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# The Exposure of French and South Korean Firms to Exchange Rates and the COVID-19 Pandemic: Evidence from the Stock Market\*

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## Abstract

Rogoff (2020) 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 uses stock returns to investigate the exposure of French and Korean firms 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 also 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. The paper concludes with suggestions to increase firms' resilience to these twin shocks.

Keywords: France, Korea, Coronavirus, Exchange rate exposure, Stock returns

JEL classification: G10, I10

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## 1. Introduction

Rogoff (2020) and Ilzetzi, Reinhart, and Rogoff (2020) noted that exchange rates have remained “eerily” stable during the COVID-19 pandemic. They predicted that volatility will reemerge and that the U.S. dollar will depreciate towards its mean. The Eurozone and South Korea run large current account surpluses year after year. These surpluses could cause the euro and the Korean won to appreciate. How would appreciations affect firms in France (a Eurozone member) 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). Either way they will impact firm 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 affect firms.

Another salient risk facing French and Korean companies comes from the coronavirus pandemic. Fear of infection makes consumers reticent about transactions requiring face-to-face contact. Job losses and reductions in income reinforce this affect. 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.

One would expect French and Korean firms to be impacted differently. 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 1,100 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.<sup>1</sup>

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 due to idiosyncratic rather than macroeconomic factors. 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.

Figure 1 shows that Korea's success compared to France's 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 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. In addition, more French firms than Korean firms are exposed to appreciations.

Many of France's flagship companies are harmed by appreciations, including its leading aerospace company (Airbus), its leading semiconductor company (STMicroelectronics), and its leading software company (Dassault Systèmes). On the other hand France's luxury companies, including LVMH, L'Oréal, Hermès, Christian Dior, and Rémy Cointreau, are either unexposed or

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<sup>1</sup> These data come from [www.statista.com](http://www.statista.com).

slightly exposed to 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, Martin, and Orefice (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, Martin, and Mayer (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 to 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 reducing the volume of exports, reducing 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.

The next section presents the data and methodology. Section 3 presents the results for French firms. Section 4 presents the results for Korean firms. Section 5 concludes.

## **2. Data and Methodology**

There is a long tradition in economics of estimating firms' exposure to exchange rates (see, e.g., Ito et al., 2016, and 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, Roll, and Ross, 1986). 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 for France and Korea are the return on the country's aggregate stock market, 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). The return on the world economy is employed to control for the impact of the world economy on stock returns. The change in the log of Brent crude oil spot prices is used for France and the change in the log of Dubai crude oil spot prices is used for Korea. 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.<sup>2</sup> 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.

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.<sup>3</sup> There are 5,216 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 series have unit roots. Company returns are thus regressed on the eight factors.

The estimated equations take the form:

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

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),  $\Delta er_t$  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  $\Delta MP_t$  represents the change in the monetary policy variables for France or Korea discussed above.

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<sup>2</sup> 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%20of%20assets.>

<sup>3</sup> In cases when stock return data are unavailable on 22 January 2001, the data are employed beginning on the first date they are available.

The change in returns during the coronavirus crisis is also investigated. 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. 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.<sup>4</sup>

### 3. Results for France

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.

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.<sup>5</sup>

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<sup>4</sup> 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.

<sup>5</sup> 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.



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), Collectis (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), Sartorius Stedim Biotech (medical supplies), and others. Thus firms in advanced, knowledge-intensive sectors such as semiconductors, biotechnology, 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 LVMH, 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 evidence of 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.

Banks are also exposed to the real estate sector, and real estate stocks in Table 2 performed badly. Icade and Klépierre lost 55% over the period, Mercialis 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 Elio 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.

#### 4. Results for Korea

Table 3 presents the results for estimating equation (2) 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.

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 3 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 is 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 3, 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 3, 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.

As with Table 2, columns (3) through (5) of Table 3 document how 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 1.

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

Industrial Bank of Korea to lose 49%, Shinhan to lost 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.

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 had 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.

LG Electronics and LG Chemicals that provides electronic inputs such as panels and polarizers to LG Electronics also initially lost due to idiosyncratic factors. Beginning in the summer, however, they started gaining. By 19 January 2021, idiosyncratic factors had caused LG Electronics to gain 45% and LG Chemicals to gain 42%.

## **5. Conclusion**

Rogoff (2020) and Ilzetzki, Reinhart, and Rogoff (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 exchange rate volatility will return. As 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.

France's leading semiconductor firm, STMicroelectronics, is exposed to appreciations. Its second leading 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 (2019) 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 1 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.

