European and East Asian Firms: Comrades or Competitors

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Abstract: This paper examines the stock market exposures of French and German firms to the Korean won and the Japanese yen. If a European firm competes with an Asian firm, an appreciation of the euro relative to its competitors' currency should lower its profitability and its stock price. If a European firm cooperates with an Asian firm by purchasing imported inputs from them, an appreciation of the euro relative to its comrades' currency should increase its ability to purchase inputs and raise its profitability and stock price. The results indicate that many European firms are harmed when the Korean won depreciates and many benefit when the Japanese yen depreciates. These findings point to competition between European and Korean firms and extensive cooperation between European and Japanese firms.

Keywords: Exchange rate exposure, stock returns, international trade

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1. Introduction

How does an appreciation affect a nation's companies? If exporting firms pass through exchange rates into foreign currency prices, then their export volumes should decrease.[1] If exporting firms price-to-market (i.e., keep foreign currency prices constant), then their profit margins in their own currency should fall. Either way, their profits should decrease. If import-competing firms find that foreign firms pass through exchange rate changes into domestic currency prices, then the volume of imports that compete against their goods should increase. If foreign firms keep the prices of imports coming into the home country constant, then the foreign firms' profit margins should increase. Either way, domestic firms should be less able to compete against foreign firms in the domestic market.

A country's firms do not only compete with foreign firms but also cooperate with them. Domestic firms purchase parts and components, primary goods, and capital goods from foreign firms. When the home country's currency appreciates, domestic firms can either purchase more of these inputs, purchase the same quantity at lower cost, or purchase higher quality imported inputs. This should benefit domestic firms.

One way to investigate the overall impact of exchange rate changes on firm profitability is to examine how they impact stock prices. Finance theory indicates that stock prices equal the expected present value of future cash flows. If a domestic firm competes with foreign firms, then an appreciation of its currency relative to its competitor's currency should decrease the domestic firm's profitability through the channels discussed above. If a domestic firm cooperates with foreign firms by purchasing imported inputs, then an appreciation should increase the home firm's profitability by increasing its ability to purchase imported inputs. If a

[1] The extent of pass through depends on whether shocks are perceived as temporary or permanent and on the nature of strategic interactions between firms (see, e.g., Amiti et al., 2019, and Burstein and Gopinath, 2014).

firm is both competing and cooperating with firms in another country, then the overall response of stock prices to the exchange rate indicates whether the cooperation or competition channel predominates. Thus examining the response of stock prices to exchange rate changes can shed light on whether domestic and foreign firms are competitors or comrades.

Foders and Vogelsang (2014) employed the unit value method to investigate the types of competition practiced by German, Japanese, Korean, Chinese, and American firms over the 1990-2011 period. They classified competition into price competition, quality competition, and ambiguous competition. They defined price competition as the case where consumers are unwilling to pay higher prices for domestic goods than for imported goods and quality competition as the opposite case. They also classified the technological intensity of goods based on research and development (R&D) intensity using the European Commission's (2013) method. They reported that Germany engages in quality competition, especially in medium level technology goods. They also found that Japan and Korea engage in a combination of price and quality competition across technology levels.

Bas (2015) and the *Conseil National de Productivité* (2019) investigated price and non-price competitiveness across OECD countries. They assumed that price competitiveness is driven by the ratio of export prices of domestic firms to export prices of foreign firms expressed in a common currency. They first attempted to explain changes in the countries' export market shares caused by factors such as changes in export price ratios. Changes in market shares that could not be attributed to changes in these standard factors were then taken to reflect non-price competitiveness. The *Conseil National de Productivité* reported the number of sectors where countries ranked in the top ten in non-price competitiveness. They found that Germany was the clear leader in 2007 and 2016, with almost 90 out of the 102 sectors investigated in the top ten.

They also reported that France and Japan lagged behind Germany in terms of the numbers of sectors in the top ten in non-price competitiveness.

Hu, Parsley, and Tan (2021) investigated cooperative relationships between importers and exporters. They employed a partial equilibrium model to examine the relationship between import currency appreciation and the quality of imported inputs. They defined quality as any factor other than price that raises demand. They demonstrated theoretically that an appreciation of the importer's currency makes imported intermediates cheaper. In their model this allows firms to switch to higher quality intermediates and thus to export higher quality final goods. Using firm level data from China's ordinary customs regime over the 2001-2006 period and firm level effective exchange rates, they reported that import currency appreciations increase both import and export quality. They noted that nothing in their work is specific to China or to developing countries.

Ahmed (2009) investigated how appreciations of the Chinese renminbi and of Asian countries supplying parts and components to China affect China's exports. He showed theoretically that both appreciations of the renminbi and of currencies in Asian supply chain countries would cause China's exports to other countries to fall. He then used quarterly data and an autoregressive distributed lag model to investigate China's exports over the 1996Q1 – 2009Q2 period. He reported that a 10 percent renminbi appreciation versus non-supply chain countries reduces exports in the processing customs regime by 17 percent and that a 10 percent appreciation versus Asian supply chain countries increases processing exports by 15 percent. This points to a cooperative relationship between China and Asian supply chain countries, as an appreciation of the renminbi against upstream countries increases China's exports to downstream countries.

Thorbecke (2019) investigated the response of Japanese semiconductor stocks to changes in the Japanese yen, Korean won, New Taiwan (NT) dollar, and other variables. He also investigated the response of a Japanese high-end electronic parts producer, Murata Manufacturing, to these exchange rates. Using daily data over the 4 January 2005 to 31 January 2019 period, he reported that a 10 percent appreciation of the yen reduces returns on Japanese semiconductor stocks by 3.1 percent and a 10 percent appreciation of the NT dollar increases returns on Japanese semiconductor stocks by 3.5 percent. The opposite signs on the yen and NT dollar exchange rates is evidence of price competition between Japanese and Taiwanese semiconductor manufacturers. For Murata, he found that the NT dollar does not affect returns. Murata produces high-end ceramic capacitors and Taiwanese firms produce lower-end capacitors, so there is not much competition between them in these goods. On the other hand, he presented evidence that a depreciation of the Korean won benefits Murata. This supports the argument of Patel and Wei (2019) that there is a complementary relationship between Japanese parts and components makers and downstream producers. A weaker won increases exports of Korean final goods and thus imports of Japanese parts and components used to produce these final goods.

This paper uses an approach similar to Thorbecke's (2019), but extends it to many firms in the two largest European countries, Germany and France. It investigates how changes in the Korean won and the Japanese yen affect European stock returns. An appreciation of the euro relative to the Korean won harms 36 of the 93 German firms studied and only benefits two. An increase in the won/euro rate also harms 25 out of 83 French firms studied and only benefits three. On the other hand, an appreciation of the euro relative to the Japanese yen only harms five out of 93 German firms and benefits 27. An increase in the yen/euro rate harms nine out of 83

French firms and benefits 18. These results indicate that there is competition between many Korean and European firms and cooperation between many Japanese and European firms.

Section 2 describes the data and methodology. Section 3 contains the results. Section 4 concludes.

2. Data and Methodology

Many papers have investigated firms' exposure to exchange rates (see, e.g., Ito et al., 2016, and Dominguez and Tesar, 2006). The methodology involves regressing stock returns on the return on the overall stock market and the change in the exchange rate. Many papers have also estimated assets' exposures to macroeconomic variables (see, e.g., McElroy and Burmeister, 1988). Chen, Roll, and Ross (1986) argued that, while few events are completely exogenous, causality should flow from the macroeconomic variables on the right-hand side of the regression equations to the sectoral or firm stock returns on the left-hand side and that the causality flowing in the other direction should be of second order.

The macroeconomic variables employed here are the return on Germany or France's aggregate stock market, the return on the world stock market, the change in the price of crude oil, monetary policy indicators, and the euro exchange rate relative to the Korean won, the Japanese yen, the U.S. dollar, the British pound, and the Swiss franc. There is a long tradition in finance of using 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). Analogously the return on the world stock market can be used to capture the effect of the world economy on returns. The change in the natural log of the spot price for Brent Crude, the benchmark for Europe, is employed.

To measure monetary policy, the data set of Altavilla et al. (2019) is used. They reported how European Central Bank (ECB) quantitative easing changes, forward guidance, and policy rate

changes affect French and German interest rates.[2] For French stock returns all of the changes in 2-year and 10-year interest rates on French government bonds caused by ECB press releases, press conferences, and monetary policy events are employed. For German stock returns all of the changes in 2-year and 10-year interest rates on German government bonds caused by ECB press releases, press conferences, and monetary policy events are employed. In addition, a dummy variable equaling one on 26 July 2012 and zero otherwise is employed. On this date ECB President Draghi reassured financial markets by saying that he would do whatever it takes to save the euro.

When using daily data for Asia and Europe, it is important to control for differences across time zones. This paper employs daily closing prices for stocks in Germany and France and exchange rates at 4 p.m. London time. There is thus a close correspondence between the timing of the stock price and exchange rate variables.

One problem with using five exchange rates as right-hand side variables is that there is a lot of multicollinearity between the exchange rate variables. To obtain sharper individual parameter estimates, a long sample period is employed that includes times when the exchange rates moved independently of each other. Daily data over the 19 January 2001 to 19 January 2021 are employed.[3] There are 5,216 observations.

Many events such as the Global Financial Crisis (GFC) occurred during this period. Including 15 right-hand side variables helps to control for the effect of these events on returns. The long time series and the assumption that causality flows from the right-hand side variables to the left-hand side variables implies that the model should generate consistent parameter estimates. In addition,

[2] 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.

[3] In cases when stock return data are unavailable on 19 January 2001, the data are employed beginning on the first date they are available.

because the structure of production may have changed, the sample period is broken up into subsample periods.

Data on firm and economy-wide stock returns, the return on the world stock market, the changes in the spot prices of Brent crude oil, and the exchange rate variables are obtained from the Datastream database. Data on French and German monetary policy indicators are obtained from Altavilla et al. (2019). Augmented Dickey–Fuller tests on the stock returns and the right hand side variables permit rejection in every case of the null hypothesis that the series used in the regressions have unit roots. Firm returns are thus regressed on the macroeconomic variables.

