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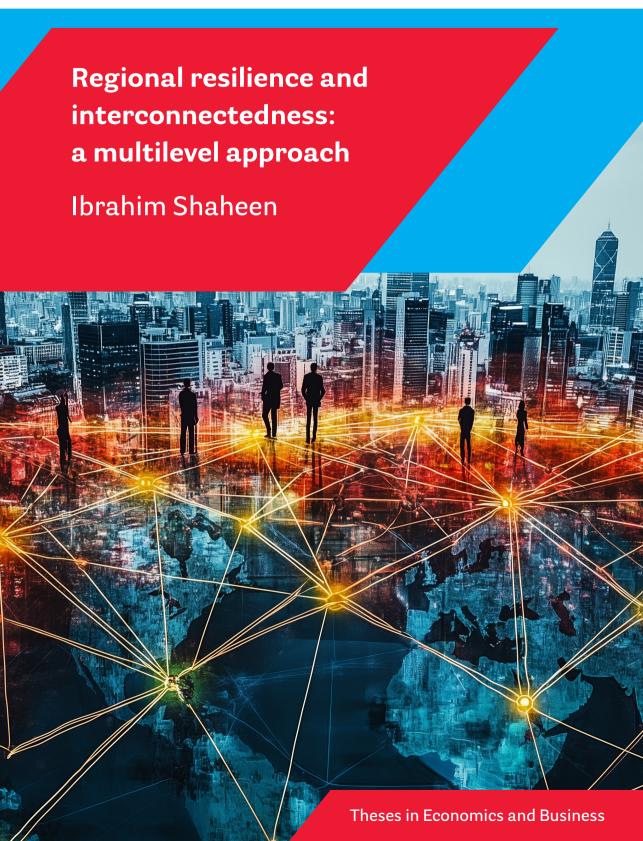
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Regional resilience and interconnectedness: a multilevel approach

Ibrahim Shaheen

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Regional resilience and interconnectedness: a multilevel approach

PhD thesis

to obtain the degree of PhD at the University of Groningen on the authority of the Rector Magnificus Prof. J.M.A. Scherpen and in accordance with the decision by the College of Deans.

This thesis will be defended in public on

Thursday 12 December 2024 at 14.30 hours

by

Ibrahim Shaheen

born on 26 May 1988 in Syria

Supervisors Prof. S. Brakman Prof. J.H. Garretsen

Co-supervisor Dr. J. Canello

Assessment Committee

Prof. Robert Hassink Prof. B. Bart Los Prof. F.G. Van Oort

In loving memory of my father Jamil Shaheen, who left us just before watching me defending this dissertation. Your wisdom and kindness will always guide me.

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As a kid, I was truly intrigued by the fact that Earth looks like a football. I had serious doubts about it, and I wanted to become an astronaut to see with eyes whether the world was flat or not. When I realized that we do not have astronautics in the Syrian universities, I decided, with soreness, to abandon my childhood dream and rely on a sophisticated methodology to pick the discipline that I will be studying for the next 50 years or so. I did a random draw and picked economics! Back then, I had no idea that in the years to come, I would be studying the economic resilience to crises in my Ph.D. dissertation at a moment in which my home country, Syria, has been suffering a devastating crisis for over a decade. Thinking of the Syrian crisis and the future of that lovely country made the notion of resilience captivating for me. Although I was not able to verify by eyes whether the Earth is flat or not, however, I consider myself very lucky to have accumulated a lot of knowledge in previous years that would allow me to understand that the world is flat, round, and spiky at the same time. It is a matter of what lenses you put when you take a look at it.

My learning journey in the Ph.D. would never have been as rich without my supervisors, Steven, Harry, and Jacopo. I owe you a lot, and I consider myself truly lucky to have you all. Steven, your Dutch directness has enriched me as a person and as a researcher. You are a brilliant supervisor and a true mentor that I am proud to have. Without your sharp feedback and insightful critiques, I would have never made it. I am so grateful to you. Harry, I had never believed that one supervisor could know everything until I met you. Your immense knowledge across multiple fields has profoundly enriched my research journey. During the previous years, you taught me how to see the whole picture and the hidden connections and how to think about them. My sincere gratitude to you. Jacopo, when I came from Italy to the Netherlands to start my Ph.D., I was incredibly

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In the end, I would like to express my deepest and most heartfelt thanks to my family in Syria. Despite the distance and the very long time apart, your infinite love, support, and encouragement helped me overcome every obstacle and challenge and immensely motivated me to seek more and more success, thank you, Mom, Majd, and Dima. I would like to thank my uncle, Prof. Husam Shaheen, for being a role model to me during all these years and for pushing my ambition beyond any limits. I am also very grateful to my Italian family for all the love and everything you have done and continue to do to make me feel at home. Thank you, Gina, Gino, and Giusi. Lastly, although it should come first, I am, and will always be, deeply grateful to my partner, Laura, for standing by my side during these very many years. Without you, this journey would never have been joyful, and I would never have been able to discover the best version of myself. Thank you for your infinite love, support, and sacrifices. Thank you for the thoughtful discussions and for the positive energy you bring to my days. Thank you for being in my life.

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Ibrahim, Rome, November 4, 2024

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To decide on the optimal number of clusters the data reveals, we
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points in a cluster and the cluster centroid. We pick the number of
clusters where the value of WCSS is minimized (the elbow point).
Source: the author
Silhouette width statistic tests the validity of the cluster solution.
It measures how similar each observation is to other observations
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