrm{ED}_i) + \beta_3(S_{t-1} \times \mathrm{ED}_i) \\ &+ \beta_4(S_{t-1} \times \mathrm{FD}_c \times \mathrm{ED}_i) + \beta_5(S_{t-1} \times \mathrm{FD}_c) \\ &+ \beta_6(S_{t-1} \times \mathrm{CHANNEL}_{ct-1}) + \gamma X_{ct-1} + \mu_c + \mu_t + \mu_i + \epsilon_{cit},\end{aligned}$$

where we introduce the following new main regressors: an interaction term between investor sentiment and the investment "channel," defined as FDI, FDIL, FDIL2, and PI, respectively, and the interaction term between investor sentiment and financial development. The main coefficient of interest in this setting is therefore β_6, which Hypothesis 3 predicts to be positive. We also introduce a vector of controls, X_{ct-1}, which includes the investment channel and net FDI as separate regressors; the interaction term between the two; and the interaction term between investor sentiment and net FDI because sentiment may matter more in countries that receive more foreign investments, not necessarily from the United States.

In Table 7, we present the estimates of equation (16). In column 1, we find that the coefficient of the interaction term between U.S. investor sentiment and U.S. FDI is positive and highly significant (0.0005, t-statistic 4.08). Therefore, the effect of U.S. investor sentiment on local employment is proportional to the level of foreign direct investments received from the United States. In countries that attract 1 standard deviation of U.S. FDI, a 1-standard-deviation increase in U.S. investor sentiment is followed by a 1.52% increase in local employment growth.

In column 2 of Table 7, we replace FDI with its first labor-specific counterpart, FDIL. The coefficient of the interaction term between investor sentiment and FDIL is positive and significant (0.0603, t-statistic 2.08), which implies that in countries that attract 1 standard deviation of U.S. foreign direct investments in labor (0.27 millions of employees), a 1-standard-deviation increase in U.S. investor sentiment is followed by a 2.20% increase in employment growth. Interestingly,

[11] This is the reason why we do not include portfolio investments in the previous specifications with the full battery of fixed effects. The number of degrees of freedom is very low.

TABLE 7

Investor Sentiment and Investments in Foreign Countries

Table 7 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of the dependent variable in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and U.S. investor sentiment (SENTIMENT), defined as Baker and Wurgler's (2006) index, orthogonalized to U.S. business-cycle indicators, normalized to have 0 mean and unit variance and lagged 1 year; an interaction term between U.S. investor sentiment, financial development, and financial dependence; an interaction term between U.S. investor sentiment and financial development; an interaction term between U.S. investor sentiment and U.S. foreign direct investments (FDI), defined as the U.S. direct investment position with respect to a foreign country on a historical-cost basis, expressed in USD billions, from the Bureau of Economic Analysis; an interaction term between U.S. investor sentiment and the U.S. direct investment in employment at majority-owned nonbank foreign affiliates (FDIL), expressed in millions of employees, from the Bureau of Economic Analysis; an interaction term between U.S. investor sentiment and the U.S. direct investment in employment at all nonbank foreign affiliates (FDIL2), expressed in millions of employees, from the Bureau of Economic Analysis; and an interaction term between U.S. investor sentiment and U.S. portfolio investments (PI), expressed in USD billions, from the International Monetary Fund's Coordinated Portfolio Investment Survey. All capital flow measures are lagged 1 year. All specifications include country, year, and industry fixed effects (FE) and the following battery of controls: the level of FDI, FDIL, FDIL2, and PI in columns 1–4, respectively; a country's net foreign direct investments, defined as the difference between foreign direct investments made abroad by a given country and foreign direct investments received from foreign countries, expressed in USD billions, from the International Monetary Fund's Balance of Payments database, supplemented by data from the United Nations Conference on Trade and Development and official national sources; an interaction term between U.S. investor sentiment and net foreign direct investments; and an interaction term between net foreign direct investments and FDI, FDIL, FDIL2, and PI in columns 1–4, respectively. We winsorize the 1% tails of the employment-growth distribution. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. The data set, however, only starts in 1983 for FDI, in 1998 for FDIL and FDIL2, and in 1997 for PI. Heteroscedasticity-robust t-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Winsorized Employment Growth (1%)	1	2	3	4
SHARE	−0.1106**	−0.0910	−0.0653	−0.1160
	(−2.64)	(−1.24)	(−0.94)	(−0.86)
FD × ED	0.0115	0.0218	0.0154	−0.0276
	(1.26)	(0.98)	(0.69)	(−0.79)
FD × SENTIMENT	−0.0202	−0.0061	−0.0071	0.0042
	(−1.31)	(−0.31)	(−0.37)	(0.17)
ED × SENTIMENT	−0.0171***	−0.0325***	−0.0351***	−0.0558**
	(−2.92)	(−2.75)	(−3.11)	(−2.10)
FD × ED × SENTIMENT	0.0261***	0.0160	0.0196	0.0694
	(2.99)	(0.75)	(0.95)	(1.42)
SENTIMENT × FDI	0.0005***			
	(4.08)			
SENTIMENT × FDIL		0.0603**		
		(2.08)		
SENTIMENT × FDIL2			0.0632**	
			(2.16)	
SENTIMENT × PI				0.0002
				(0.72)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
No. of obs.	22,165	4,004	4,212	1,923
Adj. R^2	0.0482	0.0891	0.0897	0.1668

the magnitude of this effect is quite similar to that from column 1. In column 3, the results for our second labor-specific measure, FDIL2, are analogous (0.0632, t-statistic 2.16). In column 4, we consider portfolio investments (PI). The coefficient of the interaction term between investor sentiment and PI is practically 0, however, both in magnitude and significance (0.0000, t-statistic 0.06).

