Fragmentation in the European Monetary Union: is it really over?

Financial Globalization and De-Globalization:
Perspectives and Prospects

Bertrand Candelon Angelo Luisi Francesco Roccazzella

UCLouvain - Louvain Finance

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Outline

1 Motivation

2 Model

3 Empirical Results

4 Conclusions

5 References

6 Appendix

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2 Model

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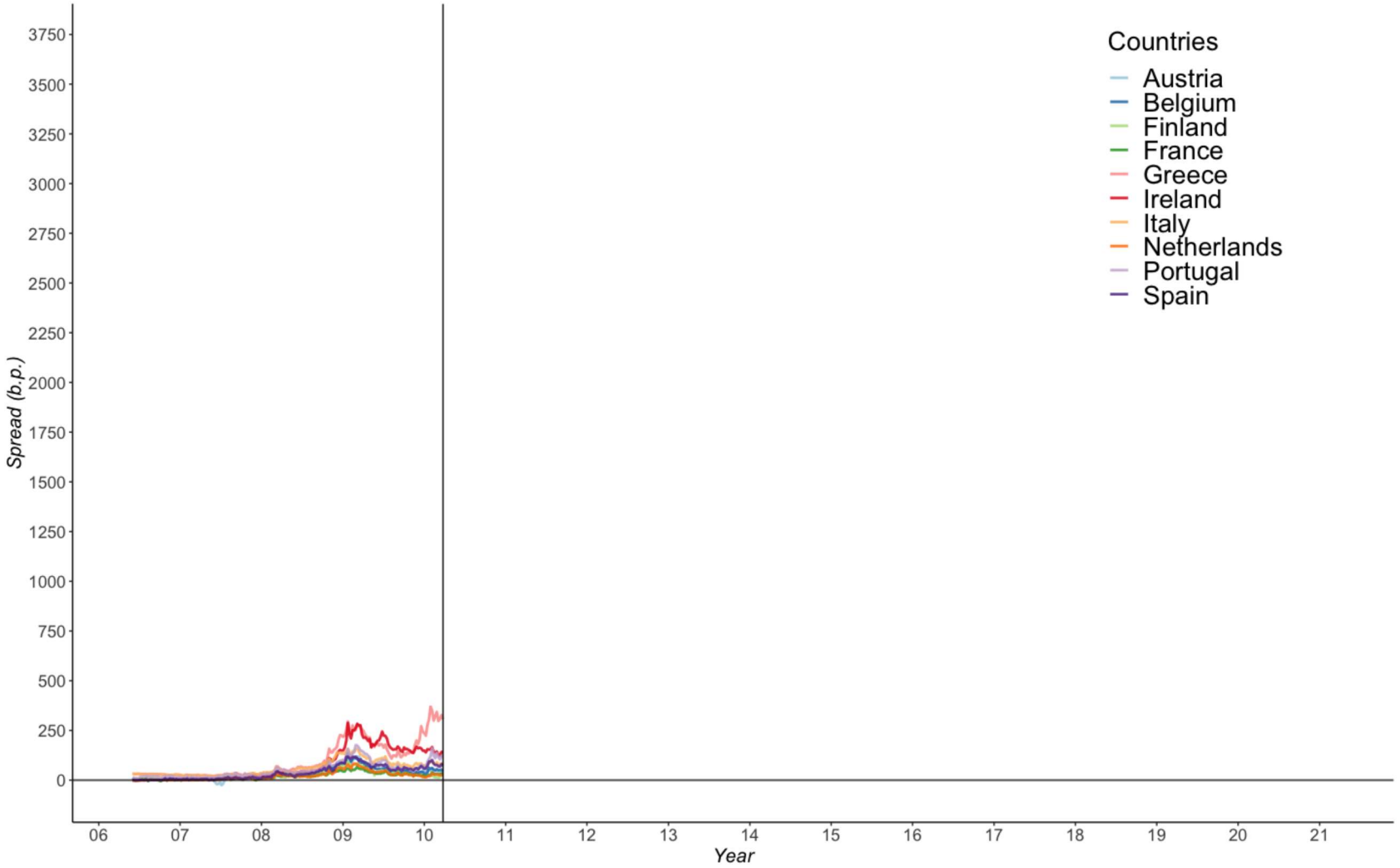
6 Appendix

Historical EA sovereign bond market's development

Figure 1: Long term sovereign bond spreads over the German *Bund* in Europe.



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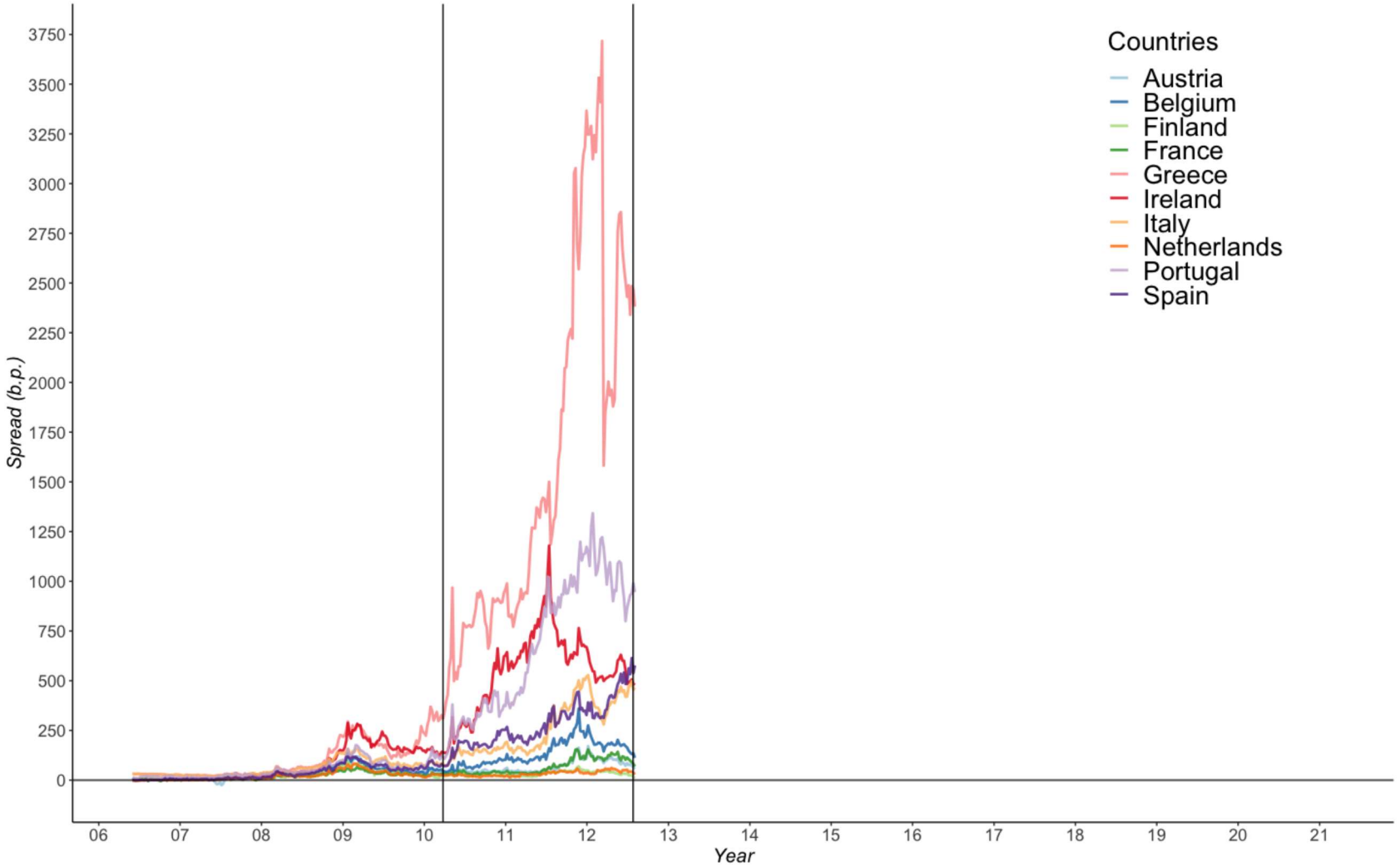

