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Abstract

We provide evidence of a positive effect of major infrastructure development on international trade, using the opening of the fixed link between Denmark and Sweden in 2000 (The Oresund Bridge) as a quasi-natural experiment. Our Synthetic Control Method (SCM) constructs a counterfactual Danish-Swedish trade relationship, which represents bilateral trade in the absence of the bridge. Evaluating actual trade against its synthetic counterpart for the period 2001-2008 shows that Danish-Swedish trade was 24.6% larger than it it would have been in the absence of the bridge using our preferred specification. The result is robust to standard sensitivity checks. We supplement our analysis with a standard Difference-in-differences (DiD) estimator, which uses fixed effects. The DiD estimator yields a slightly larger trade effect of 26.7%, and is robust to a number of sensitivity analyses, including estimation at the product level. Both our SCM and DiD point to the trade-boosting effects being gradual.

Keywords: Fixed link, bridge, tunnel, transport infrastructure, trade, Synthetic Control Method, Difference-in-differences.

JEL classification: F14, F15

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1 Introduction

There are many examples throughout history of major infrastructure development designed to reduce barriers to trade. For land bodies separated by water, bridges, tunnels or causeways facilitate trade and economic integration across regions or countries. The Channel Tunnel between the UK and France, which was inaugurated in 1994, is a prime example, but it is not the only one: existing fixed links include the King Fahd Causeway between Saudi Arabia and Bahrain, the Hong Kong–Zhuhai–Macau Bridge connecting Mainland China with Hong Kong and Macau, and the Crimean Bridge between the Russian Federation and Crimea. Moreover, a number of fixed links are either under construction, such as the Fehmarn Belt Fixed Link between Denmark and Germany, or have been proposed, such as the Strait of Gibraltar crossing between Africa and Europe, the Japan–Korea Undersea Tunnel, and the Irish Sea Bridge joining the island of Ireland with the island of Great Britain. Thus, there is widespread interest in building fixed links.[1] From a policy perspective, the overriding objective of fixed links is to enhance economic integration between the linked regions or countries and thereby stimulate trade. Such major infrastructure investment is associated with significant tax-payer contributions, and therefore it is important to quantify its economic gains and judge its merits against other forms of government spending.

In this paper, we analyse the effect of large-scale infrastructure projects that establish fixed links between countries on bilateral trade. The objective is the analysis of how fixed links affect *aggregate* trade between the linked countries, a question which to the best of the authors' knowledge has not yet been addressed. Specifically, we use the opening of The Øresund Bridge (henceforth referred to as the Bridge) between Denmark and Sweden as a quasi-natural experiment.[2]

The relationship between Denmark and Sweden, two Nordic nations separated by a sea barrier, is characterised by close political, economic, cultural and linguistic ties, and the two countries share a long history of formal economic integration.[3] Prior to the opening of the Bridge, there was a well-established transport infrastructure in the form of numerous ferry and hydrofoil services, allowing people and goods to travel between the countries.[4] The Bridge was inaugurated on 1 July 2000, and it provided a direct and de facto land route, which is likely to have significantly reduced the cost of trading goods across the border. The fact that the two countries were well integrated prior to the opening of the Bridge and that *other* trade barriers were low makes this case study highly suitable to the analysis of the importance of fixed links for bilateral trade.

There are several reasons we expect the Bridge – and fixed links in general – to have an effect on trade. Fixed links are intrinsically different from ferry services in several ways. First, fixed links offer continuous service, eliminating waiting times and the need to coordinate transit with ferry schedules. There is evidence that delays and waiting times significantly impede trade (see for example Hummels and Schaur, 2013). Second, fixed links do not necessitate a change in the mode of transport. For non-fixed links, even in the

[1] There are similarly many examples of fixed links that connect different regions within the same country, such as the Golden Gate Bridge, the Chesapeake Bay Bridge-Tunnel and the Brooklyn Bridge in the US, the Akashi-Kaikyo Bridge in Japan, or the various bridges and tunnels that connect the European and Asian parts of Turkey across the Bosporus. While the focus of this paper is on fixed links which join countries, there is no reason to suspect that fixed links joining intra-national regions would not generate similarly significant economic effects.

[2] We shall examine the nature of the Danish-Swedish border and the Bridge in more detail in Section 2 below.

[3] For instance, in the 1950s, the Nordic Passport Union created an area of freedom of movement of citizens between the Nordic countries by eliminating passport checks for travellers and allowing citizens to live and work in each other's countries without the need for work permits (the Nordic countries comprise Denmark, Finland, Iceland, Norway, and Sweden). When Sweden joined the European Union (EU) in 1995 – Denmark had been a member since 1973 – most remaining policy-based trade barriers were removed.