The estimated equations take the form:

$$\Delta R_{i,t} = \alpha_{0,i} + \alpha_{1,i}\Delta R_{m,t} + \alpha_{2,i}\Delta R_{m,World,t} + \alpha_{3,i}\Delta P_{oil,t} + \alpha_{4,i}\Delta Won_t + \alpha_{5,i}\Delta Yen_t + \alpha_{6,i}\Delta USD_t + \alpha_{7,i}\Delta GBP_t + \alpha_{8,i}\Delta CHF_{c,t} + \alpha_{9,i}\Delta ECBPRESS2_t + \alpha_{10,i}\Delta ECBPRESS10_t + \alpha_{11,i}\Delta ECBCONF2_t + \alpha_{12,i}\Delta ECBCONF10_t + \alpha_{13,i}\Delta ECEVENT2_t + \alpha_{14,i}\Delta ECEVENT10_t + \alpha_{15,i}DRAGHI_t + \varepsilon_{i,t} \quad (1)$$

where $\Delta R_{i,t}$ is the change in the log of the stock price index for firm *i* in Germany or France, $\Delta R_{m,t}$ is the change in the log of the price index for the aggregate stock market in Germany or France, $\Delta R_{m,world,t}$ 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, ΔWon_t is the change in the log of the Korean won/euro nominal exchange rate, ΔYen_t is the change in the log of the Japanese yen/euro nominal exchange rate, ΔUSD_t is the change in the log of the dollar/euro nominal exchange rate, ΔGBP_t is the change in the log of the euro/pound nominal exchange rate, and ΔCHF_t is the change in the log of the Swiss franc/euro nominal exchange rate. The variables $\Delta ECBPRESS2_t$, $\Delta ECBCONF2_t$ and $\Delta ECBEVENT2_t$ represent, respectively, the changes in 2-year government bond yields driven

by ECB press releases, press conferences, and monetary policy events. The variables $\Delta ECBPRESS10_t$, $\Delta ECBCONF10_t$, and $\Delta ECBEVENT10_t$ represent changes in 10-year government bond yields driven by press releases, press conferences, and monetary events. $DRAGHI_t$ is a dummy variable equaling one on 26 July 2012 when ECB President Draghi said he would do whatever it takes to save the euro and zero otherwise.

Examining how exchange rate exposures vary across these countries may be interesting given the four countries' comparative advantages. Table 1 presents their comparative advantages by sector. These are calculated using the empirical comparative advantage measure developed by Baldwin and Okubo (2019).[4] The table indicates that Japan and Korea have comparative advantages in chemicals but not pharmaceuticals and that Germany and France have comparative advantages in pharmaceuticals. Germany, Japan, and Korea have comparative advantages in vehicles and machinery, and Japan and Korea in iron & steel and in electronics. Between Germany and France, Germany's comparative advantage lies largely in goods and France's in services. Investigating exposures across these economies makes it possible to examine whether exchange rate exposures vary because of these different characteristics.

3. Results

Table 2 presents exposures for individuals German companies. Column (3) indicates that, out of 93 firms, 36 are harmed by a weaker Korean won (at the 5% significance level) and only two benefit. On the other hand, column (5) indicates that 27 benefit from a weaker Japanese yen and only five are harmed. Table 3 presents exposures for individual French companies. Column (3) indicates that, out of 83 firms, 25 are harmed by a weaker Korean won

[4] Table 1 does not distinguish between parts and final goods in the calculations.

and only three benefit. On the other hand, column (5) indicates that 18 benefit from a weaker Japanese yen and nine are harmed.

There is thus a clear pattern, where many firms in Germany and France are harmed by a weaker won and few benefit. In addition, many firms in these two countries benefit from a weaker yen and few are harmed. This pattern could occur if German and French firms had much more capital in Korea then in Japan. In this case, a depreciation of the won against the euro would decrease the euro value of these assets and cause more companies to be exposed to won depreciations then to yen depreciations. However, German foreign direct investment (FDI) in Korea and Japan are almost equal and French FDI is seven times larger in Japan than in Korea.[5] Thus it is unlikely that the finding that many European firms are harmed by won depreciations and benefit from yen depreciations is driven by the effects of depreciations on the value of European firms' Asian capital stocks.

It is also unlikely that the pattern in Tables 2 and 3 arises because of financial hedging. Financial hedges are implemented to reduce firms' exposure to exchange rate changes. If a European firm is harmed by a weaker won, it can use a hedge to mitigate this effect. In other words, hedges should bring exchange rate exposures closer to zero. Companies do not use them to place bets on the direction of exchange rate changes. When many firms remain exposed to the won or yen, it indicates that changes in these variables are affecting companies' cash flows.

Of the 61 firms in Tables 2 and 3 that are harmed by a weaker Korean won, 29 are in industrial sectors such as industrial goods and services, industrial engineering, and industrial suppliers. This is especially true in Germany, where 20 of the 36 firms that are harmed are in the industrial sector. Of the 45 firms in Tables 2 and 3 that benefit from a weaker Japanese yen, 26

[5] In 2020, German FDI equaled USD 9.4 billion in Japan and 10.6 billion in Korea. French FDI equaled 41.8 billion in Japan and 7.4 billion in Korea. These data come from www.unctad.org .

are in industrial sectors. Again this is especially true in Germany, where 19 of the 28 firms that benefit are in the industrial sector. Thus while Germany, Korea, and Japan all have comparative advantages in machinery and industrial goods, German firms in this sector compete more with Korean firms and cooperate more with Japanese firms.

There are many examples in Tables 2 and 3 of firms that benefit from yen or won depreciations and that use inputs from Japan or Korea. For instance, Wacker Neuson, Kiom, and Manitou employ engines from the Japanese company Kubota. Beneteau uses outboard motors from the Japanese company Yamaha. Vallourec use specialty pipe made by the Japanese company Nippon Steel. Faurecia uses screens made by the Japanese company Japan Display. Jungheinrich uses engines made by the Japanese company Mitsubishi. Brenntag provides Japanese chemicals to customers. Trigano uses Japanese parts in its motor homes. Orange and Deutsche Telecom uses telecommunications equipment and phones from the Korean company Samsung. Depreciations of the yen or won reduce the euro costs of these inputs and thus increase the European firms' profits.

Shimizu and Sato (2015) and Sasaki, Yoshida, and Otsubo (2022) noted that Japan's overseas production structure may have changed after the GFC. They reported that, as the yen appreciated during the GFC, many Japanese corporations relocated factories abroad. They observed that Japanese multinationals then kept production overseas even after the yen depreciated. If this is true, the exposure of European firms to the Japanese exchange rate may have changed after the GFC. The yen/euro exchange rate may matter less after the GFC. To investigate whether this occurred, the model is re-estimated over two equal subsamples (19 January 2001 to 19 January 2011 and 20 January 2011 to 19 January 2021).

Table 4 presents the results for German stocks over the two subsample periods. In the first subsample, column (5) indicates that 24 companies benefit from a weaker yen. In the second subsample, column (9) indicates that only nine benefit from a weaker yen. Table 5 presents the results for French stocks. In the first subsample, column (5) indicates that nine benefit from a weaker yen and in the second subsample column (9) indicates that eight benefit. Thus in the case of Germany but not France many more firms benefit from a depreciating yen over the 2001-2011 period than over the 2011-2021.

To investigate further the results for Germany one can use the fact that the lion's share of companies in Germany that benefit from a weaker yen are in the industrial sector. If there is a collaborative relationship between firms in the industrial sectors of Germany and Japan, then a weaker yen that benefits the German industrial sector purchasing inputs from Japan should also benefit the Japanese industrial sector supplying these inputs.

To investigate how a weaker yen relative to the euro impacts Japanese firms, the returns on industrial sectors in Japan are regressed on the return on the aggregate Japanese market, the return on the world stock market, the change in the log of the price of Dubai crude oil, the change in the log of the nominal Japanese yen exchange rate relative to the euro, the U.S. dollar, and the Korean won, and an indicator of Japanese monetary policy.[6] The model is estimated over the 19 January 2001 to 19 January 2011 and 20 January 2011 to 19 January 2021 subsample periods. The results are presented in Table 6.

[6] The Japanese monetary policy indicator comes from an event study of every mention of the Bank of Japan governor in the *Financial Times* archives. When the accompanying story indicates that there was a surprise move to ease monetary policy, the indicator is assigned a value of 1 on this date. When the story indicates that there was a surprise move to tighten monetary policy, the indicator is assigned a value of -1 on this date. Otherwise the indicator is assigned a value of zero.

Column (2) of Table 6 indicates that a stronger yen relative to the euro damaged the following industrial sectors during the first subsample period: industrial engineering, industrial support services, industrial suppliers, industrial machinery, and specialized machinery. Column (4) of Table 6 provides no evidence that a stronger yen relative to the euro damaged these sectors in the second subsample period, except for industrial engineering where the coefficient is significant at the 10% level. These results support Shimizu and Sato (2015) and Sasaki, Yoshida, and Otsubo's (2022) observation that Japanese corporations mitigated the impact of yen appreciations by relocating factories abroad. This created a natural hedge that reduced the exposure of Japanese firms to exchange rate changes. This also explains why, as Table 4 shows, that changes in the yen/euro rate mattered less for German firms over the 2011-2021 period than over the 2001-2011 period.

4. Conclusion

This paper investigates whether firms in France and Germany compete or cooperate with firms in Japan and South Korea. If a firm in one country competes with firms in another country, then a depreciation of the domestic firm's currency should make it more competitive relative to foreign firms and increase its profitability. If a firm in one country cooperates with firms in another country by purchasing imported inputs, then a depreciation of the domestic firm's currency should decrease its ability to purchase foreign inputs and decrease its profitability. Since finance theory indicates that stock prices equal the expected present value of future cash flows, examining the response of stock prices to exchange rates can shed light on whether competitive or complementary relationships predominate.

The results point to a competitive relationship between firms in Germany and France and Korean firms. One of the few exceptions is in telecommunications services, where European

firms such as Deutsche Telecom and Orange use inputs from the Korean firm Samsung. The results also point to complementary relationships between many European firms and Japanese firms. For instance, European firms such as Wacker Neuson, Kiom, Manitou, Beneteau, and Jungheinrich employ engines made by Japanese companies.