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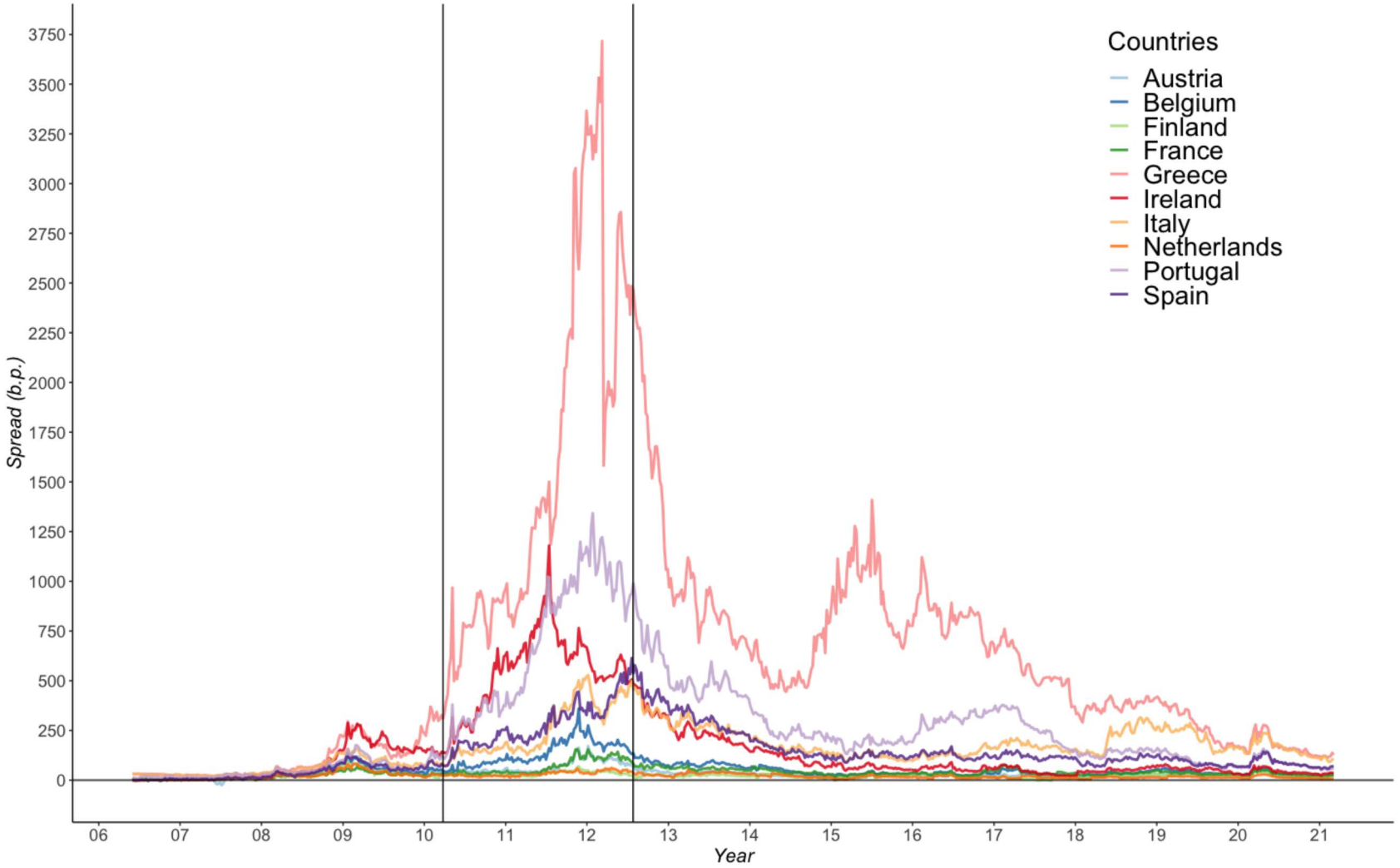

Existing literature

1. **Pre-ESD**

   Integration is high in the government- and corporate-bond markets as well as in equity markets. Baele et al. (2004)

2. **Post-ESD**

   Proximity of fiscal fundamentals determines the strength of interdependence. Favero (2013)

   Redenomination risk shocks affect sovereign yield spreads. De Santis (2019)

$\longrightarrow$ Before the sovereign debt crisis, high degree of co-movement.

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Sovereign bond market fragmentation: Sources

1. Markets are integrated when bonds are exposed to the same risks (Baele et al., 2004)
2. Fragmentation as heterogeneous reaction to common shocks (Iania and Luisi, 2021)
   - Identical EA aggregated determinants have effects on spreads that vary considerably across countries (Georgoutsos and Migiakis, 2013)
3. Fragmentation as emergence of two *equilibria* (Favero and Missale, 2012; De Grauwe and Ji, 2013)
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4. Fragmentation as asymmetric exposure to foreign shocks
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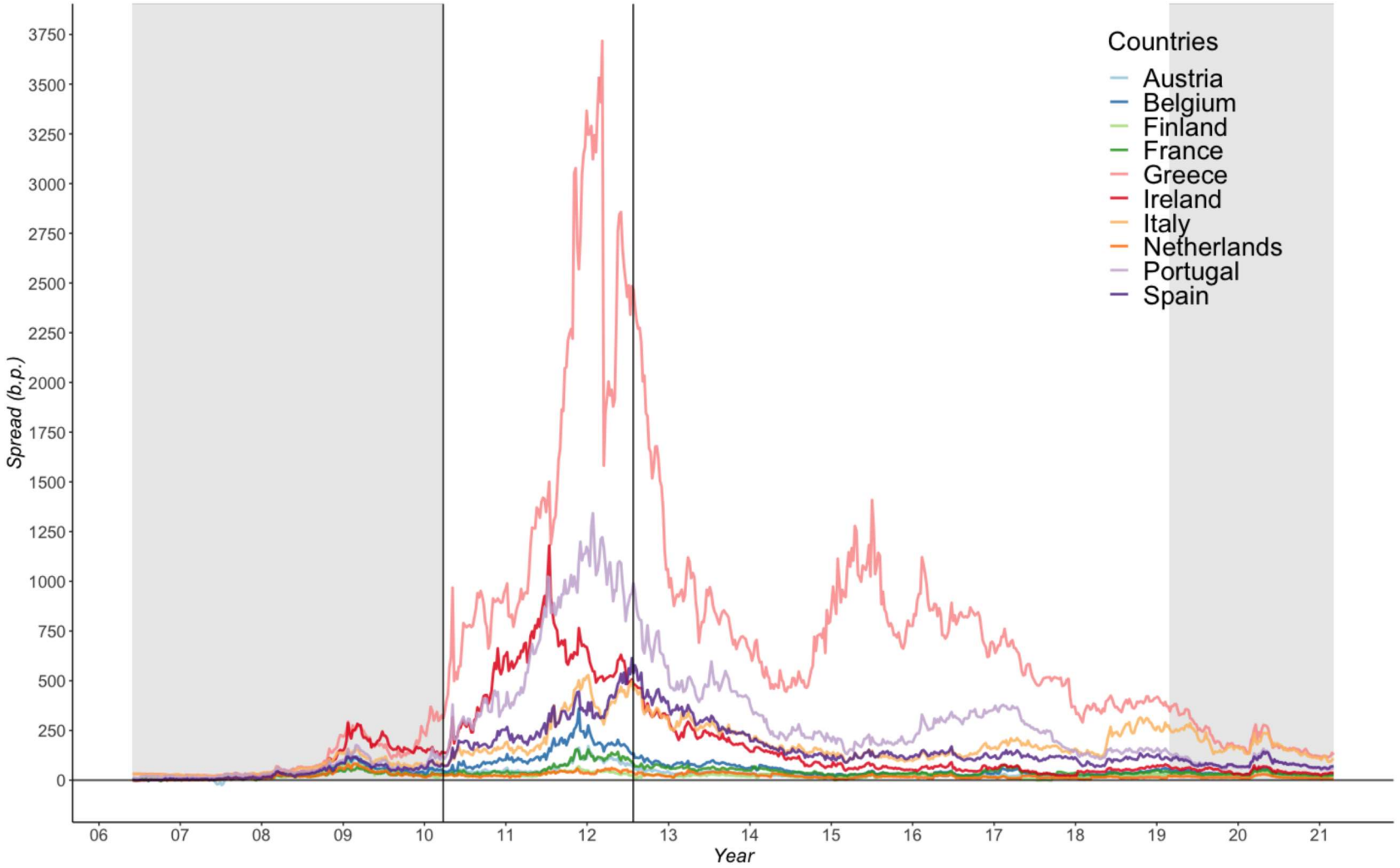

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Modelling interconnections

- The starting point is a standard local VAR:

$$(Y_t^i - Y_t^{DE}) = \beta_{i0} + \beta_{id}\mathbf{d}_t + \beta_{i1}(Y_{t-1}^i - Y_{t-1}^{DE}) + u_t^i \tag{1}$$

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where $(Y_t^i - Y_t^{DE})^* = \sum_{i \neq j} w_{ij}(Y_t^j - Y_t^{DE})$ for each $i \neq j$.

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Principal Component Analysis I

Table 1: First Principal Component: loadings

	Pre-*ESD*	Post-*ESD*	COVID
Austria	0.321	-0.319	-0.324
Belgium	0.322	-0.371	-0.335
Finland	0.309	-0.154	-0.315
France	0.320	-0.342	-0.322
Ireland	0.312	-0.361	-0.315
Italy	0.324	-0.296	-0.294
The Netherlands	0.320	-0.314	-0.327
Portugal	0.317	-0.335	-0.326
Spain	0.324	-0.363	-0.318
Greece	0.291	-0.242	-0.281
Variance explained	0.922	0.676	0.851

Principal Component Analysis II

Table 2: Second Principal Component: loadings

	Pre-*ESD*	Post-*ESD*	COVID
Austria	-0.143	-0.314	-0.273
Belgium	-0.187	-0.097	-0.020
Finland	-0.458	-0.640	-0.145
France	-0.159	-0.028	-0.309
Ireland	0.219	0.143	0.151
Italy	-0.072	-0.192	0.533
The Netherlands	-0.289	-0.172	-0.213
Portugal	0.262	0.341	-0.029
Spain	0.201	0.192	-0.207
Greece	0.681	0.492	0.643
Variance explained	0.966	0.823	0.925

Model

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- Our model

$$\begin{aligned}(Y_t^i - Y_t^{DE}) = \beta_{i0} + \beta_{if}\hat{F}_{1,t} + \beta_{i1}(Y_{t-1}^i - Y_{t-1}^{DE}) \\ +\beta_{i2}\hat{F}_{2i,t} + \beta_{i3}\hat{F}_{2i,t-1} + u_t^i\end{aligned} \tag{4}$$

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Click here

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Advantages of our specification