[4] Indeed, as noted by Knowles (2006), rail ferries across the water were available as early as 1892, and roll-on roll-off car ferries were introduced in 1930.

best case scenario where the ferry is a "roll-on/roll-off" type, this transition adds time to the journey due to pre-departure check-in and boarding times. In other contexts, cargo itself needs offloading and reloading, resulting in the intermodal transition requiring an even more substantial investment of time and personnel. Third, fixed links are typically associated with a shorter transit time. As such, even discounting check-in and boarding times, the time spent in transit is significantly reduced (the transit times on ferries between Denmark and Sweden may exceed one hour, whereas the typical lorry transits the fixed link in less than 10 minutes). Fourth, not only do fixed links reduce the cost of moving goods between countries, they also make it easier to move people. As argued in the literature on the importance of face-to-face communication (see for example Giroud, 2013; Campante and Yanagizawa-Drott, 2017; Charnoz et al., 2017, Bernard et al., 2019; and Söderlund, 2020), business travel can have substantial effects on economic outcomes such as international trade. If fixed links indeed increase the likelihood of face-to-face interaction among businesses, this would be an additional mechanism through which the fixed link could boost goods trade. Fifth, if ferry routes remain in operation after the opening of a fixed link, which has been the case with the Bridge we study, an indirect effect of the fixed link might be the intensification of competition between transport service providers. There is some anecdotal evidence in favour of this hypothesis in our context: Knowles (2006) notes that one of the ways the ferry service providers managed to keep an unexpectedly large market share was by offering discounts on multi-journey tickets. Lastly, if ferry routes remain in business, new fixed links will also expand the overall transport capacity in the region, thereby reducing capacity constraints for road and rail transport, and easing or preventing congestion and bottle necks.

To estimate the trade effects of the Bridge, we use a sample of 18 European countries (EU15 plus Iceland, Norway and Switzerland) over a large pre-treatment period (1980-2000) and employ multiple well-established methodologies. We employ the Synthetic Control Method (SCM), which is commonplace for evaluating treatment effects in comparative case studies (see for example, Abadie and Gardeazabal, 2003; Abadie et al., 2010;Abadie et al. (2015)). We compare the actual value of bilateral trade to counterfactual synthetic trade flows that represent the levels that would have prevailed in the absence of the Bridge. To generate the synthetic trade flows, we construct an algorithm which computes the best weighted combination of comparison units (bilateral trade between other country pairs), where the weights are chosen to provide the best fit for the actual trade flows prior to the opening of the Bridge. In addition, we supplement our SCM using a standard Difference-in-differences (DiD) estimator applying various levels of fixed effects (such as country-pair and time-varying importer- and exporter fixed effects). We estimate our treatment effects of the Bridge for the first 8 years after its inauguration (2001-2008) using both methodologies. Using our preferred specification in our SCM, we find that the bilateral goods trade was 24.6% larger than it would have been in the absence of the Bridge. Our standard DiD estimator, using fixed effects, yields a slightly larger 'Bridge effect' of 26.7%. Our results also suggest a somewhat asymmetric effect with Danish exports to Sweden increasing slightly more than Swedish exports to Denmark (the difference is statistically significant in two out of three specifications). Upon examination of the timing of the Bridge effect for both our SCM and DiD, we note that this is a gradual effect, with a larger effect occurring between 2005-2008 than for the first four years after its inauguration. We also estimate the long-term effects of the Bridge for the years 2009-2015. This analysis shows that the Bridge effects remains large and statistically significant albeit slightly smaller than the short- to medium term effects in our baseline models. Our product-level results suggest that the Bridge effect is larger for (1) differentiated products relative to homogeneous products; (2) bulky products relative to non-bulky products and; (3) durable and semi-durable products relative to non-durable products.

This paper is related to the broader literature on transportation costs and trade, and especially to the strand of this literature that focuses specifically on the link between transport infrastructure and various economic outcomes such as trade.[5] In an early paper in the transportation costs and trade literature, Clark et al. (2004) investigate port efficiency as a factor behind variation in shipping costs. Other papers have explored the importance of containerisation (see for example Bernhofen et al., 2016; Coşar and Demir, 2018), issues relating to competition and market power (see for example Micco and Serebrisky, 2006; Hummels et al., 2009; Behrens and Picard, 2011), and endogeneous trade costs (see Brancaccio et al., 2020). Pascali (2017) analyses the introduction of steam ships, and how they reduced transport costs, and Kalouptsidi (2014) focuses on bulk shipping, and the impact of time to build and demand uncertainty on investment and prices. Feyrer (2009) uses the temporary closing of the Suez canal as a natural experiment to more clearly link distance effects to transport costs.

