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The Exposure of French and South Korean Firm Stock Returns to Exchange Rates and the COVID-19 Pandemic

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Abstract: Rogoff predicted that the U.S. dollar will depreciate and that exchange rate volatility will return. The coronavirus crisis has also roiled the world economy. This paper investigates the exposure of French and Korean firm stock returns to exchange rate appreciations and the pandemic. Both France and Korea are major exporters, but Korea has managed the crisis better than France. The results indicate that Korean firms have come through the pandemic better than French firms. The findings also indicate that the Korean economy is less exposed to appreciations than the French economy. This paper concludes with suggestions to increase firms' resilience to these shocks.

1. Introduction

Rogoff (2020) and Ilzetzki et al. (2020) observed that exchange rates have remained "eerily" stable relative to the U.S. dollar during the COVID-19 pandemic. For instance, they noted that after the Global Financial Crisis (GFC), the dollar/euro rate fluctuated between 1.07 and 1.58 and the Japanese yen/dollar rate fluctuated between 90 and 123. During the GFC, the Korean won/dollar rate fluctuated between 903 and 1570. In contrast, during the coronavirus crisis, the dollar/euro rate varied between 107 and 123, the yen/dollar rate between 103 and 112, and the won/dollar rate between 1082 and 1267.[1] Rogoff (2020) and Ilzetzki et al. (2020) stated that history indicates that wider exchange rate swings relative to the U.S. dollar will reemerge and that the dollar will depreciate towards its mean.

In addition to exchange rate volatility, another risk comes from the coronavirus pandemic itself. Fear of infection makes consumers reticent about transactions requiring face-to-face contact. Job losses and reductions in income reinforce this effect. Uncertainty restricts investment. Shutdowns, shelter-in-place policies, and quarantines around the world limit the ability of supply chains to operate. Even if these pernicious influences recede, they could return if the virus mutates or if cases surge.

This paper investigates how exchange rate and pandemic news impacts France and South Korea. Both countries are strong exporters. Both have economies whose complexities are rated by the Atlas of Economic Complexity as high but lower than the most advanced economies in their regions (Germany in Europe and Japan in Asia).[2] Both have exchange rates that could appreciate, because both the Eurozone and South Korea run large current account surpluses year after year. This paper examines in detail how exchange rate and pandemic shocks affect firm profitability in France and Korea.

Appreciations could affect export volumes (if firms pass through exchange rate changes to foreign currency export prices) or margins (if firms keep export prices constant).

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1. These data are obtained from the Federal Reserve Bank of St. Louis Fred website and cover the period from 19 February 2020 and 11 March 2021. They are available at: https://fred.stlouisfed.org/ (accessed on 16 March 2021).
2. These data are available at: https://atlas.cid.harvard.edu/rankings/ (accessed on 17 March 2021).

Either way they will impact profitability. To investigate how appreciations affect profitability this paper examines the exchange rate exposures of French and Korean firms. Finance theory indicates that stock prices equal the expected present value of future cash flows. Black (1987, p. 113) observed that, "The sector-by-sector behavior of stocks is useful in predicting sector-by-sector changes in output, profits, or investment. When stocks in a given sector go up, more often than not that sector will show a rise in sales, earnings, and outlays for plant and equipment." Examining the response of stock returns to exchange rates can thus shed light on how appreciations impact firms.

One would expect French and Korean stock prices to be affected differently by exchange rate changes. French firms invoice primarily in euros, while Korean firms invoice primarily in U.S. dollars (Boz et al. 2020). Thus, in the short run, appreciations will cause only a small decrease in euro revenues for French firms but a large decrease in won revenues for Korean firms. In addition, France has a large domestic market and free access to all of the Eurozone countries that share the same currency. This should shield French firms from some of the risks arising from exchange rate changes. In contrast Korea has a small domestic market and a long history of relying on exports to drive economic growth (see, e.g., Yoshitomi 2003). We might thus expect Korean firms to be exposed to appreciations. On the other hand, Korean firms also have a long history of borrowing from abroad and facing losses when capital outflows depreciate the currency (see, e.g., Kim 2009).

One would also expect French and Korean stock prices to be affected differently by the pandemic. France implemented two strict lockdowns, one from 17 March to 11 May 2020 and the second from 30 October to 15 December 2020. Korea kept stores open and tested extensively. For infected individuals, they employed advanced technologies such as artificial intelligence to trace the contacts of infected individuals. These contacts were then quarantined and tested. The Korean strategy succeeded better. As of 31 January 2021, France had 1100 deaths per million people and Korea had 27 deaths per million people and. Out of 152 countries, France's outcome was only better than 18 while Korea's outcome was better than 107.[3]

Since virus concerns caused stocks to fall around 19 February 2020, this paper investigates company stock performance over the 19 February 2020 to 20 January 2021 period. The crisis impacted firms both by affecting the macroeconomy (e.g., causing GDP to fall) and by influencing individual sectors (e.g., restricting air travel). To disentangle these two channels this paper estimates stocks' exposure to five macroeconomic factors between 19 January 2001 and 18 February 2020. It then uses actual values of these macroeconomic factors beginning on 19 February 2020 to forecast how company stocks would be expected to perform. The difference between their actual performance and their forecasted performance is then attributed to idiosyncratic rather than macroeconomic factors.

Korea's success compared to France's success at fighting the virus is mirrored in better performance for the Korean stock market compared to the French stock market. News of the crisis starting on 19 February 2020 caused aggregate stock prices to fall by 40% in Korea and by 47% in France. Korean stock prices then recovered and on 21 January 2021 were more than 30% above their pre-crisis levels. French prices on 21 January 2021 had yet to regain their value on 19 February 2020. Only 10% of the Korean firms investigated here have stocks whose prices have fallen more than 10% between 19 February 2020 and 21 January 2021, while half of the French firms have. None of the Korean stocks investigated fell more than 16%, while one-quarter of the French stocks fell by at least 30%. The pandemic is leaving scars on French firms but not on Korean firms.

Surprisingly, more French firms than Korean firms are exposed to appreciations. These include many of France's flagship industries including aerospace, semiconductors, and software. On the other hand, France's luxury companies, including LVMH, L'Oréal, Hermès, Christian Dior, and Rémy Cointreau, are either unexposed or slightly exposed to

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appreciations. Many have also posted gains during the crisis. Developing strong brands can increase firms' resilience in the face of exchange rate swings, crises, and other shocks.

Héricourt et al. (2014) investigated whether high-end French exports are less sensitive to exchange rate changes. They used annual French customs data covering the exports of more than 100,000 companies to individual importing country over the 1995–2010 period. They reported that on average a 10% euro appreciation reduces exports to non-eurozone countries by about 6%. To examine whether higher-end exports are less sensitive to exports, they estimated elasticities for firms in each product category with the highest export unit values. They did not find that these higher quality exports are less sensitive to exchange rates than other exports.

Berman et al. (2012) investigated how exporters respond to exchange rate changes. They demonstrated theoretically that high productivity or high quality firms respond to depreciations by raising their markups and low productivity or low quality firms respond by raising their export volume. They then used annual firm-level French customs data to investigate how bilateral depreciations against individual importing countries affect exports. They reported that high performance firms respond to bilateral depreciations by increasing destination-specific export prices and low performance firms respond by increasing destination-specific export volumes. They also reported that the response at the extensive export margin is small because new exporters after a depreciation are smaller than existing firms.

Bénassy-Quéré et al. (2014), employing annual French customs data covering the imports of more than 100,000 companies from individual exporting countries over the 1995–2010 period, investigated how euro depreciations affect imports. They noted that a euro depreciation increases the costs of imported inputs. Their evidence indicates that a 10% euro depreciation increases the price of manufactured imports from outside the Eurozone by 2% and decreases the volume by 0–2%. After two years, they found that the cost of manufactured imports increases by 3.5%. Since the best performing exporters import the most intermediate goods, a euro depreciation can reduce exports through this channel.

Baak (2014) investigated Korean machinery exports to Japan over the 2000Q1–2012Q2 period. He estimated export demand and supply equations and employed simulations to examine exchange rate effects. He reported that a 1% depreciation of the won against the Japanese yen would increase Korean exports by 0.9%. He also found that a 1% depreciation of the Chinese renminbi against the yen decreases Korea's exports to Japan by 0.22%. These findings imply that exchange rates are important for Korea's exports.

Baek (2013) employed an autoregressive distributed lag model over the 1991Q1–2010Q2 period to investigate how exchange rates affect Korea's imports from Japan. He found that Korea's machinery and transport equipment imports are insensitive to exchange rates. This category represents more than 40% of Korea's imports from Japan. Baek reasoned that the price elasticity for Korean imports of Japanese machinery equals zero because Japanese capital goods are essential for Korea firms. A depreciation will thus increase the won cost of imported inputs for Korean firms.

Previous research thus indicates that depreciations impact French and Korean firms by increasing the volume of exports, decreasing markups, increasing the costs of imported inputs, and in other ways. Rather than investigating each of these channels separately and trying to add them together, this paper investigates how exchange rates affect stock prices. This provides evidence at the firm level of the overall effect of exchange rate changes on profitability.

Several papers have investigated how the pandemic affects asset returns. Shahzad et al. (2021) used the coronavirus crisis to investigate spillovers among U.S. stock sectors. They constructed a network of forecast error variance decompositions for a quantile vector autoregressive model. They employed the overall stock market to distinguish between systematic and idiosyncratic risk. They reported that COVID-19 caused dominant clusters to become more tightly linked while the rest of the network remained well separated and

the market did not converge to a singularity. They also noted that there is a need for studies of the impact of the pandemic on European and Asian stocks.

Okorie and Lin (2021) investigated how the COVID-19 shock affected market efficiency in the U.S., Brazil, India, and Russia. They employed martingale difference and conditional heteroscedasticity tests and equal sample periods from before and after the onset of the crisis. They reported no change in the efficiency of stock markets in the U.S. and Brazil. In India, they found that markets became less efficient in the long run. In Russia, they found that they became more efficient.

Aslam et al. (2020) investigated how the coronavirus crisis affected the multifractal properties of European stock markets. They applied multifractal detrended fluctuation analysis to 5 min index data. They reported evidence of multifractality, militating against the weak form financial market efficiency hypothesis. This evidence was strongest for Austria and the U.K. The Hurst coefficient also pointed to mean-reverting behavior during the crisis.

Bouri et al. (2021) examined the impact of the COVID-19 crisis on the connectedness between world equities, corporate bonds, gold, crude oil prices, and the value of the dollar. Using daily data and time-varying parameter vector autoregression techniques, they found that before the crisis stocks and the value of the dollar were transmitters of shocks. After the crisis bonds became the primary transmitter of shocks. These findings imply that fiscal stimulus packages and public backstops to private firms during the coronavirus period are useful for stopping contagion from the corporate bond market to the rest of the economy.

Gharib et al. (2021) investigated the impact of the COVID-19 crisis on interactions between spot gold prices and West Texas Intermediate (WTI) crude oil prices. They employed daily data and the bootstrap techniques of Phillips and Shi (2018) and tested for common bubbles for oil and gold prices. They found that during the pandemic, oil prices experienced a negative bubble and gold experienced a positive bubble. A battery of causality tests pointed to bilateral contagion between the two markets. These results imply that gold has acted as a safe haven asset against oil price movements during the coronavirus crisis.

Sharif et al. (2020) used the continuous wavelet transforms, the coherence wavelet method and Granger causality tests to examine the relationship between the pandemic, the Dow Jones Index, the spot price of WTI crude oil, the Baker et al. (2016) economic uncertainty measure, and the Caldara and Iacoviello (2018) geopolitical risk index. Using daily data, they reported that COVID-19 had a greater impact on geopolitical risk than on economic uncertainty. They also found that the coronavirus crisis affected both oil prices and stock prices.

These studies investigate how the pandemic affected stock returns and other asset classes at the aggregate level. This paper adds to the literature by investigating how the crisis is impacting stocks at the firm level in South Korea and France. This allows us to compare in detail how the crisis is affecting firms in a country that has done well at fighting the virus with firms in a country that is struggling to contain the pandemic.

The next section presents the materials and methods. Section 3 presents estimates of exposures to exchange rates. Section 4 presents estimates of exposure to the pandemic. Section 5 discusses the findings and concludes.

2. Materials and Methods

There is a long tradition in economics of estimating firms' exposure to exchange rates (see, e.g., Ito et al. 2016; Dominguez and Tesar 2006). This involves regressing firm stock returns on the return on the overall stock market and the change in the exchange rate. There is also a long tradition in finance of estimating firms' or portfolio's exposures to macroeconomic variables (see, e.g., Chen et al. 1986). This involves regressing firm stock returns on a set of macroeconomic or systematic variables. Chen, Roll, and Ross argued that, while only phenomena such as supernovas are truly exogenous, one can assume that the causality flows from the macroeconomic variables on the right-hand side to the

individual stock returns on the left-hand side and that the causality flowing in the other direction is of second order.