- In standard GVAR models, weights are normalized ($\sum_{i \neq j} w_{ij} = 1$) and each weight is nonnegative
  - In the case of EA sovereign bond spread, nonnegativity forbids the identification of a valid channel of interconnection (Candelon and Luisi, 2020).
- In our model, weights are normalized in abs. value ($\sum_{i \neq j} |\hat{w}_{ij}| = 1$)
  - This way, we allow for asymmetric exposure to foreign yields.
- In standard GVAR models, the *star* variable $(Y_t^i - Y_t^{DE})^*$ is built as a weighted average of foreign counterparts.
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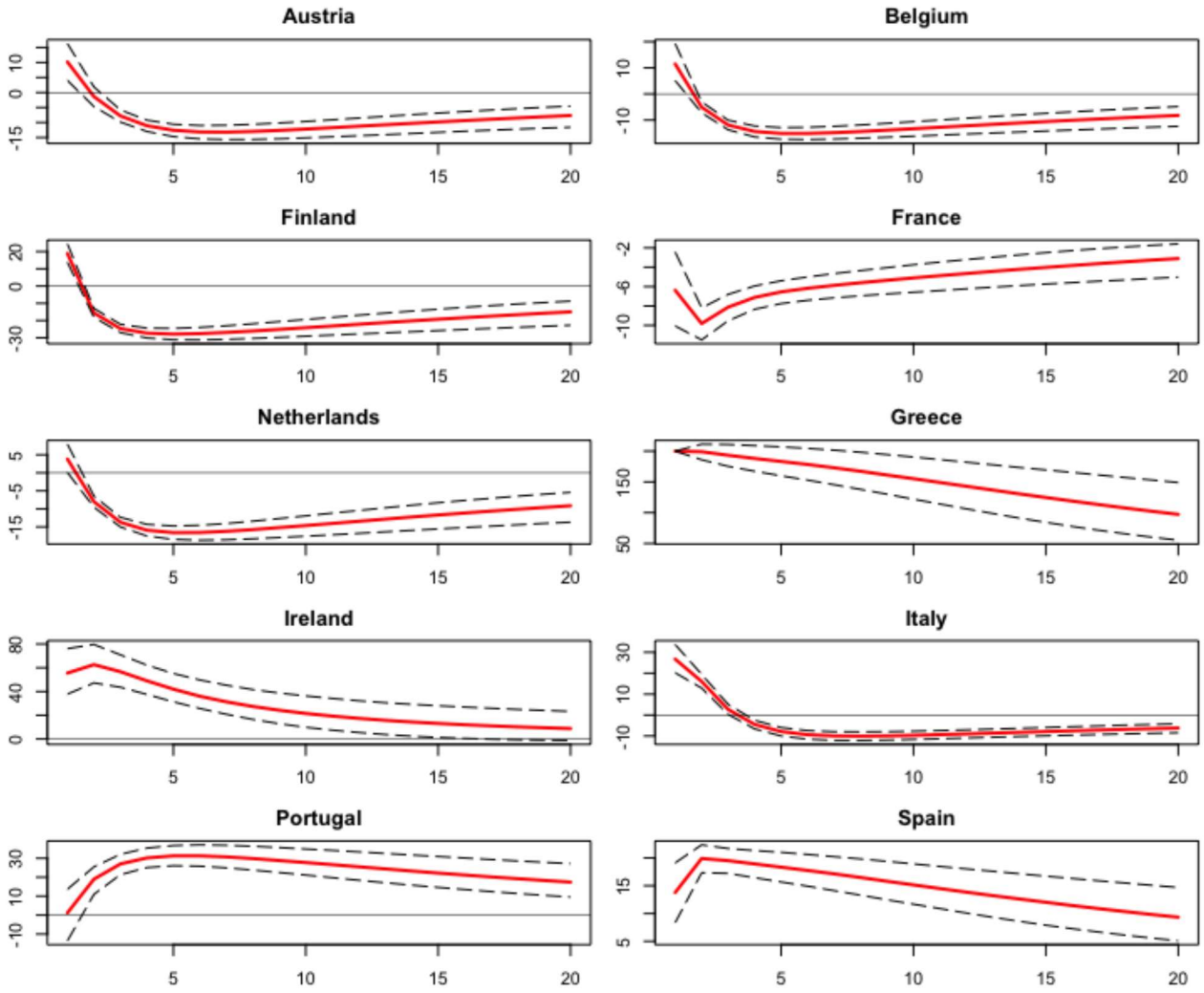
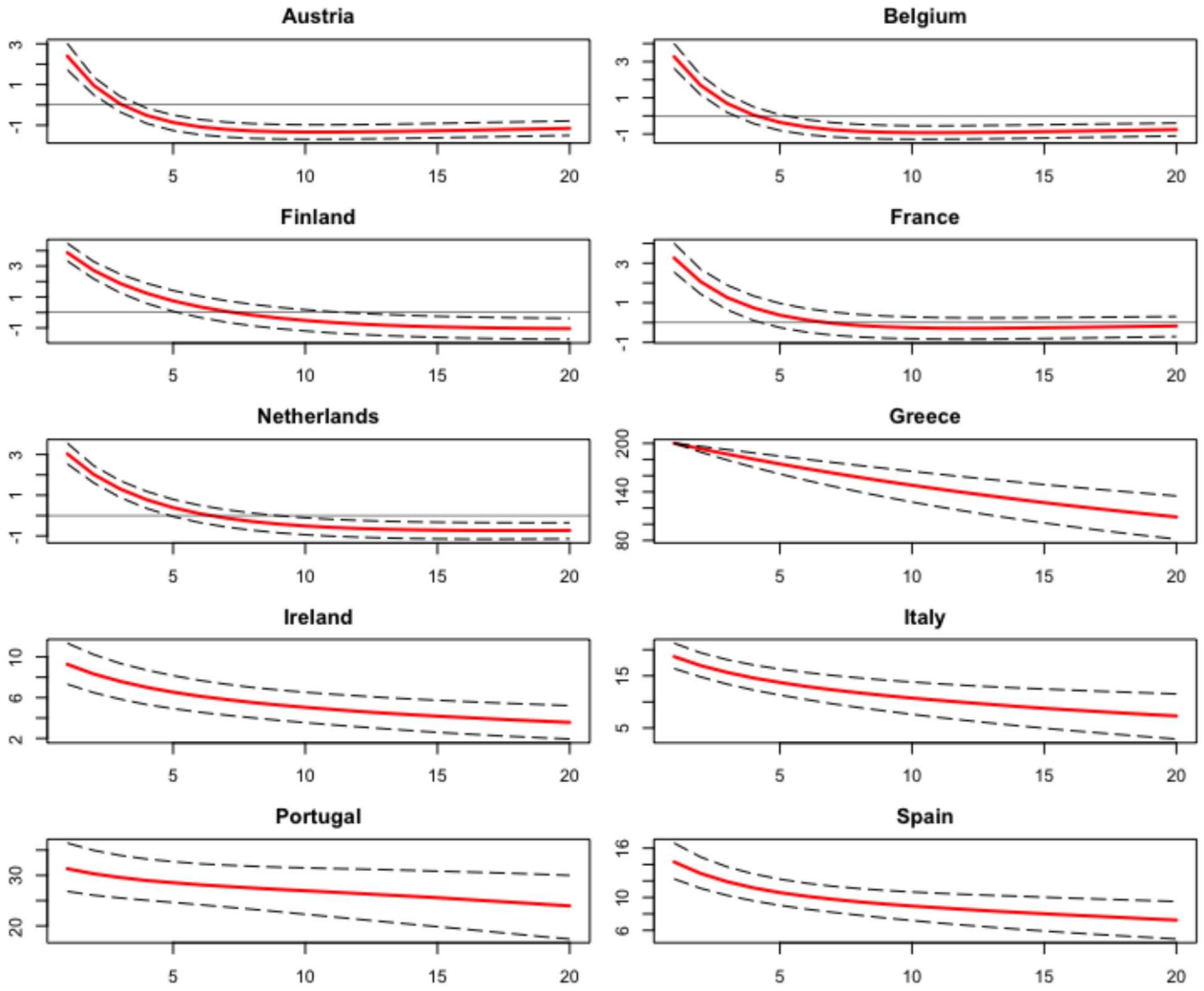
Pre-ESD: shock to the periphery