In the somewhat narrower literature on transport infrastructure and trade, papers such as Bougheas et al. (1999), Limão and Venebles (2001), Francois and Manchin (2013), and Donaubauer et al. (2018) have established that there is indeed an important link between transport infrastructure in general and international trade. Further, Allen and Arkolakis (2019) incorporate traffic congestion into a quantitative general equilibrium spatial framework, allowing them to evaluate the welfare of transport infrastructure improvements. When applying this to the US highway network and the Seattle road network, they find that the returns to infrastructure investments in these contexts vary a lot depending on where the improvements are made. Other papers focusing on road transports include Volpe Martincus and Blyde (2013), Duranton et al. (2014), and Coşar and Demir (2016). Volpe Martincus and Blyde (2013) use the exogenous variation in access to domestic road infrastructure in Chile following an earthquake in 2010, to assess the effect of transportation infrastructure on firms' exports. Duranton et al. (2014) investigate the effects of US interstate highways on the level and composition of cities' exports. Coşar and Demir (2016) use variation in public investments in roads in Turkey to assess how the quality of internal transport infrastructure affects transport costs. Lastly, Donaldson and Hornbeck (2016), Charnoz et al. (2017), Donaldson (2018) and Bernard et al. (2019) focus on the importance of railroads. Donaldson and Hornbeck (2016) develop a methodology for estimating the aggregate impact of railroads, and illustrate how the historical expansion of railroad networks in the US affected individual counties' market access (with respect to trading with other countries). Donaldson (2018) uses archival data from colonial India to analyse the impact of India's railroad network. Among his findings are that railroads in colonial India increased inter-regional and international trade. Whereas Donaldson and Hornbeck (2016) and Donaldson (2018) focuses on historical expansions of railroad networks, both Charnoz et al. (2017) and Bernard et al. (2019) analyse modern-day introductions of high-speed rail, and how this affects firm outcomes through increased face-to-face contact.[6]

The main focus of our paper is to assess the impact of the construction of fixed links – i.e. bridges, tunnels, causeways etc – on aggregate trade. The existing literature on fixed links is quite limited, and focuses on outcomes other than aggregate trade. In an early paper, Kay et al. (1989) analyse the potential welfare implications of building a channel tunnel between the UK and France, concluding that the then prospective tunnel would experience large social benefits. Further, in a literature related to our paper, Åkerman (2009) and Arnarson (2015) use the opening of the Bridge as an exogenous decrease in trade costs. Åkerman (2009) uses this exogenous variation to test the Melitz model's implications for aggregate productivity. In this paper, Åkerman (2009) also finds evidence in support of the hypothesis that local firms located in Malmö (the main city on the Swedish side of the Bridge) have increased their exports to Denmark. In a similar vein, Arnarson

[5]See Hummels (2007) for an excellent empirical overview on transportation costs and trade.

[6]Charnoz et al. (2017) use the expansion of the French high speed rail network as a shock on travel time, while Bernard et al. (2019) use the expansion of high-speed rail in Japan.

(2015) uses the exogenous decrease in trade costs to evaluate models of multi-product exporters, with a focus on firm export entry decisions, and the within-firm adjustment regarding product scope and intensity. Consistent with the results in Åkerman (2009), he finds that local manufacturing firms in Malmö increase their aggregate firm-level trade flows relative to geographically more distant firms located in Gothenburg and Stockholm. Also using the opening of the Danish-Swedish bridge, but focusing on other outcomes, Achten et al. (2019) analyse the impact on regional GDP per capita levels in Southern Sweden, and finds a positive effect. Lastly, Volpe Martincus et al. (2014) use a temporary closing of the San Martín International Bridge between Argentina and Uruguay as an exogenous variation in transport costs between these two countries, and show that this has a negative effect on firm-level exports.[7]

This paper contributes to the literature on transport infrastructure and international trade by focusing on the quasi-natural experiment of The Øresund Bridge. Contrary to Åkerman, 2009 and Arnarson, 2015, who also study the trade effects of this same fixed link, this paper uses aggregate bilateral as well as product-level trade flows obtained from UN Comtrade. This data has the advantage of providing internationally comparable trade flows, allowing us to use trade flows between other countries as comparison units. Since firm-level exports are country-specific (the collection of which is likely subject to methodological differences), the researcher is restricted to analysing trade in only one direction, and the use of comparison units is restricted to domestic regions. Åkerman's (2009) and Arnarson's (2015) approach requires the assumption that regions in Sweden (or Denmark) that are further from the Bridge have either not benefited from the fixed link or, at best, that such benefits are very small. In our judgement, this assumption probably does not apply in this instance, and it is likely that areas further afield have benefited significantly from the Bridge. Using Danish or Swedish regions as counterfactuals may therefore underestimate the actual effect of the Bridge. Our results are highly policy-relevant given the number of international fixed links that are currently in construction or have been proposed.

The rest of the paper is organised as follows. We begin by describing the Danish-Swedish border and the Bridge (Section 2), followed by a thorough presentation of our methodology and results using our SCM in 3. In Section 4 we present our results using a standard difference-in-differences estimator and in Section 5 we study the long-term effects of the Bridge as well as a product-level analysis. Section 6 concludes.

2 The Danish-Swedish border and the Bridge

Eastern Denmark and Southern Sweden are divided by a narrow straight called the *Sound* (Öresund in Swedish, and Øresund in Danish), which forms a maritime corridor between the Kattegat Strait and the Baltic Sea. In Figure 1, we have illustrated the location of the Sound and its economic region (The Øresund region) in a European map. Prior to the opening of the Bridge (Øresundsbroen in Danish; Öresundsbron in Swedish; The Øresund Bridge internationally), a variety of ferries and hydrofoil services transported people and goods between the countries.[8] We have illustrated the pre-Bridge ferry routes in panel (a) of Figure 2 in a map of the local region. The region itself is one of the most economically and strategically significant areas of the Nordic countries, and was so even prior to the opening of the Bridge. It includes Copenhagen, the capital and largest city of Denmark and Malmö, Sweden's third largest city.