The macroeconomic variables employed to explain returns on French and Korean stocks are the returns on the countries' aggregate stock markets, the return on the world stock market, the change in the price of crude oil, the country's exchange rate relative to the U.S. dollar, and measures of monetary policy. Many have used the return on the country's stock market to capture the impact of the overall economy on individual stock returns (see, e.g., Brown and Warner 1980, 1985). Firms that are dependent on their country's macroeconomy will have high betas to the country's stock market. The return on the world economy is employed to control for the impact of the world economy on stock returns. Firms that export and that compete in international markets are sensitive to the world economy. The change in the log of Brent crude oil spot prices in used for France and the change in the log of Dubai crude oil spot prices is used for Korea. Thorbecke (2019a) found that oil prices matter for many stocks. The approach of Altavilla et al. (2019) is used to capture the impact of monetary policy on French stock prices. Their Euro Area Monetary Policy Event-Study Database measures how ECB policy rate changes, quantitative easing measures, and forward guidance policies affect interest rates on French bonds.[4] All of the changes in 2 year and 10 year French interest rates driven by press releases, press conferences, and monetary policy events are included. The change in the Bank of Korea (BoK) base rate is used to capture the impact of Korean monetary policy on stock prices. Altavilla et al. (2019) and many other have reported that monetary policy exerts important effects on stock returns.

Data on 217 company stock returns for France and 92 stock returns for Korea, the returns on the aggregate Korean and French stock markets, the return on the world stock market, the changes in the spot prices of Brent and Dubai crude oil, and the change in the Bank of Korea base rate are obtained from the Datastream database. The data are daily. The sample period extends from 22 January 2001 to 19 January 2021.[5] There are 5216 observations. Augmented Dickey–Fuller tests on the company stock returns and the macro factors permit rejection in every case of the null hypothesis that the variables employed have unit roots. Since the variables are stationary, least squares regressions of company returns on the macroeconomic factors are employed.

The estimated equations take the form:

$$\Delta R_{i,t} = \alpha_0 + \alpha_1 \Delta R_{m,t} + \alpha_2 \Delta R_{m,World,t} + \alpha_3 \Delta P_{oil,t} + \alpha_4 \Delta er_t + \alpha_5 \Delta MP_t, \qquad (1)$$

where $\Delta R_{i,t}$ is the change in the log of the stock price index for firm i, $\Delta R_{m,t}$ is the change in the log of the price index for either the French or the Korean aggregate stock market, $\Delta R_{m,World,t}$ is the change in the log of the price index for the world stock market, $\Delta P_{oil,t}$ is the change in the log of the spot price for Brent crude oil (for French stocks) or Dubai crude oil (for Korean stocks), Δer_t is the change in the U.S. dollar/euro exchange rate (for France) or the Korean won/U.S. dollar exchange rate (for Korea), and ΔMP_t represents the change in the monetary policy variables for France or Korea discussed above. Since there are no cross-equation restrictions, the model is estimated equation by equation using least squares. Heteroskedasticity and autocorrelation consistent standard errors are reported. Given the large number of observations and the assumption that causality flows from the macroeconomic variables on the right-hand side to the firm-specific variables on the left-hand side, this approach should provide precise parameter estimates.

The change in returns during the coronavirus crisis is also investigated. As Figure 1 shows, the crisis caused returns around the world to fall beginning around 19 February 2020. The change in returns over the 19 February 2020 to 19 January 2021 period is thus observed.

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[4] These data are available here: https://www.ecb.europa.eu/pub/economic-research/resbull/2020/html/ecb.rb200722~528ea64f0d.et.html#:~: text=This%20section%20briefly%20introduces%20the%20new%20resource,%20the,policy%20announcements%20for%20a%20wide%20range%20 of%20assets (accessed on 17 March 2021).

[5] In cases when stock return data are unavailable on 22 January 2001, the data are employed beginning on the first date they are available.

Equation (1) is also used to decompose returns into the portion driven by macroeconomic factors and by idiosyncratic factors. Equation (1) is estimated over the 22 January 2001 to 18 February 2020 period. Actual out-of-sample values of the macroeconomic variables are then used to forecast returns over the 19 February 2020 to 19 January 2021 period. These forecasted returns represent the changes in returns driven by the macroeconomic environment. The difference between actual returns over the crisis period and forecasted returns then measures the portion of returns driven by idiosyncratic factors.[6]
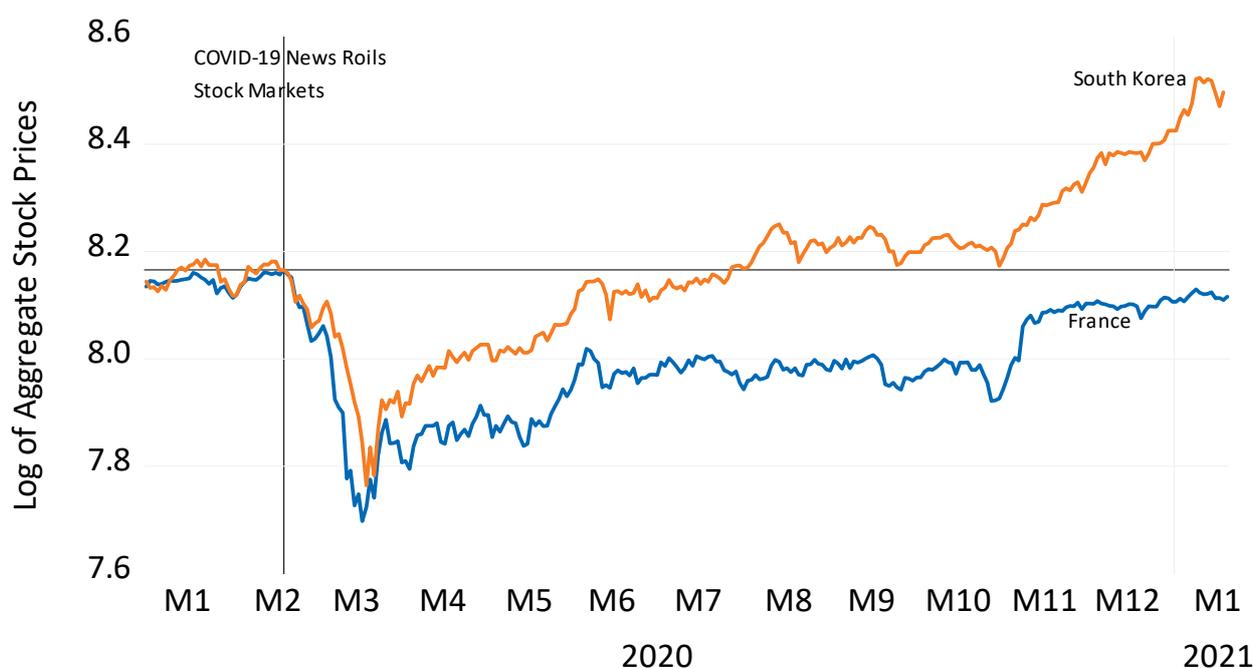
Figure 1. Aggregate stock prices in France and South Korea during the COVID-19 crisis. Source: Datastream database.

After 19 February 2020 much of the idiosyncratic response can be ascribed to the impact of the crisis on firms. Even idiosyncratic responses that are not caused by the crisis are informative because they reveal companies capable of succeeding during the pandemic. The methodology makes it possible to trace out how the idiosyncratic response evolved during the crisis. For instance, certain firms may have initially been damaged during the crisis period and subsequently recovered.

3. Results for Firms' Exchange Rate Exposures

Table 1 presents the results for estimating Equation (1) for France. Columns (3), (5), and (7) present stocks' exposures to the euro/dollar exchange rate, the French stock market, and the world stock market, respectively. Columns (4), (6), and (8) present the corresponding standard errors. Stocks' exposure to Brent crude oil prices and the six monetary policy variables are not reported for reasons of space but are available on request.

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6   In cases where the adjusted R-squared is less than 0.1, Equation (1) is not used to forecast returns. Not only are the forecasts worse in these cases, but also firms with low R-squared coefficients are often firms with very volatile returns. Including them in the sample could cloud inference.

Table 1. The Exposure of French Stocks to Macroeconomic Variables.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Exposure to Euro/Dollar Exchange Rate	S.E.	Exposure to French Stock Market	S.E.	Exposure to World Stock Market	S.E.
AGGREGATE FRENCH STOCK MARKET	NA	−0.32 ***	0.02	NA	NA	1.10 ***	0.03
AIRBUS (72,510)	Aerospace	−0.48 ***	0.05	1.22 ***	0.05	0	0.06
STMICROELECTRONICS (37,940)	Semiconductors	−0.34 ***	0.05	1.22 ***	0.04	0.23 ***	0.06
CELLECTIS (1170)	Biotechnology	−0.34 ***	0.11	0.48 ***	0.08	0.24 **	0.11
DEVOTEAM (830)	Computer Services	−0.33 ***	0.07	0.67 ***	0.06	0.30 ***	0.08
AB SCIENCE (756)	Biotechnology	−0.29 **	0.12	0.51 ***	0.1	0.41 ***	0.15
SOITEC (3490)	Semiconductors	−0.25 ***	0.09	1.01 ***	0.07	0.56 ***	0.1
DASSAULT SYSTEMES (60,660)	Software	−0.25 ***	0.04	0.88 ***	0.04	0.12 **	0.05
MAISONS DU MONDE (709)	Household Furnishings	−0.24	0.18	0.80 ***	0.12	0.16	0.12
ABIVAX (463)	Biotechnology	−0.22	0.21	0.54 ***	0.17	0.03	0.23
FOCUS HOME INTERACTIVE (322)	Electronic Entertainment	−0.20	0.12	0.34 ***	0.09	0.25 **	0.12
PUBLICIS GROUPE (10,620)	Media	−0.19 ***	0.04	0.96 ***	0.04	0.03	0.06
TELEPERFORMANCE (16,679)	Industrial Support Services	−0.18 ***	0.04	0.77 ***	0.04	0.20 ***	0.06
SOLOCAL GROUP (394)	Media, Publishing	−0.17	0.14	0.82 ***	0.11	0.23	0.25
SOPRA STERIA GROUP (2920)	Computer Services	−0.17 ***	0.06	0.77 ***	0.05	0.12 **	0.05
SODEXO (10,920)	Restaurants and Bars	−0.16 ***	0.05	0.82 ***	0.04	0.04	0.05
EUTELSAT COMMUNICATIONS (2230)	Telecommunications Equipment	−0.16 ***	0.04	0.49 ***	0.04	0.06	0.05
SOLUTIONS 30 SE (1060)	Computer Services	−0.16 **	0.08	0.21 ***	0.07	0.28 ***	0.09
MGI DIGITAL Technology (304)	Electronic Equipment: Gauges and Meters	−0.16 ***	0.06	0.13 **	0.05	0.32 ***	0.08
ESKER (1400)	Software	−0.16 **	0.08	0.32 ***	0.07	0.44 ***	0.1
SII (432)	Computer Services	−0.16 ***	0.05	0.23 ***	0.04	0.19 **	0.08
NANOBIOTIX (627)	Biotechnology	−0.16	0.14	0.58 ***	0.11	0.51 ***	0.13
INNATE PHARMA (370)	Biotechnology	−0.15	0.11	0.77 ***	0.09	0.28 **	0.12
VETOQUINOL (1110)	Pharmaceuticals	−0.15 **	0.06	0.09 *	0.05	0.24 ***	0.09
CLARANOVA (272)	Software	−0.15	0.13	0.55 ***	0.09	0.39 **	0.16
CARMAT (407)	Medical Equipment	−0.14	0.12	0.49 ***	0.1	0.35 *	0.18
ALD (4890)	Computer Services	−0.13	0.25	1.00 ***	0.11	0	0.21
ID LOGISTICS GROUP (1310)	Delivery Services	−0.13 **	0.06	0.30 ***	0.06	0.11	0.08
BUREAU VERITAS (10,180)	Industrial Support Services	−0.13 **	0.05	0.54 ***	0.03	0.27 ***	0.05
SUEZ (10,820)	Water	−0.13 **	0.05	0.80 ***	0.04	0.01	0.06
SES IMAGOTAG (694)	Electronic Equipment: Gauges and Meters	−0.13 *	0.07	0.25 ***	0.06	0.26 ***	0.09
CAPGEMINI (24,290)	Computer Services	−0.13 **	0.05	1.28 ***	0.05	0.06	0.06
EUROFINS SCIEN. (18,690)	Medical Services	−0.13 *	0.07	0.48 ***	0.05	0.30 ***	0.07
TECHNICOLOR (63)	Entertainment, Media	−0.12	0.1	1.04 ***	0.08	0.28**	0.11

