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Abstract

Using data from the World Uncertainty, World Trade Uncertainty, and World Pandemic Uncertainty indices for 142 countries, this paper introduces three new indicators for measuring uncertainty in Turkey's export markets from the first quarter of 1996 to the first quarter of 2020. The indicators measure uncertainty in Turkey's export destinations. After introducing three indicators of uncertainty for export markets, we investigate their effects on economic growth. We find that all uncertainty indicators are negatively related to economic performance. Specifically, an increase in uncertainty in export destinations leads to a slower growth rate of up to two quarters. Pandemic-induced uncertainty negatively affects economic growth only at the higher quantiles. We also discuss potential implications.

JEL-Codes: F140, F430, D810, C210.

Keywords: export market diversification, economic policy uncertainty, trade policy uncertainty, COVID-19 uncertainties, developing economics, quantile regressions.

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The data for uncertainty indicators constructed in this paper are publicly available at the corresponding author's website. The dataset will be updated quarterly.

1. Introduction

The world economy in 2020 is more uncertain ever than before, mainly due to the COVID-19 pandemic. Before COVID-19, there were also uncertainties, such as Brexit and the protectionist policies of President Donald Trump (Fajgelbaum et al., 2020; Handley and Limão, 2017). Various seminal papers have demonstrated that uncertainty shocks negatively affect domestic and global economic indicators (Bloom, 2009; Bloom et al., 2018). Policy reactions to uncertainty shocks lead to the implementation of various economic policies; these shocks can be measured by the Economic Policy Uncertainty index (EPU). The level of EPU across countries is calculated by Baker et al. (2016).¹ Following Baker et al. (2016), new policy uncertainty indices have been defined (e.g., Ahir et al., 2018, 2019, and 2020; Baker et al., 2020). Following these contributions, we introduce three new uncertainty indicators. In so doing, we aim to calculate the degree of uncertainty in exporting country destinations. Here, we focus on the Turkish case from 1996Q1 to 2020Q1.

The objective of this paper is not only to contribute to the empirical literature on measuring policy uncertainty but also focuses on different models of international trade. Uncertainty shocks in export destinations can harm the economic performance of exporter economies. The early theoretical models (e.g., Brainard and Cooper, 1968; Eichengreen, 1981; Massell, 1970) and the modern theoretical approaches (e.g., Farhi et al., 2014; Handley, 2014; Handley and Limão 2015; Helpman and Razin, 2014) show that uncertainty in export destinations can negatively affect exporting a country's economic structure via the costs of instability, sudden changes in export prices and demand, the volatility of the exchange rate (devaluation), and unforeseen changes in subsidies, taxes, and tariffs.

On the other hand, adverse foreign income shocks in exporting destinations can lead to changes in trade policy and the rise of protectionism in export destinations increasing the level of policy uncertainty. Exporters can experience an increase in levels of economic and trade policy uncertainty in exporting destinations (Carballo et al., 2018). Currently, COVID-19 policy uncertainty shocks in almost every country (Caggiano et al., 2020) can also harm exporters.

To avoid policy uncertainty shocks in foreign economies, exporter countries can diversify their export destinations. The phenomenon of export market diversification has been thoroughly discussed. One branch of the literature shows that the content of exports is essential for enhancing economic performance (Hausmann et al., 2007; Henn et al., 2020). Another branch emphasises the significant role of export diversification in reducing countries' vulnerability to external volatility (Di Giovanni and Levchenko, 2009; Haddad et al., 2013; Koren and Tenreyro, 2013; Loayza and Raddatz, 2007; Montalbano, 2011). Generally, export market diversification alleviates uncertainty due to external shocks and promotes economic growth. For instance, Dennis and Shepherd (2011) show that developing countries with more substantial diversification of their export markets have been less affected by adverse external shocks. Therefore, they have stronger growth performance.

In this context, we aim to calculate the level of uncertainty in Turkey's export destinations. Our main contributions to the existing literature are as follows. First, we introduce three new indicators for measuring uncertainty in Turkey's export markets. Our indicators are based on the World Uncertainty Index (WUI), the World Trade Uncertainty Index (WTUI), and the World Pandemic Uncertainty Index (WPUI). To the best of our knowledge, this is the first study to examine the effects of uncertainty in export destinations (including in the COVID-19 era) on

¹ Note that the level of the EPU is related to changes in government policies or regulations, which can be affected by changes in economic conditions or economic shocks.

economic performance. Second, the data for calculating three indicators come from 142 countries, with a relatively long period from 1996Q1 to 2020Q1. Third, we implement various estimation techniques to examine the effects of three uncertainty indicators on economic performance. We observe that these indicators are negatively associated with the growth performance of the Turkish economy. We find that in the Turkish case, country exports matter; Turkey should increase its export market diversification to less uncertain economies.

The remainder of the paper is organised as follows. Section 2 explains the details of the three uncertainty indicators—the so-called Fragility of Export Markets Indicators (FEMI)—and the related data. Section 3 provides an empirical examination of the impact of the FEMI on economic growth, and it reports the empirical results. Section 4 concludes.

2. Uncertainty in Exporting Destinations

This study aims to measure policy uncertainty in export markets. According to previous studies, policy uncertainty should be relatively low in countries where per capita income is high (Ahir et al., 2018). However, this hypothesis is only partially valid. The per capita income of the export destination may be high. Still, if there is no institutional quality (e.g., as in the United Arab Emirates), there may be a restriction on exports due to political tensions and economic slowdown. Besides, the uncertainty indicators we define should cover export data from more than one country. Uncertainty indicators to be created should also be comparable across countries and over time dimension (by quarters in our case).

This paper focuses on the case of Turkey. Half of Turkey's exports go to the economies of the EU (Turkish Statistical Institute, 2020). The EU economies have a high level of institutional quality; however, most of the members have experienced an economic slowdown, especially since the Eurozone Debt Crisis and Taper Tantrum of 2013. As a result, Turkey has attempted to diversify its export destinations. At this stage, the Middle East and Central Asian economies have the potential to be leading export candidates. However, most of these countries have experienced a significant increase in policy uncertainty due to such events as the Arab Spring and immigration policy uncertainty related to the Syrian Civil War (Donadelli et al., 2020). Turkey's export volume and the structure of the export basket have also been affected by uncertainties related to Brexit and rising trade protectionism during the President Donald Trump era. Overall, the EU, the UK, and the US have been a significant source of policy uncertainty in the late 2010s for the Turkish economy. However, most other exporting destinations are also fragile due to the political instability.