The decision to build the Bridge was formally taken in 1991 and construction began in 1995. It opened for rail and road transport in July 2000 (see panel (b) of Figure 2 for its location in the Øresund region).

[7] A slightly related paper is Blankespoor et al. (2018), who shows that the construction of a domestic bridge in Bangladesh led to increased technology adoption and re-allocation of land from low-value to high-value crops.

[8] See Knowles (2006) for an excellent overview of the ferry routes.

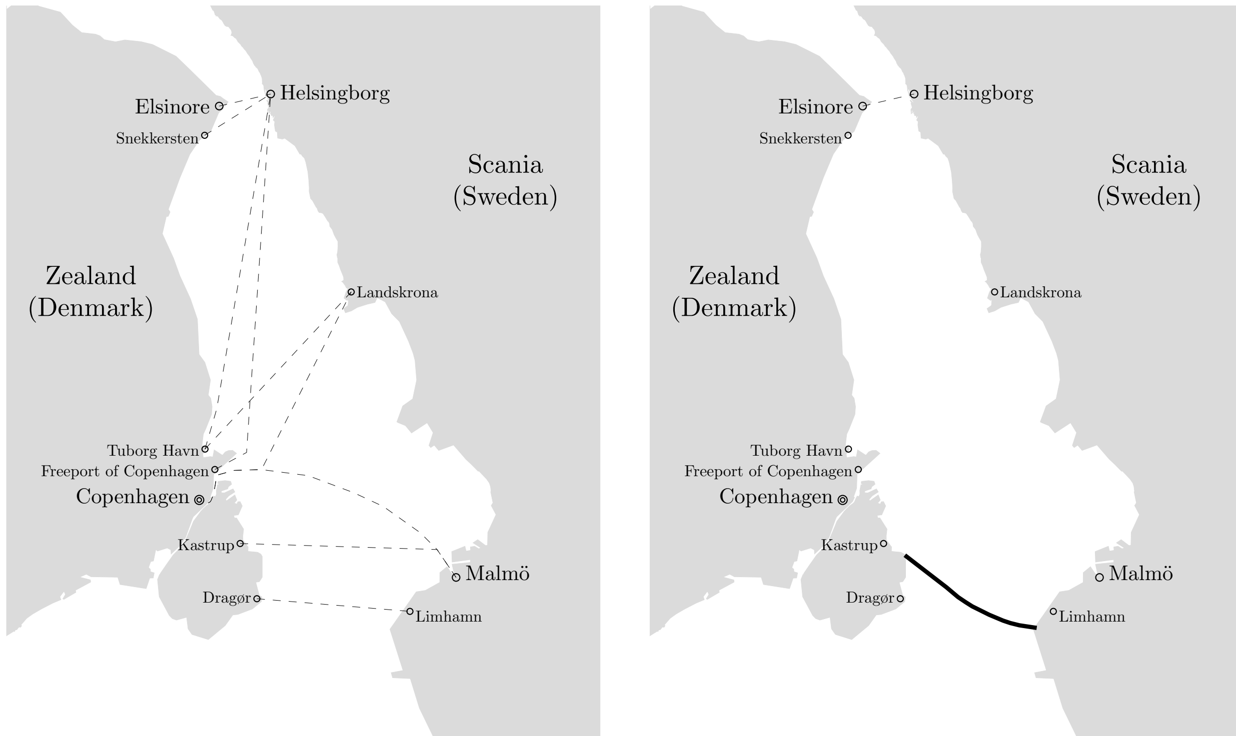
Figure 1. The location of the bridge in a map of Europe.

The entire fixed link is composed of a rail and road tunnel, and a rail and road bridge joined by an artificial island. The Bridge has become highly significant not only to the Øresund region but to Denmark and Sweden as a whole. It also gained international prominence following the release of the Danish-Swedish Nordic noir crime series of the same name, which featured a Swedish detective and her Danish counterpart investigating a murder after a body had been discovered on the Bridge. The Bridge has created a dynamic and integrated labour market with 1.3 million residents being able to commute to work on the other side of the Sound within one hour. Moreover, residents on the Danish side are able to take advantage of cheaper house prices in Southern Sweden. Due to concerns over future congestion and bottlenecks on the Bridge, plans are being considered for a metro line[9] linking Copenhagen and Malmö through a tunnel, and a second bridge between Elsinore and Helsingborg.

The Bridge has arguably reduced trade costs between Denmark and Sweden. For example, the travel

[9]This would be the world's first international metropolitan line.

Figure 2. Main pre- and post-bridge ferry routes between Denmark and Sweden in the Sound.



(a) Pre-Bridge (b) Post-Bridge

time by road for a round trip between Stockholm, Sweden's capital, and Copenhagen is reduced by two hours (from roughly 16 to 14 hours[10]), and, unlike the ferries, the Bridge enables continuous 24-hour access. After the opening of the Bridge, only three ferry routes remained[11], which were typically promoted as cheaper alternatives to the Bridge. In fact, few journeys from a location in one country to a location in the other can be completed faster by ferry, unless the origin and destination of the journey are the respective ferry ports.