Figure 5: Generalized Impulse Response. Shock to Greece



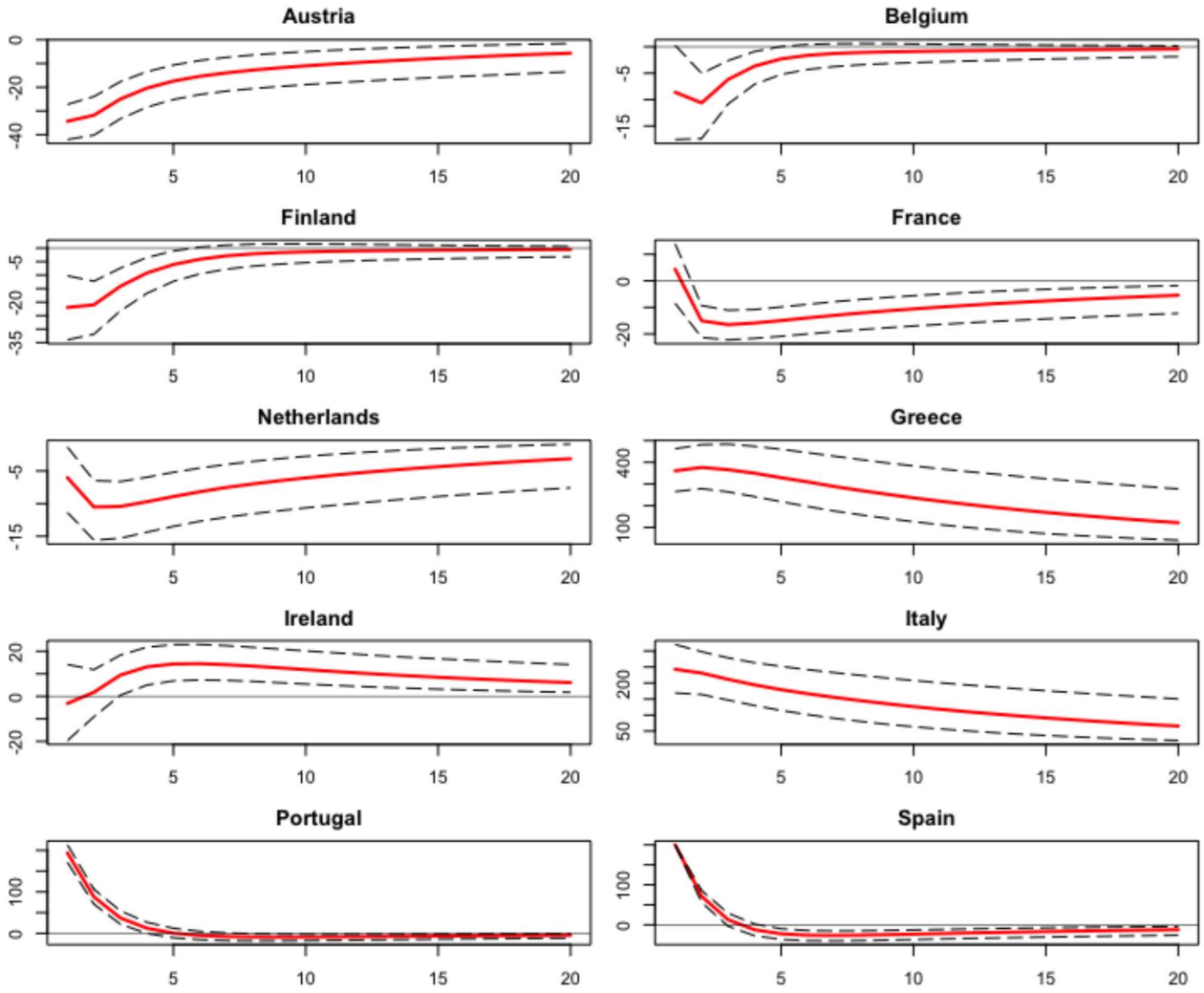
Post-ESD: shock to the periphery

Figure 6: Generalized Impulse Response. Shock to Greece



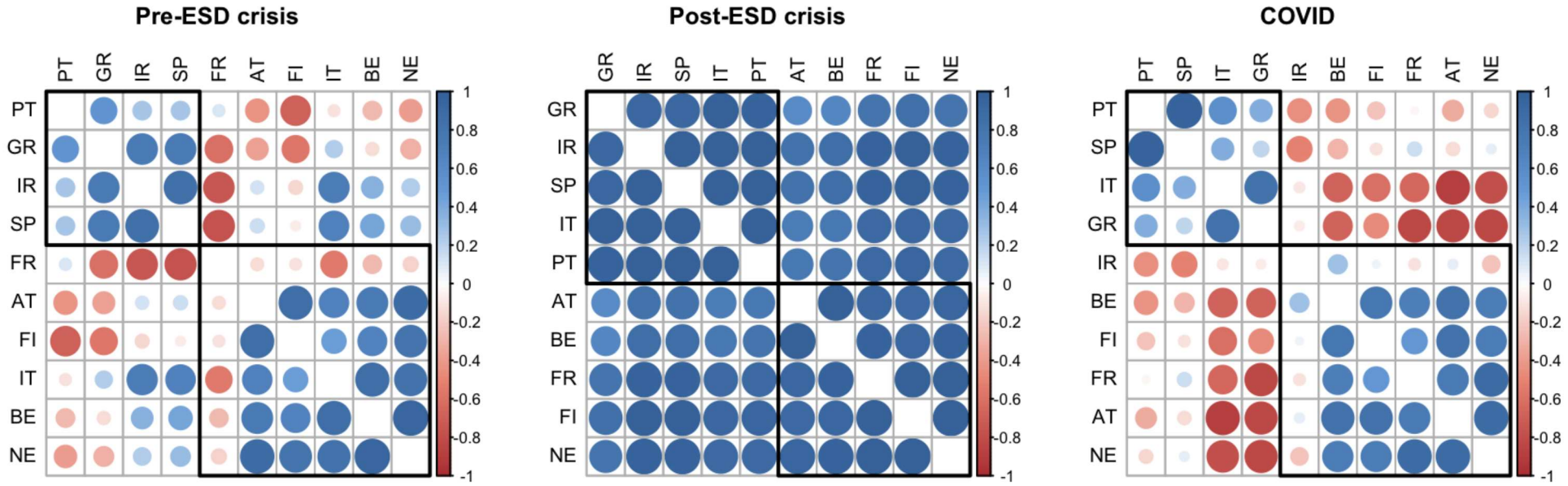
COVID-period: shock to the periphery

Figure 7: Generalized Impulse Response. Shock to Spain



Heatmaps

Figure 8: Heatmap representation of the Generalized Impulse Response Functions to a 200 b.p. shock to the Periphery.



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Appendix: How to compute $\hat{F}_{2i,t}$

Following Bernanke et al. (2005)

1. Extract the second Principal Component ($\hat{F}_{2,t}$) of the cross section of spreads
2. Regress the second Principal Component on the specific local spreads

$$\hat{F}_{2,t} = \gamma_i(Y_t^i - Y_t^{DE}) + \epsilon_{it} \tag{5}$$

3. Clean the second Principal Component from the information of country i

$$\hat{F}_{2i,t} = \hat{F}_{2t} - [\hat{\gamma}_i(Y_t^i - Y_t^{DE})] \tag{6}$$

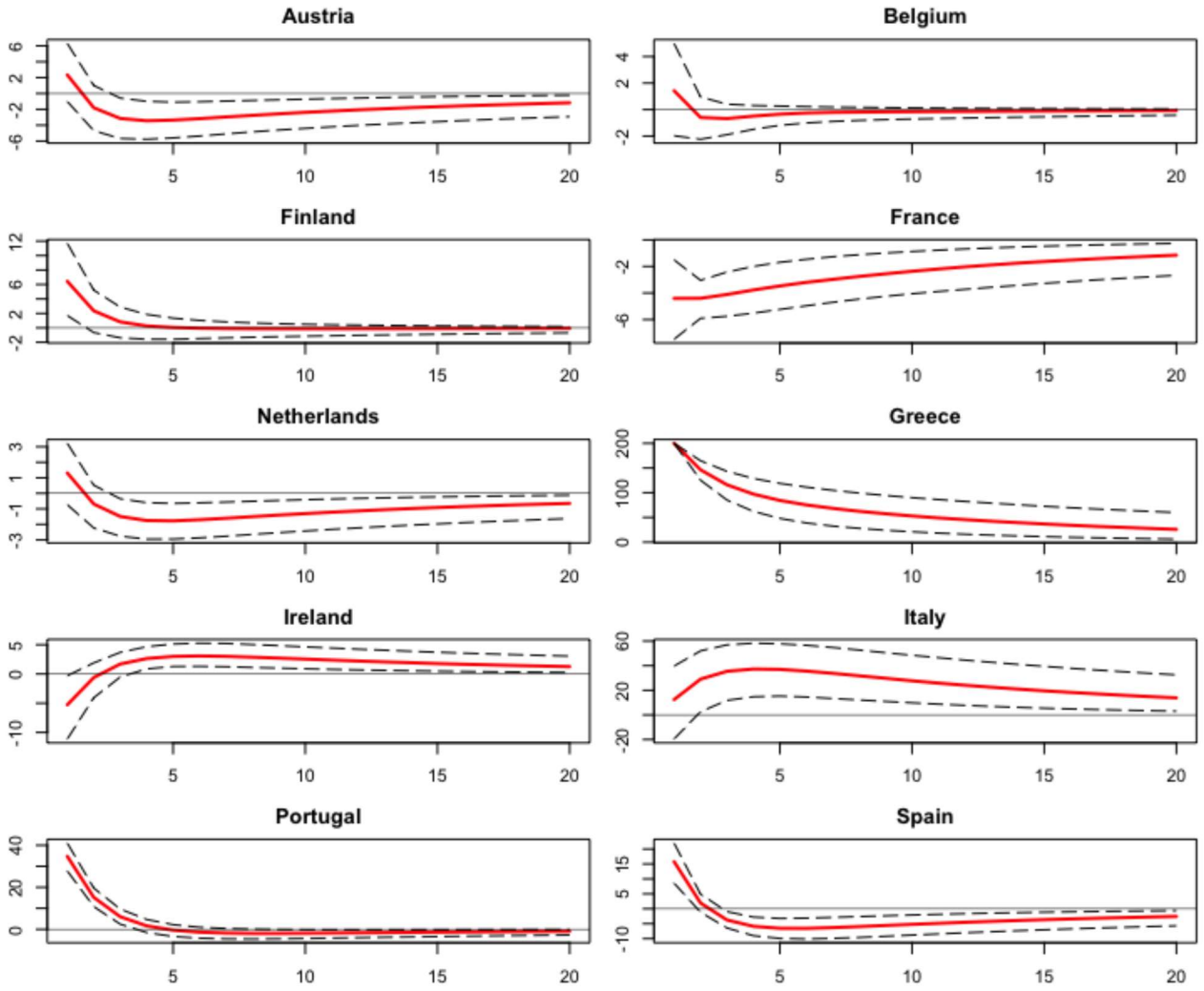
4. Obtain the external information as average of foreign spreads

$$\hat{F}_{2,it} = \sum_{i \neq j} w_{ij}(Y_t^j - Y_{t-1}^{DE}) + v_{it} \tag{7}$$