In this paper, we introduce three new indicators, called the Fragility of Export Markets Indicators (FEMI). We test a hypothesis that high policy uncertainties related to world events have significantly suppressed the real economic activity of the Turkish economy.

2.1. Introducing Fragility of Export Markets Indicators (FEMI)

We define three FEMI as:

$$FEMI_WUI_{jt} = \sum_{i=1}^n \left(\frac{x_{jit}}{x_{jt}} * WUI_{it} \right) \quad (1)$$

$$FEMI_WTUI_{jt} = \sum_{i=1}^n \left(\frac{x_{jit}}{x_{jt}} * WTUI_{it} \right) \quad (2)$$

$$FEMI_WPUI_{jt} = \sum_{i=1}^n \left(\frac{x_{jit}}{x_{jt}} * WPUI_{it} \right) \quad (3)$$

$FEMI_WUI_{jt}$, $FEMI_WTUI_{jt}$, and $FEMI_WPUI_{jt}$ are the measures of FEMI in source country j (Turkey in our case) in time t , based on the WUI, the WTUI, and the WPUI, respectively. Note that $FEMI_WUI_{jt}$, $FEMI_WTUI_{jt}$, and $FEMI_WPUI_{jt}$ calculate the level of uncertainty in Turkey's export destinations. Given that source country j exports products and services to the rest of the world, n indicates the number of countries to which country j exports. Due to the data availability of the World Uncertainty indices, n is 142 in our case. Besides, x_{jit} is the amount of exports (in US\$) of source country j to destination country i at time t , and it is divided by total exports (in US\$) of country j at time t (X_{jt}). Therefore, we calculate the share of exports to country i relative to total exports of country j , multiplied by the WUI, the WTUI, and the WPUI in country i at time t . Finally, the values of $FEMI_WUI_{jt}$, $FEMI_WTUI_{jt}$, and $FEMI_WPUI_{jt}$ are the sum of these values in n (142) number of countries. A higher level of the indices demonstrates a higher level of uncertainty in export destinations.

2.2. Data and Stylised Facts

Our three uncertainty indicators are based on a weighted average of policy uncertainty indices in 142 countries following their share of total exports. The WUI and the WTUI are introduced by Ahir et al. (2018), and the WPUI is developed by Ahir et al. (2020). The related data are obtained from the authors' website (<https://worlduncertaintyindex.com/data/>). These indices are constructed using the data of the Economist Intelligence Unit (EIU) articles to introduce comparable indicators of policy uncertainty in different countries.² The 142 countries in the dataset used to construct the indices are listed in Data Appendix I. The coverage period of the indicators, and the countries are based on data availability.

The time-series plot for $FEMI_WUI_{jt}$ for the period of 1996Q1 to 2020Q1 is illustrated in Figure 1.

[Insert Figure 1 here]

Figure 1 provides the significant spikes for the period of 1996Q1 to 2020Q1 for specific events, such as the Iraq War, the Sovereign Debt Crisis, the Brexit talks, US trade policy uncertainty, and the COVID-19 Crisis.

We also illustrate the $FEMI_WUI_{jt}$ in 2020Q1 in Figure 2. We find that the highest levels of the index based on economic policy uncertainty are observed in the UK, Germany, the US, Italy, and Spain, respectively.

[Insert Figure 2 here]

We report the $FEMI_WTUI_{jt}$ in 2020Q1 in Figure 3. We observe that the highest levels of the index based on trade policy uncertainty are seen in the US, Germany, the UK, the Netherlands, and France, respectively.

[Insert Figure 3 here]

Finally, we illustrate the $FEMI_WPUI_{jt}$ in 2020Q1 in Figure 4. We see that the highest levels of the index based on pandemic uncertainty come from the UK, Germany, the US, Italy, and France, respectively.

[Insert Figure 4 here]

² For details of the indices, refer to Ahir et al. (2018, 2019, and 2020).

The data in Figures 2 to 4 indicate that the most uncertain export destinations are developed economies (mostly in the EU). As previously discussed, most of Turkey's exports go to economies in the EU, and their shares are significant in export basket. A summary of descriptive statistics and the source of the data are provided in Table 1.

[Insert Table 1 around here]

In Table 1, three indicators are calculated over time. Here, we focus on the case of Turkey, but these indicators can also be used in cross-country comparisons. Note that the average growth rate of the GDP is 4.8% over the period under consideration. The economic growth data are obtained from the Turkish Statistical Institute (2020).

In Table 2, we provide the correlation matrix. The correlations among the three uncertainty indicators are positive, and they are less than 0.6. The correlations between the three uncertainty indicators and economic growth is negative. These results are in line with the theoretical expectations in Bloom (2009) and Bloom et al. (2018).

[Insert Table 2 around here]

2.3. Empirical Setup

After introducing three indicators of the uncertainty of export markets, we examine their effects on economic growth. At this stage, we estimate the following model to study the effects of our uncertainty indicators on economic growth using the Ordinary Least Squares (OLS) with the time trend and the Quantile Regression (QR) with the time trend estimation techniques:

$$ECG_{jt} = \Delta FEMI_WUI_{jt} + \Delta FEMI_WUI_{jt-1} + \Delta FEMI_WUI_{jt-k} + \gamma_t + \varepsilon_{jt} \quad (4)$$

$$ECG_{jt} = \Delta FEMI_WTUI_{jt} + \Delta FEMI_WTUI_{jt-1} + \Delta FEMI_WTUI_{jt-k} + \gamma_t + \varepsilon_{jt} \quad (5)$$

$$ECG_{jt} = \Delta FEMI_WPUI_{jt} + \Delta FEMI_WPUI_{jt-1} + \Delta FEMI_WPUI_{jt-k} + \gamma_t + \varepsilon_{jt} \quad (6)$$