Data cited in Knowles (2006) suggest that the Bridge has significantly diverted Heavy Goods Vehicles (HGV) transport from most ferry routes. Freight trains, which had previously been ferried across the Sound by dedicated train-carrying ferries, were diverted entirely to the Bridge after its inauguration. However, some routes have been able to compete on price, and as ferries offer meal breaks and rests, they enable drivers to comply with regulations on rest breaks. For instance, the initial drop in HGV traffic between 2001-2003 on the Elsinore-Helsingborg ferry route was relatively modest, although the number of monthly ferry departures has since declined considerably. The Bridge has increased capacity for transport of goods and people[12], benefiting Danish and Swedish exporters and importers in the Øresund region and further afield. While the Elsinore-Helsingborg ferry route remains popular for long-haul road trips, as the time saving is relatively less, ferry users still benefit from the Bridge as local traffic is absorbed thus freeing up capacity on the ferry.

While the Bridge has offered many benefits locally, especially in terms of a more integrated labour market, the benefits in terms of trade are unlikely to be restricted to the Øresund region. Firms located further afield are likely to benefit from increased capacity for road and rail transport, continuous access, reduced waiting-

[10] This is based on the authors' estimation using Google data.

[11] This excludes the Rønne-Ystad route from the Danish island Bornholm to mainland Sweden because it is usually used for Danish citizens to travel to mainland Denmark.

[12] To the authors' knowledge, freight is not subject to capacity constraints on the Bridge.

and transit times and so on. After the opening of the Bridge, the bilateral trade costs between Denmark and Sweden have declined considerably more than most other bilateral trading pairs in Europe. In Figure 3, we present data from the ESCAP-World Bank database on trade costs. The bilateral trade costs are inferred from standard gravity modelling and capture the ratio of intra-national trade costs to international trade costs. We compute the percentage change of average bilateral trade costs between countries i and j in a five-year pre-Bridge period (1995-1999) and a five-year post-Bridge period (2002-2006) as:

$$\Delta\text{TC}_{ij} = \left(\frac{\frac{1}{5}\sum_{t=2002}^{2006} \text{TC}_{ijt} - \frac{1}{5}\sum_{t=1995}^{1999} \text{TC}_{ijt}}{\frac{1}{5}\sum_{t=1995}^{1999} \text{TC}_{ijt}} \right) \times 100.$$

Our sample of countries, which will be described in more detail in the next section, consists of 18 European countries (EU15, Norway, Switzerland and Iceland; see Table A8) establishing 136[13] bilateral trading pairs (ignoring direction). We can compute the percentage change in the trade-weighted average trade cost of country i against all countries in the sample as:

$$\Delta\overline{\text{TC}}_{i-ALL} \equiv \sum_{j=1}^{16} \Delta\text{TC}_{ij} = \sum_{j=1}^{16} \left(\frac{\frac{1}{5}\sum_{t=2002}^{2006} \omega_{ijt}\text{TC}_{ijt} - \frac{1}{5}\sum_{t=1995}^{1999} \omega_{ijt}\text{TC}_{ijt}}{\frac{1}{5}\sum_{t=1995}^{1999} \omega_{ijt}\text{TC}_{ijt}} \right) \times 100,$$

where ω_{ijt} is country j's share of imports from country i at time t. We obtain a measure of the change in average trade costs in the full sample by averaging over all i as:

$$\Delta\overline{\text{TC}}_{ALL-ALL} \equiv \frac{1}{17}\sum_{i=1}^{17} \Delta\overline{\text{TC}}_{i-ALL}$$