Table 1. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Exposure to Euro/Dollar Exchange Rate	S.E.	Exposure to French Stock Market	S.E.	Exposure to World Stock Market	S.E.
SARTORIUS STEDIM BIOTECH (36,360)	Medical Supplies	−0.12 **	0.05	0.27 ***	0.05	0.15 **	0.06
UBISOFT ENTERTAINMENT CAT A (10,198)	Electronic Entertainment	−0.11	0.08	0.91 ***	0.08	0.20 *	0.1
ALTEN (3140)	Computer Services	−0.11 *	0.06	0.99 ***	0.06	0.11	0.08
IPSOS (1290)	Media	−0.11 *	0.05	0.53 ***	0.05	0.24 ***	0.07
SAMSE (546)	Home Improvement Retailers	−0.11 **	0.04	0.02	0.04	0.19 ***	0.06
AKWEL (615)	Auto Parts	−0.10	0.08	0.22 ***	0.08	0.19 *	0.1
SANOFI (123,030)	Pharmaceuticals	−0.10 ***	0.03	0.99 ***	0.03	−0.27 ***	0.04
M6-METROPOLE TV (1900)	Radio Tv Broadcast	−0.10 **	0.04	0.73 ***	0.04	0.18 ***	0.06
LA PERLA FASHION (399)	Clothing Accessories	−0.10	0.2	−0.04	0.08	−0.03	0.12
BIOMERIEUX (15,090)	Medical Equipment	−0.09 **	0.04	0.34 ***	0.06	0.15 **	0.07
SAFRAN (50,920)	Industrial Goods and Services	−0.09 **	0.04	0.95 ***	0.05	0.13 *	0.07
GAUMONT (374)	Entertainment, Media	−0.09 **	0.04	0.06 *	0.03	0.10 **	0.05
THALES (19,950)	Defense	−0.09	0.03	0.76 ***	0.04	0	0.04
BIC (2157)	Drug and Grocery Stores	−0.09	0.04	0.42 ***	0.03	0.05	0.05
IPSEN (6290)	Pharmaceuticals	−0.08	0.06	0.55 ***	0.07	0.06	0.1
BIGBEN INTERACTIVE (426)	Electronic Entertainment	−0.08	0.08	0.61 ***	0.07	0.03	0.09
CGG (658)	Oil Equipment and Services	−0.08	0.08	0.87 ***	0.07	0.69 ***	0.09
NRJ GROUP (509)	Radio Tv Broadcast	−0.08	0.05	0.44 ***	0.05	0.10 *	0.06
IGE + XAO (247)	Software	−0.08 *	0.04	0.12 ***	0.04	0.10 **	0.05
MERCIALYS REIT (684)	Real Estate	−0.08	0.05	0.50 ***	0.06	0.21 **	0.08
NEOEN (4690)	Electricity	−0.08	0.19	0.42 **	0.16	0.06	0.19
CHRISTIAN DIOR (80,330)	Clothing Accessories	−0.08 **	0.03	1.05 ***	0.03	0.17 ***	0.04
ESSILORLUXOTTICA (58,540)	Medical Supplies	−0.08 *	0.04	0.67 ***	0.04	−0.12 **	0.05
CARBIOS (446)	Chemicals	−0.08	0.14	0.18	0.12	0.64 **	0.25
ILIAD (10,950)	Telecommunications Services	−0.07	0.05	0.57 ***	0.05	0.12 *	0.07
BOIRON (646)	Pharmaceuticals	−0.07	0.05	0.14 ***	0.04	0.14 **	0.06
ALTAREA (2390)	Real Estate	−0.07	0.06	0.18 ***	0.05	−0.03	0.07
WORLDLINE (20,880)	Industrial Support Services	−0.07	0.08	0.80 ***	0.11	0.14	0.14
LAGARDERE GROUPE (2482)	Publishing	−0.07	0.05	0.94 ***	0.04	0.10 *	0.06
BONDUELLE (652)	Food Producers	−0.07	0.04	0.23 ***	0.04	0.17 ***	0.05
STEF (1010)	Trucking	−0.07	0.05	0.09 **	0.03	0.11	0.07
OENEO (752)	Industrial Goods and Services	−0.07	0.07	0.27 **	0.05	0.26 ***	0.08

Table 1. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Exposure to Euro/Dollar Exchange Rate	S.E.	Exposure to French Stock Market	S.E.	Exposure to World Stock Market	S.E.
SOMFY (5480)	Electrical and Electronic Equipment	−0.07	0.04	0.13 ***	0.03	0.14 ***	0.05
ESI GROUP (259)	Software	−0.06	0.05	0.29 ***	0.08	0.03	0.09
INFOTEL (289)	Computer Services	−0.06	0.05	0.25 ***	0.03	0.14 **	0.06
TEAM (49,672)	Aerospace	−0.06	0.12	−0.08	0.07	0.09	0.09
DASSAULT AVIATION (7450)	Aerospace	−0.06	0.05	0.26 ***	0.04	0.16 ***	0.06
LECTRA (1010)	Software	−0.06	0.06	0.21 ***	0.05	0.26 ***	0.07
BOLLORE (10,650)	Transportation Services	−0.06	0.05	0.48 ***	0.04	0.13 ***	0.06
GL EVENTS (281)	Media	−0.06	0.06	0.33 ***	0.06	0.29 ***	0.1
LVMH (271,260)	Clothing Accessories	−0.06 *	0.03	1.15 ***	0.03	0.05	0.05
EDENRED (11,720)	Industrial Support Services	−0.05	0.09	0.81 ***	0.05	0.14 **	0.07
DELTA PLUS GROUP (618)	Clothing Accessories	−0.05	0.06	0.07	0.05	0.22 ***	0.08
GTT (273)	Oil Equipment and Services	−0.05	0.12	0.70 ***	0.09	0.06	0.15
WAVESTONE (664)	Computer Services	−0.05	0.05	0.13 ***	0.04	0.33 ***	0.06
QUADIENT (702)	Electronic Office Equipment	−0.05	0.05	0.53 ***	0.04	0.07	0.06
MICHELIN (4140)	Tires	−0.04	0.04	0.93 ***	0.03	0.27 ***	0.06
RAMSAY GEN SANTE (1960)	Health Care	−0.04	0.05	0.15 ***	0.04	0.22 ***	0.08
KERING (69,450)	Apparel Retailers	−0.04	0.04	1.10 ***	0.03	−0.05	−0.02
ATOS (268)	Computer Services	−0.04	0.05	1.13 ***	0.05	0.01	0.06
KORIAN (3210)	Health Care	−0.04	0.04	0.41 ***	0.05	0.04	0.07
XPO LOGISTICS EUROPE (2750)	Transportation Services	−0.04	0.07	0.27 ***	0.05	0.12 *	0.07
FIDUCIAL REAL ESTATE (389)	Real Estate	−0.04	0.04	0.02	0.03	0.04	0.05
LUMIBIRD (381)	Medical Equipment	−0.04	0.08	0.32 ***	0.08	0.22 **	0.09
VIRBAC (1810)	Pharmaceuticals	−0.04	0.04	0.29 ***	0.04	0.14 ***	0.05
COVIVIO HOTELS (2080)	Real Estate	−0.04	0.07	0.15 ***	0.05	0.21 ***	0.07
HERMES INTL (96,660)	Clothing Accessories	−0.04	0.04	0.65 ***	0.05	0.09	0.07
BAINS MER MONACO (1520)	Casinos Gambling	−0.04	0.07	0	0.06	0.23 **	0.09
DANONE (36,710)	Food Producers	−0.04	0.03	0.72 ***	0.03	−0.09 **	0.04
AIR FRANCE-KLM (2110)	Travel and Leisure	−0.04	0.06	1.16 ***	0.06	0.18 **	0.07
VALNEVA (1220)	Biotechnology	−0.03	0.08	0.43 ***	0.08	0.22 *	0.11
SHOWROOMPRIVE (419)	Apparel Retailers	−0.03	0.24	0.43 **	0.16	0.54 ***	0.18
ADP (10,190)	Transportation Services	−0.03	0.05	0.84 ***	0.08	0.12	0.1
SECHE ENVIRONNEMENT (380)	Waste and Disposal Services	−0.03	0.06	0.22 ***	0.05	0.37 ***	0.06
LISI (1,210)	Aerospace	−0.03	0.05	0.45 ***	0.05	0.17 **	0.08
AXWAY SOFTWARE (537)	Software	−0.03	0.08	0.30 ***	0.06	0.09	0.08
SWORD GROUP (329)	Computer Services	−0.03	0.06	0.29 ***	0.06	0.32 ***	0.1
LDLC.COM (37)	Computer Digital Services	−0.03	0.09	0.26 ***	0.07	0.14	0.11

Table 1. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Exposure to Euro/Dollar Exchange Rate	S.E.	Exposure to French Stock Market	S.E.	Exposure to World Stock Market	S.E.
MERSEN (EX LCL) (591)	Electrical and Electronic Equipment	−0.02	0.05	0.75 ***	0.05	0.24 ***	0.06
EXEL INDUSTRIES (449)	Agricultural Machinery	−0.02	0.04	0.11 ***	0.03	0.14 ***	0.04
INTERPARFUMS (1798)	Personal Goods	−0.02	0.04	0.38 ***	0.04	0.10 *	0.06
GERARD PERRIER (268)	Electronic Components	−0.02	0.05	0.02	0.04	0.24 ***	0.07
NEURONES (601)	Computer Services	−0.02	0.04	0.29 ***	0.04	−0.02	0.06
TOTAL GABON (617)	Oil	−0.02	0.06	0.21 ***	0.04	0.26 ***	0.07
HOFFMANN GREEN CEMENT TECHNOLOGIES (465)	Cement	−0.02	0.43	0.26	0.17	0.37 **	0.16
VALEO (7960)	Auto Parts	−0.02	0.06	1.06 ***	0.06	0.30 ***	0.08
REMY COINTREAU (7970)	Distillers and Vintners	−0.02	0.04	0.52 ***	0.04	0.16 **	0.07
BENETEAU (1020)	Recreational Vehicles and Boats	−0.02	0.05	0.59 ***	0.04	0.35 ***	0.06
ODET (FINC DE L') (5032)	Transportation Services	−0.02	0.04	0.29 ***	0.04	0.13 **	0.05
L'OREAL (163,760)	Cosmetics	−0.02	0.03	0.98 ***	0.03	−0.19 ***	0.04
TRIGANO (2960)	Recreational Products	−0.01	0.07	0.57 ***	0.06	0.42 ***	0.07
THERMADOR GROUPE (710)	Industrial Suppliers	−0.01	0.04	0.09 ***	0.03	0.24 ***	0.05
RUBIS (4060)	Specialty Retailers	−0.01	0.04	0.39 ***	0.03	0.17 ***	0.05
BEL (2410)	Food Producers	−0.01	0.07	0.08 *	0.04	0.06	0.07
FNAC DARTY (1290)	Specialty Retailers	−0.01	0.11	0.66 ***	0.08	0.36 ***	0.12
MALTERIES F-BELGES (382)	Brewers	−0.01	0.06	0.02	0.09	0.08	0.1
LEGRAND (20,790)	Electrical and Electronic Equipment	−0.01	0.04	0.95 ***	0.04	0.03	0.06
ARGAN (722)	Real Estate	−0.01	0.06	0.26 ***	0.06	0.05	0.08
TOTAL (92,295)	International Oil and Gas	−0.01	0.03	0.97 ***	0.03	0	0.03
BASTIDE(CONFORT MED.) (394)	Health Care	0	0.06	0.22 ***	0.05	0.25 ***	0.06
CREDIT AGRICOLE BRIE PICARDIE (1134)	Banks	0	0.06	0.24 ***	0.05	0.16 **	0.07
ELIOR GROUP (989)	Consumer Services	0	0.12	1.04 ***	0.17	0.09	0.21
GUERBET (427)	Pharmaceuticals	0	0.06	0.26 ***	0.05	0.06	0.07
AUBAY (497)	Computer Services	0	0.07	0.51 ***	0.07	0.1	0.08
TF1 (TV.FSE.1) (1500)	Media	0	0.04	0.99 ***	0.04	0.12 **	0.05
TFF GROUP (611)	General Industrials	0	0.04	0.10	0.03	0.12 **	0.06
RENAULT (2342)	Automobiles	0	0.05	1.14 ***	0.04	0.46 ***	0.06
JCDECAUX (3690)	Media	0	0.05	0.79 ***	0.07	0.18 *	0.09
SELECTIRENTE (364)	Real Estate	0	0.04	−0.01	0.02	0.14 ***	0.04
MANUTAN INTL (577)	Industrial Suppliers	0	0.05	0.18 ***	0.04	0.1	0.07
CREDIT AGR.ILE DE FRANCE (34,840)	Banks	0	0.04	0.18 ***	0.04	0.01	0.06
VIVENDI (30,560)	Media	0	0.05	1.28 ***	0.08	−0.29 ***	0.09