Where ECG is the growth rate of per capita gross domestic product (GDP) in country j (Turkey) at time t , $FEMI_WUI_{jt}$, $FEMI_WTUI_{jt}$, and $FEMI_WPUI_{jt}$ are the measures of the Fragility of Export Markets Indicators (FEMI) in country j (Turkey) in times t , $t-1$, and $t-k$ (up to four lags). γ_t represents the time-trend. We also use the QR estimations to provide potential differences across levels of the ECG , $FEMI_WUI$, $FEMI_WTUI$, and $FEMI_WPUI$. The QR estimations can also address a possible endogeneity bias.³

3. Empirical Findings

3.1. OLS Estimations with the Time Trend

The findings in Column I of Table 3 show that the current $\Delta FEMI_WUI$ decreases ECG by 1.17 percentage points when it rises one unit. In Column II, there is similar evidence when the lag of $\Delta FEMI_WUI$ is considered. Column III shows that both the current and the lagged $\Delta FEMI_WUI$ negatively affect the ECG . In Column IV, the current, the first lag, and the second lag of $\Delta FEMI_WUI$ negatively affect the ECG . In Columns V and VI, we include the third and fourth lags of $\Delta FEMI_WUI$, respectively. Although the third and fourth lags of $\Delta FEMI_WUI$ are statistically insignificant, we obtain similar results (magnitudes and significance) for the current, the first lag, and the second lag of $\Delta FEMI_WUI$ (see Columns V and VI).

³ We did not include additional controls in the quarterly frequency in these estimations. Therefore, we also use the annual data estimations. In the annual data estimations, following Henn et al. (2020), we use the control variables (foreign direct investments, human capital, institutional quality, and trade liberalisation). The results are in line with the quarterly frequency estimations. We did not report the related results to save space.

[Insert Table 3 around here]

The results in Column I of Table 4 indicate that there is a negative impact of $\Delta FEMI_WTUI$ on ECG , but the coefficient is not statistically significant. In Column II, the lagged $\Delta FEMI_WTUI$ reduces ECG by 0.008 percentage points when it increases one unit. Column III shows that both the current and the lagged $\Delta FEMI_WUI$ are negatively related to ECG . In Column IV, the current, the first lag, and the second lag of $\Delta FEMI_WUI$ negatively affect ECG . In Columns V and VI, the third lag and the fourth lag of $\Delta FEMI_WUI$ are considered, respectively. The second and the fourth lag of $\Delta FEMI_WUI$ are statistically insignificant in Column VI. Similar findings (magnitudes and significance) are observed for the current and the first lag of $\Delta FEMI_WUI$ (see Columns V and VI). Overall, the results in Table 4 imply that $\Delta FEMI_WUI$ only affects economic growth with one lag.

[Insert Table 4 around here]

The results in Columns from I to VI of Table 5 show that there are adverse effects of $\Delta FEMI_WPUI$ on ECG ; however, all coefficients for the current, the first lag, the second lag, the third lag, and the fourth lag of $\Delta FEMI_WPUI$ are not statistically significant. In short, all of the findings in Table 5 indicate that $\Delta FEMI_WPUI$ does not significantly affect economic performance. This evidence is probably because we only have one observation for $\Delta FEMI_WPUI$ for global pandemics such as COVID-19. The spread of other diseases, such as SARS, Avian Flu, Swine Flu, Bird Flu, Ebola, and MERS was more regional, and they did not significantly affect the growth performance of the Turkish economy via uncertainties in their exporting destinations.

[Insert Table 5 around here]

3.2. QR Estimations with the Time-Trend

We also re-estimate the effects of current uncertainty indicators on economic growth via the QR estimations with the time-trend. Table 6 reports the results of the QR estimations from each quantile from 0.1 to 0.9. We find that the impact of $\Delta FEMI_WUI$ (t) on ECG is harmful at all quantiles. However, the impact is statistically insignificant at the middle quantiles, i.e., from 0.3 to 0.6.

[Insert Table 6 around here]

Furthermore, the results in Table 7 indicate that the effects of the lagged uncertainty indicator, $\Delta FEMI_WUI$ (t-1), on ECG are adverse, and the coefficients are statistically significant for each quantile from 0.1 to 0.9. Overall, the findings are more persuasive when we consider the first lag of $\Delta FEMI_WUI$.

[Insert Table 7 around here]

We also examine the effects of $\Delta FEMI_WTUI$ (t) on economic growth, and Table 8 provides the results of the QR estimations from each quantile from 0.1 to 0.9. We observe that the impact of $\Delta FEMI_WTUI$ (t) on ECG is negative at all quantiles. However, the effects are statistically insignificant in general. It is important to note that the coefficient of the highest quantile (0.9) is statistically significant at the 1% level.

[Insert Table 8 around here]

The findings in Table 9 show that the effects of the lagged trade policy uncertainty indicator, $\Delta FEMI_WTUI (t-1)$, on *ECG* are always adverse. The coefficients are statistically significant from each quantile from 0.1 to 0.9, except for quantile 0.1. Similarly, the results become stronger when we use the first lag of $\Delta FEMI_WTUI$.

[Insert Table 9 around here]

Finally, we investigate the effects of $\Delta FEMI_WPUI (t)$ on economic growth. Table 10 reports the findings of the QR estimations from each quantile from 0.1 to 0.9. We find that the effects of $\Delta FEMI_WPUI (t)$ on *ECG* are adverse in general. However, quantiles from 0.1 to 0.3 provide positive coefficients. The coefficients are statistically significant at the lowest quantile (0.1) and the highest quantile (0.9) at the 5% level.

[Insert Table 10 around here]

The findings in Table 11 indicate that the effects of the lagged pandemic-induced uncertainty indicator, $\Delta FEMI_WPUI (t-1)$, on *ECG* are always adverse. Similar to the results in Table 10, the coefficients are statistically insignificant in general, except for quantiles 0.1 and 0.9. Similarly, the findings show that the lowest quantile (0.1) has a positive impact, while the highest quantile (0.9) has a negative coefficient.

Overall, the findings from our QR estimations are robust to estimate different model specifications. However, the magnitudes are, of course, different. Note that we check the possible reverse causality, i.e., if the growth performance of the Turkish economy affects global uncertainty, but the relationship is statistically insignificant.