The evidence indicates that the lion's share of the German companies that benefit from a weaker yen are in the industrial sector. The results also show that fewer of these companies benefited from a weaker yen after 2010 than before. One reason for this is that Japanese companies responded to the strong yen during the Global Financial Crisis by relocating production closer to final markets. Findings reported here indicate that a weaker yen helped many Japanese industrial sectors before 2011 but not after. Japanese firms thus created natural hedges that reduced the impact of exchange rate changes on their companies and their customers.

The findings in the paper indicate that Japanese firms play a key role as suppliers of intermediate inputs. In supply chains, the lion's share of the value-added often accrue to branded firms rather than to suppliers of intermediate goods (see, e.g., Xing 2021). Future research should consider the benefits and costs for Japan when many Japanese firms occupy upstream positions in global value chains.

Table 1. Empirical Comparative Advantage by Sector in France, Germany, Japan, and Korea.

Sector	France	Germany	Japan	South Korea
Chemicals ex. Pharmaceuticals	0.052	0.146	0.285	0.250
Pharmaceuticals	0.170	0.262	-0.426	-0.091
Vehicles	0.016	0.302	0.699	0.587
Machinery	-0.083	0.282	0.320	0.137
Electronics	-0.131	0.091	0.163	0.328
Iron & Steel	0.077	0.016	0.562	0.214
Metals ex. Iron & Steel	-0.208	0.092	0.045	0.085
Crude Oil	-0.991	-0.966	-0.996	-0.983
Refined Oil	-0.402	-0.280	-0.080	0.333
Minerals ex. Crude & Refined Oil	-0.300	-0.274	-0.886	-0.788
Textiles	-0.342	-0.133	-0.660	-0.237
Agriculture	0.040	-0.024	-0.730	-0.511
Stone	-0.142	0	0.136	-0.187
Travel & Tourism Services	0.104	-0.141	0.369	-0.222
ICT Services	0.074	-0.035	0.139	-0.083
Other Services	0.015	0.005	-0.209	-0.083

Note: The table presents empirical comparative advantage (ECA) calculated according to the method of Baldwin and Okubo (2019). They calculated ECA as $(X_{cik} - M_{cik})/(X_{cik} + M_{cik})$, where X represents exports, M represents imports, *c* represents country, *i* represents sector, and *k* represents product type. This table does not distinguish between parts and final goods.

Source: https://atlas.cid.harvard.edu/and calculations by the author.

Table 2. The Exposure of German Firm Stock Returns to the Korean Won/Euro, Japanese Yen/Euro, and U.S. Dollar/Euro Exchange Rates.

		Korean won/euro		Japanese yen/euro		U.S. dollar/euro		Adjusted R^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Firm	Sector	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	
MTU Aero Engines	Aerospace	-0.038	0.071	0.059	0.069	-0.562***	0.115	0.343
Continental	Auto Parts	-0.145	0.101	0	0.071	0.267**	0.119	0.353
Hella Gmbh & Kgaa	Auto Parts	-0.169	0.145	0.127	0.091	0.408**	0.192	0.403
Schaeffler Pf. Shs	Auto Parts	-0.177	0.119	0.011	0.143	0.395**	0.166	0.349
Vitesco Technologies Group	Auto Parts	NA	NA	NA	NA	NA	NA	NA
Elringklinger	Auto Parts	-0.101	0.078	0.280***	0.072	0.103	0.121	0.225
Jost Werke	Auto Parts	-0.792***	0.198	-0.076	0.26	0.914***	0.307	0.134
Novem Group	Auto Parts	NA	NA	NA	NA	NA	NA	NA
Mercedes-Benz Group	Automobiles	-0.037	0.07	0.072	0.056	-0.084	0.054	0.639
Volkswagen	Automobiles	0.083	0.084	-0.276***	0.102	0.438**	0.173	0.396
BMW	Automobiles	-0.031	0.069	0.061	0.044	-0.127*	0.066	0.559
Porsche Pref.	Automobiles	-0.076	0.066	0.152*	0.089	-0.041	0.113	0.444
BMW Pref.	Automobiles	NA	NA	NA	NA	NA	NA	NA
Volkswagen Pref.	Automobiles	NA	NA	NA	NA	NA	NA	NA
Evotec	Biotechnology	-0.017	0.085	-0.052	0.093	-0.401***	0.134	0.178
Biotest	Biotechnology	-0.228**	0.094	0.096	0.07	0.218	0.125	0.041
Formycon	Biotechnology	-0.159	0.147	0.250*	0.146	-0.317	0.233	0.030
Morphosys	Biotechnology	-0.041	0.073	-0.209**	0.097	-0.239	0.18	0.143
Biotest Pref.	Biotechnology	-0.155	0.095	0.029	0.068	0.204*	0.120	0.066
Heidelberg	Cement	-0.040	0.064	0.166**	0.066	0.173*	0.097	0.312
Basf	Chemicals	0.009	0.041	0.078	0.049	-0.02	0.073	0.62
Covestro	Chemicals	NA	NA	NA	NA	NA	NA	NA
Symrise	Chemicals	-0.179	0.123	0.116*	0.066	0.035	0.114	0.247
Brenntag	Chemicals	-0.277***	0.069	0.191***	0.063	0.031	0.109	0.260
Evonik Industries	Chemicals	NA	NA	NA	NA	NA	NA	NA
Wacker	Chemicals	-0.168**	0.086	0.13	0.087	0.114	0.138	0.387
Fuchs Petrolub	Chemicals	-0.306***	0.063	0.312***	0.080	0.122	0.088	0.211
K+S	Chemicals	-0.08	0.072	0.226***	0.065	0.164	0.1	0.277
Lanxess	Chemicals	-0.241***	0.056	0.068	0.063	0.077	0.092	0.462
Eckert & Ziegler Strahlen & Medzi	Chemicals	-0.123	0.075	-0.015	0.077	-0.014	0.12	0.086
FUCHS PETROLUB PREF.	Chemicals	NA	NA	NA	NA	NA	NA	NA
Muehlbauer Holding	Computer Hardware	-0.103	0.125	-0.102	0.074	-0.061	0.188	0.067
Adesso	Computer Services	-0.126	0.103	-0.034	0.099	0.119	0.18	0.025
Bechtle	Computer Services	-0.122	0.1	0.189***	0.064	-0.163	0.129	0.220
Cancom	Computer Services	-0.271***	0.094	0.014	0.081	-0.072	0.145	0.156
Nagarro	Computer Services	NA	NA	NA	NA	NA	NA	NA
Secunet Security Networks	Computer Services	-0.196**	0.0970	0.004	0.102	-0.123	0.153	0.034
Allgeier	Computer Services	-0.199*	0.098	0.179**	0.072	0.078	0.133	0.066
Datagroup	Computer Services	-0.175	0.131	0.089	0.117	0.041	0.147	0.052
Northern Data	Computer Services	NA	NA	NA	NA	NA	NA	NA
Delivery Hero	Consumer Services	NA	NA	NA	NA	NA	NA	NA
Sixt	Consumer Services	-0.256***	0.063	0.020	0.066	0.226**	0.101	0.263
Cewe Stiftung	Consumer Services	-0.197***	0.065	0.119**	0.06	-0.058	0.109	0.086
Basler	Electronic Equipment: Gauges	NA	NA	NA	NA	NA	NA	NA
Hornbach-Baumarkt	Home Improvement	-0.189***	0.07	0.012	0.098	0.032	0.086	0.000
Gea Group	Industrial Engineering	-0.154**	0.066	0.160***	0.058	0.134	0.099	0.331
DMG Mori	Industrial Engineering	-0.294***	0.077	0.242***	0.070	0.333***	0.104	0.269

Duerr	Industrial Engineering	-0.237***	0.056	0.221***	0.06	0.063	0.103	0.233
Jungheinrich H Pref.	Industrial Engineering	-0.245***	0.066	0.158***	0.058	0.255***	0.096	0.226
Kion Group	Industrial Engineering	NA	NA	NA	NA	NA	NA	NA
Krones	Industrial Engineering	-0.069	0.056	0.236***	0.055	0.033	0.089	0.251
Kuka	Industrial Engineering	-0.074	0.086	0.031	0.063	0.140	0.116	0.197
Pfeiffer Vacuum Tech.	Industrial Engineering	-0.198***	0.063	0.061	0.059	0.182*	0.094	0.194
Stabilus	Industrial Engineering	NA	NA	NA	NA	NA	NA	NA
Wacker Neuson	Industrial Engineering	-0.109	0.077	0.163**	0.080	-0.093	0.132	0.202
Deutz	Industrial Engineering	-0.201***	0.075	0.134*	0.070	0.363***	0.132	0.204
Heidelberger Druckmaschinen	Industrial Engineering	-0.201*	0.105	0.163**	0.073	0.151	0.135	0.207
Homag Group	Industrial Engineering	-0.115	0.083	0.174*	0.097	0.011	0.136	0.071
Norma Group	Industrial Engineering	-0.451**	0.19	0.067	0.11	0.039	0.241	0.188
Washtec	Industrial Engineering	-0.167**	0.082	0.020	0.091	-0.179	0.154	0.026
Vossloh	Industrial Transportation	-0.163**	0.075	0.210***	0.068	0.007	0.095	0.160
Verallia Deutchland	Industrial Goods and Services	-0.095**	0.047	-0.060	0.045	0.126	0.087	0
Simona	Industrial Goods and Services	-0.104	0.069	-0.111**	0.053	0.123	0.117	0.008
Medion	Industrial Goods and Services	-0.155	0.102	0.049	0.063	-0.138	0.114	0.111
Logwin	Industrial Goods and Services	-0.181*	0.094	0.014	0.103	-0.341**	0.173	0.048
Indus Holding	Industrial Goods and Services	-0.218***	0.054	0.212***	0.042	0.053	0.068	0.274
First Sensor	Industrial Goods and Services	-0.115	0.097	-0.012	0.081	-0.156	0.132	0.065
Amadeus Fire	Industrial Goods and Services	-0.359***	0.097	0.133	0.083	0.181	0.119	0.085
Varta	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA
Traton	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA
Thyssenkrupp	Industrial Goods and Services	-0.221***	0.068	0.111**	0.051	0.164*	0.09	0.471
Takkt	Industrial Goods and Services	-0.159***	0.066	0.141**	0.066	-0.005	0.103	0.056
Rational	Industrial Goods and Services	-0.103	0.069	0.151**	0.064	-0.031	0.106	0.113
Osram Licht	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA
Hensoldt	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA
Hamb.Hafenud.Logistik	Industrial Goods and Services	-0.103	0.083	0.148**	0.063	0.101	0.142	0.301
Bilfinger Berger	Industrial Goods and Services	-0.184***	0.07	0.240***	0.055	0.014	0.109	0.312
Baywa	Industrial Goods and Services	-0.185***	0.048	0.158***	0.054	0.195**	0.078	0.155
Basler	Industrial Goods and Services	-0.187**	0.079	-0.086	0.090	0.038	0.142	0.048
Knorr Bremse	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA
Fraport	Industrial Goods and Services	-0.119*	0.068	0.160***	0.056	0.02	0.106	0.257