Go back

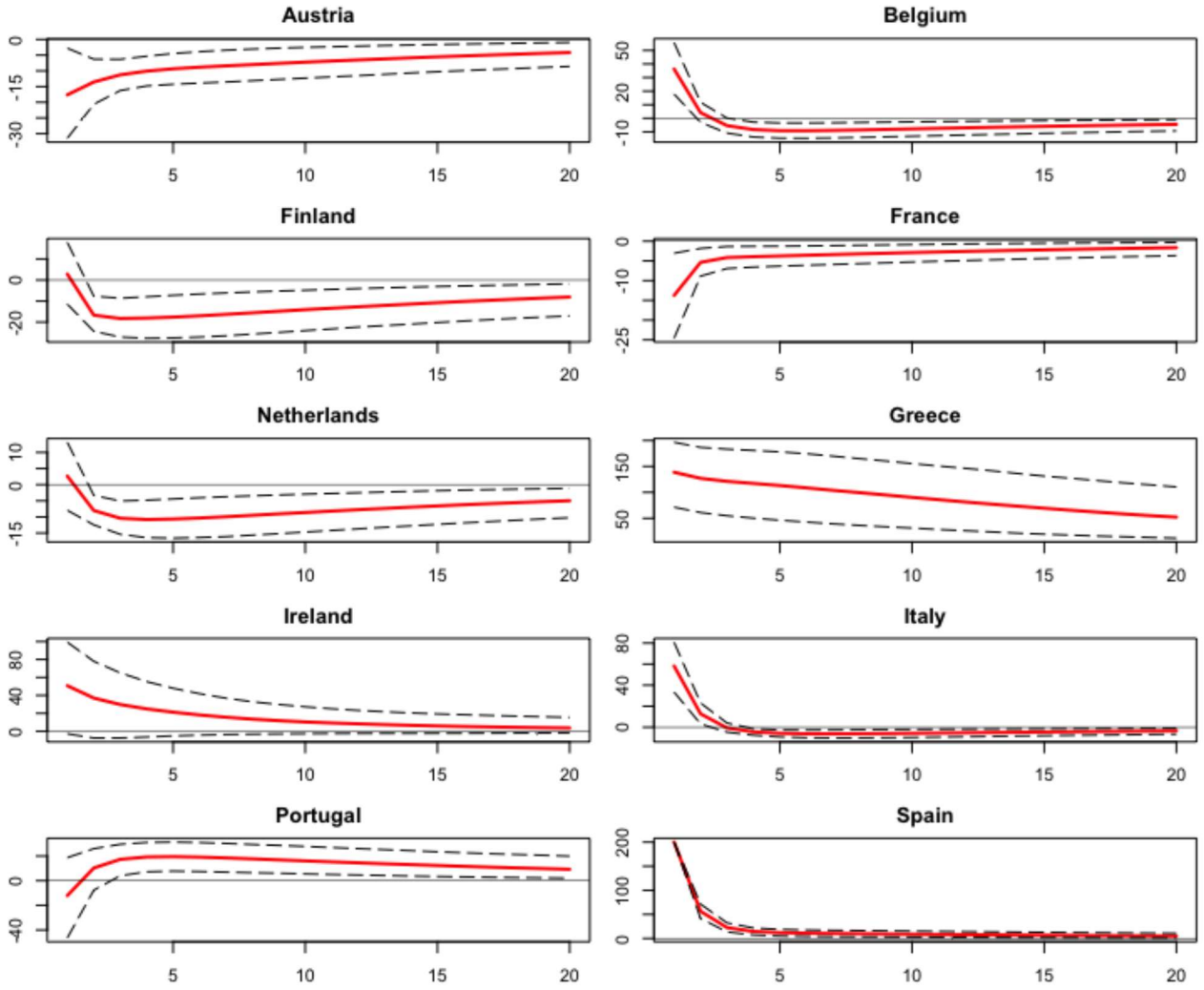
Appendix: Shock to Greece: COVID period

Figure 9: Generalized Impulse Response. Shock to Greece



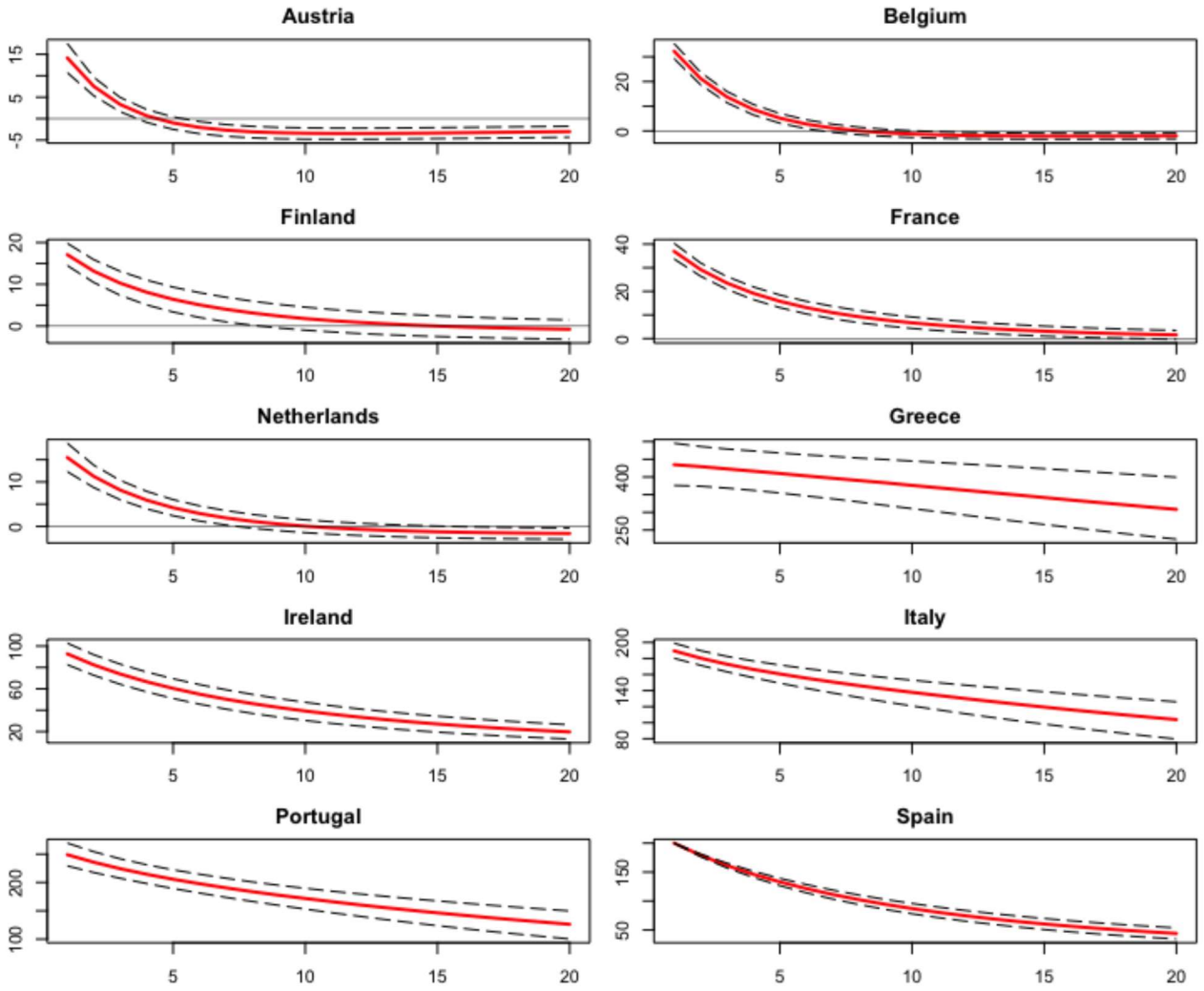
Appendix: Shock to Spain: Pre-ESD

Figure 10: Generalized Impulse Response. Shock to Spain



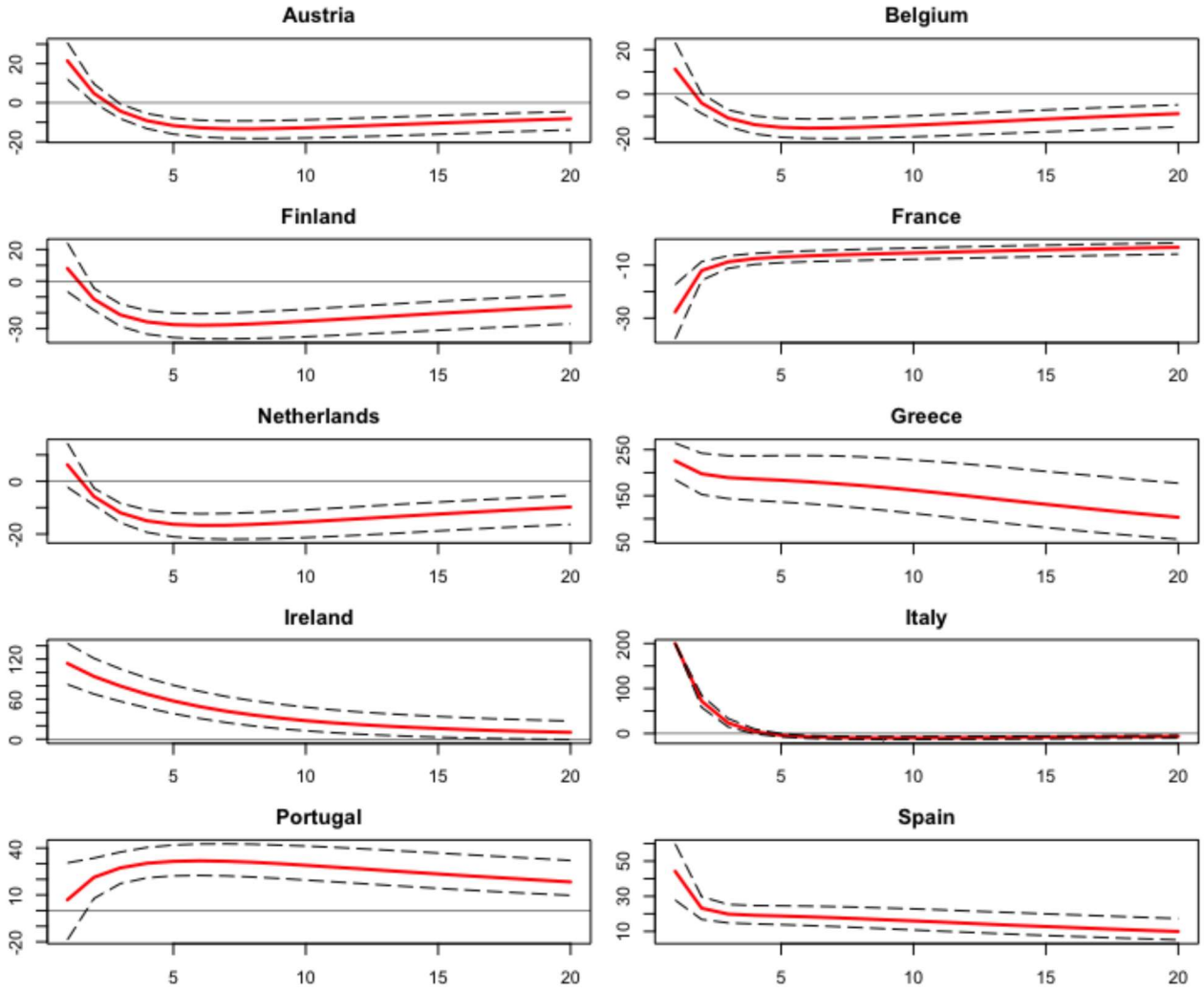
Appendix: Shock to Spain: Post-ESD

Figure 11: Generalized Impulse Response. Shock to Spain