[Insert Table 11 around here]

4. Conclusion

In this paper, we measure the level of uncertainty in Turkey's export destinations. We introduce three new indicators for measuring the uncertainty of Turkey's export markets from 1996Q1 to 2020Q1. We use the data of the WUI, WTUI, and WPUI from 142 countries. Furthermore, we investigate the effects of the uncertainty indicators on economic growth. We find that all uncertainty indicators are negatively related to economic growth. Specifically, a rise in uncertainty in export destinations leads to a slower growth rate up to two quarters. The pandemic-induced uncertainty measure negatively affects economic growth only at the higher quantiles.

In the light of these findings, policymakers should monitor the economic policy uncertainty shocks in their main export destinations, since their surges can slow economic performance. We suggest that exporting products to countries with low levels of uncertainty will be beneficial for exporter countries. A lower level of uncertainty is essential in achieving higher growth performance in Turkey, a developing country, whose economic performance depends on stable export earnings.

Future research can focus on other developed and developing countries. For example, one may create a panel dataset of uncertainty shocks in the export markets for the OECD economies. The effects of uncertainty shocks in the export markets on economic growth can also be examined via Vector Autoregression (VAR) models.

References

- Ahir, H., Bloom, N., & Furceri, D. (2018). *The World Uncertainty Index*. Available at SSRN, 3275033.
- Ahir, H., Bloom, N., & Furceri, D. (2019). Caution: Trade Uncertainty is Rising and can Harm the Global Economy. *VoxEU.org* July 4.
- Ahir, H., Bloom, N., & Furceri, D. (2020). *60 Years of Uncertainty*. *International Monetary Fund Finance and Development*, 57 (1), 58–60.
- Baker, S.R., Bloom, N., & Davis, S.J. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics*, 131 (4), 1593–1636.
- Baker, S.R., Bloom, N., Davis, S.J., & Terry, S.J. (2020). COVID-induced Economic Uncertainty. *Covid Economics: Vetted and Real-Time Papers*, 1 (3), 33–42.
- Bloom, N. (2009). The Impact of Uncertainty Shocks. *Econometrica*, 77 (3), 623–685.
- Bloom, N., Floetotto, M., Jaimovich, N., Saporta- Eksten, I., & Terry, S.J. (2018). Really Uncertain Business Cycles. *Econometrica*, 86 (3), 1031–1065.
- Brainard, W.C., & Cooper, R.N. (1968). Uncertainty and Diversification in International Trade. *Food Research Institute Studies*, 8, 257–285.
- Caggiano, G., Castelnuovo, E., & Kima, R. (2020). The Global Effects of Covid-19-induced Uncertainty. *Bank of Finland Research Discussion Paper*, No. 11/2020.
- Carballo, J., Handley, K., & Limão, N. (2018). Economic and Policy Uncertainty: Export Dynamics and the Value of Agreements *National Bureau of Economic Research Working Paper*, No. 24368.
- Dennis, A., & Shepherd, B. (2011). Trade Facilitation and Export Diversification. *The World Economy*, 34 (1), 101–122.
- Di Giovanni, JD, & Levchenko, A.A. (2009). Trade Openness and Volatility. *The Review of Economics and Statistics*, 91 (3), 558–585.
- Donadelli, M., Gerotto, L., Lucchetta, M., & Arzu, D. (2020). Immigration, Uncertainty and Macroeconomic Dynamics. *The World Economy*, 43 (2), 326–354.
- Eichengreen, BJ (1981). A Dynamic Model of Tariffs, Output and Employment under Flexible Exchange Rates. *Journal of International Economics*, 11 (3), 341–359.
- Fajgelbaum, P.D., Goldberg, P.K., Kennedy, P.J., & Khandelwal, AK (2020). The Return to Protectionism. *The Quarterly Journal of Economics*, 135 (1), 1–55.
- Farhi, E., Gopinath, G., Itskhoki, O. (2014). Fiscal Devaluations. *Review of Economic Studies*, 81 (2), 725–760.
- Haddad, M., Lim, J.J., Pancaro, C., & Saborowski, C. (2013). Trade Openness Reduces Growth Volatility When Countries Are Well Diversified. *Canadian Journal of Economics*, 46 (2), 765–790.
- Handley, K. (2014). Exporting under Trade Policy Uncertainty: Theory and Evidence. *Journal of International Economics*, 94 (1), 50–66.
- Handley, K., & Limão, N. (2015). Trade and Investment under Policy Uncertainty: Theory and Firm Evidence. *American Economic Journal: Economic Policy*, 7 (4), 189–225.
- Handley, K., & Limão, N. (2017). Policy Uncertainty, Trade, and Welfare: Theory and Evidence for China and the United States. *American Economic Review*, 107 (9), 2731–2783.
- Hausmann, R., Hwang, J., & Rodrik, D. (2007). What you Export Matters. *Journal of Economic Growth*, 12 (1), 1–25.
- Helpman, E., & Razin, A. (2014). *A Theory of International Trade under Uncertainty*. New York and London: Academic Press.
- Henn, C., Papageorgiou, C., Romero, J.M. & Spatafora, N. (2020). Export Quality in Advanced and Developing Economies: Evidence from a New Data Set. *IMF Economic Review*, 68, 421–451.

- Koren, M., & Tenreyro, S. (2013). Technological Diversification. *American Economic Review*, 103 (1), 378–414.
- Loayza, N.V., & Raddatz, C. (2007). The Structural Determinants of External Vulnerability. *World Bank Economic Review*, 21 (3), 359–387.
- Massell, B.F. (1970). Export Instability and Economic Structure. *American Economic Review*, 60 (4), 618–630.
- Montalbano, P. (2011). Trade Openness and Developing Countries' Vulnerability: Concepts, Misconceptions, and Directions for Research. *World Development*, 39 (9), 1489–1502.
- Turkish Statistical Institute (TSI) (2020). *Official Statistics Portal*. Ankara: TSI.