Rheinmetall	Industrial Goods and Services	-0.203**	0.086	0.238***	0.057	0.267**	0.126	0.257
Daimler Truck Holding	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA
Hapag Lloyd	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA
Deutsche Post	Industrial Goods and Services	-0.131	0.079	0.081*	0.045	0.062	0.075	0.425
Siemens	Industrial Goods and Services	-0.006	0.041	0.003	0.063	-0.154	0.066	0.633
Aurubis	Industrial Metals and Mines	-0.177***	0.06	0.200***	0.061	0.233***	0.089	0.273
Kloeckner & Co.	Industrial Metals and Mines	-0.084	0.071	0.186*	0.097	0.094	0.158	0.394
Salzgitter	Industrial Metals and Mines	-0.096	0.068	0.241***	0.071	0.042	0.126	0.369
SGL Carbon	Industrial Metals and Mines	-0.155**	0.068	0.056	0.08	0.124	0.112	0.271
Suedwestdeutsche Salzwerke	Industrial Metals and Mines	NA	NA	NA	NA	NA	NA	NA
Siemens Healthineers	Medical Equipment	NA	NA	NA	NA	NA	NA	NA
Carl Zeiss Meditec	Medical Equipment	-0.026	0.062	-0.019	0.08	-0.209**	0.099	0.081
Sartorius	Medical Equipment	-0.105	0.082	0.048	0.093	-0.091	0.115	0.039
Stratec	Medical Equipment	-0.176**	0.070	-0.061	0.1	-0.08	0.122	0.075
Draegerwerk Pref.	Medical Equipment	NA	NA	NA	NA	NA	NA	NA
Draegerwerk	Medical Equipment	-0.095	0.141	-0.036	0.098	-0.028	0.196	0.096
Sartorius Shs Pref.	Medical Equipment	NA	NA	NA	NA	NA	NA	NA
Gerresheimer	Medical Supplies	-0.051	0.077	0.057	0.068	-0.077	0.097	0.151
Paul Hartmann	Medical Supplies	0.047	0.051	-0.025	0.048	-0.063	0.066	0.006
Bayer	Pharmacueticals	0.152**	0.061	0.008	0.051	-0.185	0.095	0.451
Merck Kgaa	Pharmacueticals	0.065	0.041	0.042	0.049	-0.351***	0.080	0.212
Dermapharm Holding	Pharmacueticals	NA	NA	NA	NA	NA	NA	NA
Medios	Pharmacueticals	NA	NA	NA	NA	NA	NA	NA
Borussia Dortmund	Recreational Services	-0.115	0.066*	0.066	0.062	0.12	0.096	0.066
Sap	Software	0.068	0.045	-0.161***	0.058	-0.307***	0.072	0.415
Teamviewer	Software	NA	NA	NA	NA	NA	NA	NA
Atoss Software	Software	-0.278***	0.072	-0.067	0.075	0.119	0.108	0.047
Gft Technologies	Software	-0.166*	0.09	-0.104	0.105	0.057	0.144	0.120
Mensch und Maschine Software	Software	-0.138**	0.066	-0.007	0.083	0.068	0.105	0.072
Nemetschek	Software	-0.255**	0.110	-0.093	0.082	-0.036	0.145	0.105
Software N	Software	-0.078	0.088	-0.092	0.068	-0.058	0.117	0.196
Suse	Software	NA	NA	NA	NA	NA	NA	NA
Auto de N	Software	NA	NA	NA	NA	NA	NA	NA
Nexus	Software	-0.08	0.074	0.070	0.079	-0.168	0.129	0.023
PSI Software	Software	-0.127	0.095	-0.073	0.086	0.003	0.151	0.090
Adva Optical Networking	Telecommunications Equipment	-0.412***	0.111	-0.288***	0.108	0.131	0.156	0.193
OHB	Telecommunications Equipment	-0.101	0.087	0.021	0.075	0.043	0.124	0.058
Deutsche Telecom	Telecommunications Services	0.188***	0.035	-0.037	0.049	-0.305***	0.064	0.432
Vantage Towers	Telecommunications Services	NA	NA	NA	NA	NA	NA	NA
L&L	Telecommunications Services	-0.169	0.116	0.062	0.09	0.157	0.18	0.155
Telefonica Dtl. Holdings	Telecommunications Services	NA	NA	NA	NA	NA	NA	NA
Freenet	Telecommunications Services	0.029	0.079	-0.040	0.083	-0.318**	0.133	0.190
Tele Columbus	Telecommunications Services	NA	NA	NA	NA	NA	NA	NA
Tui	Travel and tourism	-0.123*	0.063	0.094	0.065	0.112	0.107	0.360

Note: The table presents results from regressions of the returns on the German firms listed in column (1) on the change in the log of the Korean won/euro nominal exchange rate (column (3), the change in the log of the Japanese yen/euro nominal exchange rate (column (5)), the change in the log of the U.S. dollar/ euro nominal exchange rate (column (7)), the change in the log of the British pound/euro nominal exchange rate, the change in the log of the Swiss franc/euro nominal exchange

rate, the return on the German stock market, the return on the world stock market, the change in the log of the spot price for Brent crude oil, Altavilla et al's (2019) measures of the changes in 2-year and 10-year German government bonds driven by European Central Bank (ECB) press conferences, press releases, and monetary events, and a dummy variable equaling one of the date when ECB President Draghi promised to do whatever it takes to save the euro and equaling zero otherwise.. Increases in the exchange rate variables represent appreciations of the euro. The data extends from 19 January 2001 to 19 January 2021. There are 5216 observations. When return data are not available on 19 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 3. The Exposure of French Firm Stock Returns to the Japanese Yen/Euro, Korean Won/Euro, and U.S. Dollar/Euro Exchange Rates.

		Korean won/euro		Japanese yen/euro		U.S. dollar/euro		Adjusted R^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Firm	Sector	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	
Airbus	Aerospace	0.092*	0.049	-0.078	0.062	-0.454***	0.107	0.434
Dassault Aviation	Aerospace	-0.137***	0.044	-0.005	0.048	0.107	0.076	0.085
LISI	Aerospace	-0.154***	0.058	0.102*	0.060	-0.012	0.091	0.125
Team	Aerospace	0.175*	0.100	0.065	0.107	-0.055	0.142	0.000
Kering	Apparel Retailer	-0.122**	0.054	0.033	0.044	0.049	0.077	0.518
Showroomprive	Apparel Retailer	NA	NA	NA	NA	NA	NA	NA
Faurecia	Auto Parts	-0.101	0.062	0.182**	0.072	0.155*	0.09	0.36
Valeo	Auto Parts	-0.168***	0.051	0.107*	0.056	0.114	0.092	0.443
Plastic Omnium	Auto Parts	-0.258***	0.082	0.126*	0.066	0.388***	0.129	0.212
Akwel	Auto Parts	0.016	0.077	-0.01	0.102	-0.149	0.127	0.025
Burelle	Auto Parts	-0.182***	0.064	-0.004	0.072	0.284***	0.095	0.062
Renault	Automobiles	-0.073	0.054	0.251***	0.056	-0.111	0.084	0.528
BNP Parisbas	Banks	NA	NA	NA	NA	NA	NA	NA
L'air Liquide	Basic Materials	0.059*	0.035	0.018	0.027	-0.039	0.061	0.59
Arkema	Basic Materials	-0.112**	0.052	0.001	0.058	0.139	0.102	0.573
Imerys	Basic Materials	-0.183***	0.047	0.131**	0.052	0.241***	0.079	0.347
Robertet	Basic Materials	-0.033	0.053	0.074*	0.04	-0.048	0.081	0.028
Carbios	Basic Materials	NA	NA	NA	NA	NA	NA	NA
AB Science	Biotechnology	-0.035	0.138	0.03	0.147	-0.236	0.225	0.058
Abivax	Biotechnology	NA	NA	NA	NA	NA	NA	NA
Cellectis	Biotechnology	-0.180*	0.098	0.04	0.116	-0.301*	0.163	0.055
Gensight Biologics	Biotechnology	NA	NA	NA	NA	NA	NA	NA
Innate Pharmacuetical	Biotechnology	-0.069	0.102	0.07	0.104	-0.073	0.192	0.134
Inventiva	Biotechnology	NA	NA	NA	NA	NA	NA	NA
Nanobiotix	Biotechnology	NA	NA	NA	NA	NA	NA	NA
Valneva	Biotechnology	-0.032	0.061	0.083	0.095	-0.026	0.123	0.082
LVMH	Consumer Discretionary	-0.025	0.037	-0.096***	0.034	-0.008	0.055	0.633
Hermes	Consumer Discretionary	0.047	0.059	-0.065	0.055	-0.08	0.094	0.272
Christian Dior	Consumer Discretionary	-0.066*	0.038	-0.142***	0.041	0.04	0.054	0.605
Vivendi	Consumer Discretionary	0.049	0.047	-0.098*	0.057	-0.032	0.093	0.437
Michelin	Consumer Discretionary	-0.039	0.057	0.060	0.045	-0.041	0.075	0.463
Accor	Consumer Discretionary	-0.039	0.039	0.023	0.047	0.087	0.071	0.489
Publicis Group	Consumer Discretionary	0.021	0.054	-0.157***	0.050	-0.149*	0.082	0.398
FNAC Darty	Consumer Discretionary	NA	NA	NA	NA	NA	NA	NA
LaGardere Groupe	Consumer Discretionary	-0.013	0.052	-0.044	0.046	0.008	0.086	0.385
Rubis	Consumer Discretionary	-0.053	0.042	0.056	0.04	0.037	0.079	0.204
Vicat	Cement	-0.101**	0.044	0.130***	0.048	0.155**	0.068	0.198
Hoffman	Cement	NA	NA	NA	NA	NA	NA	NA
L'Oreal	Cosmetics	0.033	0.031	-0.073**	0.033	-0.099*	0.055	0.517
Interparfums	Cosmetics	-0.017	0.046	0.071	0.05	-0.178**	0.081	0.101
Ubisoft	Electronic Entertainment	0.016	0.07	-0.131*	0.077	-0.055	0.115	0.212
Focus Home Interactive	Electronic Entertainment	NA	NA	NA	NA	NA	NA	NA
Bigben Interactive	Consumer Discretionary	-0.02	0.066	-0.003	0.076	-0.129	0.128	0.074
MGI Digital Graphics	Electronic Equipment: Gauges	0.018	0.049	-0.007	0.061	-0.167**	0.085	0.065
SES Imagotag	Electronic Equipment: Gauges	-0.089*	0.051	0.059	0.063	-0.180*	0.101	0.074
Gerard Perrier	Electronic Components	-0.034	0.056	0.013	0.046	0.043	0.08	0.027
Verallia	General Industrials	NA	NA	NA	NA	NA	NA	NA
Groupe Guillin	General Industrials	-0.089**	0.039	-0.006	0.046	0.092	0.076	0.021
Oeneo	General Industrials	-0.089	0.072	0.195***	0.073	-0.035	0.144	0.053
TFF Group	General Industrials	-0.096**	0.043	0.049	0.046	0.088	0.067	0.038
Hexaom	Home Construction	-0.142***	0.048	0.099*	0.056	0.112	0.089	0.07
Kaufman et Broad	Home Construction	-0.069	0.073	0.081	0.066	0.137	0.097	0.100
Exel	Industrial Engineering	-0.029	0.048	-0.030	0.044	0.11	0.072	0.026
Manitou	Industrial	-0.166**	0.078	0.175**	0.068	0.111	0.107	0.154
Chargeurs	Industrial Materials	-0.065	0.057	0.160**	0.063	0.031	0.094	0.100
Elis	Industrial Suppliers	NA	NA	NA	NA	NA	NA	NA
Manutan International	Industrial Suppliers	-0.164***	0.056	0.026	0.052	0.027	0.082	0.031
Thermador Groupe	Industrial Suppliers	-0.146***	0.040	0.083**	0.04	0.066	0.060	0.057
Worldline	Industrial Support Services	NA	NA	NA	NA	NA	NA	NA