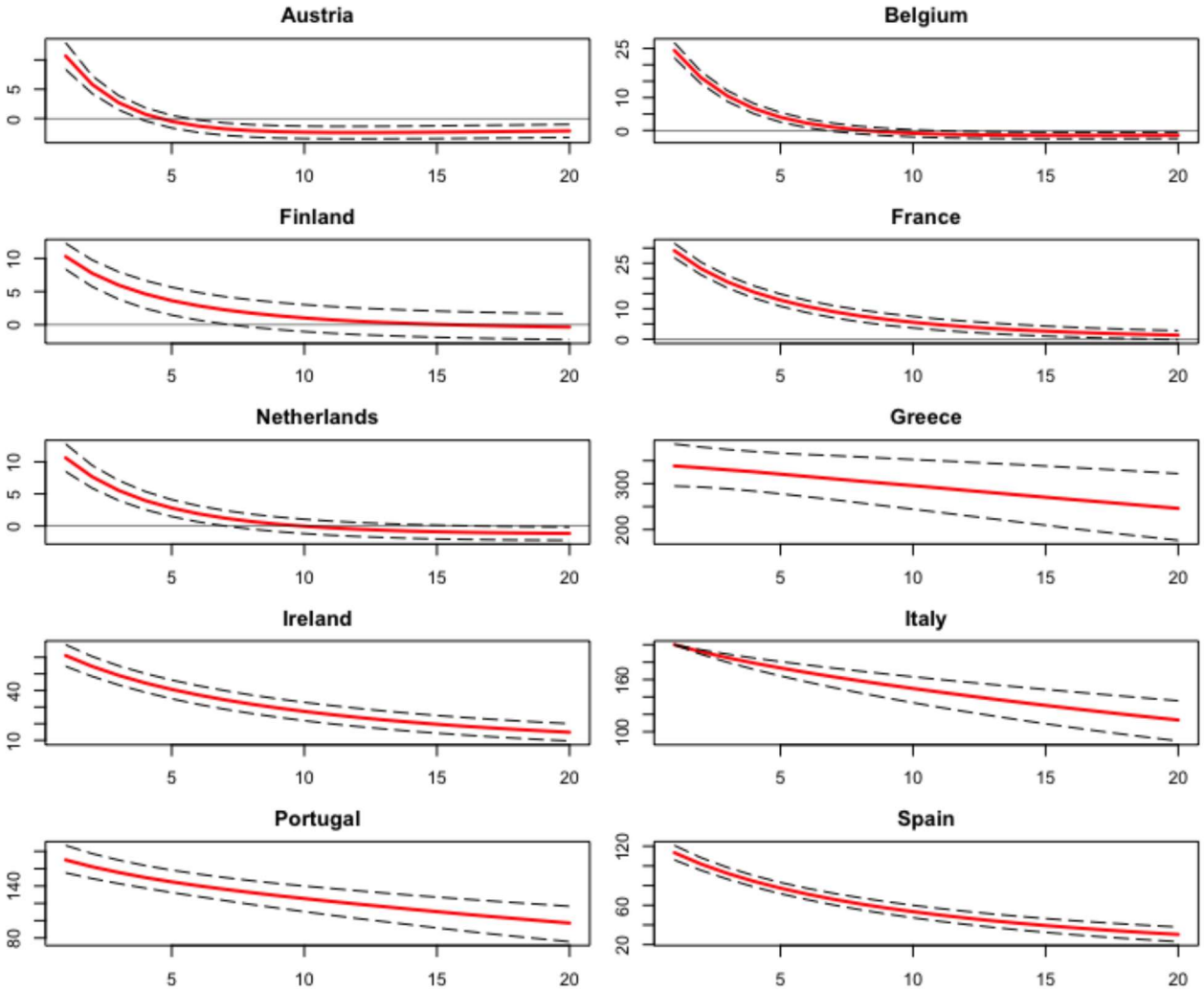
Appendix: Shock to Italy: Pre-ESD

Figure 12: Generalized Impulse Response. Shock to Italy



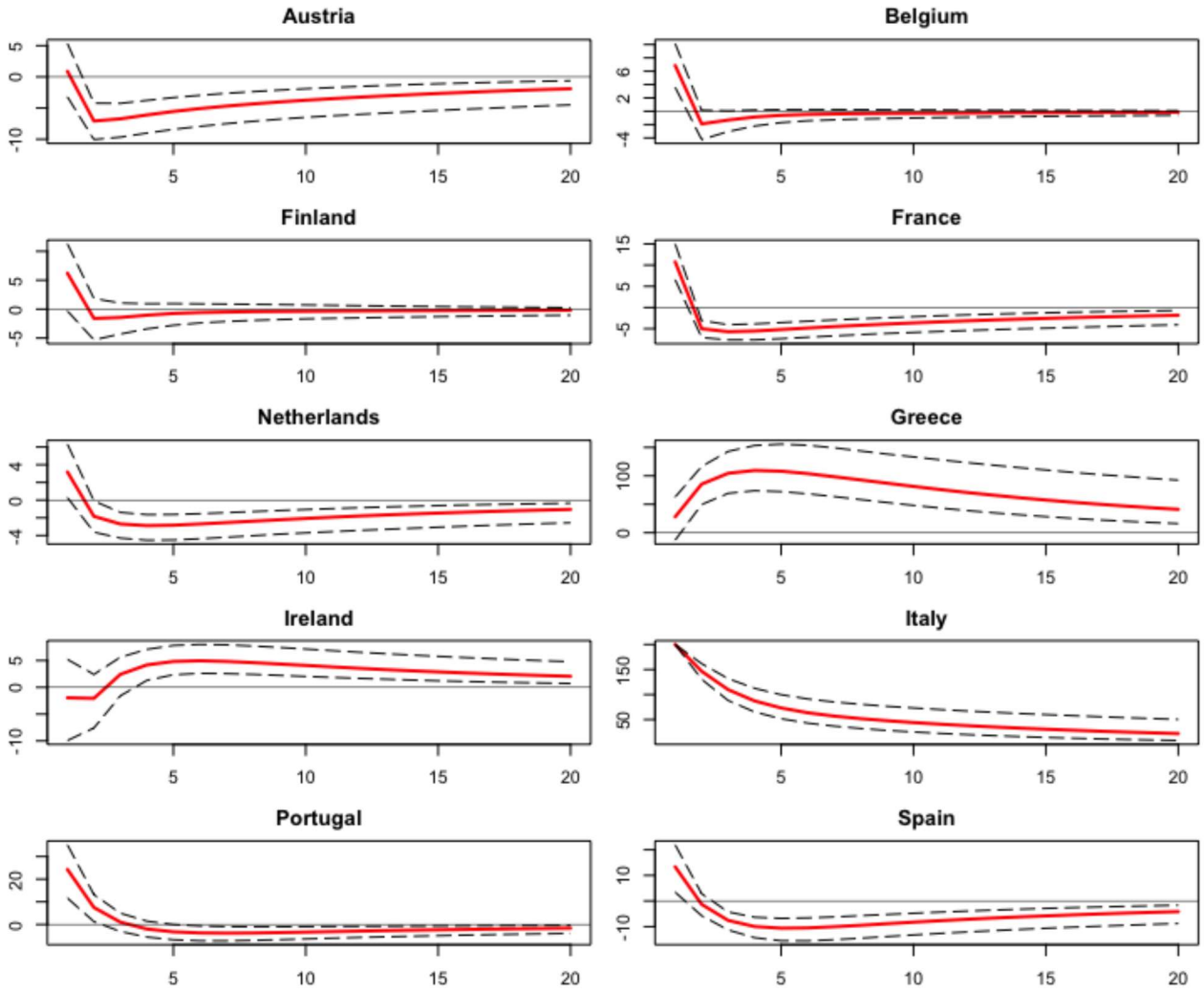
Appendix: Shock to Italy: Post-ESD

Figure 13: Generalized Impulse Response. Shock to Italy



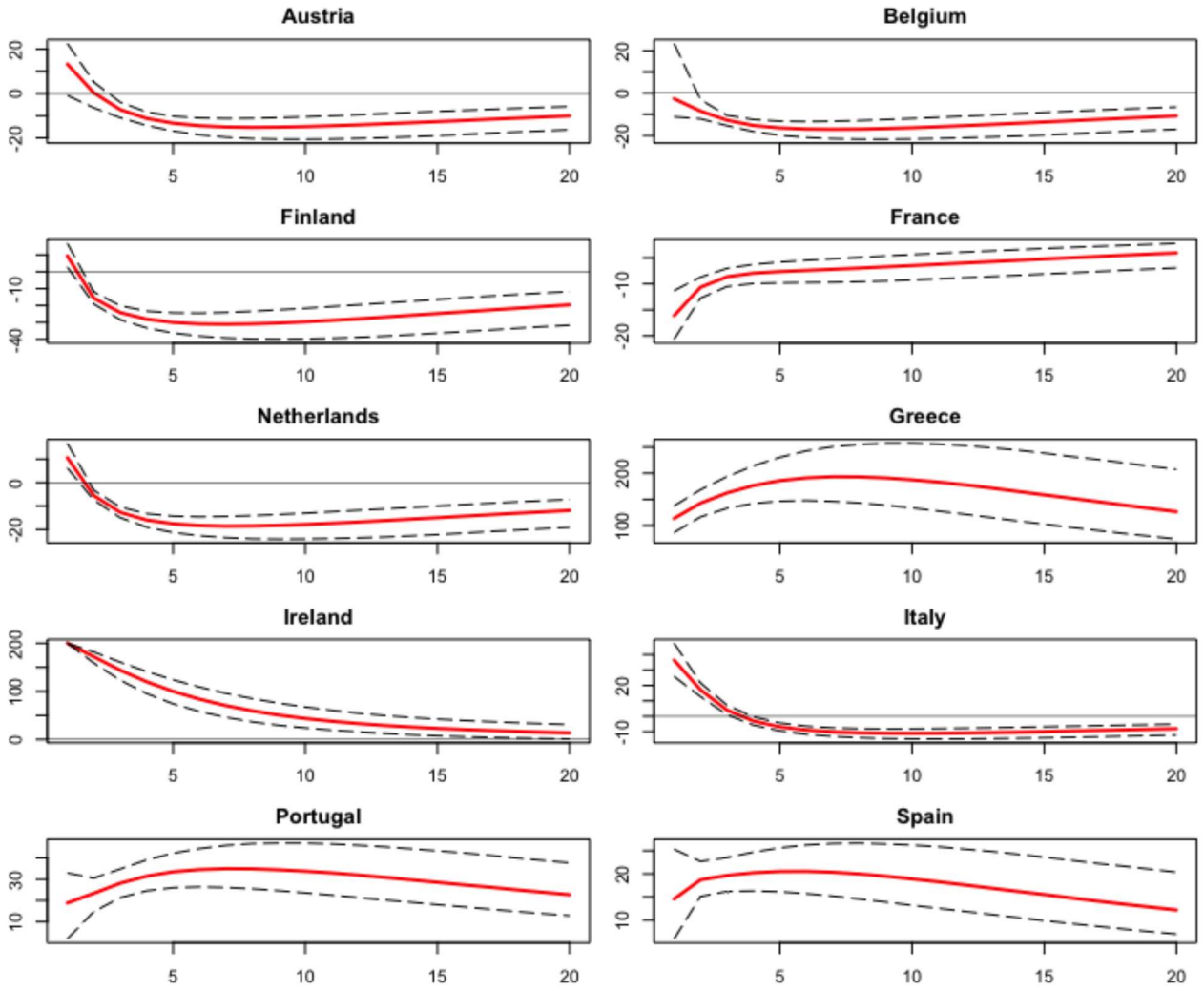
Appendix: Shock to Italy: COVID