Table 1
Descriptive Statistics

Variable	Definition	Data Source	Mean	Standard Deviation	Minimum	Maximum	Observations
Fragility of Export Market Index (Based on the World Uncertainty Index)	Index	Authors' Calculations	0.060	0.025	0.018	0.145	97
Fragility of Export Market Index (Based on the World Trade Uncertainty Index)	Index	Authors' Calculations	0.620	2.130	0.000	13.00	97
Fragility of Export Market Index (Based on the World Pandemic Uncertainty Index)	Index	Authors' Calculations	0.321	2.994	0.000	29.49	97
Growth Rate of Gross Domestic Product	Percentage	Turkish Statistical Institute (2020)	0.048	0.051	-0.143	0.116	97

Table 2
Correlation Matrix

Regressors	FEMI_WUI	FEMI_WTUI	FEMI_WTUI	ECG
FEMI_WUI	1.000	–	–	–
FEMI_WTUI	0.590	1.000	–	–
FEMI_WPUI	0.347	0.213	1.000	–
ECG	-0.048	-0.155	-0.005	1.000

Table 3
Effects of FEMI_WUI on ECG

Dependent Variable: ECG	(I)	(II)	(III)	(IV)	(V)	(VI)
Δ FEMI_WUI (t)	-1.173*** (0.441)	–	-1.142*** (0.428)	-1.314*** (0.435)	-1.328*** (0.435)	-1.340*** (0.440)
Δ FEMI_WUI (t-1)	–	-1.139** (0.449)	-1.089*** (0.406)	-1.062*** (0.390)	-1.129*** (0.424)	-1.138*** (0.426)
Δ FEMI_WUI (t-2)	–	–	–	-0.791** (0.383)	-0.792** (0.381)	-0.773* (0.420)
Δ FEMI_WUI (t-3)	–	–	–	–	-0.302 (0.475)	-0.321 (0.484)
Δ FEMI_WUI (t-4)	–	–	–	–	–	0.097 (0.506)
Constant Term	0.043*** (0.011)	0.042*** (0.011)	0.040*** (0.011)	0.039*** (0.011)	0.038*** (0.012)	0.036*** (0.012)
Time-Trend	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.051	0.049	0.097	0.118	0.124	0.128
Observations	96	95	95	94	93	92

Notes: ECG=Economic Growth; FEMI_WUI= Fragility of Export Market Index (Based on the World Uncertainty Index).

The standard errors in (); * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 4
Effects of FEMI_WTUI on ECG

Dependent Variable: ECG	(I)	(II)	(III)	(IV)	(V)	(VI)
Δ FEMI_WTUI (t)	-0.004 (0.003)	–	-0.007* (0.003)	-0.006*** (0.002)	-0.008*** (0.002)	-0.012*** (0.003)
Δ FEMI_WTUI (t-1)	–	-0.008*** (0.003)	-0.012*** (0.003)	-0.013*** (0.003)	-0.016*** (0.004)	-0.016*** (0.003)
Δ FEMI_WTUI (t-2)	–	–	–	-0.009** (0.003)	-0.008** (0.003)	-0.003 (0.004)
Δ FEMI_WTUI (t-3)	–	–	–	–	-0.006** (0.002)	-0.006** (0.002)
Δ FEMI_WTUI (t-4)	–	–	–	–	–	-0.008 (0.006)
Constant Term	0.044*** (0.011)	0.040*** (0.011)	0.039*** (0.011)	0.035*** (0.012)	0.034*** (0.012)	0.032** (0.013)
Time-Trend	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.011	0.022	0.045	0.065	0.074	0.080
Observations	96	95	95	94	93	92

Notes: ECG=Economic Growth; FEMI_WTUI= Fragility of Export Market Index (Based on the World Trade Uncertainty Index).
The standard errors in (); * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 5
Effects of FEMI_WPUI on ECG

Dependent Variable: ECG	(I)	(II)	(III)	(IV)	(V)	(VI)
Δ FEMI_WPUI (t)	-0.0002 (0.0003)	-	-0.0002 (0.0003)	-0.0002 (0.0003)	-0.0002 (0.0003)	-0.0002 (0.0003)
Δ FEMI_WPUI (t-1)	-	-0.020 (0.027)	-0.020 (0.027)	-0.038 (0.045)	-0.040 (0.049)	-0.033 (0.045)
Δ FEMI_WPUI (t-2)	-	-	-	-0.046 (0.041)	-0.054 (0.052)	-0.047 (0.051)
Δ FEMI_WPUI (t-3)	-	-	-	-	-0.018 (0.051)	-0.004 (0.050)
Δ FEMI_WPUI (t-4)	-	-	-	-	-	0.029 (0.047)
Constant Term	0.044*** (0.011)	0.042*** (0.011)	0.042*** (0.011)	0.042*** (0.012)	0.041*** (0.012)	0.040*** (0.013)
Time-Trend	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.001	0.003	0.004	0.011	0.013	0.017
Observations	96	95	95	94	93	92

Notes: ECG=Economic Growth; FEMI_WPUI= Fragility of Export Market Index (Based on the World Pandemic Uncertainty Index).

The standard errors in (); *** p < 0.01.

Table 6
QR Estimations (Based on the Current FEMI_WUI)

Dependent Variable: ECG	10%	20%	30%	40%	50%	60%	70%	80%	90%
$\Delta FEMI_WUI (t)$	-1.723*	-1.769**	-0.778	-0.712	-0.571	-0.729	-0.994*	-0.968*	-1.018**
	(0.894)	(0.885)	(0.560)	(0.503)	(0.490)	(0.504)	(0.544)	(0.530)	(0.511)
Constant Term	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.085	0.043	0.015	0.031	0.031	0.021	0.028	0.045	0.054
Observations	96	96	96	96	96	96	96	96	96

Notes: ECG=Economic Growth; FEMI_WUI= Fragility of Export Market Index (Based on the World Uncertainty Index).
Constant term and time-trend are included. The standard errors in (); * p < 0.10 and ** p < 0.05.

Table 7
QR Estimations (Based on the First Lag of FEMI_WUI)

Dependent Variable: ECG	10%	20%	30%	40%	50%	60%	70%	80%	90%
$\Delta FEMI_WUI (t-1)$	-3.157*	-2.136**	-1.437**	-1.016*	-0.980*	-1.056**	-0.979**	-0.824**	-0.732**
	(1.856)	(0.903)	(0.667)	(0.603)	(0.528)	(0.449)	(0.396)	(0.365)	(0.329)
Constant Term	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.070	0.040	0.013	0.033	0.042	0.046	0.058	0.045	0.070
Observations	95	95	95	95	95	95	95	95	95

Notes: ECG=Economic Growth; FEMI_WUI= Fragility of Export Market Index (Based on the World Uncertainty Index).
Constant term and time-trend are included. The standard errors in (); * p < 0.10 and ** p < 0.05.