The results are in line with Hypothesis 3.

D. Local Sentiment

The model predicts that idiosyncratic sentiment in local financial markets should also have an impact on the hiring activity of local firms. To introduce local sentiment in the analysis, we define it as the country-level indicators of consumer confidence from the OECD.[12] In our preliminary analysis of the data, we find that many of the indicators of local consumer confidence exhibit positive and significant correlation with the University of Michigan consumer sentiment index and real value-added growth. For this reason, we orthogonalize local indicators to the effect of both.

In the first batch of tests, we address the concern that the results so far may partly reflect the idiosyncratic optimism of local investors. To test for this, we reestimate equation (16) by including both U.S. and local sentiment in the analysis and defining the channel as U.S. foreign direct investments. Following the model's guidance, and specifically equation (7), we split the sample into two subsamples where U.S. foreign direct investments represent a high (above-median) and low (below-median) fraction of local employment, respectively. We expect the investment channel to have a stronger effect in the first subsample and the correlation channel to have higher explanatory power in the second one.

The results are presented in Table 8. In the full sample (column 1), we find that the coefficient of the interaction term between FDI and U.S. sentiment is positive and highly significant (0.00003, t-statistic 2.46), with a similar magnitude to the previous set of results. The coefficient of the interaction term between financial development, financial dependence, and U.S. sentiment is also positive but lies outside the rejection region (0.0026, t-statistic 1.34). The interaction terms with local sentiment are also positive but not significant (t-statistics 0.08 and 1.56, respectively).

The sample breakdown, however, reveals an interesting pattern. In column 2 of Table 8, we find that the coefficient of the interaction term between FDI and U.S. sentiment is positive and significant for the above-median subsample (0.00003, t-statistic 2.32) and very close to the estimate from column 1. On the other hand, none of the other coefficients of interest is significant at any conventional level.

In column 3 of Table 8, we consider the below-median subsample. The coefficient of the interaction term between FDI and sentiment lies outside of the rejection region for U.S. sentiment (0.00020, t-statistic 1.54), whereas it is positive and marginally significant for local sentiment (0.00102, t-statistic 1.62). On the contrary, the coefficient of the triple-interaction term between sentiment, financial development, and financial dependence is positive and highly significant for both U.S. sentiment (0.0043, t-statistic 3.17) and local sentiment (0.0128, t-statistic 3.48). We obtain similar estimates when we consider the orthogonalized version of local consumer confidence in columns 4–6.

These empirical patterns lend support to Hypothesis 4 because idiosyncratic sentiment benefits employment growth in financially dependent industries when they are located in financially developed countries. To understand the magnitude,

[12] Unfortunately, then, the data cover only approximately one-third of the countries in the sample.