Table 1. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Exposure to Euro/Dollar Exchange Rate	S.E.	Exposure to French Stock Market	S.E.	Exposure to World Stock Market	S.E.
PERNOD-RICARD (42,932)	Distillers and Vintners	0.01	0.04	0.61 ***	0.04	0.05	0.08
CRCAM NORD CCI (372)	Bank	0.01	0.05	0.17 ***	0.04	0.14 *	0.08
COLAS (4780)	Construction	0.01	0.04	0.24 ***	0.03	0.21 ***	0.04
ORPEA (7450)	Health Care	0.01	0.04	0.54 ***	0.04	0.10 *	0.05
VOLTALIA (2310)	Electricity	0.01	0.1	0.07	0.06	0.27 ***	0.09
L AIR LQE.SC.ANYME. POUR L ETUDE ET L EPXTN (4780)	Chemicals	0.01	0.02	0.91 ***	0.02	−0.02	0.04
GROUPE CRIT (698)	Industrial Support Services	0.01	0.07	0.30 ***	0.07	0.29 ***	0.1
ORANGE (31,570)	Telecommunications Services	0.01	0.05	1.26 ***	0.05	−0.35 ***	0.05
COVIVIO (6449)	Real Estate	0.01	0.05	0.44 ***	0.07	0.34 ***	0.08
IMMOBILIERE DASSAULT (397)	Real Estate	0.01	0.04	0.02	0.03	0.09	0.06
LDC (1700)	Food Producers	0.01	0.03	0.09 ***	0.03	0.06	0.04
NEXITY (2130)	Real Estate	0.02	0.06	0.72 ***	0.04	0.37 ***	0.07
CREDIT FONCIER DE MONACO (NA)	Banks	0.02	0.06	0.1	0.06	0.01	0.08
BOUYGUES (12,760)	Construction	0.02	0.03	1.15 ***	0.04	0.02	0.05
SAVENCIA (853)	Food Producers	0.02	0.05	0.12 ***	0.04	0.12 ***	0.04
UNIBEL (1510)	Food Producers	0.02	0.06	0.02	0.04	0.02	0.06
DERICHEBOURG (934)	Waste and Disposal Services	0.02	0.09	1.08 ***	0.08	0.35 ***	0.1
ACCOR (8080)	Hotels and Motels	0.02	0.04	1.07 ***	0.04	0.12 **	0.05
VERALLIA (3660)	Industrial Goods and Services	0.02	0.55	0.31	0.19	0.51	0.32
LNA SANTE (470)	Health Care	0.02	0.04	0.30 ***	0.04	0.15 ***	0.05
GENSIGHT BIOLOGICS (299)	Health Care	0.02	0.28	0.37 **	0.18	0.86 ***	0.27
GROUPE GUILLIN (463)	General Industrials	0.02	0.05	0.13 ***	0.04	0.08	0.06
CEGEREAL REIT (509)	Real Estate	0.02	0.04	0.18 ***	0.04	0	0.06
ROBERTET (2240)	Chemicals	0.03	0.05	0.15 ***	0.03	0.04	0.05
KAUFMAN ET BROAD (841)	Home Constructions	0.03	0.05	0.25 ***	0.05	0.34 ***	0.1
X-FAB SILICON FOUNDRIES (929)	Semiconductor	0.03	0.27	0.73 ***	0.18	0.69 ***	0.22
ARKEMA (6790)	Chemicals	0.03	0.06	1.05 ***	0.05	0.25 ***	0.07
ICADE REIT (4442)	Real Estate	0.03	0.04	0.39 ***	0.06	0.30 ***	0.06
FONCIERE INEA (317)	Real Estate	0.03	0.05	0.12 **	0.06	−0.02	0.08
CEGEDIM (337)	Computer Services	0.04	0.05	0.24 **	0.05	0.11 *	0.07
CARREFOUR (11,900)	Food Retailers and Wholesalers	0.04	0.04	1.05 ***	0.04	−0.16 ***	0.04
TESSI (424)	Computer Services	0.04	0.05	0.11 ***	0.04	0.17 ***	0.05
FREY (728)	Real Estate	0.04	0.03	0.02	0.02	0	0.03
COMPAGNIE DES ALPES (466)	Travel and Leisure	0.04	0.04	0.23 ***	0.04	0.06	0.06
SOCIETE FONC.LYONNAISE (464)	Banks	0.04	0.03	0.10 ***	0.03	0.11 **	0.05
PHARMAGEST INTERACTIVE (1710)	Software	0.04	0.05	0.29 ***	0.05	−0.05	0.07
EDF (32,490)	Electricity	0.05	0.04	0.95 ***	0.04	−0.02	0.06
H&K (2267)	Defense	0.05	0.26	0.16	0.15	−0.17	0.21

Table 1. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Exposure to Euro/Dollar Exchange Rate	S.E.	Exposure to French Stock Market	S.E.	Exposure to World Stock Market	S.E.
ELECTRICITE STRASBOURG (864)	Electricity	0.05	0.04	0.17 ***	0.04	0.14 **	0.05
HEXAOM (253)	Home Construction	0.05	0.06	0.20 ***	0.04	0.25 ***	0.06
JACQUET METALS (351)	Industrial Metals	0.05	0.07	0.51 ***	0.06	0.24 **	0.09
MANITOU (1080)	Construction and Handling Machinery	0.05	0.07	0.56 ***	0.05	0.27 ***	0.08
REXEL (4760)	Electrical and Electronic Equipment	0.05	0.06	1.07 ***	0.07	0.15 *	0.09
CHARGEURS (511)	Textile Products	0.06	0.06	0.38 ***	0.05	0.21 **	0.08
SERMA GROUP (308)	Industrial Support Services	0.06	0.14	−0.05	0.09	0.04	0.13
KLEPIERRE REIT (5193)	Real Estate	0.07	0.04	0.62 ***	0.08	0.29 ***	0.09
LAURENT PERRIER (446)	Distillers and Vintners	0.07	0.05	0.17 ***	0.04	0.09	0.07
IMERYS (3470)	Industrial Metals and Mines	0.08 *	0.04	0.65 ***	0.04	0.30 ***	0.06
VOYAGEURS DU MONDE (281)	Travel and Tourism	0.08	0.05	0.16 ***	0.05	0.07	0.06
SYNERGIE (770)	Industrial Support Services	0.08	0.07	0.36 ***	0.05	0.14	0.1
GECINA (9140)	Real Estate	0.08 *	0.04	0.45 ***	0.05	0.37 ***	0.06
RALLYE (346)	Retailers	0.09 *	0.05	0.79 ***	0.05	0.13 *	0.07
ALBIOMA (1340)	Electricity	0.09 *	0.05	0.36 ***	0.04	0.32 ***	0.05
VILMORIN & CIE (1210)	Food Producers	0.09 **	0.04	0.17 ***	0.03	0.25 ***	0.05
NATIXIS (144)	Banks	0.09	0.07	1.08 ***	0.08	0.31 ***	0.1
VALLOUREC (289)	Iron and Steel	0.09	0.07	0.76 ***	0.05	0.51 ***	0.07
FAURECIA (6040)	Auto Parts	0.09	0.06	1.01 ***	0.05	0.35 ***	0.07
MAUREL ET PROM (353)	Crude Oil Producers	0.09	0.06	0.42 ***	0.05	0.50 ***	0.06
BASSAC (767)	Real Estate	0.1	0.09	0.48 ***	0.07	0.12	0.09
INVENTIVA (555)	Health Care	0.1	0.41	0.72 ***	0.26	0.29	0.29
CASINO GUICHARD-P (2621)	Drugs/Grocery Stores	0.10 **	0.04	0.76 ***	0.03	−0.03	0.04
VICAT (1710)	Cements	0.11 **	0.04	0.47 ***	0.04	0.20 ***	0.05
GETLINK (7510)	Railroads	0.12 *	0.06	0.83 ***	0.06	0.14	0.09
PLASTIC OMNIUM (4920)	Auto Parts	0.12 *	0.07	0.69 ***	0.05	0.16 **	0.07
VINCI (48,951)	Construction	0.12 ***	0.04	0.91 ***	0.05	0.15 ***	0.05
SCHNEIDER ELECTRIC (69,830)	Electrical and Electronic Equipment	0.12 ***	0.04	1.09 ***	0.04	0.14 **	0.06
VEOLIA ENVIRON (12,660)	Electronic Recycling	0.13 ***	0.04	0.90 ***	0.04	−0.01	0.06
NEXANS (1050)	Electrical and Electronic Equipment	0.13 **	0.06	0.92 ***	0.05	0.34 ***	0.06
GALIMMO (461)	Real Estate	0.16	0.15	−0.05	0.15	0.1	0.2
BURELLE (1580)	Auto Parts	0.17 **	0.06	0.31 ***	0.05	0.14 *	0.07
ALSTOM (16,210)	Electrical and Electronic Equipment	0.18 **	0.08	1.19 ***	0.07	0.05	0.09

Table 1. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Exposure to Euro/Dollar Exchange Rate	S.E.	Exposure to French Stock Market	S.E.	Exposure to World Stock Market	S.E.
SOCIETE GENERALE (14,850)	Banks	0.20 ***	0.07	1.56 ***	0.05	0.06	0.1
EIFFAGE (8150)	Construction	0.21 ***	0.05	0.76 ***	0.05	0.22 ***	0.05
BNP PARIBAS (54,890)	Banks	0.21 ***	0.05	1.48 ***	0.05	−0.07	0.1
CREDIT AGRICOLE (29,560)	Banks	0.25 ***	0.06	1.43 ***	0.05	0	0.09
CARMILA (1650)	Real Estate	0.27	0.25	0.21	0.13	0.26	0.19
ELIS (2930)	Industrial Suppliers, Industrial Support Services'	0.29 **	0.14	1.18 ***	0.18	−0.07	0.2
ERAMET (618)	Nonferrous Metals	0.31 ***	0.07	0.65 ***	0.07	0.73 *	0.1
ALTAREIT (854)	Real Estate	0.36 *	0.21	0.09	0.09	−0.04	0.16
NOVACYT (596)	Medical Equipment	0.48 *	0.24	−0.07	0.28	0.23	0.48
SMCP (312)	Clothing Accessories	0.56	0.38	1.57 ***	0.19	−0.41	0.29

Note: The table presents results from regressions of the returns on the firms listed in column (1) on the change in the euro/dollar nominal exchange rate (column (3)), the return on the aggregate French stock market (column (5)), the return on the world stock market (column (7)), the change in the log of the spot price for Brent crude oil (not shown), and Altavilla et al. (2019) measures of the changes in 2 year and 10 year bonds due to monetary policy news (not shown). The sample period extends from 22 January 2001 to 19 January 2021. There are 5217 observations. In cases where return data are not available on 22 January 2001, the sample begins on the first date when return data become available. S.E. in columns (4), (6), and (8) are heteroscedasticity and autocorrelation consistent standard errors. Source: Datastream database and calculations by the author. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

The top row presents exposures for the aggregate French stock market. The overall market is strongly exposed to exchange rate changes, with an exchange rate beta of −0.32 that is significant at the 1% level. This implies that a 10% appreciation of the euro is associated with a drop in the return on the overall market of 3.2%. The market is also exposed to the return on the world economy, with an exposure of 1.10 that is also significant at the 1% level. This implies that a 10% fall in the return on the world stock market is associated with an 11% drop in the French stock market. Although not shown in Table 1, the market is not exposed to changes in Brent crude oil prices. Finally, although also not shown, the market is exposed to the monetary policy variables.[7]

The rows below the top row present results for individual companies. They are ordered from the company most exposed to appreciations (Airbus) to the company least exposed to appreciations (SMCP). Many of France's prize companies, including its leading aerospace company (Airbus), its leading semiconductor company (STMicroelectronics), and its leading software company (Dassault Systèmes), are damaged by appreciations.

Many companies are exposed to both appreciations and slowdowns in the rest of the world. This combination indicates that these companies are vulnerable to international competition. Companies exposed to both of these factors, with their corresponding sectors in parentheses, include STMicroelectronics (semiconductors), Cellectis (biotechnology), Devoteam (computer services), AB Science (biotechnology), Soitec (software), Dassault Systèmes (software), Téléperformance (industrial support services), Sopra Steria Group (computer services), Solutions 30 (computer services), MGI Digital Technology (electronic equipment), Esker (software), SII (computer services), Vetoquinol (pharmaceuticals), Bureau Veritas (industrial support services), and Sartorus Stedim Biotech (medical supplies). Thus, firms in advanced, knowledge-intensive sectors such as semiconductors, biotechnol-

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[7] An F-test permits rejection at the 1% level of the null hypothesis that the six coefficients on the monetary policy variables jointly equal zero.

ogy, software, and computer services are exposed to appreciations and slowdowns in the rest of the world. Therefore, in spite of large domestic and Eurozone markets, the value of the euro remains crucial for many French firms.

France's luxury brands including LVMH, L'Oréal, Hermès, Kering, Christian Dior, and Rémy Cointreau, are either unexposed or slightly exposed to appreciations. For LVHM, the exchange rate coefficient equals −0.06 and is significant at the 10% level. For Dior, this coefficient equals −0.08 and is significant at the 1% level. For LVMH, a 10% appreciation is associated with a 0.6% drop in returns and for Dior it is associated with an 0.8% drop. For the other luxury brands, there is no relationship between exchange rate changes and returns.

There are also some firms that gain from appreciations. These include several banks (Crédit Agricole, BNP Paribas, and Société Générale), several electrical and electronic equipment firms (Alstom, Nexans, and Schneider Electric), and a nonferrous metal company (Eramet). The IMF (2020) noted that French banks have lots of foreign debt. An appreciation of the euro makes these debts easier to repay. Electrical and electronic equipment that use imported parts and components benefit from appreciations because these reduce the euro cost of imported inputs. Metal companies can benefit from euro appreciations that reflect depreciations in the U.S. dollar. Many metal and other commodity exports are denominated in U.S. dollars. When the dollar depreciates, metals become cheaper in importing countries' currencies and they purchase more.

Table 2 presents the results for estimating Equation (1) for Korea. Columns (3), (5), and (7) present the stocks' exposures to the won/dollar exchange rate, the Korean stock market, and the world stock market, respectively. Stocks' exposure to Dubai crude oil prices and the Bank of Korea base rate are not reported for reasons of space but are available on request.