Teleformance	Industrial Support Services	-0.008	0.052	-0.201***	0.049	0.028	0.075	0.281
Edenred	Industrial Support Services	-0.180***	0.067	-0.025	0.068	0.058	0.086	0.336
Bureau Veritas	Industrial Support Services	0.045	0.063	-0.027	0.041	-0.206**	0.100	0.352
Groupe Crit	Industrial Support Services	-0.240**	0.100	0.078	0.069	0.089	0.115	0.081
Serma Group	Industrial Support Services	0.027	0.08	-0.057	0.116	0.084	0.176	0.000
Synergie	Industrial Support Services	-0.105*	0.061	0.055	0.066	0.067	0.100	0.058
ADP	Industrial Transportation	-0.025	0.063	0.017	0.052	0.08	0.089	0.402
Bollore	Industrial Transportation	-0.098	0.06	0.117**	0.046	-0.124	0.090	0.209
Getlink	Industrial Transportation	-0.153***	0.047	0.028	0.085	0.371***	0.112	0.296
Odet	Industrial Transportation	-0.132***	0.044	0.127***	0.045	-0.008	0.077	0.095
XPO Logistics	Industrial Transportation	-0.028	0.068	-0.007	0.070	0.082	0.116	0.047
ID Logistics	Industrial Transportation	0.006	0.093	-0.041	0.058	-0.05	0.115	0.065
Stef	Industrial Transportation	-0.029	0.037	0.089**	0.045	-0.066	0.092	0.021
Jacquet Metals	Iron and Steel	-0.090	0.075	0.130*	0.067	0.001	0.116	0.144
Vallourec	Iron and Steel	-0.130**	0.061	0.311***	0.079	0.112	0.134	0.271
Eurofins Scientific	Medical Services	-0.053	0.06	-0.042	0.069	-0.147	0.103	0.119
Eramet	Nonferrous Metals	-0.19*	0.098	0.225***	0.086	0.480***	0.139	0.254
GTT	Oil Equipment and Services	NA	NA	NA	NA	NA	NA	NA
CGG	Oil Equipment and Services	-0.121	0.081	0.198**	0.086	0.001	0.148	0.277
Maurel and Prom	Oil Producers	-0.137***	0.052	0.157**	0.064	0.182*	0.093	0.231
Total Gabon	Oil Producers	-0.069	0.05	0.176***	0.056	-0.077	0.102	0.098
Sanofi	Pharmaceuticals	0.094**	0.041	0.011	0.04	-0.229***	0.068	0.429
Ipsen	Pharmaceuticals	-0.04	0.073	-0.112*	0.059	-0.063	0.147	0.153
Virbac	Pharmaceuticals	-0.009	0.046	0.072	0.059	-0.04	0.092	0.066
Boiron	Pharmaceuticals	0.013	0.062	0.002	0.045	-0.051	0.109	0.031
Guerbet	Pharmaceuticals	-0.093*	0.056	0.137**	0.069	0.04	0.095	0.032
Trigano	Recreational Products	-0.201***	0.064	0.104	0.066	0.151	0.107	0.173
Beneteau	Recreational Vehicles and Boats	-0.183***	0.048	0.127**	0.054	0.097	0.085	0.208
Sodexo	Restaurants and Bars	-0.002	0.042	-0.013	0.043	-0.147*	0.085	0.323
Stmicroelectronics	Semiconductors	0.151***	0.057	-0.205***	0.055	-0.442***	0.085	0.464
Soitec	Semiconductors	-0.081	0.102	-0.193**	0.093	-0.207	0.157	0.19
X-fab Silicon Foundaries	Semiconductors	-0.099	0.318	0.137	0.252	0.026	0.500	0.204
Dassault Systems	Software	0.042	0.052	-0.215***	0.050	-0.117	0.074	0.351
Pharmagest Interactive	Software	-0.061	0.041	0.020	0.046	-0.015	0.083	0.031
Axway Software	Software	-0.228***	0.088	0.107	0.104	0.108	0.15	0.045
Claranova	Software	-0.01	0.14	-0.019	0.098	-0.096	0.223	0.060
ESI Group	Software	-0.114**	0.055	0.096	0.063	-0.034	0.097	0.031
Esker	Software	-0.08	0.097	0.091	0.079	0.070	0.133	0.070
IGE+XAO	Software	-0.031	0.035	0.024	0.045	-0.011	0.064	0.016
Lectra	Software	0.048	0.077	-0.011	0.068	-0.13	0.105	0.045
Eutelsat	Telecommunications Equipment	0.016	0.041	-0.020	0.047	-0.192***	0.074	0.148
Orange	Telecommunications Services	0.248***	0.037	-0.142***	0.046	-0.239***	0.07	0.42
Illiad	Telecommunications Services	-0.068	0.047	-0.112*	0.059	-0.050	0.095	0.154

Note: The table presents results from regressions of the returns on the French firms listed in column (1) on the change in the log of the Japanese yen/euro nominal exchange rate (column (3)), the change in the log of the Korean won/euro nominal exchange rate (column (5), the change in the log of the U.S. dollar/ euro nominal exchange rate (column (7)), the change in the log of the British pound/euro nominal exchange rate, the change in the log of the Swiss franc/euro nominal exchange rate, the return on the French stock market, the return on the world stock market, the change in the log of the spot price for Brent crude oil, Altavilla et al's (2019) measures of the changes in 2-year and 10-year French government bonds driven by European Central Bank (ECB) press conferences, press releases, and monetary events, and a dummy variable equaling one of the date when ECB President Draghi promised to do whatever it takes to save the euro and equaling zero otherwise.. Increases in the exchange rate variables represent appreciations of the euro. The data extend from 19 January 2001 to 19 January 2021. There are 5216 observations. When return data are not available on 19 January 2001, the sample begins on the first date when return data become available. Standard Error in columns (3) and (5) 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 Exposure of German Firm Stock Returns to the Korean Won/Euro and Japanese Yen/Euro Exchange Rates over the 2001-2011 and 2011-2021 Periods.