Table 8

QR Estimations (Based on the Current FEMI_WTUI)

Dependent Variable: ECG	10%	20%	30%	40%	50%	60%	70%	80%	90%
Δ FEMI_WTUI (t)	-0.003 (0.002)	-0.003* (0.002)	-0.008 (0.005)	-0.009 (0.005)	-0.010* (0.005)	-0.002 (0.024)	-0.005 (0.047)	-0.010 (0.010)	-0.017*** (0.004)
Constant Term	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.028	0.020	0.013	0.009	0.015	0.007	0.017	0.045	0.006
Observations	96	96	96	96	96	96	96	96	96

Notes: ECG=Economic Growth; FEMI_WTUI= Fragility of Export Market Index (Based on the World Trade Uncertainty Index). Constant term and time-trend are included. The standard errors in (); * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 9

QR Estimations (Based on the First Lag of FEMI_WTUI)

Dependent Variable: ECG	10%	20%	30%	40%	50%	60%	70%	80%	90%
Δ FEMI_WTUI (t-1)	-0.002 (0.004)	-0.008** (0.004)	-0.009** (0.004)	-0.009** (0.004)	-0.010** (0.004)	-0.011*** (0.004)	-0.013*** (0.004)	-0.011*** (0.004)	-0.016*** (0.003)
Constant Term	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.030	0.032	0.021	0.019	0.025	0.020	0.029	0.024	0.029
Observations	95	95	95	95	95	95	95	95	95

Notes: ECG=Economic Growth; FEMI_WTUI= Fragility of Export Market Index (Based on the World Trade Uncertainty Index). Constant term and time-trend are included. The standard errors in (); ** p < 0.05 and *** p < 0.01.

Table 10
QR Estimations (Based on the Current FEMI_WPUI)

Dependent Variable: ECG	10%	20%	30%	40%	50%	60%	70%	80%	90%
FEMI_WPUI (t)	0.0020** (0.0008)	0.0007 (0.0009)	0.0002 (0.0009)	-0.0001 (0.0010)	-0.0003 (0.0009)	-0.0004 (0.0009)	-0.0008 (0.0008)	-0.0013 (0.0007)	-0.0019** (0.0007)
Constant Term	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.025	0.008	0.002	0.002	0.017	0.009	0.018	0.008	0.012
Observations	96	96	96	96	96	96	96	96	96

Notes: ECG=Economic Growth; FEMI_WPUI= Fragility of Export Market Index (Based on the World Pandemic Uncertainty Index). Constant term and time-trend are included. The standard errors in (); ** p < 0.05.

Table 11
QR Estimations (Based on the First Lag of FEMI_WPUI)

Dependent Variable: ECG	10%	20%	30%	40%	50%	60%	70%	80%	90%
FEMI_WPUI (t-1)	0.139*** (0.046)	-0.112 (0.089)	-0.009 (0.056)	-0.009 (0.033)	-0.009 (0.030)	-0.016 (0.030)	-0.030 (0.033)	-0.036 (0.032)	-0.050* (0.027)
Constant Term	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.022	0.009	0.002	0.009	0.014	0.006	0.018	0.009	0.024
Observations	95	95	95	95	95	95	95	95	95

Notes: ECG=Economic Growth; FEMI_WPUI= Fragility of Export Market Index (Based on the World Pandemic Uncertainty Index). Constant term and time-trend are included. The standard errors in (); * p < 0.10 and ** p < 0.05.

Figure 1
The Fragility of Export Market Index (FEMI) of Turkey 1996Q1–2020Q1 (Based on the World Uncertainty Index–WUI)