Table 2. The Exposure of Korean Stocks to Macroeconomic Variables.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Trillions of Korean Won)	Sector	Exposure to Won/Dollar Exchange Rate	S.E.	Exposure to Korean Stock Market	S.E.	Exposure to World Stock Market	S.E.
AGGREGATE KOREAN STOCK MARKET	NA	−0.25 ***	0.03	NA	NA	0.64 ***	0.02
CELLTRION HEALTHCARE (21.89)	Biotechnology	0.43	0.34	1.24 ***	0.15	−0.26 **	0.11
PEARLABYSS (4.76)	Electronic Entertainment	0.32	0.23	0.68 ***	0.09	0.07	0.09
NETMARBLE (11.85)	Electronic Entertainment	0.29	0.26	0.81 ***	0.11	−0.01	0.09
HYUNDAI MOTOR (27.18)	Automobiles	0.28 ***	0.06	1.14 ***	0.03	−0.10 ***	0.03
ORION (0.78)	Food Producers	0.26	0.22	0.71 ***	0.09	−0.06	0.08
KIA MOTORS (35.02)	Automobiles	0.23 ***	0.07	1.08 ***	0.03	−0.07	0.04
LG ELECTRONICS (30.29)	Consumer Electronics	0.21 ***	0.05	1.04 ***	0.02	0.02	0.04
HYUNDAI MOBIS (31.51)	Auto Parts	0.18 ***	0.06	0.98 ***	0.03	−0.10 **	0.04
LG DISPLAY (8.56)	Electronic Components	0.16 **	0.06	1.11 ***	0.04	0.06	0.05
ECOPRO BM (3.93)	Electronic and Electrical Equipment	0.14	0.47	1.12 ***	0.14	0.14	0.12
SAMSUNG ELTO.MECHANICS (20.99)	Electronic Components	0.13 **	0.06	1.09 ***	0.02	0.04	0.05
LG INNOTEK (5.03)	Electronic Components	0.13	0.12	1.08 ***	0.08	−0.02	0.06

Table 2. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Trillions of Korean Won)	Sector	Exposure to Won/Dollar Exchange Rate	S.E.	Exposure to Korean Stock Market	S.E.	Exposure to World Stock Market	S.E.
SAMSUNG BIOLOGICS (52.87)	Biologics	0.12	0.24	1.01 ***	0.11	−0.10	0.12
SAMSUNG ELECTRONICS (554.28)	Technology Hardware	0.10 ***	0.05	1.17 ***	0.02	−0.10 ***	0.02
SAMSUNG FIRE & MAR.IN. (8.57)	Insurance	0.07	0.04	0.82 ***	0.02	−0.04	0.03
SAMSUNG LIFE INSURANCE (14.34)	Insurance	0.06	0.08	0.70 ***	0.05	0.02	0.04
HYUNDAI GLOVIS (7.82)	Trucking	0.05	0.09	0.86 ***	0.04	0	0.04
NCSOFT (22.55)	Electronic Entertainment	0.04	0.07	0.85 ***	0.03	0.03	0.06
NH INVESTMENT & SECS. (3.47)	Investment Banking and Brokerage	0.04	0.1	1.44 ***	0.03	−0.02	0.04
HANON SYSTEMS (9.80)	Auto Parts	0.03	0.06	0.80 ***	0.03	0	0.04
COWAY (5.28)	Household Equipment Producers	0.03	0.06	0.70 ***	0.04	−0.07	0.04
LG (12.91)	Diversified Industrials	0.03	0.05	1.06 ***	0.03	0.05	0.04
KAKAO (43.35)	Consumer Digital Services	0.03	0.08	0.90 ***	0.04	0.03	0.05
KB FINANCIAL GROUP (18.76)	Banks	0.02	0.1	1.08 ***	0.03	0.03	0.05
SAMSUNG SDI (55.11)	Technology Hardware	0.01	0.05	1.02 ***	0.03	−0.01	0.04
DOUZONBIZON (3.44)	Software and Computer Services	0.01	0.09	0.74 ***	0.05	0.06	0.07
S-1 (3.093)	Security Services	0.01	0.06	0.59 ***	0.03	−0.02	0.03
SHINHAN FINL.GROUP (17.0)	Banks	0	0.07	1.03 ***	0.02	−0.01	0.04
CELLTRION (42.6)	Healthcare	0	0.1	0.77 ***	0.05	−0.07	0.06
WOORI FINANCIAL GROUP (7.0	Banks	−0.01	0.1	0.89 ***	0.06	0.01	0.06
CELLTRION PHARM (5.79)	Pharmaceuticals	−0.01	0.13	0.74 ***	0.07	0.05	0.07
KT & G (10.8)	Tobacco	−0.02	0.05	0.37 ***	0.02	−0.04	0.02
SAMSUNG SDS (15.5)	Computer Services	−0.03	0.13	0.88 ***	0.07	0.09	0.06
GREEN CROSS (4.37)	Pharmaceuticals	−0.04	0.05	0.42 ***	0.05	0.01	0.05
LG CHEM (64.7)	Chemicals	−0.04	0.06	1.10 ***	0.03	0.04	0.04
POSCO (21.0)	Iron and Steel	−0.05	0.06	0.90 ***	0.02	0.11 ***	0.03
HANKOOK TIRE & TECHNOLOGY (6.5)	Tires	−0.06	0.11	0.82 ***	0.07	0	0.05
SK HYNIX (99.4)	Semiconductor	−0.06	0.09	1.39 ***	0.05	0	0.07
LG HHLD. & HLTH.CARE (27.7)	Drug-Grocery Stores	−0.06	0.06	0.60 ***	0.03	0	0.04
SKC (4.8)	Chemicals	−0.06	0.09	1.05 ***	0.04	0.22 ***	0.05
GS HOLDINGS (3.9)	Diversified Industrials	−0.06	0.09	0.98 ***	0.03	0.08 **	0.03
KANGWON LAND (5.3)	Travel and Leisure	−0.06	0.06	0.68 ***	0.03	0.04	0.03
S-OIL (10.1)	Oil Refining and Marketing	−0.06	0.07	0.77 ***	0.04	0.10 **	0.04
MACQUARIE KOREA INFR.FD. (5.1)	Investment Banking	−0.07 *	0.04	0.16 ***	0.02	0.02	0.02

Table 2. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Trillions of Korean Won)	Sector	Exposure to Won/Dollar Exchange Rate	S.E.	Exposure to Korean Stock Market	S.E.	Exposure to World Stock Market	S.E.
AMOREPACIFIC (16.4)	Cosmetics	−0.07	0.07	0.53 ***	0.04	0.01	0.04
INDUSTRIAL BANK OF KOREA (6.2)	Banks	−0.07	0.08	0.99 ***	0.03	0.11 ***	0.04
CJ ENM (3.1)	Retailers	−0.08	0.07	0.76 ***	0.03	0.03	0.04
DB INSURANCE (2.9)	Insurance	−0.08	0.13	1.07 ***	0.05	0.02	0.05
DONGSUH (4.2)	Food Producers	−0.08	0.06	0.25 ***	0.02	0.01	0.03
CJ LOGISTICS (3.9)	Transportation Services	−0.08	0.07	0.60 ***	0.04	−0.03	0.04
NAVER (63.5)	Consumer Digital Services	−0.08	0.06	0.88 ***	0.04	−0.04	0.04
SAMSUNG SECURITIES (3.4)	Investment Banking	−0.09	0.07	1.25 ***	0.03	0.04	0.04
LOTTE (6.3)	Food Producers	−0.1	0.09	0.49 ***	0.03	0.07 *	0.04
LOTTE CHEMICAL (10.4)	Chemicals	−0.1	0.08	1.15 ***	0.04	0.11	0.05
KOREA ELECTRIC POWER (13.8)	Electricity	−0.11	0.08	0.64 ***	0.03	0	0.04
MIRAE ASSET DAEWOO (7.8)	Investment Banking	−0.11 *	0.06	1.46 ***	0.03	0.04	0.04
SK HOLDINGS (19.8)	Software and Computer Services	−0.11	0.11	0.82 ***	0.09	0.10	0.07
YUHAN (4.5)	Pharmaceuticals	−0.11 *	0.06	0.40 ***	0.03	0	0.04
HOTEL SHILLA (3.3)	Retailers	−0.12	0.08	0.82 ***	0.03	0.11 ***	0.04
SAMSUNG C&T (23.4)	Construction	−0.12	0.11	1.15 ***	0.06	0.01	0.06
SEEGENE (4.0)	Biotechnology	−0.13	0.17	0.40 ***	0.11	0.04	0.25
SSANGYONG CEMENT INDL. (3.5)	Cement	−0.13	0.08	0.86 ***	0.04	0.05	0.05
E-MART (5.0)	Retailers	−0.13	0.1	0.54 ***	0.04	−0.02	0.05
POSCO CHEMICAL (13.0)	Chemicals	−0.14 *	0.07	0.51 ***	0.04	0.05	0.04
SK MATERIALS (3.4)	Basic Materials	−0.14	0.1	1.00 ***	0.04	0.08	0.05
HYUNDAI HEAVY INDUSTRIES (7.4)	Marine Transport	−0.15 **	0.07	1.12 ***	0.03	0.15 ***	0.03
CJ CHEILJEDANG (7.1)	Food Producers	−0.15	0.1	0.58 ***	0.08	0.06	0.09
HANA FINANCIAL GROUP (10.9)	Banks	−0.15	0.12	1.06 ***	0.04	0.06	0.08
KOREAN AIR LINES (9.8)	Airlines	−0.16	0.1	1.07 ***	0.04	0.04	0.04
KUMHO PETRO CHEMICAL (7.8)	Chemicals	−0.17	0.1	0.99 ***	0.05	0.17 **	0.07
GS ENGR. & CON. (3.2)	Construction	−0.18 **	0.07	1.18 ***	0.04	0.05	0.04
HYUNDAI STEEL (5.3)	Iron and Steel	−0.19 ***	0.06	1.07 ***	0.03	0.23 ***	0.04
SK INNOVATION (26.6)	Oil Refining and Marketing	−0.19 **	0.07	1.24 ***	0.05	0.11 ***	0.04
HLB (3.6)	Consumer Products and Services	−0.19	0.12	0.51 ***	0.07	0.20 **	0.08
KOREA INVESTMENT HDG. (4.0)	Investment Banking	−0.20 **	0.09	1.24 ***	0.05	0.09 *	0.05
HANWHA SOLUTIONS (9.4)	Chemicals	−0.22 **	0.1	1.28 ***	0.03	0.11 **	0.05
HMM (5.7)	Marine Transportation	−0.22 **	0.09	0.95 ***	0.04	−0.04	0.06
HANMI SCIENCE (4.5)	Pharmaceuticals	−0.23 **	0.06	0.65 ***	0.04	0.03	0.05
SAMSUNG HEAVY INDS. (24.9)	Marine Transport	−0.24 ***	0.08	1.08 ***	0.03	0.18 ***	0.05

Table 2. *Cont.*

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm or Portfolio (Market Capitalization in Trillions of Korean Won)	**Sector**	**Exposure to Won/Dollar Exchange Rate**	**S.E.**	**Exposure to Korean Stock Market**	**S.E.**	**Exposure to World Stock Market**	**S.E.**
KOREA ZINC (8.1)	Precious Metals and Mines	−0.25 ***	0.08	0.89 ***	0.03	0.12 ***	0.04
AMOREPACIFIC GROUP (6.6)	Cosmetics	−0.28 ***	0.11	0.62 ***	0.03	0.07	0.05
DOOSAN HVY.IN&C. (4.2)	Industrial Machinery	−0.30 ***	0.09	1.04 ***	0.04	0.14 ***	0.05
ALTEOGEN (3.8)	Biotechnology	−0.35	0.26	0.85 ***	0.15	0.37 ***	0.14
HYUNDAI ENGR & CON. (4.6)	Construction	−0.36 ***	0.11	1.14 ***	0.04	−0.02	0.04
SHIN POONG PHARM. (4.2)	Pharmaceuticals	−0.36 ***	0.08	0.50 ***	0.05	0.09	0.08
CS WIND (3.3)	Energy	−0.37 **	0.18	0.83 ***	0.11	0.30 ***	0.12
HYUNDAI HEAVY INDUSTRIES HOLDINGS (4.1)	Commercial Vehicle Parts	−0.37	0.25	0.93 ***	0.08	0.05	0.07
GENEXINE (2.5)	Biotechnology	−0.41 ***	0.12	0.81 ***	0.08	0.09	0.1
HANMI PHARM (4.1)	Pharmaceuticals	−0.46 ***	0.12	0.54 ***	0.06	−0.05	0.06
HANJIN KAL (3.9)	Travel and Leisure	−0.58 ***	0.21	0.65 ***	0.15	−0.11	0.25
SK CHEMICALS (4.8)	Chemicals	−0.79 **	0.38	0.32 *	0.17	0.05	0.19
DOOSAN FUEL CELL (4.2)	Construction	−1.11	0.63	0.92 ***	0.29	0.27	0.29

Note: The table presents results from regressions of the returns on the firms listed in column (1) on the change in the won/dollar nominal exchange rate (column (3)), the return on the aggregate Korean stock market (column (5)), the return on the world stock market (column (7)), the change in the log of the spot price for Dubai crude oil (not shown) and the change in the Bank of Korea base rate (not shown). The sample period extends from 22 January 2001 to 19 January 2021. There are 5217 observations. In cases where return data are unavailable on 22 January 2001, the sample begins on the first date when return data become available. S.E. in columns (4), (6), and (8) are heteroscedasticity and autocorrelation consistent standard errors. Source: Datastream database and calculations by the author. *** (**) [*] denotes significance at the 1% (5%) [10%] level.