The findings are nuanced for Korea. Many firms in Korea gain from appreciations. Only seven of those 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.<sup>6</sup> 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.

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.<sup>7</sup> In addition, with French young people reeling from the coronavirus crisis, it is an opportune time to provide apprenticeships and nurture craftsmen in France. Also 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.

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<sup>6</sup> The *Financial Times* rated Samsung as the 38<sup>th</sup> strongest brand in the world, one behind Hermès ( see <https://www.ft.com/content/3a3419f4-78b1-11e9-be7d-6d846537acab> )

<sup>7</sup> I am indebted to Dr. Sebastien Lechevalier for this point.



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. Policymakers should consider providing incentives for workers to retrain and relocate to sustainable industries.

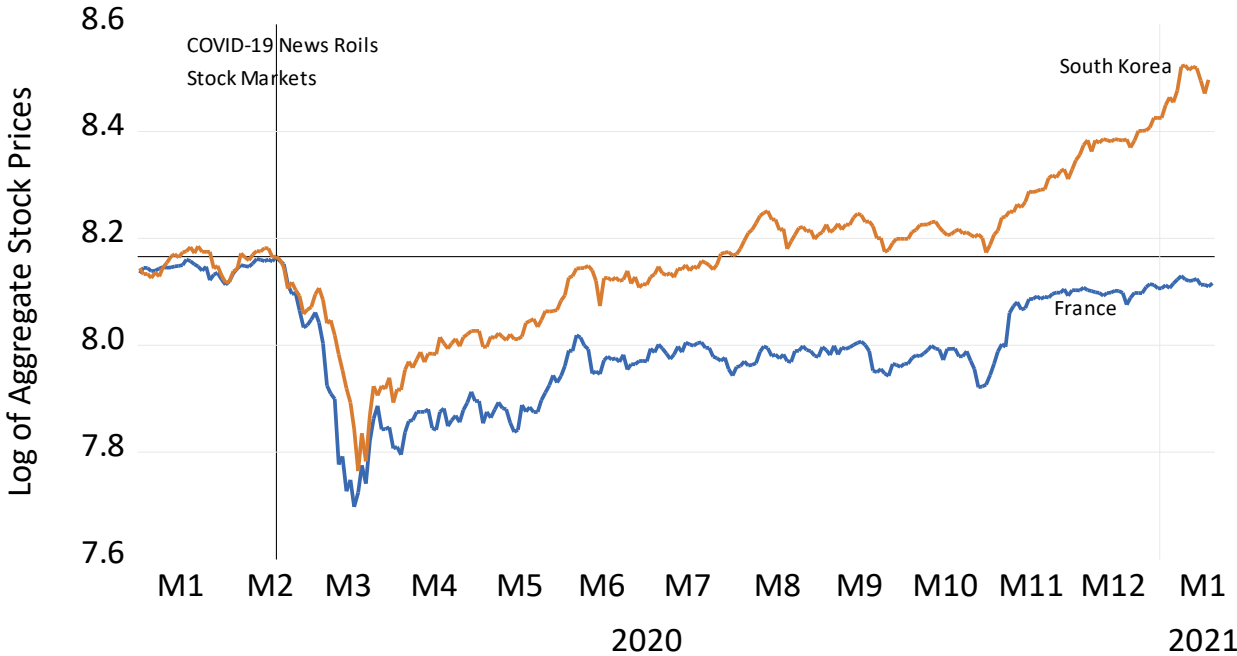


Figure 1. Aggregate Stock Prices in France and South Korea during the COVID-19 Crisis.  
*Source:* Datastream database.