Figure 14: Generalized Impulse Response. Shock to Italy



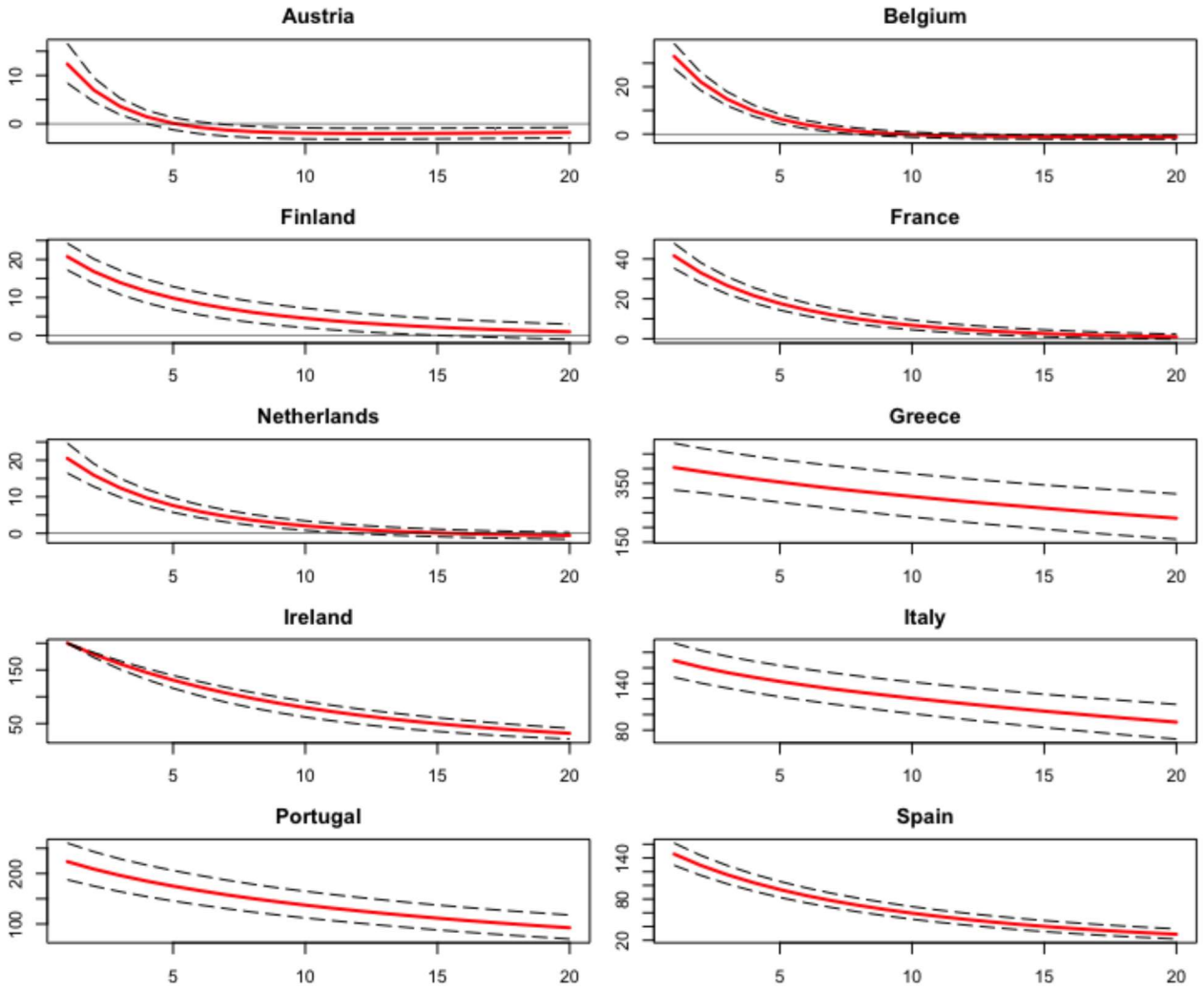
Appendix: Shock to Ireland: Pre-ESD

Figure 15: Generalized Impulse Response. Shock to Ireland



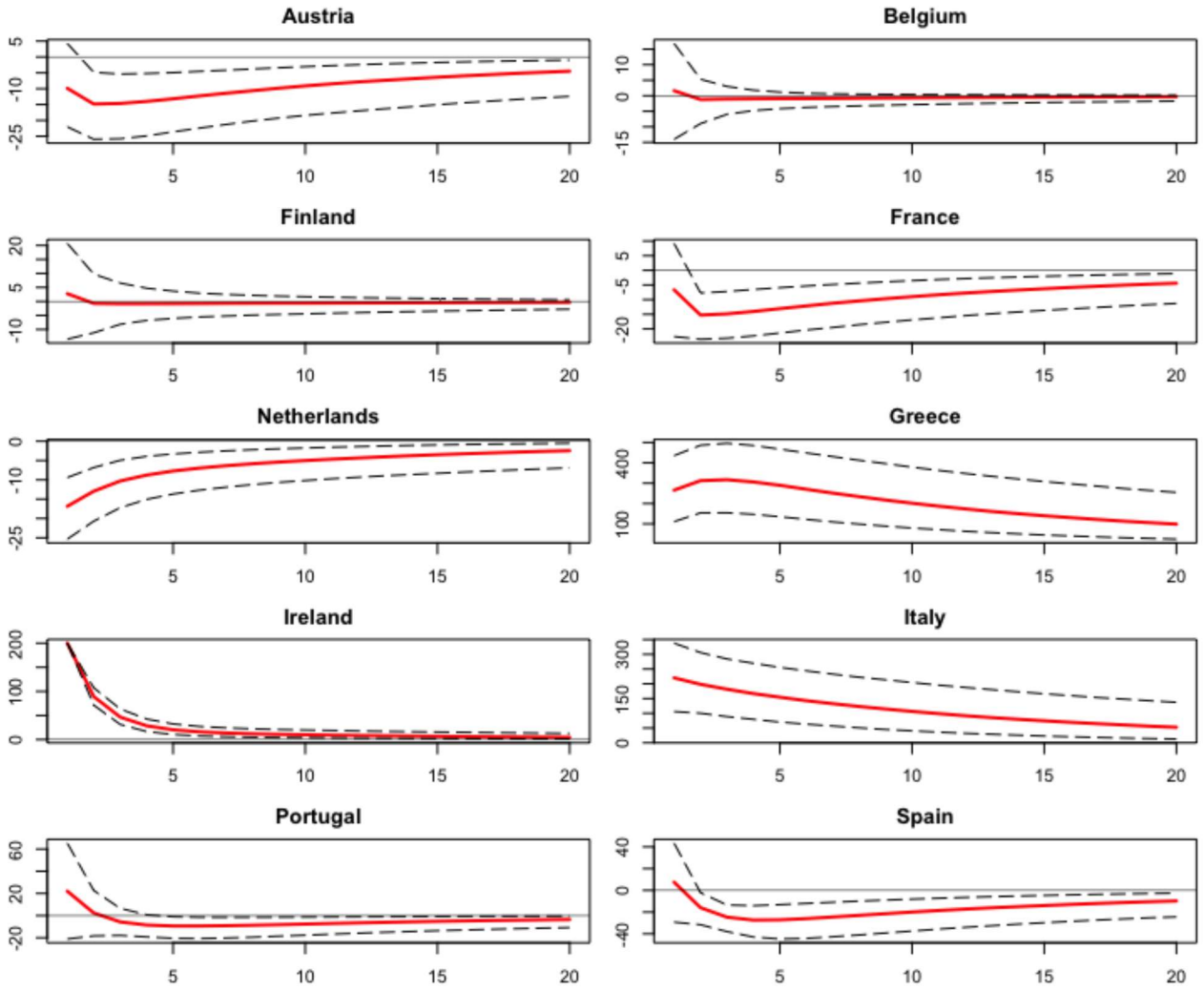
Appendix: Shock to Ireland: Post-ESD

Figure 16: Generalized Impulse Response. Shock to Ireland



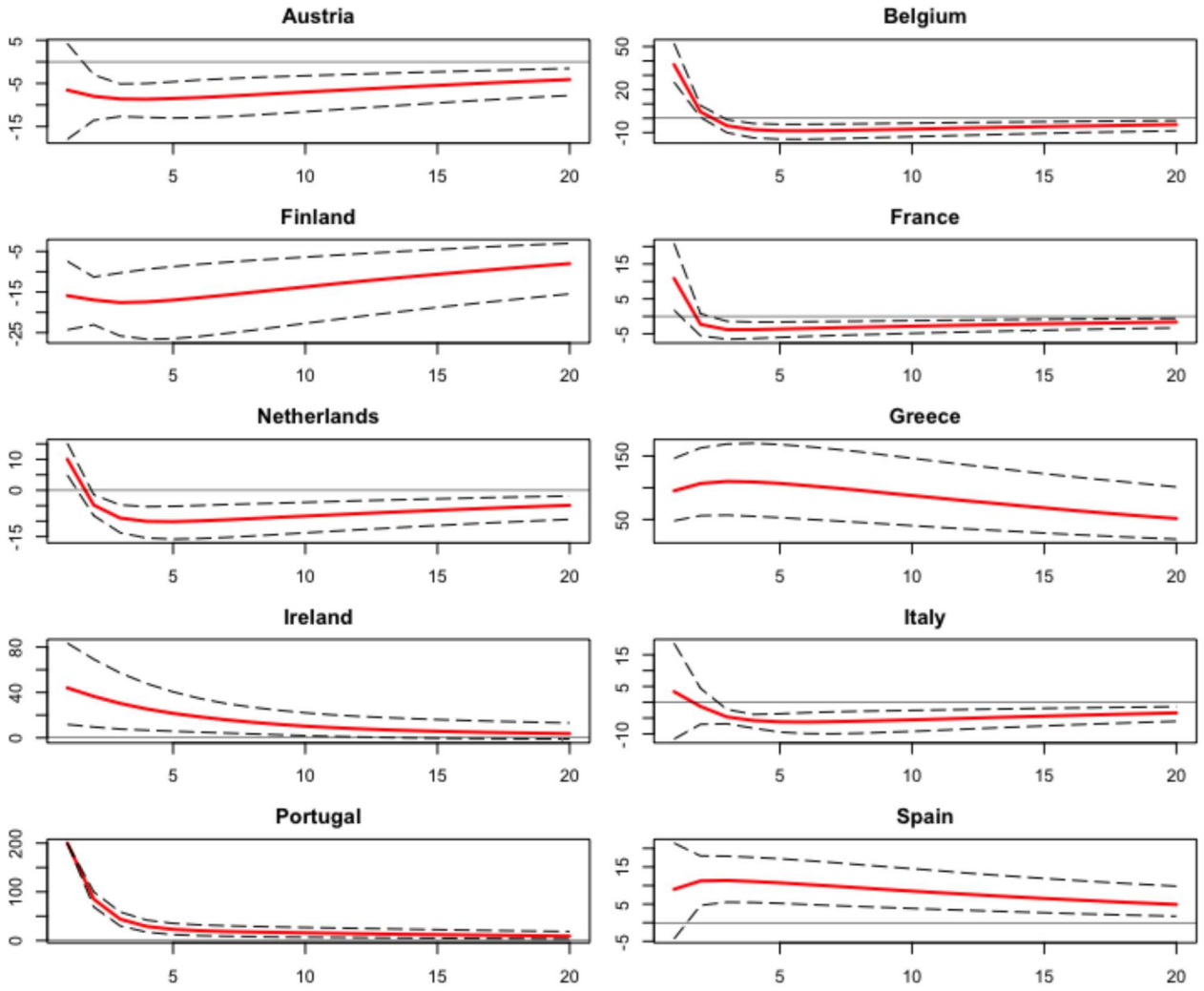
Appendix: Shock to Ireland: COVID