The top row presents exposures for the aggregate Korean stock market. The overall market is exposed to exchange rate changes, with an exchange rate beta of −0.25 that is significant at the 1% level. Unlike for the French stock market, this finding implies that an appreciation of the currency is associated with an increase in stock returns. There is a long history in Korea of borrowing from abroad and suffering capital outflows that depreciate the currency and harm the economy (see, e.g., Kim 2009). Kim et al. (2020), while not naming the individual firms, reported that there was a positive relationship between firm stock returns and won appreciations for more than half of the Korean manufacturing firms they investigated. The coefficient on the exchange rate in Table 2 implies that a 10% appreciation of the won is associated with an increase in the return on the overall market of 2.5%.

The Korean stock market is also exposed to the return on the world market, with an exposure of 0.64 that is also significant at the 1% level. This implies that a 10% fall in the return on the world stock market is associated with a 6.4% drop in the Korean stock market. There is a problem between the timing of the data on the Korean stock market and the world stock market. For instance, if the return on the world stock market lagged one day is also included in the regression, it has a coefficient of 0.36 and a t-statistic greater than 18. When the world return lagged one day in included in regressions for individual firms, the coefficient on the world return lagged one day can turn out positive and significant and the coefficient on the contemporaneous return can turn out negative and significant. Because of this problem, this section does not focus on interpreting the coefficients on the

world return. Finally, although not shown in Table 2, the market is exposed to oil prices but not to the BoK base rate.

The rows below the top row presents results for individual companies. As with Table 1, they are ordered from the company most exposed to appreciations to the company least exposed to appreciations.

Of the 92 firms listed in Table 2, only 7 are harmed by exchange rate appreciations. Interestingly, these seven are flagship companies from Korea's key automotive and electronics industries. They include Korea's two largest auto producers (Hyundai Motors and Kia Motors), its two largest electronics manufacturers (Samsung Electronics and LG Electronics), and automobile and electronics parts and components suppliers (Hyundai Mobis, LG Display, and Samsung Electro-Mechanics). A 10% appreciation would reduce Hyundai Motors' stock price by 2.8%, Kia Motors' by 2.3%, LG Electronics' by 2.1%, Hyundai Mobis' by 1.8%, LG Display's by 1.6%, Samsung Electro-Mechanics' by 1.3%, and Samsung Electronics' by 1.0%.

Among the companies that gain from appreciations are metal, oil, chemical and some pharmaceutical companies that sell products invoiced in dollars. When the dollar depreciates, these products become cheaper in importing countries' currencies and customers are able to purchase more. Companies that fall in this category include Hyundai Steel, Korea Zinc, SK Chemicals, Hanwha Solutions, SK Innovation, and Posco Chemicals. HMH that provides marine transport for iron, steel, oil and other commodities also gains because demand for its services increases when the dollar weakens. Companies that employ imported inputs, such as CS Wind, gain when the won grows stronger. Travel and leisure businesses such as Hanjin Kal also gain as a stronger won boosts the purchasing power of Korean tourists.

Comparing the results for France and Korea, French stocks are more exposed to appreciations than Korean stocks. An appreciation reduces the French aggregate market but increases the Korean aggregate market. For the French firms examined, 17% are exposed to appreciations (at least the 10% level); for Korean firms, only 8% are. Since French firms sell in euros to the large Eurozone market and Korean firm sell in won only to the small Korean market, it is surprising that more French firms than Korean firms are exposed to appreciations. In both France and Korea, many strategic firms are exposed to appreciations. These include Airbus, STMicroelectronics, and Dassault Systèmes in France and Hyundai, Kia, Samsung Electronics, and LG Electronics in Korea. Additionally, in both countries, there are firms whose stocks gain from appreciations such as those that sell commodities such as metals that are priced in U.S. dollars and those that use imported inputs.

4. Results for Firms' Exposures to the Pandemic

Table 3 presents evidence of French firms' exposure to the pandemic. Column (3) reports the change in the log of each firm's stock price between 19 February 2020, when the crisis caused aggregate stock prices to tumble, and 20 January 2021. Column (4) reports the change over this period driven by the macroeconomic factors and column (5) reports the change driven by other factors. For the aggregate market, forecasts based on the macroeconomic environment in column (4) predicted a 9% increase by 20 January 2021. However, during the pandemic, other factors in column (5) caused offsetting losses of 13%, leading to an overall loss in column (3) of 5%.

Several banks exhibited losses over this period. Société Générale lost (in logs) 62%, Crédit Agricole lost 27%, and BNP Paribas lost 19%. For Société Générale, macroeconomic factors caused an 11% drop in prices and idiosyncratic factors caused a 51% drop. For Crédit Agricole, macroeconomic factors caused a 9% drop and idiosyncratic factors caused an 18% drop. For BNP Paribas, macroeconomic factors caused an 8% drop and idiosyncratic factors caused an 11% drop.

Table 3. Change in French Stock Prices between 19 February 2020 and 20 January 2021 Driven by Macroeconomic and Firm-Specific Factors.

(1)	(2)	(3)	(4)	(5)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by All Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Macro Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Other Factors
AGGREGATE FRENCH STOCK MARKET	NA	−0.05	0.08	−0.13
AIRBUS (72,510)	Aerospace	−0.36	−0.06	−0.30
STMICROELECTRONICS (37,940)	Semiconductors	0.14	−0.13	0.27
DEVOTEAM (830)	Computer Services	0.14	−0.03	0.16
SOITEC (3490)	Semiconductors	0.72	−0.09	0.81
DASSAULT SYSTEMES (60,660)	Software	0.03	0.01	0.02
MAISONS DU MONDE (709)	Household Furnishings	0.25	−0.16	0.40
PUBLICIS GROUPE (10,620)	Media	0.05	−0.07	0.13
TELEPERFORMANCE (16,679)	Industrial Support Services	0.17	0.04	0.13
SOLOCAL GROUP (394)	Media, Publishing	−1.39	−0.38	−1.02
SOPRA STERIA GROUP (2920)	Computer Services	−0.025	0.01	0.01
SODEXO (10,920)	Restaurants and Bars	−0.25	−0.02	−0.22
EUTELSAT COMMUNICATIONS (2230)	Telecommunications Equipment	−0.30	−0.03	−0.27
INNATE PHARMA (370)	Biotechnology	−0.59	−0.04	−0.55
ALD (4890)	Computer Services	−0.01	−0.05	0.04
BUREAU VERITAS (10,180)	Industrial Support Services	−0.10	0.05	−0.15
SUEZ (10,820)	Water	0.11	−0.10	0.21
CAPGEMINI (24,290)	Computer Services	0.08	−0.12	0.20
EUROFINS SCIEN (18,690)	Medical Services	0.49	0.11	0.38
TECHNICOLOR (63)	Entertainment, Media	−1.53	−0.41	−1.11
UBISOFT ENTERTAINMENT CAT A (10,198)	Electronic Entertainment	0.12	0.04	0.08
ALTEN (3140)	Computer Services	−0.14	0	−0.14
IPSOS (1290)	Media	−0.11	0	−0.11
SANOFI (123,030)	Pharmaceuticals	−0.13	−0.08	−0.05
M6-METROPOLE TV (1900)	Radio Tv Broadcast	−0.09	−0.08	−0.01
BIOMERIEUX (15,090)	Medical Equipment	0.22	0.06	0.16
SAFRAN (50,920)	Industrial Goods and Services	−0.24	0.01	−0.25
THALES (19,950)	Defense	−0.20	−0.02	−0.18
BIC (2157)	Drug and Grocery Stores	−0.22	−0.02	−0.20
IPSEN (6290)	Pharmaceuticals	0.08	0.05	0.02
CGG (658)	Oil Equipment and Services	−1.15	−0.18	−0.97
NRJ GROUP (509)	Radio Tv Broadcast	0.07	−0.11	0.18
MERCIALYS REIT (684)	Real Estate	−0.46	−0.01	−0.45
NEOEN (4690)	Electricity	0.61	0.36	0.25
CHRISTIAN DIOR (80,330)	Clothing Accessories	−0.01	0.05	−0.06
ESSILORLUXOTTICA (58,540)	Medical Supplies	−0.14	0.04	−0.17
ILIAD (10,950)	Telecommunications Services	0.15	0.06	0.09
WORLDLINE (20,880)	Industrial Support Services	−0.05	0.17	−0.22
LAGARDERE GROUPE (2482)	Publishing	0.03	−0.12	0.16
BOLLORE (10,650)	Transportation Services	−0.06	0.07	−0.13
LVMH (271,260)	Clothing Accessories	0.19	0.01	0.18
EDENRED (11,720)	Industrial Support Services	−0.07	0.05	−0.12
GTT (273)	Oil Equipment and Services	−0.13	0.05	0.18
QUADIENT (702)	Electronic Office Equipment	−0.32	−0.03	−0.30
MICHELIN (4140)	Tires	0.01	0.01	0
KERING (69,450)	Apparel Retailers	−0.05	−0.02	−0.04
ATOS (268)	Computer Services	−0.16	−0.08	−0.08
KORIAN (3210)	Health Care	−0.30	0	−0.30

Table 3. *Cont.*

(1)	(2)	(3)	(4)	(5)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by All Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Macro Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Other Factors
HERMES INTL (96,660)	Clothing Accessories	0.20	0.10	0.10
DANONE (36,710)	Food Producers	−0.26	−0.03	−0.23
AIR FRANCE-KLM (2110)	Travel and Leisure	−0.69	−0.09	−0.59
ADP (10,190)	Transportation Services	−0.57	0.07	−0.63
LISI (1210)	Aerospace	−0.35	0.07	−0.42
SWORD GROUP (329)	Computer Services	−0.02	0.09	−0.11
MERSEN (EX LCL) (591)	Electrical and Electronic Equipment	−0.11	−0.06	−0.05
VALEO (7960)	Auto Parts	0.15	−0.01	0.16
REMY COINTREAU (7970)	Distillers and Vintners	0.33	0.03	0.30
BENETEAU (1020)	Recreational Vehicles and Boats	0.07	−0.01	0.08
L'OREAL (163,760)	Cosmetics	0.08	−0.03	0.10
TRIGANO (2960)	Recreational Products	0.59	0.08	0.51
RUBIS (4060)	Specialty Retailers	−0.32	0.09	−0.41
FNAC DARTY (1290)	Specialty Retailers	0.12	0.04	0.08
LEGRAND (20,790)	Electrical and Electronic Equipment	0.04	0.02	0.02
TOTAL (92,295)	International Oil and Gas	−0.19	−0.02	−0.18
ELIOR GROUP (989)	Consumer Services	−0.85	−0.06	−0.79
TF1 (TV.FSE.1) (1500)	Media	−0.07	−0.16	0.09
RENAULT (2342)	Automobiles	0.09	−0.06	0.15
JCDECAUX (3690)	Media	−0.34	−0.01	−0.33
VIVENDI (30,560)	Media	0.05	−0.17	0.22
PERNOD-RICARD (42,932)	Distillers and Vintners	−0.09	0.06	−0.16
COLAS (4780)	Construction	−0.09	0.04	−0.12
ORPEA (7450)	Health Care	−0.09	0.11	−0.20
L AIR LQE.SC.ANYME. POUR L ETUDE ET L EPXTN (4780)	Chemicals	−0.07	0.01	−0.08
ORANGE (31,570)	Telecommunications Services	−0.33	−0.20	−0.14
COVIVIO (6449)	Real Estate	−0.45	0.10	−0.55
NEXITY (2130)	Real Estate	−0.19	0.06	−0.25
BOUYGUES (12,760)	Construction	−0.12	−0.08	−0.04
DERICHEBOURG (934)	Waste and Disposal Services	0.57	−0.17	0.73
ACCOR (8080)	Hotels and Motels	−0.26	−0.04	−0.22
LNA SANTE (470)	Health Care	−0.01	0.11	−0.12
X-FAB SILICON FOUNDRIES (929)	Semiconductor	0.34	−0.16	0.50
ARKEMA (6790)	Chemicals	0.13	0.03	0.11
ICADE REIT (4442)	Real Estate	−0.55	0.07	−0.62
CARREFOUR (11,900)	Food Retailers and Wholesalers	−0.08	−0.15	0.07
EDF (32,490)	Electricity	−0.11	−0.14	0.03
JACQUET METALS (351)	Industrial Metals	0.06	0	0.05
MANITOU (1080)	Construction and Handling Machinery	0.41	−0.01	0.42
REXEL (4760)	Electrical and Electronic Equipment	0.04	−0.06	0.11
KLEPIERRE REIT (5193)	Real Estate	−0.55	0.05	−0.60
IMERYS (3470)	Industrial Metals and Mines	0.06	0.01	0.04
GECINA (9140)	Real Estate	−0.42	0.07	−0.55
RALLYE (346)	Retailers	−0.42	0.07	−0.49