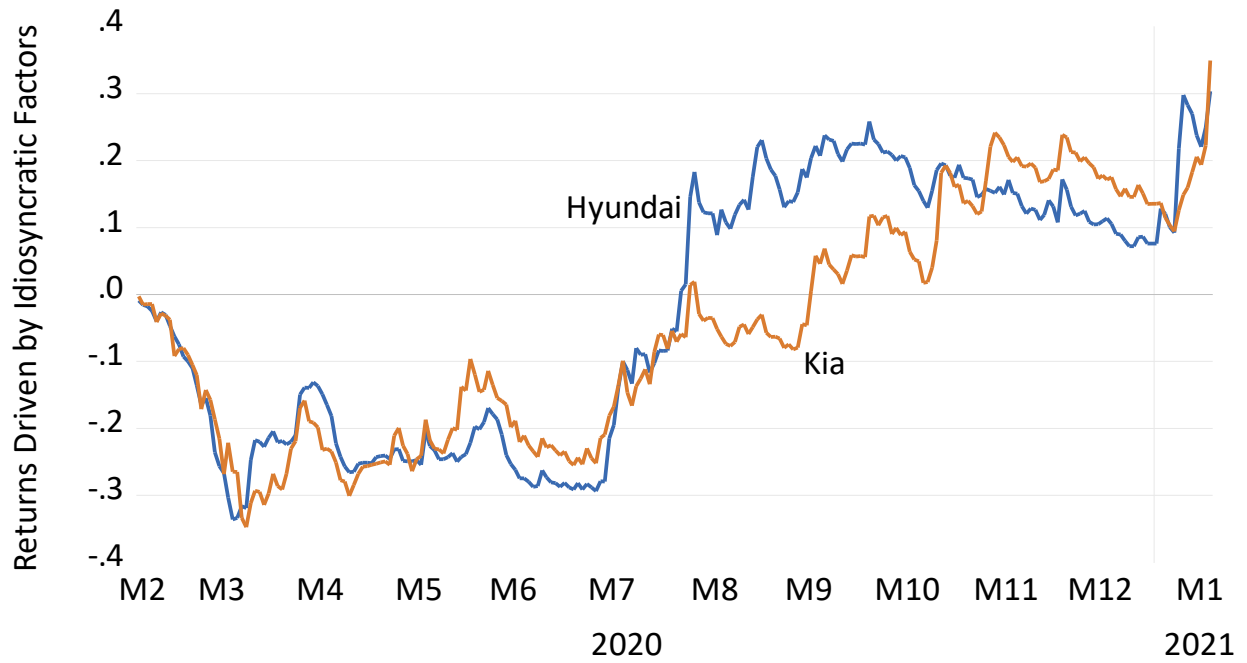


Figure 2. Stock Returns for Kia Motors and Hyundai Motors Driven by Idiosyncratic Factors during the COVID-19 Crisis.

Source: Datastream database and calculations by the author.

**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 (1,170)	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 (3,490)	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 (2,920)	Computer Services	-0.17***	0.06	0.77***	0.05	0.12**	0.05
SODEXO (10,920)	Restaurants & bars	-0.16***	0.05	0.82***	0.04	0.04	0.05
EUTELSAT COMMUNICATIONS (2,230)	Telecommunications equipment	-0.16***	0.04	0.49***	0.04	0.06	0.05
SOLUTIONS 30 SE (1.060)	Computer services	-0.16**	0.08	0.21***	0.07	0.28***	0.09
MGI DIGITAL Technology (304)	Electronic Equipment: Gauges & Meters	-0.16***	0.06	0.13**	0.05	0.32***	0.08
ESKER (1,400)	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 (1,110)	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 (4,890)	Computer Services	-0.13	0.25	1.00***	0.11	0	0.21
ID LOGISTICS GROUP (1,310)	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 & 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
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 (3,140)	Computer services	-0.11*	0.06	0.99***	0.06	0.11	0.08
IPSOS (1,290)	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 (1,900)	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 & 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 (2,157)	Drug & Grocery Stores	-0.09	0.04	0.42***	0.03	0.05	0.05
IPSEN (6,290)	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 & 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 (4,690)	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 (2,390)	Real Estate	-0.07	0.06	0.18***	0.05	-0.03	0.07
WORLDCORP (20,880)	Industrial Support Services	-0.07	0.08	0.80***	0.11	0.14	0.14
LAGARDERE GROUPE (2,482)	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 (1,010)	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
SOMFY (5,480)	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 (7,450)	Aerospace	-0.06	0.05	0.26***	0.04	0.16***	0.06
LECTRA (1,010)	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
QUADIANT (702)	Electronic Office Equipment	-0.05	0.05	0.53***	0.04	0.07	0.06
MICHELIN (4,140)	Tires	-0.04	0.04	0.93***	0.03	0.27***	0.06
RAMSAY GEN SANTE (1,960)	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 (3,210)	Health Care	-0.04	0.04	0.41***	0.05	0.04	0.07
XPO LOGISTICS EUROPE (2,750)	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 (1,810)	Pharmaceuticals	-0.04	0.04	0.29***	0.04	0.14***	0.05
COVIVIO HOTELS (2,080)	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 (1,520)	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 (2,110)	Travel and Leisure	-0.04	0.06	1.16***	0.06	0.18**	0.07
VALNEVA (1,220)	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
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 (1,798)	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 (7,960)	Auto Parts	-0.02	0.06	1.06***	0.06	0.30***	0.08
REMY COINTREAU (7,970)	Distillers and Vintners	-0.02	0.04	0.52***	0.04	0.16**	0.07
BENETEAU (1,020)	Recreational Vehicles and Boats	-0.02	0.05	0.59***	0.04	0.35***	0.06
ODET (FINC DE L') (5,032)	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 (2,960)	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 (4,060)	Specialty Retailers	-0.01	0.04	0.39***	0.03	0.17***	0.05
BEL (2,410)	Food Producers	-0.01	0.07	0.08*	0.04	0.06	0.07
FNAC DARTY (1,290)	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 (1,134)	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) (1,500)	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 (2,342)	Automobiles	0	0.05	1.14***	0.04	0.46***	0.06
JCDECAUX (3,690)	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
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 (4,780)	Construction	0.01	0.04	0.24***	0.03	0.21***	0.04
ORPEA (7,450)	Health Care	0.01	0.04	0.54***	0.04	0.10*	0.05
VOLTALIA (2,310)	Electricity	0.01	0.1	0.07	0.06	0.27***	0.09
L AIR LQE.SC.ANYME. POUR L ETUDE ET L EPXTN. (4,780)	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 (6,449)	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 (1,700)	Food Producers	0.01	0.03	0.09***	0.03	0.06	0.04
NEXITY (2,130)	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 (1,510)	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 (8,080)	Hotels and Motels	0.02	0.04	1.07***	0.04	0.12**	0.05
VERALLIA (3,660)	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 (2,240)	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 (6,790)	Chemicals	0.03	0.06	1.05***	0.05	0.25***	0.07
ICADE REIT (4,442)	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 (1,710)	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 (2,267)	Defense	0.05	0.26	0.16	0.15	-0.17	0.21
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 (1,080)	Construction and Handling Machinery	0.05	0.07	0.56***	0.05	0.27***	0.08