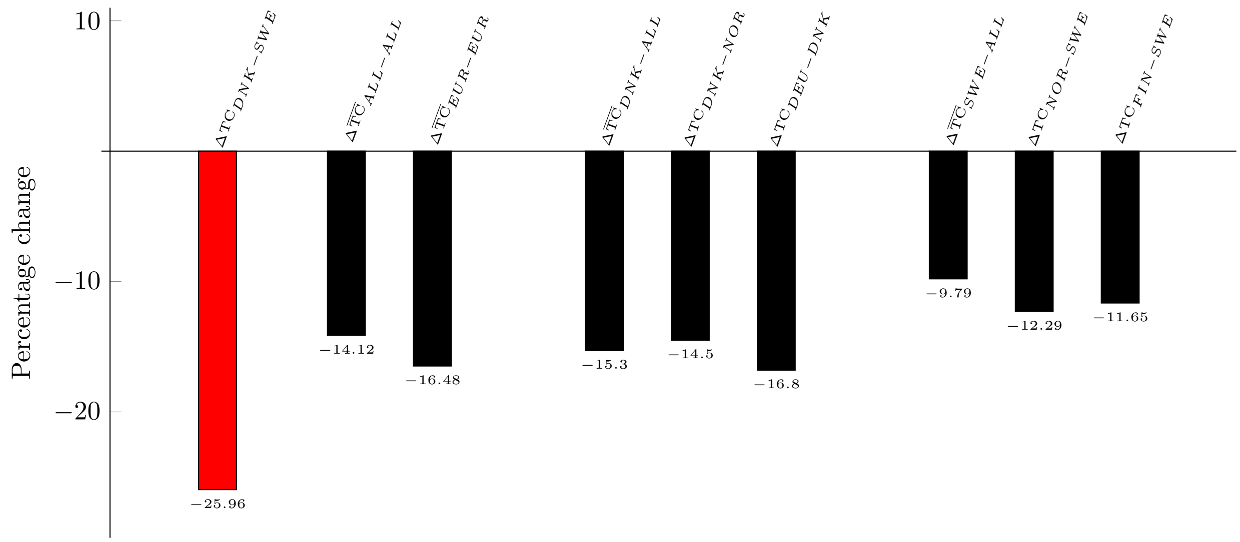
We can compute a similar average for subsets of the full sample, such as the eurozone, $\Delta\overline{\text{TC}}_{EUR-EUR}$. From inspection of Figure 3, we note that average bilateral trade costs have declined substantially for the full sample, $\Delta\overline{\text{TC}}_{ALL-ALL}$, by about 14%, with the decline being slightly larger for the eurozone subset, $\Delta\overline{\text{TC}}_{EUR-EUR}$, at 16.5%. The bilateral trade costs between Denmark and Sweden have declined considerably more, by as much as 26%. In Figure 3 we also report the percentage decrease in trade costs averaged over all trading partners for, respectively, Denmark and Sweden, $\Delta\overline{\text{TC}}_{DNK-ALL}$ and $\Delta\overline{\text{TC}}_{SWE-ALL}$. The decline in Danish trade costs is greater at around 15% compared with Sweden's 9.8%. We also provide data for some of Denmark's and Sweden's other close trading partners, such as Norway and Germany for Denmark, and Norway and Finland for Sweden. However, the reduction in bilateral trade costs between Denmark and Sweden clearly stands out for period post-Bridge.

3 Synthetic Control Method

In order to estimate the value of bilateral trade flows between Denmark and Sweden which was created as an outcome of the establishment of the Bridge, we use the SCM, which offers a number of methodological advantages over alternative estimation strategies. First, it does not rely on the parallel trends assumption. Second, it is more disciplined with respect to the selection of comparison units, and lastly, it is not sensitive to functional form issues (Huntington-Klein, 2021). In this section, we describe this methodology in detail and present our results. In Section 4, we supplement our analysis with a standard DiD estimator.

[13] Since Belgium and Luxembourg are treated as one unit due to data availability.

Figure 3. Percentage difference in trade costs (TC) between 2002-2006 and 1995-1999.



3.1 Data and methodology

The SCM, which we have adapted from Abadie and Gardeazabal (2003), Abadie et al. (2010) and Abadie et al. (2015), is commonplace in the literature on comparative case studies. It allows us to construct synthetic trade flows between Denmark and Sweden, that is, the trade flows that would have occurred in the event the Bridge had not been built. The difference between actual and synthetic trade flows is used to determine the trade effects of the Bridge, or simply the 'Bridge effect'.

To create our synthetic trade flows, we use a sample of trade data for a number of European countries. Specifically, our sample consists of Denmark and Sweden, the remaining countries in EU15[14], as well as three EFTA[15] countries (Norway, Switzerland and Iceland), observed over our sample period, 1980-2008. As Belgium and Luxembourg did not report separate trade data for our full sample period, we treat Belgium-Luxembourg as one unit. This leaves us with 17 countries, and a set X containing 136 bilateral country pairs (ignoring the direction of trade). Of these 136 pairs, the subset X^{NT} comprises 105 bilateral pairs that do not contain Denmark and/or Sweden and this set will therefore serve as our "donor pool", that is, our stock of potential comparison units. Since the timing of the adoption of the European common currency, the euro, roughly corresponds with the opening of the Bridge, we exclude bilateral pairs in which both countries use the euro in our SCM. The motivation for this is that the euro is likely to have generated positive effects upon trade, thus inflating comparison units trading in this currency. In our difference-in-differences estimator, in which we are able to explicitly control for euro adoption, we show that our results are robust even after the inclusion of bilateral pairs using the euro. Omitting euro-pairs from our donor pool reduces the number of comparison units from 105 to 50.

The Bridge was inaugurated in July 2000, so we define our treatment period as 2001-2008. The post-2008 period was characterised by significant volatility in the trade flows of all bilateral country pairs in our sample due to the financial crisis. There is evidence that international trade is more volatile than domestic production during recessions (see for example Novy and Taylor, 2020). The weights chosen by our synthetic

[14]During the sample period, the EU15 comprises the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

[15]EFTA is the European Free Trade Association between Norway, Switzerland, Iceland and Liechtenstein

algorithm may not be able to simultaneously model the long-run exponential trade growth of bilateral trade and the large and potentially country-pair specific shocks produced by the financial crisis and its aftermath. For this reason, we restrict our baseline post-Bridge period to the years before the onset of the financial crisis. However, we also allow for analysis of the longer term effects of the Bridge by extending our post-treatment period by an additional seven years, 2009-2015, in Section 5.1.