TABLE 8

U.S. Versus Local Consumer Sentiment

Table 8 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of employment in the (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and investor sentiment, lagged 1 year and defined as the University of Michigan consumer confidence index for the United States (UMC), orthogonalized to U.S. business-cycle indicators and expressed in rank order, and country-specific consumer confidence indicators from the OECD (CCI); an interaction term between investor sentiment, financial development, and financial dependence; an interaction term between investor sentiment and financial development; and an interaction term between investor sentiment and U.S. foreign direct investments (FDI), defined as the U.S. direct investment position with respect to a foreign country on a historical-cost basis, expressed in USD billions and lagged 1 year, from the Bureau of Economic Analysis. In columns 4–6, the measures of local consumer sentiment are orthogonalized to real GDP growth and U.S. consumer sentiment. Columns 2 and 5 include only the countries that received a high (above-median) amount of FDI over the previous year, normalized by local employment, whereas columns 3 and 6 include the other countries. All specifications include country, year, and industry fixed effects (FE) and the following battery of controls: the level of FDI; a country's net foreign direct investments, defined as the difference between foreign direct investments made abroad by a given country and foreign direct investments received from foreign countries, expressed in USD billions, from the International Monetary Fund's Balance of Payments database, supplemented by data from the United Nations Conference on Trade and Development and official national sources; an interaction term between investor sentiment and net foreign direct investments; and an interaction term between net foreign direct investments and FDI. We winsorize the 1% tails of the employment-growth distribution. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. The data set for FDI, however, is available only from 1983. Heteroscedasticity-robust *t*-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Nonorthogonal Sentiment			Orthogonal Sentiment		
	Full Sample	High FDI	Low FDI	Full Sample	High FDI	Low FDI
Winsorized Employment Growth (1%)	1	2	3	4	5	6
SHARE	−0.0558	−0.1802***	0.0369	−0.0565	−0.1789***	0.0336
	(−1.00)	(−2.83)	(0.43)	(−1.01)	(−2.81)	(0.39)
FD × ED	−0.9606*	0.4197	−1.4227***	−0.0824	−0.0741	−0.1347***
	(−1.69)	(0.25)	(−3.75)	(−1.14)	(−0.98)	(−2.72)
FD × CCI	0.0133	0.0292***	−0.0015	0.0128	0.0274**	−0.0077
	(1.24)	(2.82)	(−0.28)	(0.99)	(2.10)	(−0.97)
ED × CCI	−0.0000	0.0064	−0.0020	−0.0019	0.0046	−0.0022
	(−0.01)	(0.67)	(−0.85)	(−0.45)	(0.43)	(−0.68)
FD × ED × CCI	0.0087	−0.0050	0.0128***	0.0122*	−0.0056	0.0188***
	(1.56)	(−0.29)	(3.48)	(1.71)	(−0.30)	(3.70)
CCI × FDI	0.0000	−0.0001	0.0010*	0.0000	−0.0001	0.0014**
	(0.08)	(−1.35)	(1.62)	(0.17)	(−1.05)	(2.09)
FD × UMC	−0.0038***	−0.0035*	−0.0038***	−0.0040***	−0.0040*	−0.0037***
	(−3.83)	(−1.70)	(−3.45)	(−3.96)	(−1.79)	(−3.30)
ED × UMC	0.0000	−0.0007	0.0008	0.0002	−0.0005	0.0008
	(0.00)	(−0.59)	(0.90)	(0.19)	(−0.35)	(0.81)
FD × ED × UMC	0.0026	0.0022	0.0043***	0.0023	0.0020	0.0041***
	(1.34)	(1.20)	(3.17)	(1.20)	(0.98)	(2.89)
UMC × FDI	0.00002**	0.00003**	0.00022	0.00002**	0.00004***	0.00023
	(2.46)	(2.32)	(1.54)	(2.17)	(2.67)	(1.50)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	7,181	4,620	2,561	7,181	4,620	2,561
Adj. R^2	0.0913	0.1263	0.0949	0.0908	0.1261	0.0957

we consider the industries that lie at the 75th and 25th percentiles of financial dependence and focus on countries that receive a below-median amount of U.S. foreign direct investments. In the orthogonalized specification, the estimates imply that in a country at the 75th percentile of financial development, the differential in employment growth between these industries is 0.08% higher than in a

country at the 25th percentile of financial development. Following a 1-standard-deviation increase in idiosyncratic sentiment, however, the growth differential between these industries rises by an additional 0.13%. The effect is then economically large.

In unreported tests, we obtain similar results when we alternatively define local sentiment as the returns on the country-specific MSCI equity indices and U.S. sentiment as Baker and Wurgler's (2006) investor sentiment index. The results are also robust to the inclusion of global sentiment, defined in the spirit of Baker et al. (2012) by aggregating the local sentiment indicators introduced previously across the G7 countries, excluding the United States.

E. Sentiment Versus Fundamentals

In this section, we test the model's cross-sectional predictions on the quality of firms. Our aim is to rule out the possibility that sentiment may still capture economic fundamentals to some extent, even after the orthogonalization.[13] To address this issue, we turn to Hypothesis 5 and look into the model's cross-sectional prediction that high sentiment increases investments in speculative projects. This is an important test because an improvement in economic fundamentals is also linked with more capital flows from abroad but leads to an increase in the quality of the investment projects in the economy (see, e.g., Bekaert et al. (2011)).

Following Baker and Wurgler ((2006), (2007)), we define firms with speculative projects as those with highly subjective valuations. Such firms are characterized by low market capitalization; low dividend-to-price ratios; high stock return volatility; and extreme values of book-to-market, EBIT-to-price, and EBITDA-to-price ratios. In the spirit of Braun and Larrain (2005), we split our industries into two subsamples along each of these dimensions and reestimate equation (16) in each subsample.

Table 9 presents the results.[14] Consistent with the theoretical arguments, we find that the coefficient of the interaction term between U.S. foreign direct investments and U.S. consumer sentiment is positive and highly significant for industries with above-median market capitalization (0.00003, t-statistic 2.40), below-median dividend-to-price ratio (0.00006, t-statistic 3.26), above-median stock return volatility (0.00003, t-statistic 2.90), extreme book-to-market ratios (t-statistic 0.00003, t-statistic 2.63), extreme EBIT-to-price ratios (0.00003, t-statistic 2.71), and extreme EBITDA-to-price ratios (0.00004, t-statistic 2.31). These effects are similar, both in magnitude and significance, to the estimates from the full sample. On the contrary, the coefficient is never significant and mostly close to 0 in the other subsamples.

The empirical evidence, then, lends support to the idea that it is indeed sentiment that drives the results, rather than an improvement in economic fundamentals. This is consistent with Hypothesis 5.

[13]This seems less likely, however, for Baker and Wurgler's (2006) measure of investor sentiment, especially in light of the negative sentiment beta for low-volatility stocks (see DeVault, Sias, and Starks (2019) for an excellent discussion).