REXEL (4,760)	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 (5,193)	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 (3,470)	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 (9,140)	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 (1,340)	Electricity	0.09*	0.05	0.36***	0.04	0.32***	0.05
VILMORIN & CIE (1,210)	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 (6,040)	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 (2,621)	Drugs/Grocery Stores	0.10**	0.04	0.76***	0.03	-0.03	0.04
VICAT (1,710)	Cements	0.11**	0.04	0.47***	0.04	0.20***	0.05
GETLINK (7,510)	Railroads	0.12*	0.06	0.83***	0.06	0.14	0.09
PLASTIC OMNIUM (4,920)	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 & 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 (1,050)	Electrical & 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 (1,580)	Auto Parts	0.17**	0.06	0.31***	0.05	0.14*	0.07
ALSTOM (16,210)	Electrical & Electronic Equipment	0.18**	0.08	1.19***	0.07	0.05	0.09
SOCIETE GENERALE (14,850)	Banks	0.20***	0.07	1.56***	0.05	0.06	0.1
EIFFAGE (8,150)	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 (1,650)	Real Estate	0.27	0.25	0.21	0.13	0.26	0.19
ELIS (2,930)	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's (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

**Table 2. Change in 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	$\Delta$ Log of stock price between 19 Feb. 2020 and 20 Jan. 2021 driven by all factors	$\Delta$ Log of stock price between 19 Feb. 2020 and 20 Jan. 2021 driven by macro factors	$\Delta$ Log of stock price between 19 Feb. 2020 and 20 Jan. 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
CELLECTIS (1,170)	Biotechnology	NA	NA	NA
DEVOTEAM (830)	Computer services	0.14	-0.03	0.16
AB SCIENCE (756)	Biotechnology	NA	NA	NA
SOITEC (3,490)	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
ABIVAX (463)	Biotechnology	NA	NA	NA
FOCUS HOME INTERACTIVE (322)	Electronic Entertainment	NA	NA	NA
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 (2,920)	Computer Services	-0.025	0.01	0.01