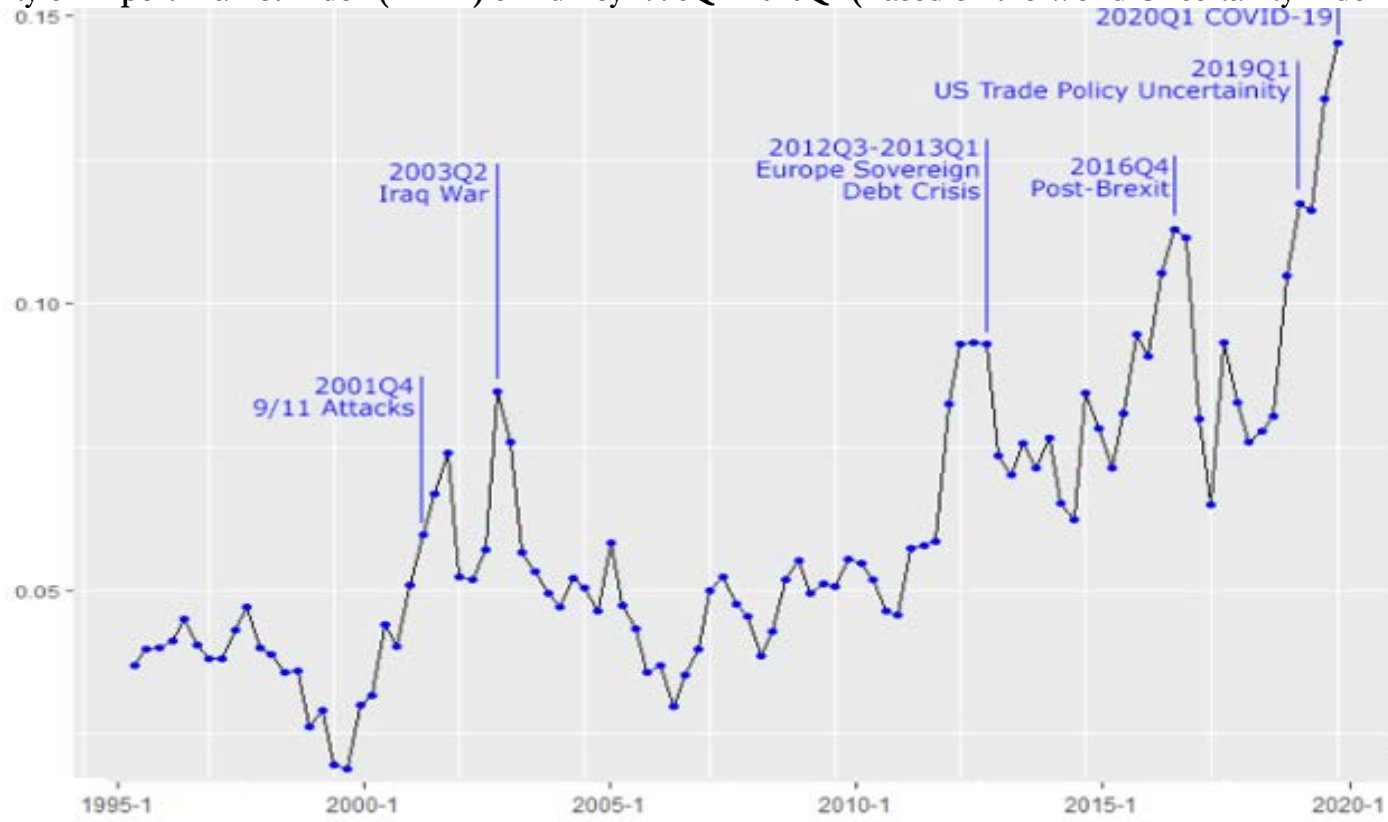


Figure 2
The Fragility of Export Market Index (FEMI) of Turkey in 2020Q1 (Based on the World Uncertainty Index–WUI)

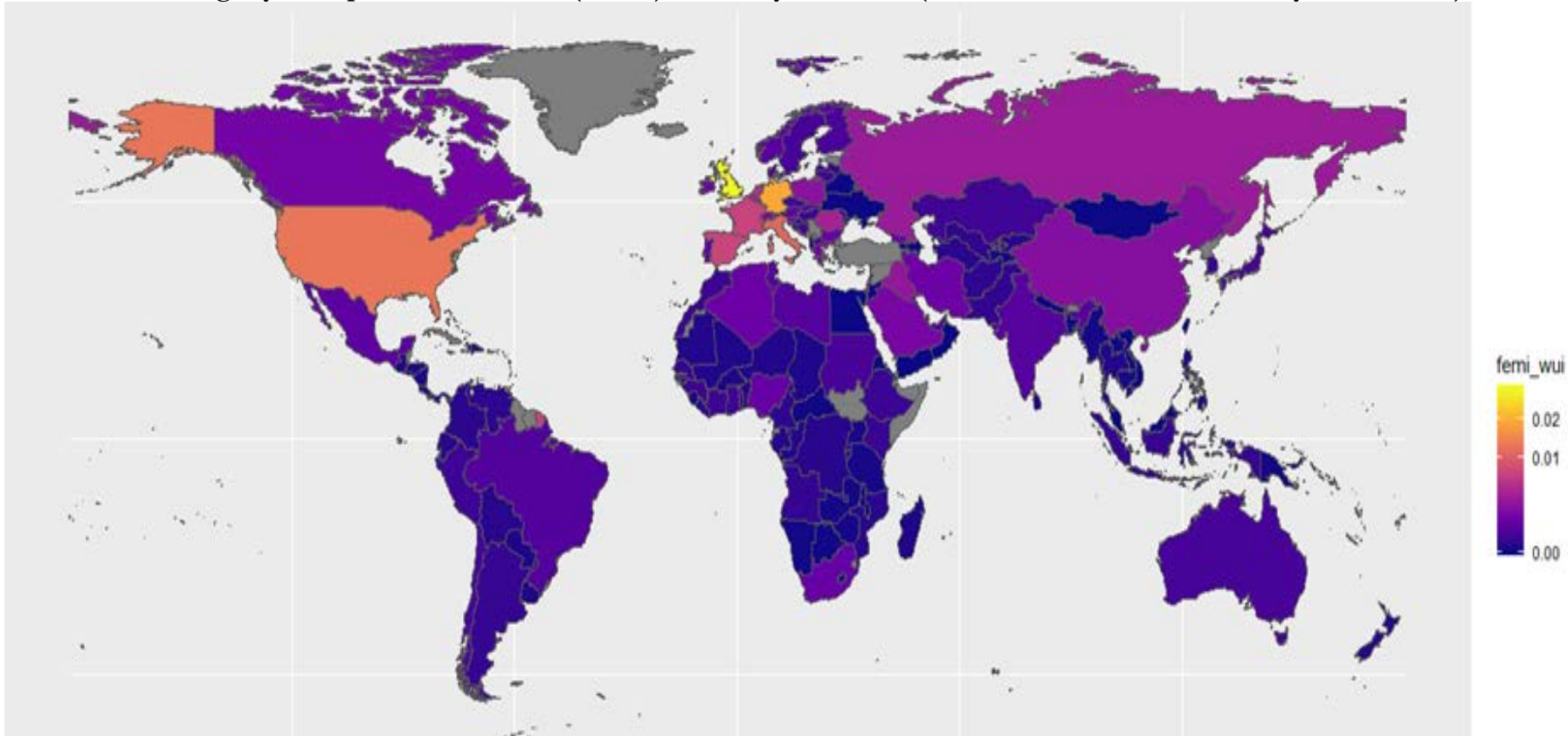


Figure 3
The Fragility of Export Market Index (FEMI) of Turkey in 2020Q1 (Based on the World Trade Uncertainty Index–WTUI)