[14]For brevity, we report only the coefficients of interest.

TABLE 9
Cross-Industry Effects

Table 9 reports the panel regression of annual industry-level employment growth in non-U.S. countries on the following set of regressors: the industry's share of employment in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and investor sentiment, lagged 1 year and defined as the University of Michigan consumer confidence index for the United States (UMC), orthogonalized to U.S. business-cycle indicators and expressed in rank order, and country-specific consumer confidence indicators from the OECD (CCI); an interaction term between investor sentiment, financial development, and financial dependence; an interaction term between investor sentiment and financial development; and an interaction term between investor sentiment and U.S. foreign direct investments (FDI), defined as the U.S. direct investment position with respect to a foreign country on a historical-cost basis, expressed in USD billions and lagged 1 year, from the Bureau of Economic Analysis. For each year in the sample, we divide industries across the following characteristics from Baker and Wurgler (2006): above versus below the median level of market capitalization, dividend-to-price ratio, and volatility of stock returns (Panel A) and middle 40% versus top – bottom 30% ratios of book to market, earnings before interest and taxes (EBIT) to price, and earnings before interest, taxes, depreciation, and amortization (EBITDA) to price (Panel B). All specifications include country, year, and industry fixed effects (FE) and the following battery of controls: the level of FDI; a country's net foreign direct investments, defined as the difference between foreign direct investments made abroad by a given country and foreign direct investments received from foreign countries, expressed in USD billions, from the International Monetary Fund's Balance of Payments database, supplemented by data from the United Nations Conference on Trade and Development and official national sources; an interaction term between investor sentiment and net foreign direct investments; and an interaction term between net foreign direct investments and FDI. We winsorize the 1% tails of the employment-growth distribution. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. The data set for FDI, however, is available only from 1983. Heteroscedasticity-robust t-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Size, Dividend to Price, and Volatility

	Size		Dividend to Price		Volatility	
	≥ Median	< Median	≥ Median	< Median	≥ Median	< Median
Winsorized Employment Growth (1%)	1	2	3	4	5	6
FD × ED × UMC	0.0017	0.0035	0.0024	0.0075	0.0047**	−0.0022
	(0.58)	(1.40)	(1.10)	(1.36)	(2.20)	(−0.66)
UMC × FDI	0.00000	0.00001**	0.00001	0.00003***	0.00002***	0.00002
	(0.07)	(2.40)	(0.95)	(3.26)	(2.90)	(1.47)
Country, year, and industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	3,273	3,656	5,053	1,876	3,797	3,320
No. of obs.	0.0685	0.1211	0.0789	0.1370	0.1215	0.0723

Panel B. Book to Market, EBIT to Price, and EBITDA to Price

	Book to Market		EBIT to Price		EBITDA to Price	
	Extreme	Middle	Extreme	Middle	Extreme	Middle
Winsorized Employment Growth (1%)	1	2	3	4	5	6
FD × ED × UMC	0.0034	−0.0015	0.0038	−0.0005	0.0033	−0.0023
	(1.21)	(−0.59)	(1.11)	(−0.23)	(1.41)	(−0.87)
UMC × FDI	0.00002***	0.00001	0.00002***	−0.00000	0.00002**	−0.00000
	(2.63)	(0.74)	(2.71)	(−0.33)	(2.31)	(−0.07)
Country, year, and industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	5,226	1,703	4,804	2,125	5,024	1,905
Adj. R^2	0.0945	0.1332	0.0881	0.1340	0.0922	0.1259

F. Growth in Real Wages

Finally, we turn to Hypothesis 6 and reestimate our main equations using the growth in real wages as a dependent variable. The results are presented in Table 10. In column 1, we find that the coefficient of the triple interaction-term between financial development, financial dependence, and U.S. consumer sentiment is positive and highly significant (0.0018, t-statistic 3.20). In column 2, we find that the coefficient of the interaction term between U.S. sentiment and U.S.