SODEXO (10,920)	Restaurants & bars	-0.25	-0.02	-0.22
EUTELSAT COMMUNICATIONS (2,230)	Telecommunications equipment	-0.30	-0.03	-0.27
SOLUTIONS 30 SE (1.060)	Computer services	NA	NA	NA
MGI DIGITAL Technology (304)	Electronic Equipment: Gauges & Meters	NA	NA	NA
ESKER (1,400)	Software	NA	NA	NA
SII (432)	Computer services	NA	NA	NA
NANOBIOTIX (627)	Biotechnology	NA	NA	NA
INNATE PHARMA (370)	Biotechnology	-0.59	-0.04	-0.55
VETOQUINOL (1,110)	Pharmaceuticals	NA	NA	NA
CLARANOVA (272)	Software	NA	NA	NA
CARMAT (407)	Medical Equipment	NA	NA	NA
ALD (4,890)	Computer Services	-0.01	-0.05	0.04
ID LOGISTICS GROUP (1,310)	Delivery Services	NA	NA	NA
BUREAU VERITAS (10,180)	Industrial Support Services	-0.10	0.05	-0.15
SUEZ (10,820)	Water	0.11	-0.10	0.21
SES IMAGOTAG (694)	Electronic Equipment: Gauges & Meters	NA	NA	NA
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
SARTORIUS STEDIM BIOTECH (36,360)	Medical Supplies	NA	NA	NA
UBISOFT ENTERTAINMENT CAT A (10,198)	Electronic Entertainment	0.12	0.04	0.08
ALTEN (3,140)	Computer services	-0.14	0	-0.14

IPSOS (1,290)	Media	-0.11	0	-0.11
SAMSE (546)	Home Improvement Retailers	NA	NA	NA
AKWEL (615)	Auto Parts	NA	NA	NA
SANOFI (123,030)	Pharmaceuticals	-0.13	-0.08	-0.05
M6-METROPOLE TV (1,900)	Radio TV Broadcast	-0.09	-0.08	-0.01
LA PERLA FASHION (399)	Clothing Accessories	NA	NA	NA
BIOMERIEUX (15,090)	Medical Equipment	0.22	0.06	0.16
SAFRAN (50,920)	Industrial Goods & Services	-0.24	0.01	-0.25
GAUMONT (374)	Entertainment, Media	NA	NA	NA
THALES (19,950)	Defense	-0.20	-0.02	-0.18
BIC (2,157)	Drug & Grocery Stores	-0.22	-0.02	-0.20
IPSEN (6,290)	Pharmaceuticals	0.08	0.05	0.02
BIGBEN INTERACTIVE (426)	Electronic Entertainment	NA	NA	NA
CGG (658)	Oil Equipment & Services	-1.15	-0.18	-0.97
NRJ GROUP (509)	Radio TV Broadcast	0.07	-0.11	0.18
IGE + XAO (247)	Software	NA	NA	NA
MERCIALYS REIT (684)	Real Estate	-0.46	-0.01	-0.45
NEOEN (4,690)	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
CARBIOS (446)	Chemicals	NA	NA	NA
ILIAD (10,950)	Telecommunications Services	0.15	0.06	0.09
BOIRON (646)	Pharmaceuticals	NA	NA	NA
ALTAREA (2,390)	Real Estate	NA	NA	NA

WORLDLINE (20,880)	Industrial Support Services	-0.05	0.17	-0.22
LAGARDERE GROUPE (2,482)	Publishing	0.03	-0.12	0.16
BONDUELLE (652)	Food Producers	NA	NA	NA
STEF (1,010)	Trucking	NA	NA	NA
OENEO (752)	Industrial Goods and Services	NA	NA	NA
SOMFY (5,480)	Electrical and Electronic Equipment	NA	NA	NA
ESI GROUP (259)	Software	NA	NA	NA
INFOTEL (289)	Computer Services	NA	NA	NA
TEAM (49,672)	Aerospace	NA	NA	NA
DASSAULT AVIATION (7,450)	Aerospace	NA	NA	NA
LECTRA (1,010)	Software	NA	NA	NA
BOLLORE (10,650)	Transportation Services	-0.06	0.07	-0.13
GL EVENTS (281)	Media	NA	NA	NA
LVMH (271,260)	Clothing Accessories	0.19	0.01	0.18
EDENRED (11,720)	Industrial Support Services	-0.07	0.05	-0.12
DELTA PLUS GROUP (618)	Clothing Accessories	NA	NA	NA
GTT (273)	Oil Equipment and Services	-0.13	0.05	0.18
WAVESTONE (664)	Computer Services	NA	NA	NA
QUADIENT (702)	Electronic Office Equipment	-0.32	-0.03	-0.30
MICHELIN (4,140)	Tires	0.01	0.01	0
RAMSAY GEN SANTE (1,960)	Health Care	NA	NA	NA
KERING (69,450)	Apparel Retailers	-0.05	-0.02	-0.04
ATOS (268)	Computer Services	-0.16	-0.08	-0.08