		19 January 2001 – 19 January 2011 sample period				20 January 2011 – 19 January 2021 sample period			
		Korean won/euro		Japanese yen/euro		Korean won/euro		Japanese yen/euro	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Firm	Sector	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
MTU Aero Engines	Aerospace	-0.075	0.095	0.167	0.112	0.094	0.106	-0.032	0.082
Continental	Auto Parts	-0.162	0.137	-0.015	0.115	-0.037	0.081	-0.108**	0.053
Hella Gmbh & Kgaa	Auto Parts	NA	NA	NA	NA	-0.169	0.145	0.127	0.091
Schaeffler Pf. Shs	Auto Parts	NA	NA	NA	NA	-0.177	0.119	0.011	0.143
Vitesco Technologies Group	Auto Parts	NA	NA	NA	NA	NA	NA	NA	NA
Elringklinger	Auto Parts	-0.024	0.097	0.305***	0.094	-0.215*	0.127	0.158*	0.095
Jost Werke	Auto Parts	NA	NA	NA	NA	-0.792***	0.198	-0.076	0.26
Novem Group	Auto Parts	NA	NA	NA	NA	NA	NA	NA	NA
Mercedes-Benz Group	Automobiles	-0.063	0.083	0.095	0.071	0.054	0.05	-0.008	0.043
Volkswagen	Automobiles	0.091	0.111	-0.353***	0.117	-0.08	0.083	-0.025	0.054
BMW	Automobiles	-0.012	0.085	0.095	0.06	-0.039	0.065	-0.009	0.043
Porsche Pref.	Automobiles	0.028	0.073	0.307**	0.127	-0.273**	0.108	-0.067	0.061
BMW Pref.	Automobiles	NA	NA	NA	NA	NA	NA	NA	NA
Volkswagen Pref.	Automobiles	NA	NA	NA	NA	NA	NA	NA	NA
Evotec	Biotechnology	-0.021	0.113	-0.094	0.138	-0.031	0.106	0.044	0.105
Biotest	Biotechnology	-0.214	0.118	0.148	0.092	-0.256**	0.108	0.003	0.089
Formycon	Biotechnology	NA	NA	NA	NA	-0.157	0.148	0.258*	0.146
Morphosys	Biotechnology	-0.025	0.094	-0.393**	0.16	-0.079	0.107	0.066	0.091
Biotest Pref.	Biotechnology	-0.155	0.121	0.012	0.102	-0.128	0.103	-0.006	0.087
Heidelberg	Cement	-0.079	0.09	0.302***	0.113	0.058	0.087	-0.022	0.05
BASF	Chemicals	-0.012	0.058	0.116*	0.063	0.087	0.055	0.004	0.035
Covestro	Chemicals	NA	NA	NA	NA	0.104	0.092	0.059	0.117
Symrise	Chemicals	-0.185	0.177	0.239*	0.143	-0.043	0.057	-0.09	0.058
Brenntag	Chemicals	-0.367	0.233	0.207	0.204	-0.274***	0.072	0.197***	0.067
Evonik Industries	Chemicals	NA	NA	NA	NA	0.006	0.085	-0.052	0.063
Wacker	Chemicals	-0.224**	0.107	0.238	0.167	0.04	0.089	-0.044	0.083
Fuchs Petrolub	Chemicals	-0.299***	0.074	0.270**	0.111	-0.251**	0.122	0.212***	0.068
K+S	Chemicals	-0.071	0.100	0.369***	0.090	-0.079	0.09	0.024	0.092
Lanxess	Chemicals	-0.259***	0.072	0.173*	0.104	-0.133*	0.068	-0.014	0.068
Eckert & Ziegler Strahlen & Medzi	Chemicals	-0.154	0.101	0.062	0.115	-0.073	0.105	-0.098	0.098
FUCHS PETROLUB PREF.	Chemicals	NA	NA	NA	NA	-0.143	0.099	0.085	0.092
Muehlbauer Holding	Computer Hardware	-0.025	0.175	-0.177	0.11	-0.278**	0.119	0.028	0.088
Adesso	Computer Services	-0.195	0.143	-0.182	0.156	0.028	0.118	0.074	0.105
Bechtle	Computer Services	-0.151	0.142	0.296***	0.093	-0.019	0.077	-0.012	0.07
Cancom	Computer Services	-0.367***	0.125	-0.131	0.130	-0.008	0.092	0.134	0.092
Nagarro	Computer Services	NA	NA	NA	NA	NA	NA	NA	NA
Secunet Security Networks	Computer Services	-0.271**	0.132	-0.088	0.153	0	0.125	0.084	0.114
Allgeier	Computer Services	-0.200	0.131	0.316***	0.096	-0.192	0.133	-0.041	0.097
Datagroup	Computer Services	-0.139	0.172	0.392	0.25	-0.280*	0.146	0.007	0.104
Northern Data	Computer Services	NA	NA	NA	NA	0.780*	0.417	0.147	0.676
Delivery Hero	Consumer Services	NA	NA	NA	NA	-0.496	0.337	-0.058	0.352
Sixt	Consumer Services	-0.227***	0.078	0.076	0.097	-0.289***	0.102	-0.136	0.085
Cewe Stiftung	Consumer Services	-0.141*	0.079	0.087	0.090	-0.314***	0.105	0.146**	0.073
Basler	Electronic Equipment: Gauges	-0.268***	0.085	0.040	0.092	-0.247***	0.089	-0.062	0.087
Hornbach-Baumarkt	Home Improvement	-0.152*	0.076	-0.052	0.15	-0.307**	0.151	0.114	0.084
Gea Group	Industrial Engineering	-0.152*	0.090	0.304***	0.080	-0.108	0.072	-0.091	0.062
DMG Mori	Industrial Engineering	-0.357***	0.103	0.361***	0.105	-0.056	0.075	-0.065	0.078
Duerr	Industrial Engineering	-0.204***	0.077	0.149*	0.086	-0.284***	0.098	0.210**	0.087
Jungheinrich H Pref.	Industrial Engineering	-0.262***	0.087	0.129	0.082	-0.184**	0.083	0.105	0.083
Kion Group	Industrial Engineering	NA	NA	NA	NA	-0.332*	0.190	0.163	0.102
Krones	Industrial Engineering	-0.031	0.080	0.303***	0.078	-0.079	0.071	0.029	0.068
Kuka	Industrial Engineering	-0.04	0.116	0.022	0.087	-0.109	0.097	-0.054	0.095
Pfeiffer Vacuum Tech.	Industrial Engineering	-0.172**	0.080	0.042	0.086	-0.258***	0.09	0.074	0.077
Stabilus	Industrial Engineering	NA	NA	NA	NA	-0.335*	0.181	0.104	0.143
Wacker Neuson	Industrial Engineering	0.004	0.105	0.102	0.164	-0.290***	0.092	0.233***	0.083
Deutz	Industrial Engineering	-0.131	0.085	0.075	0.088	-0.308**	0.13	0.126	0.115
Heidelberger Druckmaschinen	Industrial Engineering	-0.283**	0.143	0.216**	0.101	0.031	0.112	0.043	0.103
Homag Group	Industrial Engineering	-0.104	0.131	0.218	0.18	-0.082	0.069	0.049	0.088
Norma Group	Industrial Engineering	NA	NA	NA	NA	-0.451	0.19	0.066	0.11
Washtec	Industrial Engineering	-0.124	0.109	0.056	0.139	-0.230*	0.125	-0.044	0.108
Vossloh	Industrial Transportation	-0.167	0.09	0.336***	0.086	-0.106	0.108	-0.038	0.075
Verallia Deutchland	Industrial Goods and Services	-0.02	0.041	-0.047	0.059	-0.256**	0.125	-0.11	0.07
Simona	Industrial Goods and Services	-0.06	0.047	0.011	0.05	-0.221	0.196	-0.232	0.107
Medion	Industrial Goods and Services	-0.176	0.127	0.105	0.101	-0.071	0.053	0.022	0.06
Logwin	Industrial Goods and Services	-0.219*	0.117	0.027	0.162	-0.089	0.121	0.041	0.108
Indus Holding	Industrial Goods and Services	-0.260***	0.061	0.249***	0.063	-0.112	0.09	0.137**	0.061
First Sensor	Industrial Goods and Services	-0.072	0.130	-0.038	0.125	-0.190*	0.107	-0.019	0.086