TABLE 10

U.S. Versus Local Consumer Sentiment and Growth in Real Wages

Table 10 reports the panel regression of annual industry-level growth in real wages in non-U.S. countries on the following set of regressors: the industry's share of growth in real wages in the manufacturing sector in the previous year (SHARE); an interaction term between the country's financial development (FD), defined as in Rajan and Zingales (1998) as stock market capitalization over gross domestic product (GDP) (1980–1995 average), and the industry's degree of dependence on external finance (ED), defined as in Rajan and Zingales (1998) as the industry-level median fraction of capital expenditures not financed with cash flow from operations for listed U.S. firms from the Compustat database (1980–1990 average); an interaction term between financial dependence and investor sentiment, defined as the University of Michigan consumer confidence index for the United States (UMC), orthogonalized to U.S. business-cycle indicators and expressed in rank order, and country-specific consumer confidence indicators from the OECD (CCI); an interaction term between investor sentiment, financial development, and financial dependence; an interaction term between investor sentiment and financial development; and an interaction term between investor sentiment and U.S. foreign direct investments (FDI), defined as the U.S. direct investment position with respect to a foreign country on a historical-cost basis, expressed in USD billions and lagged 1 year, from the Bureau of Economic Analysis. In columns 3 and 4, we identify cases in which the cyclical component of the country's real GDP is above or below a given threshold. Specifically, we construct two subsamples, considering observations that lie above or below the median value of the cyclical component of local real GDP, expressed in levels, and estimated through the Hodrick and Prescott (1997) filter. In columns 5 and 6, we identify countries with above- and below-median levels of human capital, respectively, defined as the average years of schooling in the population over age 25 from the Barro and Lee (1993) files. In column 1, the regression includes country–year and industry fixed effects (FE). Columns 2–6 include country, year, and industry FE and the following battery of controls: the level of FDI; a country's net foreign direct investments, defined as the difference between foreign direct investments made abroad by a given country and foreign direct investments received from foreign countries, expressed in USD billions, from the International Monetary Fund's Balance of Payments database, supplemented by data from the United Nations Conference on Trade and Development and official national sources; an interaction term between investor sentiment and net foreign direct investments; and an interaction term between net foreign direct investments and FDI. We winsorize the 1% tails of the real-wages-growth distribution. The data set includes 28 manufacturing industries for 60 countries for the period 1970–2003 from the United Nations Industrial Development Organization Industrial Statistics (UNIDO Indstat-3) 2006 database. The data set for FDI, however, is available only from 1983. Heteroscedasticity-robust *t*-statistics, allowing for clustering by country, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Full Sample		GDP Growth		Human Capital	
			High	Low	High	Low
Winsorized Growth in Real Wages (1%)	1	2	3	4	5	6
SHARE	−0.0741***	−0.1004***	−0.1366***	−0.0512**	−0.1174***	−0.1017**
	(−7.43)	(−3.41)	(−3.60)	(−2.39)	(−5.82)	(−2.21)
FD × ED	−0.0504***	1.0730**	1.3861**	1.3582	−0.7251	1.5047**
	(−3.23)	(2.37)	(2.31)	(0.69)	(−1.01)	(2.52)
ED × UMC	−0.0010***	−0.0005	−0.0023**	0.0009	0.0012*	−0.0011
	(−3.13)	(−0.72)	(−2.22)	(1.10)	(1.66)	(−1.02)
FD × ED × UMC	0.0018***	0.0012	0.0042***	−0.0015	−0.0018	0.0020*
	(3.20)	(1.20)	(3.13)	(−1.13)	(−1.64)	(1.73)
FD × CCI		0.0137	0.0011	0.0557**	0.0045	0.0036
		(1.59)	(0.08)	(2.17)	(0.19)	(0.36)
ED × CCI		0.0037	0.0069	0.0033	−0.0063**	0.0120**
		(1.07)	(1.63)	(0.62)	(−2.29)	(2.21)
FD × ED × CCI		−0.0112**	−0.0154**	−0.0131	0.0076	−0.0156**
		(−2.36)	(−2.44)	(−0.66)	(1.02)	(−2.52)
CCI × FDI		−0.00031**	−0.00038	−0.00065	−0.00006	−0.00073***
		(−2.28)	(−1.26)	(−1.28)	(−0.31)	(−3.72)
FD × UMC		−0.0044***	−0.0030	−0.0097***	0.0045	−0.0051***
		(−3.11)	(−0.80)	(−2.59)	(0.56)	(−2.60)
UMC × FDI		0.00006***	0.00007***	0.00010	0.00001	0.00027***
		(4.23)	(2.71)	(1.12)	(0.21)	(2.59)
Country–year FE	Yes	No	No	No	No	No
Country FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
No. of obs.	29,982	6,905	3,678	3,227	3,453	3,452
Adj. R^2	0.0138	0.4503	0.5039	0.5256	0.4711	0.4898

FDI is also positive and highly significant (0.00006, *t*-statistic 4.23). The results are qualitatively similar, even though not significant, for U.S. investor sentiment.[15]

[15]Note, however, that data on the growth in real wages include a substantial amount of noise (Solon, Barsky, and Parker (1994)).

The analysis of earnings allows us to shed light on the type of labor that is most affected by sentiment. If it is frictional unemployment, defined as the temporary loss of employment resulting from job changes, the effect should be asymmetric over the business cycle, and specifically, it should be stronger in periods of economic growth. The intuition is that jobs are in a higher supply in booming economies, which makes workers more likely to leave their current occupation to seek better employment opportunities.

To identify local business cycles, we follow Braun and Larrain (2005) and distinguish between cases in which the cyclical component of the country's real GDP is above or below a given threshold. Therefore, we construct two subsamples, considering observations that lie above or below the median value of the cyclical component of local real GDP, expressed in levels and estimated through the Hodrick and Prescott (1997) filter.

The results are presented in columns 3 and 4 of Table 10. We find that the coefficient of the interaction term between U.S. sentiment and U.S. FDI is positive and significant during expansions (t-statistic 2.71) but not during economic downturns (t-statistic 1.12). Similarly, the coefficient of the interaction term between U.S. sentiment, financial development, and financial dependence is positive and significant in the first subsample (t-statistic 3.13) but not in the second one (t-statistic -1.13).