KORIAN (3,210)	Health Care	-0.30	0	-0.30
XPO LOGISTICS EUROPE (2,750)	Transportation Services	NA	NA	NA
FIDUCIAL REAL ESTATE (389)	Real Estate	NA	NA	NA
LUMIBIRD (381)	Medical Equipment	NA	NA	NA
VIRBAC (1,810)	Pharmaceuticals	NA	NA	NA
COVIVIO HOTELS (2,080)	Real Estate	NA	NA	NA
HERMES INTL. (96,660)	Clothing Accessories	0.20	0.10	0.10
BAINS MER MONACO (1,520)	Casinos Gambling	NA	NA	NA
DANONE (36,710)	Food Producers	-0.26	-0.03	-0.23
AIR FRANCE-KLM (2,110)	Travel and Leisure	-0.69	-0.09	-0.59
VALNEVA (1,220)	Biotechnology	NA	NA	NA
SHOWROOMPRIVE (419)	Apparel Retailers	NA	NA	NA
ADP (10,190)	Transportation Services	-0.57	0.07	-0.63
SECHE ENVIRONNEMENT (380)	Waste and Disposal Services	NA	NA	NA
LISI (1,210)	Aerospace	-0.35	0.07	-0.42
AXWAY SOFTWARE (537)	Software	NA	NA	NA
SWORD GROUP (329)	Computer Services	-0.02	0.09	-0.11
LDLC.COM (37)	Computer Digital Services	NA	NA	NA
MERSEN (EX LCL) (591)	Electrical and Electronic Equipment	-0.11	-0.06	-0.05
EXEL INDUSTRIES (449)	Agricultural Machinery	NA	NA	NA
INTERPARFUMS (1,798)	Personal Goods	NA	NA	NA
GERARD PERRIER (268)	Electronic Components	NA	NA	NA



NEURONES (601)	Computer Services	NA	NA	NA
TOTAL GABON (617)	Oil	NA	NA	NA
HOFFMANN GREEN CEMENT TECHNOLOGIES (465)	Cement	NA	NA	NA
VALEO (7,960)	Auto Parts	0.15	-0.01	0.16
REMY COINTREAU (7,970)	Distillers and Vintners	0.33	0.03	0.30
BENETEAU (1,020)	Recreational Vehicles and Boats	0.07	-0.01	0.08
ODET (FINC DE L') (5,032)	Transportation Services	NA	NA	NA
L'OREAL (163,760)	Cosmetics	0.08	-0.03	0.10
TRIGANO (2,960)	Recreational Products	0.59	0.08	0.51
THERMADOR GROUPE (710)	Industrial Suppliers	NA	NA	NA
RUBIS (4,060)	Specialty Retailers	-0.32	0.09	-0.41
BEL (2,410)	Food Producers	NA	NA	NA
FNAC DARTY (1,290)	Specialty Retailers	0.12	0.04	0.08
MALTERIES F-BELGES (382)	Brewers	NA	NA	NA
LEGRAND (20,790)	Electrical and Electronic Equipment	0.04	0.02	0.02
ARGAN (722)	Real Estate	NA	NA	NA
TOTAL (92,295)	International Oil and Gas	-0.19	-0.02	-0.18
BASTIDE(CONFORT MED.) (394)	Health Care	NA	NA	NA
CREDIT AGRICOLE BRIE PICARDIE (1,134)	Banks	NA	NA	NA
ELIOR GROUP (989)	Consumer Services	-0.85	-0.06	-0.79
GUERBET (427)	Pharmaceuticals	NA	NA	NA
AUBAY (497)	Computer Services	NA	NA	NA
TF1 (TV.FSE.1) (1,500)	Media	-0.07	-0.16	0.09

TFF GROUP (611)	General Industrials	NA	NA	NA
RENAULT (2,342)	Automobiles	0.09	-0.06	0.15
JCDECAUX (3,690)	Media	-0.34	-0.01	-0.33
SELECTIRENTE (364)	Real Estate	NA	NA	NA
MANUTAN INTL. (577)	Industrial Suppliers	NA	NA	NA
CREDIT AGR.ILE DE FRANCE (34,840)	Banks	NA	NA	NA
VIVENDI (30,560)	Media	0.05	-0.17	0.22
PERNOD-RICARD (42,932)	Distillers and Vintners	-0.09	0.06	-0.16
CRCAM NORD CCI (372)	Bank	NA	NA	NA
COLAS (4,780)	Construction	-0.09	0.04	-0.12
ORPEA (7,450)	Health Care	-0.09	0.11	-0.20
VOLTALIA (2,310)	Electricity	NA	NA	NA
L AIR LQE.SC.ANYME. POUR L ETUDE ET L EPXTN. (4,780)	Chemicals	-0.07	0.01	-0.08
GROUPE CRIT (698)	Industrial Support Services	NA	NA	NA
ORANGE (31,570)	Telecommunications Services	-0.33	-0.20	-0.14
COVIVIO (6,449)	Real Estate	-0.45	0.10	-0.55
IMMOBILIERE DASSAULT (397)	Real Estate	NA	NA	NA
LDC (1,700)	Food Producers	NA	NA	NA
NEXITY (2,130)	Real Estate	-0.19	0.06	-0.25
CREDIT FONCIER DE MONACO (NA)	Banks	NA	NA	NA
BOUYGUES (12,760)	Construction	-0.12	-0.08	-0.04
SAVENCIA (853)	Food Producers	NA	NA	NA
UNIBEL (1,510)	Food Producers	NA	NA	NA
DERICHEBOURG (934)	Waste and Disposal Services	0.57	-0.17	0.73
ACCOR (8,080)	Hotels and Motels	-0.26	-0.04	-0.22