Let $\text{BTF}^N_{DNK-SWE,t}$ be the average bilateral trade flow (that is, the average of the two-way export flow) between Denmark and Sweden which would be observed at time t in the absence of the Bridge, and $\text{BTF}^I_{DNK-SWE,t}$ the actual recorded average bilateral trade flow at time t after the Bridge was built.[16] Using this notation we can identify, from a theoretical perspective, the gain or loss (in percentage terms) to bilateral trade as a result of constructing the Bridge between Denmark and Sweden as:

$$\alpha_{DNK-SWE,2001-2008} = \frac{\sum_{t=2001}^{2008} \left(\text{BTF}^I_{DNK-SWE,t} - \text{BTF}^N_{DNK-SWE,t}\right)}{\sum_{t=2001}^{2008} \text{BTF}^N_{DNK-SWE,t}}. \tag{1}$$

It is assumed that the Bridge does not affect bilateral trade flows between Denmark and Sweden prior to its dedication in mid-2000 such that:

$$\alpha_{DNK-SWE,1980-2000} = \frac{\sum_{t=1980}^{2000} \left(\text{BTF}^I_{DNK-SWE,t} - \text{BTF}^N_{DNK-SWE,t}\right)}{\sum_{t=1980}^{2000} \text{BTF}^N_{DNK-SWE,t}} = 0.$$

In practice, however, it is possible that the treatment might have impacted bilateral trade flows prior to 2001 through various channels, such as the announcement of the construction of the Bridge. We shall examine anticipation effects in more detail below using placebo-in-time analysis. To construct a credible counterfactual of what trade between Denmark and Sweden would have been without the Bridge, we use the donor pool of comparison units. The logic behind the SCM is to choose weights so that a weighted combination of comparison units produces as close a fit as possible to the actual outcome for the case of interest prior to the treatment. We index the counterfactual bilateral country pairs in our donor pool $i = 1, ..., n$ such that $X^{NT}_t = \{\text{BTF}_{1,t}, ..., \text{BTF}_{n,t}\}$. An estimate of $\alpha_{DNK-SWE,2001-2008}$ in (1) can now be constructed as:

$$\hat{\alpha}_{DNK-SWE,2001-2008} = \frac{\sum_{t=2001}^{2008} \left(\text{BTF}^I_{DNK-SWE,t} - \sum_{i=1}^{n} w_i \text{BTF}_{i,t}\right)}{\sum_{t=2001}^{2008} \sum_{i=1}^{n} w_i \text{BTF}_{i,t}}. \tag{2}$$

where $\sum_{i=1}^{n} w_i \text{BTF}_{i,t}$ is our post-treatment synthetic average bilateral trade flow between Denmark and Sweden, that is, a weighted combination of bilateral country pairs in our donor pool. The parameter w_i is the weight associated with the ith counterfactual unit in X^{NT}, such that $\sum_{i=1}^{n} w_i = 1$. As is standard in literature on SCM we select the vector $\mathbf{W}^*$ of weights which minimises,

$$\arg\min \sqrt{(\mathbf{Y}_{DNK-SWE} - \mathbf{YW})'\mathbf{V}(\mathbf{Y}_{DNK-SWE} - \mathbf{YW})}, \tag{3}$$

where $\mathbf{Y}_{DNK-SWE}$ is a vector of pre-Bridge characteristics, or predictors, of our treated unit, and $\mathbf{Y}$ is a matrix of pre-Bridge characteristics of our potential comparison units that are assumed not to be affected by

[16] In the SCM analysis, we use the average of two-way bilateral exports, rather than uni-directional exports. Our concern is that the opening of the Bridge coincided with a depreciation of the Swedish krona, and that we are unable to isolate the effect on trade due the depreciation from that due to the Bridge. Since the corresponding appreciation of the Danish krone might have produced effects to counter this, using average trade flows will likely level out any trade effects running through exchange rates. However, in our subsequent DiD analysis, we control for exchange rate movements using time-varying exporter- and importer fixed effects, thus allowing analysis of the Bridge's effects on trade flows in both directions.

the treatment.

The SCM exercise is performed using four pre-Bridge characteristics that are motivated by the gravity model of trade. In particular, we use the log of the product of each country's GDP in every bilateral pair at time t; the weighted distance (in logs) between each country; a dummy variable equal to unity for adjacency (or sharing a land border); and a dummy equal to unity if both countries are members of the EU. We obtain these variables from Centre d'Études Prospectives et d'Informations Internationales (CEPII), and we have extracted the bilateral trade flows from the UN Comtrade database. In addition to these four pre-Bridge characteristics, we also include pre-treatment lags of the outcome variable, which is common practice in the literature. As argued in Abadie et al. (2010) and Abadie et al. (2015), if the pre-treatment matching window is large enough, matching on pre-intervention outcomes helps to control for unobserved factors and for the heterogeneity of observed and unobserved factors. This is because "only units that are alike in both observed and unobserved determinants of the outcome variable as well as in the effect of those determinants on the outcome variable should produce similar trajectories of the outcome variable over extended periods of time" (Abadie et al., 2015). As long as the treatment unit as well as the synthetic control can be established to display very similar trajectories prior to the intervention, any discrepancy which occurs after the treatment can be interpreted as the effect of the treatment upon the outcome variable.