Another point of interest is whether sentiment affects the wages of workers with high or low skills. To assess this, we rank countries on the level of human capital, defined as the average years of schooling in the population over age 25 from the Barro and Lee (1993) files. We then form two subsamples, considering observations that lie above or below the median value of human capital (i.e., 9 years of schooling). We argue that the average worker hired in such countries is likely to be high skilled and low skilled, respectively.

The results are presented in columns 5 and 6 of Table 10. We find that the coefficient of the interaction term between U.S. sentiment and U.S. FDI is positive and significant for low-human-capital countries (t-statistic 2.59) but insignificant when human capital is high (t-statistic 0.21). Similarly, the coefficient of the interaction term between U.S. sentiment, financial development, and financial dependence is positive, even though only marginally significant, when human capital is low (t-statistic 1.73), whereas the coefficient even flips signs when human capital is high (t-statistic -1.64).

Overall, the results suggest that U.S. sentiment primarily affects frictional labor, specifically, employees with fewer years of schooling. This finding lends support to the idea that finance affects labor by increasing wages for low-skilled workers (Beck et al. (2010)).

Note that a higher wage might induce firms to replace labor with capital and increase the productivity of workers. In unreported tests, however, we find that this is not the case. The effect of U.S. investor sentiment on labor productivity and capital intensity is insignificant and close to 0, which indicates that the growth in output and capital that follows high U.S. sentiment is not significantly different from employment growth.

As such, the results complement those from Pagano and Pica (2012), who show that an increase in financial development allows firms to expand output by

increasing labor and capital in equal measure, rather than shifting to more capital-intensive technologies. Our findings suggest that U.S. sentiment has a similar effect.

V. Conclusion

We find that in a world with moral-hazard and noise traders, investor sentiment should affect employment growth both domestically and abroad. Consistent with the model's predictions, we show that higher U.S. sentiment leads to higher employment growth worldwide. This effect is driven by spillover effects of U.S. sentiment to other financial markets and capital flows from U.S. firms. The findings are robust to a variety of empirical specifications and alternative explanations.

On the other hand, we find that U.S. sentiment exacerbates the negative effect of local crises on employment growth. This is consistent with the idea that financial development has a dark side; that is, the firms that benefit the most from financial development are also the ones that are hit the hardest during financial crises. Our findings suggest that U.S. sentiment amplifies this mechanism, especially in financial markets that are more tied to the United States. The hiring that follows high investor sentiment, then, actually translates into layoffs under financial downturns, thus leading to greater labor instability.

Finally, we show that U.S. sentiment also has a positive impact on the growth in real wages. The effect, however, is entirely concentrated around economic expansions rather than recessions and in countries whose workforces exhibit fewer years of schooling. These empirical patterns suggest that sentiment primarily affects frictional and low-skilled labor.

Overall, our findings contribute to the view that investor sentiment has real effects.

Appendix A. Manager's Problem

The first-order conditions yield the manager's optimal trade-off between domestic and foreign labor:

$$L_{11}^{*} = \frac{\alpha_1}{\alpha_2}\frac{w_2}{w_1}L_{12}^{*}. \tag{A-1}$$

The optimal demand for labor is a function of capital, wages, and the expected profitability of the project:

$$L_{11}^{*} = \bar{\theta}_1^{\frac{1}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_1}{w_1}\right)^{\frac{1-\alpha_2}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_2}{c_{12}w_2}\right)^{\frac{\alpha_2}{1-\alpha_1-\alpha_2}}K_1, \tag{A-2}$$

$$L_{12}^{*} = \bar{\theta}_1^{\frac{1}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_2}{c_{12}w_2}\right)^{\frac{1-\alpha_1}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_1}{w_1}\right)^{\frac{\alpha_1}{1-\alpha_1-\alpha_2}}K_1. \tag{A-3}$$

Using these results in the manager's objective function yields the expected private benefit for the manager:

$$E(\tilde{B}_1^*) = (1-\lambda_1)\left(\bar{\theta}_1\left(\frac{\alpha_1}{w_1}\right)^{\alpha_1}\left(\frac{\alpha_2}{c_{12}w_2}\right)^{\alpha_2}\right)^{\frac{1}{1-\alpha_1-\alpha_2}} \times(1-\alpha_1-\alpha_2)K_1 \equiv (1-\lambda_1)\phi_1 K_1. \tag{A-4}$$