Table 3. *Cont.*

(1)	(2)	(3)	(4)	(5)
Firm or Portfolio (Market Capitalization in Millions of Euros)	Sector	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by All Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Macro Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Other Factors
ALBIOMA (1340)	Electricity	0.36	0.14	0.22
NATIXIS (144)	Banks	−0.31	−0.03	−0.29
VALLOUREC (289)	Iron and Steel	−1.27	−0.03	−1.24
FAURECIA (6040)	Auto Parts	0	−0.01	0.01
MAUREL ET PROM (353)	Crude Oil Producers	−0.34	0.06	−0.39
CASINO GUICHARD-P (2621)	Drugs/Grocery Stores	−0.30	−0.09	−0.21
VICAT (1710)	Cements	−0.06	0.03	−0.08
GETLINK (7510)	Railroads	−0.20	−0.06	−0.14
PLASTIC OMNIUM (4920)	Auto Parts	0.29	0.09	0.20
VINCI (48,951)	Construction	−0.25	0.03	−0.27
SCHNEIDER ELECTRIC (69,830)	Electrical and Electronic Equipment	0.24	0.01	0.23
VEOLIA ENVIRON (12,660)	Electronic Recycling	−0.21	−0.08	−0.13
NEXANS (1050)	Electrical and Electronic Equipment	0.29	0	0.29
ALSTOM (16,210)	Electrical and Electronic Equipment	0.10	−0.10	0.20
SOCIETE GENERALE (14,850)	Banks	−0.62	−0.11	−0.51
EIFFAGE (8150)	Construction	−0.32	0.11	−0.43
BNP PARIBAS (54,890)	Banks	−0.19	0.08	−0.11
CREDIT AGRICOLE (29,560)	Banks	−0.27	−0.09	−0.18
ELIS (2930)	Industrial Suppliers, Industrial Support Services'	−0.32	0.06	−0.38
ERAMET (618)	Nonferrous Metals	0.23	0.04	0.19
SMCP (312)	Clothing Accessories	−0.47	−0.55	0.08

Note: Column (3) presents the change in the log of the stock price in column (1) between 19 February 2020 and 20 January 2021. Column (4) presents the change in the log of the stock price between 19 February 2020 and 20 January 2021 forecasted by a regression of returns on the firms listed in column (1) on the change in the euro/dollar nominal exchange rate, the return on the aggregate French stock market, the return on the world stock market, the change in the log of the spot price for Brent crude oil, and Altavilla et al. (2019) measures of the changes in 2 year and 10 year bonds due to monetary policy news run over the 22 January 2001 to 18 February 2020 period. Column (5) presents the difference between the actual change in the stock price over the 19 February 2020 to 20 January 2021 period and the change forecasted from the regression. Source: Datastream database and calculations by the author.

Banks are also exposed to the real estate sector, and real estate stocks in Table 3 performed badly. Icade and Klépierre lost 55% over the period, Mercialys lost 46%, Covivio lost 45%, and Gecina lost 42%. These losses were driven entirely by idiosyncratic factors. Icade and Gecina invested in offices, Klépierre was a landlord for shopping centers, and Covivio owned luxury hotels. Offices, shopping centers, and hotels have been roiled by the pandemic.

Firms related to air transport have also suffered. Air France—KLM lost 68%. ADP, which manages Paris's airports, lost 57%. Airbus lost 36%. Safran, which provides engines for airplanes, lost 24%. In every case, the lion's share of these losses was driven by idiosyncratic rather than macroeconomic factors.

The decline in transportation and other factors have hit firms linked to the oil industry. Vallourbe, a manufacturer of iron and steel pipes for shale oil drillers, saw its share prices fall logarithmically by 127%. CGG, a provider of geophysical services to the oil industry, suffered a price drop of 115%. Maurel and Prom, a producer of hydrocarbons, experienced a 34% fall in prices. Total, a crude oil producer, faced a price drop of 19%. These losses were driven primarily or entirely by idiosyncratic factors.

Some other firms also suffered because of the pandemic. The Elior Group, a caterer for corporations, saw prices fall by 85%. JCDecaux, a provider of outdoor advertising, saw its prices fall by 34%. These losses were driven by idiosyncratic factors.

Other firms gained from the pandemic. Trigano, a manufacturer of motor homes and caravans, experienced a stock price rise of 59%. Macroeconomic factors caused the price to rise by 8% and idiosyncratic factors caused the price to rise by 51%. As the crisis made staying in hotels and traveling by public transportation dangerous, the demand for motor homes and caravans increased. Maisons du Monde, a merchant of home furnishing and accessories, saw prices rise 25%. Macroeconomic variables would have caused prices to fall 16%, and this was offset by idiosyncratic factors that caused prices to rise by 40%. People working from home invested in their home environment.

There was also an increase in spending on information and communications technology to facilitate teleworking. This was a boom for the semiconductor industry. Semiconductor companies Soitec, X-Fab Silicon Foundries, and STMicroelectronics, saw their stock prices increase by 72%, 34%, and 14%, respectively. In every case, the macroeconomic environment would have caused prices to fall, and these were offset by firm- and sector-specific influences.

Several firms involved in green industries also gained. Neoen and Albioma, renewable energy producers, experienced gains of 61% and 37%, respectively. Nexans, a provider of cables for offshore wind farms, gained 29%. Schneider Electric, a firm that provides digital solutions to achieve sustainability, gained 25%.

Luxury brands survived and some performed well. Rémy Cointreau shares increased 33%, with idiosyncratic factors producing a 30% gain. Hermès gained 20%, with idiosyncratic factors generating a 10% gain. LVMH gained 19%, with idiosyncratic factors leading to an 18% increase. L'Oréal gain. While the crisis harmed lower paid service workers, it did less to harm higher paid workers in knowledge-intensive sectors (see, e.g., Dingel and Neiman 2020). These wealthier consumers throughout the world sustained the demand for French luxury goods. In addition, luxury brands gained from the recovery in China. Chinese GDP grew 2.2% in 2020 and its stock market is up more than 40% between March 2020 and January 2021. When Chinese stock returns are included in equation (1) the coefficient is positive and significant at the 1% level for Hermès and Dior and at the 10% level for Rémy Cointreau.

As with Table 3, columns (3) through (5) of Table 4 document how Korean firms have fared during the coronavirus crisis. Column (3) reports the change in the log of each firm's stock price between 19 February 2020 and 20 January 2021. Column (4) reports the change over this period driven by the macroeconomic factors and column (5) reports the change driven by other factors. For the aggregate market, forecasts based on the macroeconomic environment in column (4) predicted a 16% increase by 20 January 2021. During the pandemic period, other factors in column (5) caused gains of 17%, leading to an overall gain in column (3) of 33%. This stands in contrast to the 5% loss for the French aggregate stock market shown in Table 3.

Column (4) indicates that macroeconomic factors produced gains in all the stocks during this period. Focusing on column (5), the results indicate that, as occurred in France, several Korean banks were damaged by the crisis. Idiosyncratic factors during the crisis period caused the Industrial Bank of Korea to lose 49%, Shinhan to lose 42%, KB Financial to lose 24%, Woori to lose 21%, and Hana to lose 18%.

Some other key losers, with losses driven by idiosyncratic factors in parentheses, were Amorepacific Group (−52%), Hotel Shilla (−48%), Hyundai Heavy Industries (−45%), and Samsung Heavy Industries (−30%). Amorepacific suffered as people got together less and thus used less makeup. Hotel Shilla lost from the decline in tourism and from fewer people visiting its duty-free shops. Hyundai Heavy and Samsung Heavy faced falling demand for ships during the pandemic.

Table 4. The Change in Korean Stock Prices between 19 February 2020 and 20 January 2021 Driven by Macroeconomic and Firm-Specific Factors.

(1)	(2)	(3)	(4)	(5)
Firm or Portfolio (Market Capitalization in Trillions of Korean Won)	Sector	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by All Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Macro Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Other Factors
AGGREGATE KOREAN STOCK MARKET	NA	0.33	0.16	0.17
CELLTRION HEALTHCARE (21.89)	Biotechnology	0.76	0.60	0.16
NETMARBLE (11.85)	Electronic Entertainment	0.25	0.20	0.05
HYUNDAI MOTOR (27.18)	Automobiles	0.69	0.38	0.30
KIA MOTORS (35.02)	Automobiles	0.70	0.35	0.35
LG ELECTRONICS (30.29)	Consumer Electronics	0.77	0.31	0.45
HYUNDAI MOBIS (31.51)	Auto Parts	0.38	0.43	−0.04
LG DISPLAY (8.56)	Electronic Components	0.29	0.25	0.05
ECOPRO BM (3.93)	Electronic and Electrical Equipment	0.80	0.69	0.11
SAMSUNG ELTO.MECHANICS (20.99)	Electronic Components	0.35	0.34	0.01
LG INNOTEK (5.03)	Electronic Components	0.23	0.38	−0.15
SAMSUNG BIOLOGICS (52.87)	Biologics	0.46	0.69	−0.24
SAMSUNG ELECTRONICS (554.28)	Technology Hardware	0.37	0.42	−0.06
SAMSUNG FIRE & MAR.IN. (8.57)	Insurance	−0.11	0.31	−0.42
SAMSUNG LIFE INSURANCE (14.34)	Insurance	0.19	0.13	0.06
HYUNDAI GLOVIS (7.82)	Trucking	0.29	0.29	0
NCSOFT (22.55)	Electronic Entertainment	0.33	0.34	−0.01
NH INVESTMENT & SECS. (3.47)	Investment Banking and Brokerage	0.05	0.38	−0.33
HANON SYSTEMS (9.80)	Auto Parts	0.48	0.39	0.09
COWAY (5.28)	Household Equipment Producers	0	0.36	−0.35
LG (12.91)	Diversified Industrials	0.29	0.39	−0.10
KAKAO (43.35)	Consumer Digital Services	0.84	0.28	0.56
KB FINANCIAL GROUP (18.76)	Banks	0.08	0.32	−0.24
SAMSUNG SDI (55.11)	Technology Hardware	0.79	0.35	0.43
DOUZONBIZON (3.44)	Software and Computer Services	0.11	0.23	−0.22
S-1 (3.093)	Security Services	0.01	0.25	−0.24
SHINHAN FINL.GROUP (17.0)	Banks	−0.10	0.32	−0.42
WOORI FINANCIAL GROUP (7.0	Banks	−0.02	0.20	−0.21
SAMSUNG SDS (15.5)	Computer Services	0.01	0.24	−0.23
LG CHEM (64.7)	Chemicals	0.90	0.49	0.42
POSCO (21.0)	Iron and Steel	0.23	0.30	−0.07
HANKOOK TIRE & TECHNOLOGY (6.5)	Tires	0.38	0.15	0.23
SK HYNIX (99.4)	Semiconductor	0.23	0.34	−0.11
LG HHLD & HLTH.CARE (27.7)	Drug-Grocery Stores	0.10	0.38	−0.29
SKC (4.8)	Chemicals	0.68	0.40	−0.28
GS HOLDINGS (3.9)	Diversified Industrials	−0.16	0.32	−0.48
KANGWON LAND (5.3)	Travel and Leisure	−0.07	0.23	−0.29
S-OIL (10.1)	Oil Refining and Marketing	−0.04	0.32	−0.37
INDUSTRIAL BANK OF KOREA (6.2)	Banks	−0.16	0.33	−0.48

Table 4. *Cont.*

(1)	(2)	(3)	(4)	(5)
Firm or Portfolio (Market Capitalization in Trillions of Korean Won)	Sector	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by All Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Macro Factors	Δ Log of Stock Price between 19 February 2020 and 20 January 2021 Driven by Other Factors
CJ ENM (3.1)	Retailers	0.10	0.29	−0.19
DB INSURANCE (2.9)	Insurance	0	0.47	−047
NAVER (63.5)	Consumer Digital Services	0.49	0.47	0.01
SAMSUNG SECURITIES (3.4)	Investment Banking	0.16	0.34	−0.18
LOTTE CHEMICAL (10.4)	Chemicals	0.35	0.47	−0.12
KOREA ELECTRIC POWER (13.8)	Electricity	−0.04	0.20	−0.23
MIRAE ASSET DAEWOO (7.8)	Investment Banking	0.37	0.40	−0.03
SK HOLDINGS (19.8)	Software and Computer Services	0.32	0.37	−0.05
HOTEL SHILLA (3.3)	Retailers	−0.11	0.37	−0.48
SAMSUNG C&T (23.4)	Construction	0.20	0.36	−0.16
SSANGYONG CEMENT INDL. (3.5)	Cement	0.35	0.31	0.04
SK MATERIALS (3.4)	Basic Materials	0.71	0.47	0.23
HYUNDAI HEAVY INDUSTRIES (7.4)	Marine Transport	−0.04	0.41	−0.45
CJ CHEILJEDANG (7.1)	Food Producers	047	0.16	0.31
HANA FINANCIAL GROUP (10.9)	Banks	0.15	0.33	−0.18
KOREAN AIR LINES (9.8)	Airlines	0.43	0.36	0.07
KUMHO PETRO CHEMICAL (7.8)	Chemicals	0.90	0.42	0.48
GS ENGR. & CON. (3.2)	Construction	0.45	0.44	0
HYUNDAI STEEL (5.3)	Iron and Steel	0.47	0.43	0.05
SK INNOVATION (26.6)	Oil Refining and Marketing	0.69	0.39	0.30
KOREA INVESTMENT HDG. (4.0)	Investment Banking	0.25	0.49	−0.25
HANWHA SOLUTIONS (9.4)	Chemicals	1.10	0.42	0.68
HMM (5.7)	Marine Transportation	1.39	0.42	0.68
SAMSUNG HEAVY INDS. (24.9)	Marine Transport	0.04	0.34	−0.30
KOREA ZINC (8.1)	Precious Metals and Mines	−0.10	0.37	−0.46
AMOREPACIFIC GROUP (6.6)	Cosmetics	−0.14	0.37	−0.52
DOOSAN HVY.IN&C. (4.2)	Industrial Machinery	0.94	0.39	0.55
ALTEOGEN (3.8)	Biotechnology	0.011	0.04	0.04
HYUNDAI ENGR & CON. (4.6)	Construction	0.17	0.30	−0.14
CS WIND (3.3)	Energy	1.59	0.36	1.24
HYUNDAI HEAVY INDUSTRIES HOLDINGS (4.1)	Commercial Vehicle Parts	−0.09	0.18	−0.27