Amadeus Fire	Industrial Goods and Services	-0.429***	0.123	0.208*	0.121	-0.221	0.152	0.025	0.091
Varta	Industrial Goods and Services	NA	NA	NA	NA	0.318	0.224	-0.006	0.254
Traton	Industrial Goods and Services	NA	NA	NA	NA	-0.650**	0.26	0.047	0.282
Thyssenkrupp	Industrial Goods and Services	-0.250***	0.077	0.128*	0.068	-0.140	0.094	0.091	0.079
Takkt	Industrial Goods and Services	-0.114	0.081	0.184*	0.099	-0.264**	0.102	0.073	0.093
Rational	Industrial Goods and Services	-0.042	0.085	0.206***	0.088	-0.192**	0.097	-0.024	0.082
Osram Licht	Industrial Goods and Services	NA	NA	NA	NA	-0.455**	0.206	0.257**	0.117
Hensoldt	Industrial Goods and Services	NA	NA	NA	NA	NA		NA	NA
Hamb.Hafenud.Logistik	Industrial Goods and Services	0.003	0.113	0.322**	0.129	-0.208***	0.079	-0.009	0.069
Bilfinger Berger	Industrial Goods and Services	-0.225***	0.085	0.376***	0.082	-0.066	0.11	0.017	0.07
Baywa	Industrial Goods and Services	-0.173***	0.062	0.215***	0.081	-0.165**	0.072	0.014	0.062
Basler	Industrial Goods and Services	-0.190*	0.104	-0.217	0.139	-0.162	0.114	0.05	0.098
Knorr Bremse	Industrial Goods and Services	NA	NA	NA	NA	-0.078	0.189	0.108	0.24
Fraport	Industrial Goods and Services	-0.160***	0.061	0.187**	0.089	-0.013	0.156	0.076	0.07
Rheinmetall	Industrial Goods and Services	-0.157	0.106	0.355***	0.083	-0.236*	0.133	-0.048	0.068
Daimler Truck Holding	Industrial Goods and Services	NA	NA	NA	NA	NA	NA	NA	NA
Hapag Lloyd	Industrial Goods and Services	NA	NA	NA	NA	-0.336	0.268	-0.029	0.201
Deutsche Post	Industrial Goods and Services	-0.207**	0.084	0.054	0.066	0.092	0.104	0.037	0.041
Siemens	Industrial Goods and Services	0.002	0.051	-0.001	0.08	0.002	0.035	0.003	0.037
Aurubis	Industrial Metals and Mines	-0.163**	0.078	0.315***	0.073	-0.16*	0.086	-0.052	0.082
Kloeckner & Co.	Industrial Metals and Mines	-0.031	0.100	0.324*	0.180	-0.067	0.128	0.013	0.103
Salzgitter	Industrial Metals and Mines	-0.115	0.079	0.313***	0.097	-0.021	0.131	0.099	0.098
SGL Carbon	Industrial Metals and Mines	-0.139	0.085	0.129	0.109	-0.129	0.114	-0.119	0.104
Suedwestdeutsche Salzwerke	Industrial Metals and Mines	-0.02	0.04	0	0.049	-0.062	0.189	0.007	0.155
Siemens Healthineers	Medical Equipment	NA	NA	NA	NA	0.61	0.42	-0.182	0.17
Carl Zeiss Meditec	Medical Equipment	-0.006	0.077	0.055	0.127	-0.072	0.091	-0.141**	0.066
Sartorius	Medical Equipment	-0.11	0.104	0.067	0.132	-0.108	0.139	0.018	0.113
Stratec	Medical Equipment	-0.182**	0.085	-0.18	0.154	-0.134	0.114	0.021	0.093
Draegerwerk Pref.	Medical Equipment	NA	NA	NA	NA	-0.12	0.12	0.041	0.113
Draegerwerk	Medical Equipment	0.238	0.265	0.078	0.287	-0.105	0.149	-0.047	0.102
Sartorius Shs Pref.	Medical Equipment	0.005	0.121	0.099	0.118	-0.087	0.099	0.049	0.095
Gerresheimer	Medical Supplies	0.071	0.097	0.087	0.155	-0.220***	0.076	0.033	0.063
Paul Hartmann	Medical Supplies	0.064	0.058	0.044	0.065	-0.014	0.092	-0.097	0.074
Bayer	Pharmacueticals	0.183**	0.084	0.009	0.067	0.109	0.075	-0.043	0.048
Merck Kgaa	Pharmacueticals	0.138***	0.051	0.081	0.072	-0.069	0.055	-0.058	0.049
Dermapharm Holding	Pharmacueticals	-0.016	0.275	0.244	0.188	0	0.229	0.236	0.324
Medios	Pharmacueticals	-0.052	0.209	-0.588**	0.338	-0.549	0.699	0.052	0.155
Borussia Dortmund	Recreational Services	-0.113	0.078	0.184**	0.092	-0.126	0.094	-0.096	0.075
Sap	Software	0.053	0.053	-0.228***	0.083	0.111**	0.053	-0.045	0.048
Teamviewer	Software	NA	NA	NA	NA	0.772	0.533	-0.225	0.69
Atoss Software	Software	-0.343***	0.091	-0.083	0.116	-0.143	0.095	-0.043	0.09
Gft Technologies	Software	-0.100	0.102	-0.297*	0.161	-0.296*	0.152	0.122	0.111
Mensch und Maschine Software	Software	-0.193**	0.080	0.032	0.133	-0.017	0.099	-0.105	0.081
Nemetschek	Software	-0.291**	0.141	-0.132	0.131	-0.125	0.089	-0.124	0.096
Software N	Software	NA	NA	NA	NA	0.052	0.09	-0.019	0.079
Suse	Software	NA	NA	NA	NA	NA	NA	NA	NA
Auto de N	Software	-0.074	0.093	0.103	0.116	NA	NA	NA	NA
Nexus	Software	-0.168	0.122	0.027	0.132	-0.114	0.123	0.022	0.105
PSI Software	Software	-0.510***	0.161	-0.582***	0.161	-0.072	0.143	-0.115	0.089
Adva Optical Networking	Telecommunications Equipment	NA	NA	NA	NA	-0.169	0.106	0.114	0.096
OHB	Telecommunications Equipment	-0.073	0.121	0.111	0.118	-0.164	0.098	-0.082	0.079
Deutsche Telecom	Telecommunications Services	0.214***	0.048	-0.100	0.068	0.123***	0.047	0.082**	0.040
Vantage Towers	Telecommunications Services	NA	NA	NA	NA	NA	NA	NA	NA
L&L	Telecommunications Services	-0.175	0.165	0.153	0.147	-0.143	0.111	-0.062	0.078
Telefonica Dtl. Holdings	Telecommunications Services	NA	NA	NA	NA	-0.110*	0.066	0.062	0.078
Freenet	Telecommunications Services	0.017	0.103	-0.027	0.133	0.086	0.101	-0.066	0.067
Tele Columbus	Telecommunications Services	NA	NA	NA	NA	-0.368**	0.16	0.342**	0.161
Tui	Travel and tourism	-0.175**	0.072	0.049	0.096	0.000	0.106	0.154**	0.077

Note: The table presents results from regressions of the returns on the German firms listed in column (1) over the 19 January 2001-19 January 2011 period on the change in the log of the Korean won/euro nominal exchange rate (column (3), the change in the log of the Japanese yen/euro nominal exchange rate (column (5)), the change in the log of the U.S. dollar/ euro nominal exchange rate, the change in the log of the British pound/euro nominal exchange rate, the change in the log of the

Swiss franc/euro nominal exchange rate, the return on the German 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 German government bonds driven by European Central Bank (ECB) press conferences, press releases, and monetary events. The table also presents results from the same regression over the 20 January 2011-19 January 2021 period, with the coefficient on the Korean won/euro exchange rate listed in column (7) and the coefficient on the Japanese yen/euro exchange rate listed in column (9). Increases in the exchange rate variables represent appreciations of the euro. When return data are not available on 19 January 2001, the sample begins on the first date when return data become available. S.E. in columns (4), (6), (8), and (10) are heteroscedasticity and autocorrelation consistent standard errors.
Source: Datastream database and calculations by the author.
*** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 5. The Exposure of French Firm Stock Returns to the Japanese Yen/Euro, Korean Won/Euro, and U.S. Dollar/Euro Exchange Rates over the 2001-2011 and 2011-2021 Periods.

		19 January 2001 – 19 January 2011 sample period				20 January 2011 – 19 January 2021 sample period			
		Korean won/euro		Japanese yen/euro		Korean won/euro		Japanese yen/euro	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Firm	Sector	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Airbus	Aerospace	0.09	0.062	-0.034	0.076	0.067	0.072	-0.081	0.088
Dassault Aviation	Aerospace	-0.146***	0.052	0.008	0.069	-0.134*	0.078	-0.064	0.061
LISI	Aerospace	-0.134*	0.071	0.12	0.077	-0.217***	0.083	0.05	0.085
Team	Aerospace	0.213	0.133	0.081	0.171	0.087	0.11	0.022	0.088
Kering	Apparel Retailer	-0.112	0.074	0.101*	0.06	-0.153***	0.057	-0.036	0.058
Showroomprive	Apparel Retailer	NA	NA	NA	NA	NA	14	NA	NA
Faurecia	Auto Parts	-0.117	0.083	0.170*	0.099	-0.075	0.083	0.117	0.092
Valeo	Auto Parts	-0.201***	0.054	0.163**	0.079	-0.094	0.108	-0.013	0.075
Plastic Omnium	Auto Parts	-0.232**	0.088	0.124	0.095	-0.348**	0.135	0.043	0.079
Akwel	Auto Parts	0.076	0.096	-0.176	0.168	-0.138	0.09	0.108	0.098
Burelle	Auto Parts	-0.180**	0.081	-0.132	0.105	-0.209**	0.086	0.087	0.074
Renault	Automobiles	-0.122*	0.067	0.317***	0.079	0.043	0.076	0.115	0.076
BNP Parisbas	Banks	NA	NA	NA	NA	NA	NA	NA	NA
L'air Liquide	Basic Materials	0.033	0.036	0.049	0.039	0.129	0.071	-0.026	0.036
Arkema	Basic Materials	-0.107	0.071	0.017	0.112	-0.115	0.074	-0.018	0.059
Imerys	Basic Materials	-0.229***	0.059	0.221***	0.072	-0.082	0.063	-0.021	0.061
Robertet	Basic Materials	-0.108*	0.062	0.097*	0.057	0.127	0.095	0.025	0.057
Carbios	Basic Materials	NA	NA	NA	NA	0.104	0.141	-0.008	0.152
AB Science	Biotechnology	-0.463	0.32	0.343	0.309	-0.017	0.152	0.034	0.159
Abivax	Biotechnology	NA	NA	NA	NA	-0.023	0.234	0.245	0.264
Cellectis	Biotechnology	-0.161	0.111	0.297	0.211	-0.338**	0.143	0.096	0.127
Gensight Biologics	Biotechnology	NA	NA	NA	NA	0.188	0.306	0.177	0.235
Innate Pharmacuetical	Biotechnology	-0.23	0.15	0.17	0.182	0.154	0.128	0.074	0.122
Inventiva	Biotechnology	NA	NA	NA	NA	-0.56	0.352	-0.19	0.498
Nanobiotix	Biotechnology	NA	NA	NA	NA	-0.141	0.158	0.195	0.129
Valneva	Biotechnology	-0.116	0.072	0.028	0.134	0.082	0.105	0.169	0.127
LVMH	Consumer Discretionary	-0.018	0.05	-0.099*	0.052	-0.028	0.045	-0.095**	0.043
Hermes	Consumer Discretionary	0.102	0.077	0.021	0.082	-0.058	0.054	-0.192***	0.051
Christian Dior	Consumer Discretionary	-0.073	0.052	-0.140**	0.062	-0.048	0.044	-0.142***	0.052
Vivendi	Consumer Discretionary	0.026	0.057	-0.202**	0.087	0.071	0.061	0.122**	0.059
Michelin	Consumer Discretionary	-0.079	0.073	0.149**	0.068	0.055	0.053	-0.049	0.055
Accor	Consumer Discretionary	-0.048	0.043	0.05	0.065	-0.022	0.077	-0.028	0.06
Publicis Group	Consumer Discretionary	0.008	0.074	-0.193**	0.075	0.039	0.064	-0.06	0.056
FNAC Darty	Consumer Discretionary	NA	NA	NA	NA	-0.045	0.104	-0.051	0.148
LaGardere Groupe	Consumer Discretionary	-0.059	0.059	-0.028	0.062	0.057	0.092	0.009	0.068
Rubis	Consumer Discretionary	-0.086*	0.048	0.067	0.051	0.024	0.068	-0.033	0.067
Vicat	Cement	-0.13**	0.058	0.202***	0.073	-0.023	0.053	-0.006	0.056
Hoffman	Cement	NA	NA	NA	NA	-0.268	0.306	0.374	0.384
L'Oreal	Cosmetics	0.062	0.039	-0.093*	0.047	-0.027	0.047	-0.059	0.04
Interparfums	Cosmetics	-0.034	0.057	0.077	0.067	0	0.078	0.037	0.076
Ubisoft	Electronic Entertainment	0.065	0.099	-0.235*	0.12	-0.101	0.087	0.028	0.082