Given the stock market equilibrium and the equality $F_1 = p_1^*$, then the firm's equilibrium level of capital is as follows:

$$K_1^* = \frac{A_1 - \frac{1}{\gamma}}{1-\lambda_1\phi_1 S_1}, \tag{A-5}$$

which, in turn, determines the manager's private benefit:

$$E(\tilde{B}_1^*) = (1-\lambda_1)\phi_1 \frac{A_1 - \frac{1}{\gamma_1}}{1-\lambda_1\phi_1 S_1}, \tag{A-6}$$

and the firm's demand for labor:

$$L_{11}^* = \bar{\theta}_1^{\frac{1}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_1}{w_1}\right)^{\frac{1-\alpha_2}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_2}{c_{12}w_2}\right)^{\frac{\alpha_2}{1-\alpha_1-\alpha_2}}\frac{A_1-\frac{1}{\gamma_1}}{1-\lambda_1\phi_1 S_1}, \tag{A-7}$$

$$L_{12}^* = \bar{\theta}_1^{\frac{1}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_2}{c_{12}w_2}\right)^{\frac{1-\alpha_1}{1-\alpha_1-\alpha_2}}\left(\frac{\alpha_1}{w_1}\right)^{\frac{\alpha_1}{1-\alpha_1-\alpha_2}}\frac{A_1-\frac{1}{\gamma_1}}{1-\lambda_1\phi_1 S_1}. \tag{A-8}$$

These dynamics symmetrically apply to country 2, whose firms hire

$$L_{21}^* = \bar{\theta}_2^{\frac{1}{1-\alpha_2-\alpha_1}}\left(\frac{\alpha_1}{c_{21}w_1}\right)^{\frac{1-\alpha_2}{1-\alpha_2-\alpha_1}}\left(\frac{\alpha_2}{w_2}\right)^{\frac{\alpha_2}{1-\alpha_2-\alpha_1}}\frac{A_2-\frac{1}{\gamma_2}}{1-\lambda_2\phi_2 S_2} \tag{A-9}$$

in country 1, and

$$L_{22}^* = \bar{\theta}_2^{\frac{1}{1-\alpha_2-\alpha_1}}\left(\frac{\alpha_2}{w_2}\right)^{\frac{1-\alpha_1}{1-\alpha_2-\alpha_1}}\left(\frac{\alpha_1}{c_{21}w_1}\right)^{\frac{\alpha_1}{1-\alpha_2-\alpha_1}}\frac{A_2-\frac{1}{\gamma_2}}{1-\lambda_2\phi_2 S_2} \tag{A-10}$$

in country 2, where c_{21} is the counterpart to c_{12} from country 1. These demand functions then determine the labor market equilibrium in the two countries.

Appendix B. Deviation from the Efficient Level of Employment

The difference between the second- and first-best level of local labor demand for firms in country 1 is as follows:

$$\hat{L}_{11}(K_1^*) - \hat{L}_{11}(K_1^*)|_{S_1=1} = \left(\bar{\theta}_1\left(\frac{\alpha_1}{w_1}\right)^{1-\alpha_2}\left(\frac{\alpha_2}{c_{12}w_2}\right)^{\alpha_2}\right)^{\frac{1}{1-\alpha_1-\alpha_2}} \times\left(\frac{A_1-\frac{1}{\gamma_1}}{1-\lambda_1\phi_1 S_1} - \frac{A_1-\frac{1}{\gamma_1}}{1-\lambda_1\phi_1}\right) \tag{B-1}$$

or equivalently:

$$\Delta \hat{L}_{11}|_{S_1 \neq 1} = (S_1 - 1)\frac{\lambda_1 \phi_1}{1 - \lambda_1 \phi_1} \hat{L}_{11}(K_1^*)|_{S_1 = 1}. \tag{B-2}$$

The same holds for foreign labor demand ($\hat{L}_{12}(K_1^*)$).

Appendix C. Effect of Sentiment on Employment

For total sentiment S_1, it is easy to see that it affects the equilibrium level of employment through local wages:

$$\frac{dL_1^*}{dS_1} = \underbrace{\frac{\partial L_1^s}{\partial S_1}}_{=0} + \frac{\partial L_1^s}{\partial w_1}\frac{dw_1}{dS_1} + \underbrace{\frac{\partial L_1^s}{\partial w_2}}_{=0}\frac{dw_2}{dS_1}, \tag{C-1}$$

or equivalently:

$$\frac{dL_1^*}{dS_1} = \frac{\partial L_1^s}{\partial w_1}(-1)\frac{F'_{S_1}}{F'_{w_1}}, \tag{C-2}$$

where $F = 0$ represents the labor-market-clearing condition, and

$$F'_{S_1} = \bar{\theta}_1^{\frac{1}{1-\alpha_1-\alpha_2}} \left(\frac{\alpha_1}{w_1}\right)^{\frac{1-\alpha_2}{1-\alpha_1-\alpha_2}} \left(\frac{\alpha_2}{c_{12} w_2}\right)^{\frac{\alpha_2}{1-\alpha_1-\alpha_2}} \tag{C-3}$$
$$\times \frac{A_1 - \frac{1}{\gamma_1}}{(1 - \lambda_1 \phi_1 S_1)^2} \lambda_1 \phi_1 \equiv L_{11}^* \frac{\lambda_1 \phi_1}{1 - \lambda_1 \phi_1 S_1},$$

$$F'_{w_1} = \frac{\partial L_{11}^*}{\partial w_1} \frac{-(1-\alpha_2) + S_1 \lambda_1 \phi_1 (1 - \alpha_1 - \alpha_2)}{(1-\alpha_1-\alpha_2)(1 - S_1 \lambda_1 \phi_1)} \tag{C-4}$$
$$+ \frac{\partial L_{21}^*}{\partial w_1} \frac{-(1-\alpha_2) + S_2 \lambda_2 \phi_2 (1 - \alpha_2 - \alpha_2)}{(1-\alpha_1-\alpha_2)(1 - S_2 \lambda_2 \phi_2)} - \frac{\partial L_1^s}{\partial w_1}.$$