Note: Column (3) presents the change in the log of the stock price in column (1) between 19 February 2020 and 20 January 2021. Column (4) presents the change in the log of the stock price between 19 February 2020 and 20 January 2021 forecasted by a regression of the returns on the firms listed in column (1) on the change in the won/dollar nominal exchange rate, the return on the aggregate Korean stock market, the return on the world stock market, the change in the log of the spot price for Dubai crude oil and the change in the Bank of Korea base rate run over the 22 January 2001 to 18 February 2020 period. The model employs actual out of sample values of the five macroeconomic variables to forecast stock prices. Column (5) presents the difference between the actual change in the stock price over the 19 February 2020 to 20 January 2021 period and the change forecasted from the regression. Source: Datastream database and calculations by the author.

As in France, several Korean firms involved in green industries gained. Idiosyncratic factors caused the wind tower manufacturer CS Wind to gain 124%, the sustainable solutions firm Hanwha to gain 68%, and the lithium ion maker Samsung SDI to gain 43%.

Idiosyncratic factors caused automakers Kia Motors and Hyundai Motors to gain 35% and 30%, respectively. As Figure 2 shows, these firm- and industry-specific factors caused major losses to both companies until August 2020. Then, as demand recovered in Korea, China, and other countries, stock returns first for Hyundai and then for Kia grew quickly.
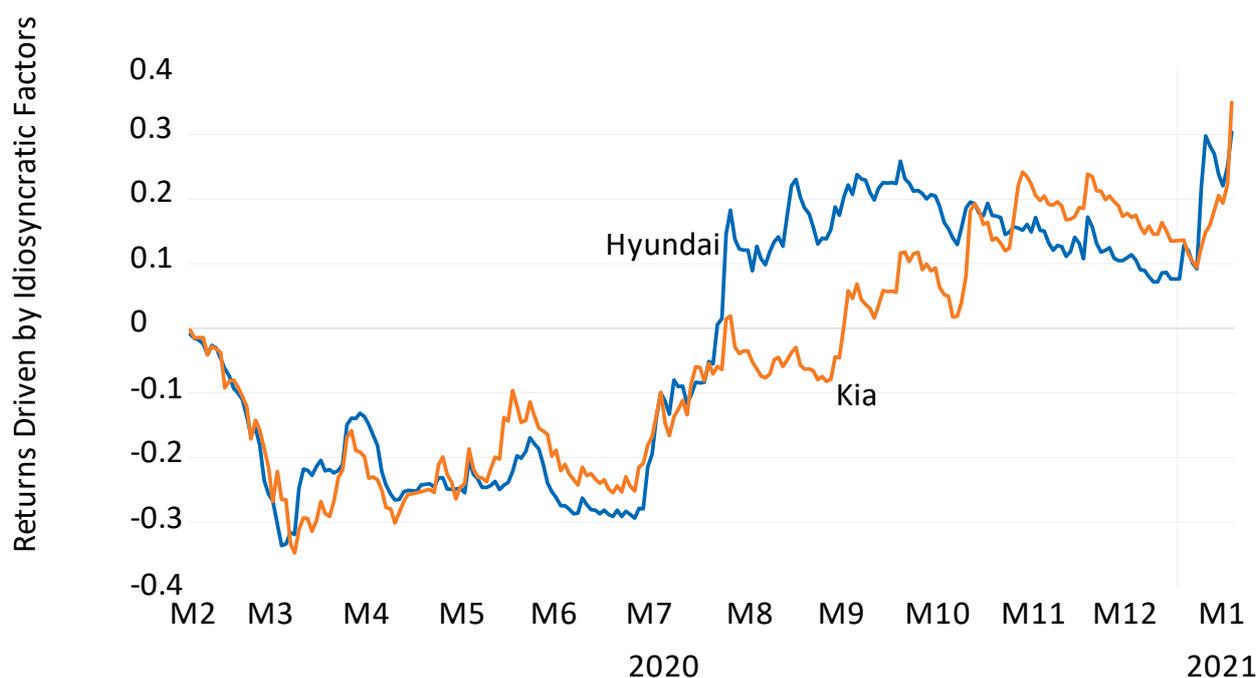
Figure 2. Stock returns for Kia Motors and Hyundai Motors driven by idiosyncratic factors during the COVID-19 crisis.

Comparing the results for France and Korea, the macroeconomic environment caused half of the French stocks investigated to lose but all of the Korean stocks investigated to gain. These differences mirror France's failure relative to Korea in controlling the crisis. For both countries idiosyncratic factors during the crisis harmed banks. Given the important role that banks play in these countries, policy makers need to monitor banks to ensure that they remain well capitalized. Idiosyncratic factors in both countries also harmed sectors related to hotels. On the other hand, idiosyncratic factors helped firms making electronic components. As people worked more from home, their need for computers and other electronic goods increased, raising demand for electronic components for these goods. In addition, idiosyncratic factors helped firms in green industries. Thus, during the pandemic period, idiosyncratic factors have caused several sectors in the two countries to respond in the same way.

5. Discussion and Conclusions

Rogoff (2020) and Ilzetzki et al. (2020) noted that during the 2008 Global Financial Crisis (GFC), the U.S. dollar fluctuated between \$1.07 and \$1.58 to the euro. The Korean won also fluctuated wildly during the GFC. Rogoff predicted that the dollar will depreciate to return to its mean and that wide exchange rate swings will return. Since the Eurozone and South Korea run large current account surpluses year after year, their currencies face appreciation pressure. This paper investigates how appreciations would affect French and Korean firms. One would expect French firms to be less exposed to appreciations than Korean firms, since French firms can sell in euros to large French and Eurozone markets while Korean firms can only sell in won to a small domestic market. On the other hand, one might expect French firms to be harmed more by the pandemic than Korean firms, since France has one of the highest death rates per capita from the crisis and Korea has one of the lowest.

Surprisingly, more French firms than Korean firms are exposed to appreciations. These include many of France's flagship companies, including its leading aerospace company (Airbus), its leading software company (Dassault Systèmes), and its leading semiconductor company (STMicroelectronics). Not only is STMicroelectronics exposed to appreciations but France's second leading semiconductor firm, Soitec, is also exposed. How can we interpret the magnitude of the exchange rate exposures? For STMicroelectronics, a 10% euro

appreciation is associated with a 3.4% drop in stock returns. When equation (1) is estimated for the French semiconductor industry aggregated together on a value-weighted basis, a 10% appreciation is still associated with a 3.4% appreciation. Thorbecke (2019b) found that a 10% Japanese yen appreciation caused Japanese semiconductor stocks to fall by 3.1%. He also found that yen appreciations during the GFC, by damaging the profitability of Japanese firms and restricting their ability to invest in capital and innovation, caused Japan to lose its comparative advantage in producing electronic parts and components. Given the need for massive investment in the semiconductor industry to remain competitive, French semiconductor firms face a similar risk if the euro appreciates.

The risks are even greater for Airbus, France's leading aerospace company. The Conseil National de Productivité (2019) highlighted aerospace as an industrial sector where France has strong non-price competitiveness. However, the results in Table 3 indicate that Airbus's stock is down 36% since the COVID-19 crisis hit. Five-sixth of this drop is driven, not by the macroeconomic environment but by firm-specific responses during the crisis. The airline industry has collapsed and with it demand for new aircrafts. Airbus is also the firm most exposed to appreciations in Table 1, with a 10% euro appreciation causing a 4.8% drop in its stock. A large euro appreciation coming on the heels of the COVID crisis could devastate Airbus.

On the other hand, strong brands such as LVMH, L'Oréal, Hermès, Christian Dior, and Rémy Cointreau are either unexposed or only slightly exposed to appreciations. These firms have pricing power (see, e.g., Goldstein 2021). Rémy Cointreau shares also increased 33% during the crisis, Hermès gained 20%, LVMH gained 19%, and L'Oréal gained 8%. Idiosyncratic rather than macroeconomic factors drove these gains. The crisis harmed lower paid service workers much more than workers in advanced sectors who could work from home (see, e.g., Dingel and Neiman 2020). These wealthier consumers ordered goods online and sustained the demand for French luxury products. In addition, the recovery in China benefited these companies.

Appreciations in Switzerland exert similar effects as appreciations in France, harming medium-high technology industries but not the strongest brands and the highest-end luxury products. The IMF (2013, p. 18) stated, Switzerland's " . . . exporting industries may be built around production of very specific items, which are particularly valued for their brands or special characteristics and hence face limited price competition". Thorbecke and Kato (2018) found that Swiss franc appreciations do not decrease exports of Switzerland's most sophisticated products, pharmaceuticals and watches, but do decrease exports of machinery and capital goods. They also reported that appreciations do not reduce stock prices and Swiss franc export prices for the pharmaceutical and watch industries, but do reduce these for the machinery and capital goods sectors. Thus, as in France, Swiss luxury companies and strong brands such as Patek Philippe, Rolex, and Novartis can weather exchange rate changes but machinery, precision instrument, and machine tool manufacturers remain exposed to appreciations.

The findings reported in this paper are nuanced for Korea. Many firms in Korea gain from appreciations. Only seven of the 92 investigated are harmed by appreciations, including flagship firms such as Hyundai Motors, Kia Motors, LG Electronics, and Samsung Electronics. The effect is smallest for Samsung. This is partly because Samsung is one of the strongest brands in the world and has pricing power in some of its products.[8] Korea has also succeeded much better than France at controlling the spread of the coronavirus. This has contributed to a stronger macroeconomy in Korea than in France. The macroeconomic environment caused every Korean firm investigated to post gains during the 19 February 2020 to 19 January 2021 period. Thus, Korean firms are in better shape than French firms and the Korean economy is less exposed to appreciations than the French economy.

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[8] The *Financial Times* rated Samsung as the 38th strongest brand in the world, one behind Hermès (see https://www.ft.com/content/3a3419f4-78b1-11e9-be7d-6d846537acab (accessed on 1 March 2021)).

Several policy lessons flow from these findings. One is that luxury brands help stabilize the French economy in the face of exchange rate shocks and the pandemic. Many luxury brands outsource production to Eastern Europe or Asia. This risks a decay of knowledge in France.[9] In addition, with French young people reeling from the coronavirus crisis, it is an opportune time to provide apprenticeships and nurture craftsmen in France. Additionally, labor costs will be lower because of the crisis. Luxury brands can take a page from Asia. Industrial clusters have emerged in Japan, China, Taiwan, and other places where upstream and downstream firms congregate and workers interact. This agglomeration provides an environment where young people and even experienced workers can acquire knowhow and gain human capital. Keeping production in France also helps to preserve quality and maintain strong brands.

A second policy lesson is that appreciations harm French knowledge-intensive companies such as Airbus, STMicroelectronics, and Dassault Systèmes. Given the damage already caused to the economy by the pandemic, a large appreciation would inflict a double whammy. France should lobby against large Eurozone current account surpluses that could generate appreciations. Since current account surpluses reflect excesses of saving over investment, one way to lower current account surpluses is for Eurozone countries with decaying infrastructure to spend on this.

While France cannot control the spending of other countries, it can act to control the costs it imposes on firms. A reduction in costs would act like a depreciation to improve price competitiveness. The Conseil National de Productivité (2019) noted that taxes on French businesses are distortionary and higher than in European partners. Tax reform could help French companies confront international competition.

Finally, there is a danger in a crisis of continuing to finance unprofitable firms. As the pandemic changes the economic landscape, some firms that survived before the crisis may no longer be viable or may need to be scaled down. The experience of Japan in the 1990s indicates that keeping zombie companies on life support only increases long-term costs. It is better to reallocate resources to promising sectors. The results in this paper indicate that firms in green industries in both France and Korea have done well in spite of the pandemic. Policy makers should consider providing incentives for workers to retrain and relocate to sustainable industries.

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[9]   I am indebted to Dr. Sebastien Lechevalier for this point.

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