Figure 17: Generalized Impulse Response. Shock to Ireland



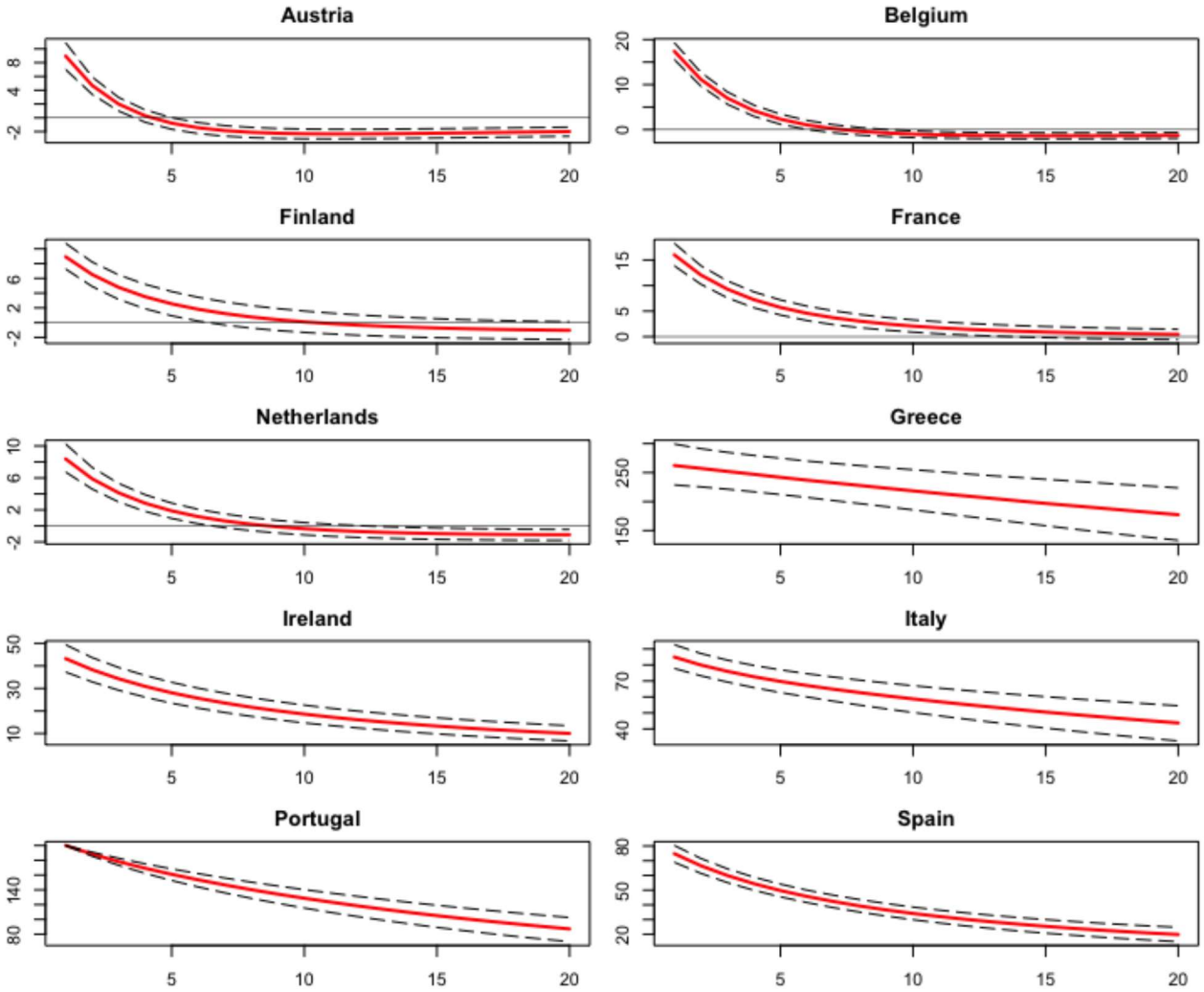
Appendix: Shock to Portugal: Pre-ESD

Figure 18: Generalized Impulse Response. Shock to Portugal



Appendix: Shock to Portugal: Post-ESD

Figure 19: Generalized Impulse Response. Shock to Portugal



Appendix: Shock to Portugal: COVID

Figure 20: Generalized Impulse Response. Shock to Portugal