Similarly, the effect of sentiment on wages is as follows:

$$\frac{dw_1^*}{dS_1} = (-1)\frac{F'_{S_1}}{F'_{w_1}}. \tag{C-5}$$

When breaking down sentiment into a local and a foreign component, the two derivatives are the result of the following:

$$\frac{dw_1}{ds_1} = (-1)\frac{F'_{s_1}}{F'_{w_1}}, \tag{C-6}$$

$$\frac{dw_1}{ds_2} = (-1)\frac{F'_{s_2}}{F'_{w_1}}, \tag{C-7}$$

where

$$F'_{s_1} = L_{11}^* \frac{\lambda_1 \phi_1}{1 - \lambda_1 \phi_1 S_1}(1 - \delta_1), \tag{C-8}$$

$$F'_{s_2} = L_{11}^* \rho_1 (1 - \delta_1) \frac{\lambda_1 \phi_1}{1 - \lambda_1 \phi_1 S_1} + L_{21}^* (1 - \delta_2) \frac{\lambda_2 \phi_2}{1 - \lambda_2 \phi_2 S_2}. \tag{C-9}$$

Appendix D. Maximum Probability of Default

Investors participate if the profit per dollar invested is at least equal to 1. This implies the following:

$$(s_1+\rho_1 s_2)\phi_1(1-\delta_1)+\phi_1\delta_1 \quad \equiv \quad \phi_1 S_1 \quad \geq \quad 1, \tag{D-1}$$

which identifies a critical level for ϕ_1:

$$\phi_1^c \quad = \quad \frac{1}{S_1}, \tag{D-2}$$

or in terms of the probability of default:

$$\pi_1^c \quad = \quad 1-\frac{1}{\theta_1}\left(\frac{w_1}{\alpha_1}\right)^{\alpha_1}\left(\frac{c_{12}w_2}{\alpha_2}\right)^{\alpha_2}\left(\frac{1}{1-\alpha_1-\alpha_2}\frac{1}{S_1}\right)^{1-\alpha_1-\alpha_2}. \tag{D-3}$$

Differentiating the critical probability of default with respect to A_1 yields the following:

$$\frac{d\pi_1^c}{dA_1} \quad = \quad \underbrace{\frac{\partial\pi_1^c}{\partial A_1}}_{=0}+\frac{\partial\pi_1^c}{\partial w_1}\frac{dw_1}{dA_1}+\frac{\partial\pi_1^c}{\partial w_2}\frac{dw_2}{dA_1} \tag{D-4}$$

where the first addend is 0 because there is no direct effect of A_1 on π_1^c. The overall effect is negative because

$$\frac{dw_1}{dA_1} \quad = \quad -\frac{F'_{A_1}}{F'_{w_1}} \quad \equiv \quad -\frac{1}{F'_{w_1}}\frac{L_{11}^*}{A_1-\frac{1}{\gamma_1}} \quad > \quad 0, \tag{D-5}$$

and the same argument applies to w_2.

On the other hand, differentiating the critical probability of default with respect to S_1 yields the following:

$$\frac{d\pi_1^c}{dS_1} \quad = \quad \underbrace{\frac{\partial\pi_1^c}{\partial S_1}}_{>0}+\frac{\partial\pi_1^c}{\partial w_1}\frac{dw_1}{dS_1}+\frac{\partial\pi_1^c}{\partial w_2}\frac{dw_2}{dS_1}, \tag{D-6}$$

where sentiment has a direct effect on π_1^c. The overall effect is positive because for a generic firm i from country 1:

$$\frac{dL_{11}^i}{dS_1} \quad \propto \quad \left(1-\frac{\alpha_1}{1-\alpha_1-\alpha_2}\frac{dw_1}{dS_1}\frac{S_1}{w_1}-\frac{\alpha_2}{1-\alpha_1-\alpha_2}\frac{dw_2}{dS_1}\frac{S_1}{w_2}\right) \quad > \quad 0 \tag{D-7}$$

for at least one firm.

Appendix E. Effect of Sentiment on Employment During Crises

A shock in the probability of default affects the equilibrium level of employment through wages:

$$\begin{aligned}\frac{dL_1^*}{d\pi_1} \quad &= \quad \frac{\partial L_1^s}{\partial w_1}(-1)\frac{F'_{\pi_1}}{F'_{w_1}} \quad \equiv \quad \frac{\partial L_1^s}{\partial w_1}\frac{1}{F'_{w_1}}\frac{L_{11}^*}{(1-\alpha_1-\alpha_2)(1-\pi_1)(1-S_1\lambda_1\phi_1)} \\ &< \quad 0.\end{aligned} \tag{E-1}$$

Supplementary Material

Supplementary Material for this article is available at https://doi.org/10.1017/S0022109019000711.

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