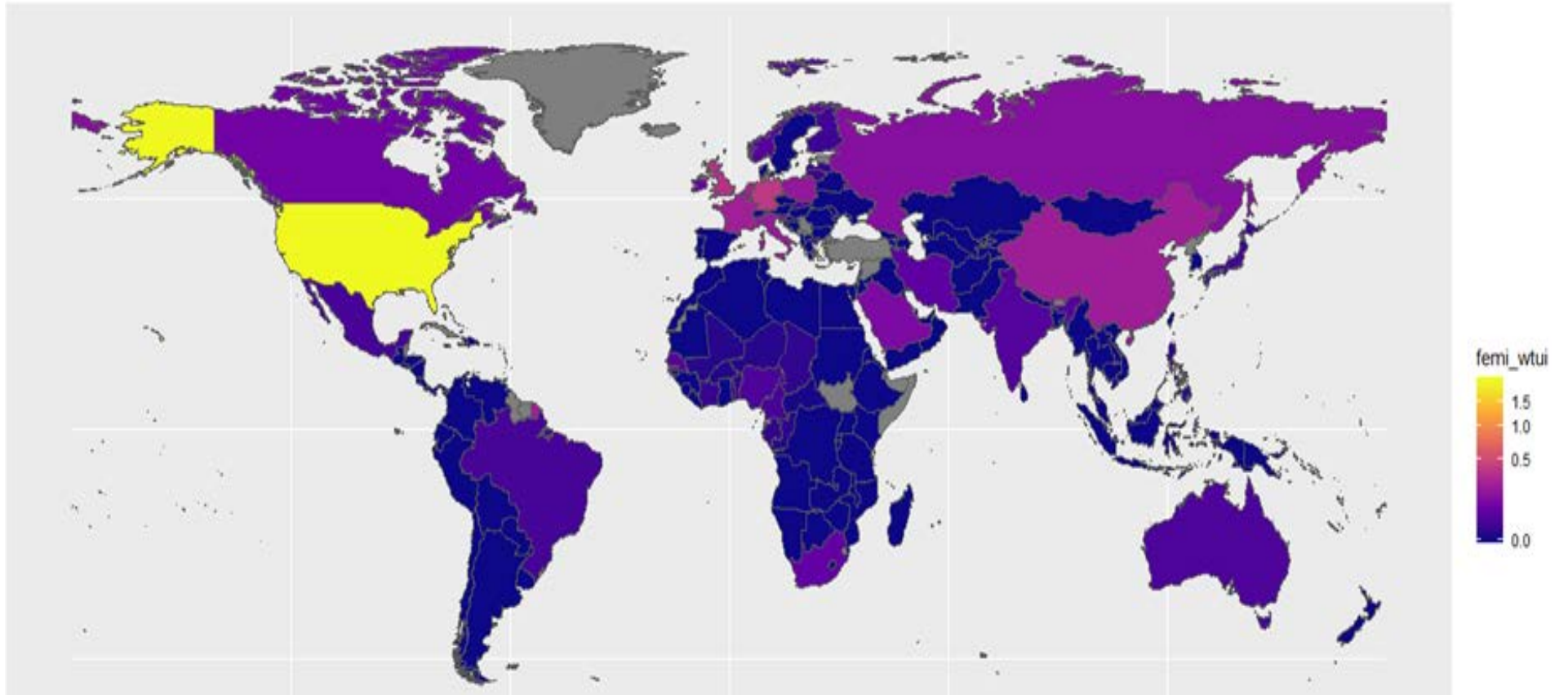
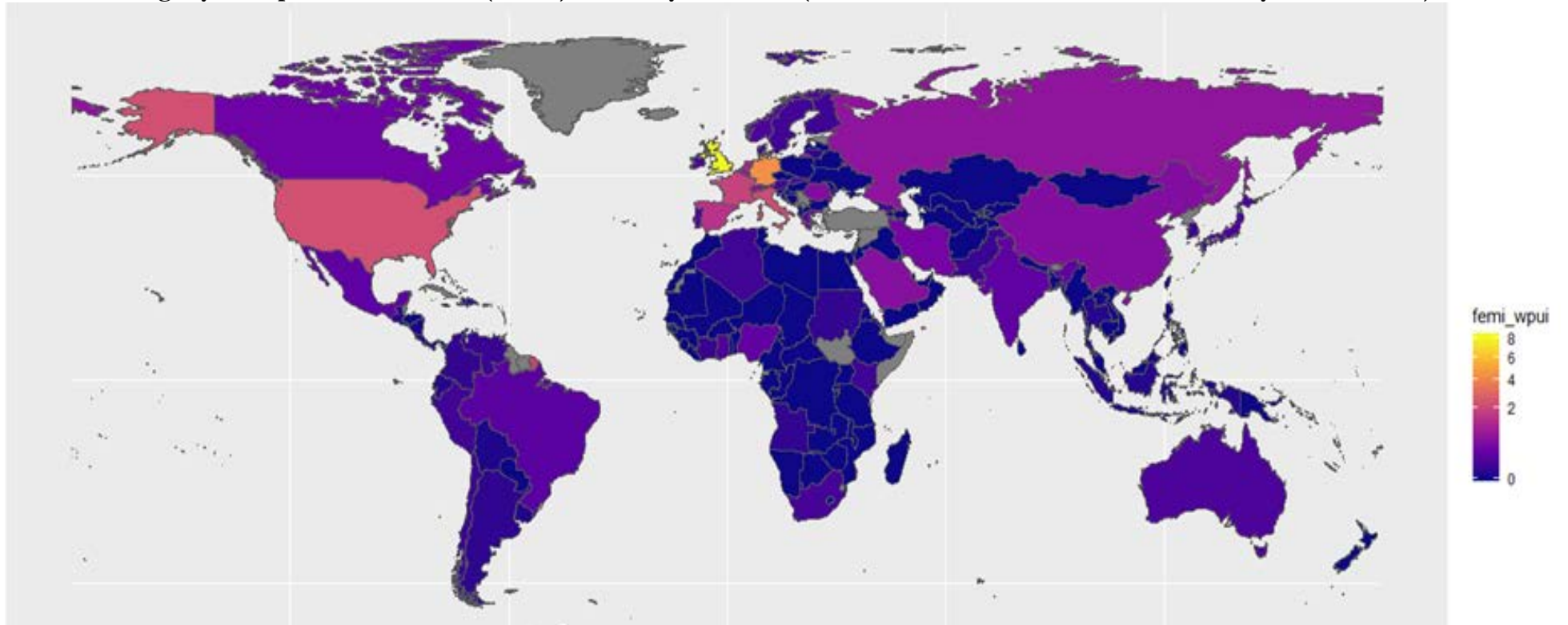


Figure 4
The Fragility of Export Market Index (FEMI) of Turkey in 2020Q1 (Based on the World Pandemic Uncertainty Index–WPUI)



Data Appendix I

List of Countries in Calculating for the Fragility of Export Market Indices (FEMI) of Turkey (142 Countries)

Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bangladesh, Belarus, Belgium, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Congo Republic, Costa Rica, Côte d'Ivoire, Croatia, the Czech Republic, Democratic Republic of the Congo, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Finland, France, Gabon, the Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea–Bissau, Haiti, Honduras, Hong Kong SAR, Hungary, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea Republic, Kuwait, Kyrgyz Republic, Laos, Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, North Macedonia, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tunisia, Turkmenistan, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, the United States, Uruguay, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, and Zimbabwe.