Focus Home Interactive	Electronic Entertainment	NA	NA	NA	NA	-0.16	0.112	0.081	0.147
Bigben Interactive	Consumer Discretionary	-0.022	0.084	-0.12	0.116	-0.16	0.112	0.081	0.147
MGI Digital Graphics	Electronic Equipment: Gauges	0.006	0.061	0.037	0.104	0	0.072	0.001	0.071
SES Imagotag	Electronic Equipment: Gauges	-0.123**	0.056	0.041	0.109	-0.044	0.096	0.086	0.07
Gerard Perrier	Electronic Components	-0.079	0.067	-0.007	0.065	0.045	0.083	0.009	0.063
Verallia	General Industrials	NA	NA	NA	NA	0.74	0.78	0.759*	0.452
Groupe Guillin	General Industrials	-0.065	0.04	-0.056	0.068	-0.185**	0.073	0.064	0.063
Oeneo	General Industrials	-0.099	0.099	0.197	0.12	-0.067	0.074	0.156**	0.063
TFF Group	General Industrials	-0.121**	0.052	0.026	0.064	-0.037	0.052	0.058	0.064
Hexaom	Home Construction	-0.144**	0.061	0.121	0.084	-0.139*	0.078	0.036	0.059
Kaufman et Broad	Home Construction	-0.112	0.101	0.156	0.102	0.009	0.083	0	0.074
Exel	Industrial Engineering	-0.015	0.059	-0.065	0.059	-0.074	0.072	0.016	0.071
Manitou	Industrial	-0.199**	0.094	0.178**	0.09	-0.13	0.102	0.146	0.102
Chargeurs	Industrial Materials	-0.162***	0.061	0.125	0.082	0.101	0.101	0.163*	0.09
Elis	Industrial Suppliers	NA	NA	NA	NA	0.009	0.13	-0.344**	0.139
Manutan International	Industrial Suppliers	-0.198***	0.074	0.024	0.076	-0.092	0.078	-0.009	0.068
Thermador Groupe	Industrial Suppliers	-0.153***	0.052	0.095*	0.056	-0.121*	0.065	0.022	0.055
Worldline	Industrial Support Services	NA	NA	NA	NA	0.026	0.156	-0.095	0.096
Teleformance	Industrial Support Services	-0.027	0.068	-0.272***	0.079	0.026	0.065	-0.130**	0.055
Edenred	Industrial Support Services	-0.029	0.432	0.73	0.772	-0.201***	0.067	-0.067	0.06
Bureau Veritas	Industrial Support Services	0.049	0.087	0.118	0.09	0.052	0.103	-0.074*	0.039
Groupe Crit	Industrial Support Services	-0.317***	0.140	0.068	0.101	-0.062	0.078	0.056	0.079
Serma Group	Industrial Support Services	0.032	0.073	0.049	0.137	0.023	0.208	-0.223	0.211
Synergie	Industrial Support Services	-0.144*	0.075	0.064	0.1	-0.062	0.094	0.035	0.071
ADP	Industrial Transportation	0.016	0.088	0.042	0.101	-0.062	0.071	-0.033	0.058
Bollore	Industrial Transportation	-0.114	0.085	0.123*	0.066	-0.073	0.057	0.051	0.054
Getlink	Industrial Transportation	-0.184***	0.07	0.131	0.186	-0.099	0.067	-0.028	0.087
Odet	Industrial Transportation	-0.134**	0.053	0.057	0.067	-0.131*	0.074	0.165***	0.062
XPO Logistics	Industrial Transportation	0.002	0.092	-0.053	0.105	-0.096	0.079	0.035	0.094
ID Logistics	Industrial Transportation	NA	NA	NA	NA	0.005	0.092	-0.041	0.058
Stef	Industrial Transportation	-0.002	0.041	0.047	0.057	-0.095	0.065	0.124*	0.068
Jacquet Metals	Iron and Steel	-0.127	0.099	0.105	0.088	-0.057	0.102	0.164*	0.092
Vallourec	Iron and Steel	-0.140**	0.062	0.278***	0.094	-0.106	0.142	0.308**	0.131
Eurofins Scientific	Medical Services	-0.035	0.075	-0.139	0.102	-0.100	0.071	0.043	0.08
Eramet	Nonferrous Metals	-0.053	0.127	0.211**	0.106	-0.513***	0.115	0.201	0.146
GTT	Oil Equipment and Services	NA	NA	NA	NA	-0.146	0.167	0.028	0.106
CGG	Oil Equipment and Services	-0.158*	0.092	0.187*	0.105	-0.015	0.151	0.144	0.143
Maurel and Prom	Oil Producers	-0.160**	0.067	0.171**	0.078	-0.08	0.089	0.108	0.104
Total Gabon	Oil Producers	-0.066	0.058	0.141*	0.082	-0.082	0.08	0.160**	0.071
Sanofi	Pharmaceuticals	0.115**	0.055	0.077	0.059	0.049	0.05	-0.057	0.045
Ipsen	Pharmaceuticals	-0.068	0.077	-0.127	0.097	-0.02	0.141	-0.062	0.073
Virbac	Pharmaceuticals	-0.01	0.052	0.047	0.068	-0.031	0.089	0.085	0.096

Boiron	Pharmaceuticals	-0.052	0.051	0.005	0.057	0.144	0.152	-0.009	0.073
Guerbet	Pharmaceuticals	-0.078	0.067	0.091	0.094	-0.122	0.101	0.143	0.097
Trigano	Recreational Products	-0.284***	0.083	0.14	0.098	0.009	0.113	-0.002	0.079
Beneteau	Recreational Vehicles and Boats	-0.197***	0.056	0.088	0.072	-0.129	0.097	0.119	0.087
Sodexo	Restaurants and Bars	0.006	0.045	0.051	0.059	-0.012	0.097	-0.100*	0.057
Stmicroelectronics	Semiconductors	0.098	0.070	-0.284***	0.067	0.222**	0.095	-0.017	0.087
Soitec	Semiconductors	-0.220*	0.130	-0.388***	0.130	0.244*	0.134	0.128	0.12
X-fab Silicon Foundaries	Semiconductors	NA	NA	NA	NA	-0.002	0.27	0.244	0.306
Dassault Systems	Software	0.083	0.057	-0.273***	0.076	-0.069	0.103	-0.062	0.054
Pharmagest Interactive	Software	-0.112**	0.053	0.038	0.068	0.038	0.076	-0.045	0.055
Axway Software	Software	-0.228***	0.088	0.107	0.104	-0.228***	0.088	0.107	0.104
Claranova	Software	-0.01	0.14	-0.019	0.098	0.413	0.393	0.084	0.19
ESI Group	Software	-0.081	0.071	0.034	0.093	-0.193***	0.064	0.181**	0.084
Esker	Software	-0.12	0.13	0.096	0.128	0.029	0.065	0.044	0.061
IGE+XAO	Software	-0.023	0.043	-0.089	0.067	-0.064	0.063	0.176***	0.058
Lectra	Software	0.058	0.098	-0.087	0.104	-0.01	0.087	0.1	0.076
Eutelsat	Telecommunications Equipment	0.032	0.048	-0.057	0.072	-0.036	0.082	0.025	0.066
Orange	Telecommunications Services	0.300***	0.045	-0.278***	0.066	0.111*	0.065	0.109**	0.055
Illiad	Telecommunications Services	-0.053	0.059	-0.316***	0.094	-0.096	0.074	0.08	0.071

Note: The table presents results from regressions of the returns on the French firms listed in column (1) over the 19 January 2001-19 January 2011 period on the change in the log of the Korean won/euro nominal exchange rate (column (3), the change in the log of the Japanese yen/euro nominal exchange rate (column (5)), the change in the log of the U.S. dollar/ euro nominal exchange rate, the change in the log of the British pound/euro nominal exchange rate, the change in the log of the Swiss franc/euro nominal exchange rate, the return on the 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 French government bonds driven by European Central Bank (ECB) press conferences, press releases, and monetary events. The table also presents results from the same regression over the 20 January 2011-19 January 2021 period, with the coefficient on the Korean won/euro exchange rate listed in column (7) and the coefficient on the Japanese yen/euro exchange rate listed in column (9). Increases in the exchange rate variables represent appreciations of the euro. When return data are not available on 19 January 2001, the sample begins on the first date when return data become available. Standard Error in columns (3) and (5) are heteroscedasticity and autocorrelation consistent standard errors.
Source: Datastream database and calculations by the author.
*** (**) [*] denotes significance at the 1% (5%) [10%] level.

Table 6. The Exposure of Japanese Industrial Sectors to the Euro/yen Exchange Rate over the 2001-2011 and 2011-2021 Periods.

	19 January 2001 – 19 January 2011 sample period		20 January 2011 – 19 January 2021 sample period	
(1)	(2)	(3)	(4)	(5)
Sector	Exposure to Euro/yen Exchange Rate	Standard Error	Exposure to Euro/yen Exchange Rate	Standard Error
Industrial Engineering	-0.100***	0.026	-0.052*	0.028
Industrial Support Services	-0.192***	0.035	-0.013	0.027
Industrial Suppliers	-0.186***	0.045	-0.031	0.037
Industrial Materials	0.011	0.053	0.055	0.054
Industrial Machinery	-0.105***	0.030	-0.044	0.029
Specialized Machinery	-0.122***	0.044	-0.058	0.038

Note: The table presents results from regressions of the returns on the Japanese sectors listed in column (1) over the 19 January 2001-19 January 2011 period on the change in the log of the euro/Japanese yen nominal exchange rate (column (2), the change in the log of the U.S. dollar/Japanese yen nominal exchange rate, the change in the log of the Korean won/Japanese yen nominal exchange rate, the return on the aggregate Japanese market, the return on the world stock market, the change in the log of the price of Dubai crude oil, and an indicator of Japanese monetary policy derived from an event study. The table also presents results from the same regression over the 20 January 2011-19 January 2021 period, with the coefficient on the /euro/Japanese yen exchange rate listed in column (4). An increase in the exchange rate represents an appreciations of the yen. When return data are not available on 19 January 2001, the sample begins on the first date when return data become available. Standard Error in columns (3) and (5) are heteroscedasticity and autocorrelation consistent standard errors.
Source: Datastream database and calculations by the author.
*** [*] denotes significance at the 1% [10%] level.

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