VERALLIA (3,660)	Industrial Goods and Services	NA	NA	NA
LNA SANTE (470)	Health Care	-0.01	0.11	-0.12
GENSIGHT BIOLOGICS (299)	Health Care	NA	NA	NA
GROUPE GUILLIN (463)	General Industrials	NA	NA	NA
CEGEREAL REIT (509)	Real Estate	NA	NA	NA
ROBERTET (2,240)	Chemicals	NA	NA	NA
KAUFMAN ET BROAD (841)	Home Constructions	NA	NA	NA
X-FAB SILICON FOUNDRIES (929)	Semiconductor	0.34	-0.16	0.50
ARKEMA (6,790)	Chemicals	0.13	0.03	0.11
ICADE REIT (4,442)	Real Estate	-0.55	0.07	-0.62
FONCIERE INEA (317)	Real Estate	NA	NA	NA
CEGEDIM (337)	Computer Services	NA	NA	NA
CARREFOUR (11,900)	Food Retailers and Wholesalers	-0.08	-0.15	0.07
TESSI (424)	Computer Services	NA	NA	NA
FREY (728)	Real Estate	NA	NA	NA
COMPAGNIE DES ALPES (466)	Travel and Leisure	NA	NA	NA
SOCIETE FONC.LYONNAISE (464)	Banks	NA	NA	NA
PHARMAGEST INTERACTIVE (1,710)	Software	NA	NA	NA
EDF (32,490)	Electricity	-0.11	-0.14	0.03
H&K (2,267)	Defense	NA	NA	NA
ELECTRICITE STRASBOURG (864)	Electricity	NA	NA	NA
HEXAOM (253)	Home Construction	NA	NA	NA
JACQUET METALS (351)	Industrial Metals	0.06	0	0.05
MANITOU (1,080)	Construction and Handling Machinery	0.41	-0.01	0.42

REXEL (4,760)	Electrical and Electronic Equipment	0.04	-0.06	0.11
CHARGEURS (511)	Textile Products	NA	NA	NA
SERMA GROUP (308)	Industrial Support Services	NA	NA	3
KLEPIERRE REIT (5,193)	Real Estate	-0.55	0.05	-0.60
LAURENT PERRIER (446)	Distillers and Vintners	NA	NA	NA
IMERYS (3,470)	Industrial Metals and Mines	0.06	0.01	0.04
VOYAGEURS DU MONDE (281)	Travel and Tourism	NA	NA	NA
SYNERGIE (770)	Industrial Support Services	NA	NA	NA
GECINA (9,140)	Real Estate	-0.42	0.07	-0.55
RALLYE (346)	Retailers	-0.42	0.07	-0.49
ALBIOMA (1,340)	Electricity	0.36	0.14	0.22
VILMORIN & CIE (1,210)	Food Producers	NA	NA	NA
NATIXIS (144)	Banks	-0.31	-0.03	-0.29
VALLOUREC (289)	Iron and Steel	-1.27	-0.03	-1.24
FAURECIA (6,040)	Auto Parts	0	-0.01	0.01
MAUREL ET PROM (353)	Crude Oil Producers	-0.34	0.06	-0.39
BASSAC (767)	Real Estate	NA	NA	NA
INVENTIVA (555)	Health Care	NA	NA	NA
CASINO GUICHARD-P (2,621)	Drugs/Grocery Stores	-0.30	-0.09	-0.21
VICAT (1,710)	Cements	-0.06	0.03	-0.08
GETLINK (7,510)	Railroads	-0.20	-0.06	-0.14
PLASTIC OMNIUM (4,920)	Auto Parts	0.29	0.09	0.20
VINCI (48,951)	Construction	-0.25	0.03	-0.27
SCHNEIDER ELECTRIC (69,830)	Electrical & Electronic Equipment	0.24	0.01	0.23

VEOLIA ENVIRON (12,660)	Electronic Recycling	-0.21	-0.08	-0.13
NEXANS (1,050)	Electrical & Electronic Equipment	0.29	0	0.29
GALIMMO (461)	Real Estate	NA	NA	NA
BURELLE (1,580)	Auto Parts	NA	NA	NA
ALSTOM (16,210)	Electrical & Electronic Equipment	0.10	-0.10	0.20
SOCIETE GENERALE (14,850)	Banks	-0.62	-0.11	-0.51
EIFFAGE (8,150)	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
CARMILA (1,650)	Real Estate	NA	NA	NA
ELIS (2,930)	Industrial Suppliers, Industrial Support Services'	-0.32	0.06	-0.38
ERAMET (618)	Nonferrous metals	0.23	0.04	0.19
ALTAREIT (854)	Real Estate	NA	NA	NA
NOVACYT (596)	Medical Equipment	NA	NA	NA
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's (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.

\*\*\* (\*\*)[\*]denotes significance at the 1% (5%) [10%] level

**Table 3. The Exposure of Korean Stocks to Macroeconomic Variables and 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)	(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
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 & 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 HHL D.& 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
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
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

**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	$\Delta$ Log of stock price between 19 Feb. 2020 and 20 Jan. 2021 driven by all factors	$\Delta$ Log of stock price between 19 Feb. 2020 and 20 Jan. 2021 driven by macro factors	$\Delta$ Log of stock price between 19 Feb. 2020 and 20 Jan. 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
PEARLABYSS (4.76)	Electronic Entertainment	NA	NA	NA
NETMARBLE (11.85)	Electronic Entertainment	0.25	0.20	0.05
HYUNDAI MOTOR (27.18)	Automobiles	0.69	0.38	0.30
ORION (0.78)	Food Producers	NA	NA	NA
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 & 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
CELLTRION (42.6)	Healthcare	NA	NA	NA
WOORI FINANCIAL GROUP (7.0)	Banks	-0.02	0.20	-0.21
CELLTRION PHARM (5.79)	Pharmaceuticals	NA	NA	NA
KT & G (10.8)	Tobacco	NA	NA	NA
SAMSUNG SDS (15.5)	Computer Services	0.01	0.24	-0.23
GREEN CROSS (4.37)	Pharmaceuticals	NA	NA	NA
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
MACQUARIE KOREA INFR.FD. (5.1)	Investment Banking	NA	NA	NA
AMOREPACIFIC (16.4)	Cosmetics	NA	NA	NA
INDUSTRIAL BANK OF KOREA (6.2)	Banks	-0.16	0.33	-0.48
CJ ENM (3.1)	Retailers	0.10	0.29	-0.19

DB INSURANCE (2.9)	Insurance	0	0.47	-0.47
DONGSUH (4.2)	Food Producers	NA	NA	NA
CJ LOGISTICS (3.9)	Transportation Services	NA	NA	NA
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 (6.3)	Food Producers	NA	NA	NA
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
YUHAN (4.5)	Pharmaceuticals	NA	NA	NA
HOTEL SHILLA (3.3)	Retailers	-0.11	0.37	-0.48
SAMSUNG C&T (23.4)	Construction	0.20	0.36	-0.16
SEEGENE (4.0)	Biotechnology	NA	NA	NA
SSANGYONG CEMENT INDL. (3.5)	Cement	0.35	0.31	0.04
E-MART (5.0)	Retailers	NA	NA	NA
POSCO CHEMICAL (13.0)	Chemicals	NA	NA	NA
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	0.47	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
HLB (3.6)	Consumer Products and Services	NA	NA	NA
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
HANMI SCIENCE (4.5)	Pharmaceuticals	NA	NA	NA
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
SHIN POONG PHARM. (4.2)	Pharmaceuticals	NA	NA	NA
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
GENEXINE (2.5)	Biotechnology	NA	NA	NA
HANMI PHARM (4.1)	Pharmaceuticals	NA	NA	NA
HANJIN KAL (3.9)	Travel and Leisure	NA	NA	NA
SK CHEMICALS (4.8)	Chemicals	NA	NA	NA
DOOSAN FUEL CELL (4.2)	Construction	NA	NA	NA

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*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.

\*\*\* (\*\*)[\*]denotes significance at the 1% (5%) [10%] level



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