We find that including all lags of the outcome variable as characteristics in our SCM produces the best pre-treatment fit. However, Kaul et al. (2015) show that this approach comes with the caveat that it eliminates the predictive power of the other characteristics. They argue further that if the other characteristics are important in terms of predicting the post-treatment outcome, omitting them can bias the synthetic model. We therefore follow the recommendation in Ferman et al. (2016) and employ different sets of lags, reporting the results from all of them. Hence, in addition to reporting a synthetic model that includes all lags, we report a version of our model with three years of outcome lags – 1980, 1990 and 2000 – an approach which closely mirrors that of Abadie et al. (2010). The term $\mathbf{V}$ is a diagonal and positive definite matrix containing the non-negative weights measuring the importance of each pre-Bridge characteristic. $\mathbf{V}$ is chosen such that the mean squared prediction error of the outcome variable is minimised for the pre-treatment periods.

Within the standard application of the SCM, the use of inferential techniques is limited since probabilistic sampling is not employed to select the comparison units. As such, we only obtain one estimate of $\mathbf{W}^*$. In this paper, therefore, we will use an alternative approach to assess the statistical significance based on the subsampling procedure in Politis and Romano (1994) – a technique which was first proposed as an application to the SCM in Saia (2017). We construct $j = 1, ..., m$ subsamples of X^{NT}, where for each subsample we randomly exclude a fraction z of the comparison units. For each subsample j we run a synthetic control as described above,

$$\alpha_{DNK-SWE,j,2001-2008} = \frac{\sum_{t=2001}^{2008} \left(\text{BTF}^{I}_{DNK-SWE,t} - \sum_{i=1}^{n} w_{i,j}\text{BTF}_{i,j,t}\right)}{\sum_{t=2001}^{2008} \sum_{i=1}^{n} w_{i,j}\text{BTF}_{i,j,t}}. \quad (4)$$

Then we compute the average,

$$\overline{\alpha}_{DNK-SWE,2001-2008} = \frac{1}{m}\sum_{j=1}^{m}\left[\frac{\sum_{t=2001}^{2008} \left(\text{BTF}^{I}_{DNK-SWE,t} - \sum_{i=1}^{n} w_{i,j}\text{BTF}_{i,j,t}\right)}{\sum_{t=2001}^{2008} \sum_{i=1}^{n} w_{i,j}\text{BTF}_{i,j,t}}\right], \quad (5)$$

and standard deviation,

$$\sigma_{DNK-SWE,2001-2008} = \sqrt{\frac{1}{m-1}\sum_{j=1}^{m}\left(\alpha_{DNK-SWE,j,2001-2008} - \overline{\alpha}_{DNK-SWE,2001-2008}\right)^2}. \tag{6}$$

Following Saia (2017), we arbitrarily set $z = \frac{1}{6}$ and $m = 500$.[17] We also construct synthetic counterfactuals for the remaining bilateral trading pairs involving Denmark and Sweden in the set X^T. We index the bilateral pairs in X^T as $k = 1, .., l$ and construct a synthetic model for each k. In obtaining each synthetic model k, we use the same comparison units in the set X^{NT} that we used when constructing the Danish-Swedish synthetic model. Suppose the first 15 bilateral pairs in X^T are country pairs involving Denmark, the 16th pair is the Danish-Swedish bilateral pair and the pairs $k = 17, ..., 31$ are pairs involving Sweden. We compute the effect (if any) on aggregate trade following the completion of the Bridge for Sweden,

$$\overline{A}_{SWE,2001-2008} = \frac{1}{m}\sum_{j=1}^{m}\left[\frac{\sum_{t=2001}^{2008}\left(\sum_{k=16}^{31}\text{BTF}_{k,t}^{I} - \sum_{k=16}^{31}\sum_{i=1}^{n} w_{i,k,j}\text{BTF}_{i,j,t}\right)}{\sum_{t=2001}^{2008}\sum_{k=16}^{31}\sum_{i=1}^{n} w_{i,k,j}\text{BTF}_{i,j,t}}\right], \tag{7}$$

and, for Denmark,

$$\overline{A}_{DNK,2001-2008} = \frac{1}{m}\sum_{j=1}^{m}\left[\frac{\sum_{t=2001}^{2008}\left(\sum_{k=1}^{16}\text{BTF}_{k,t}^{I} - \sum_{k=1}^{16}\sum_{i=1}^{n} w_{i,k,j}\text{BTF}_{i,j,t}\right)}{\sum_{t=2001}^{2008}\sum_{k=1}^{16}\sum_{i=1}^{n} w_{i,k,j}\text{BTF}_{i,j,t}}\right]. \tag{8}$$

We measure the fit of our synthetic model over a specific time period as the average Root Mean Square Prediction Error (RMSPE), or the lack of fit between the outcome variable and its synthetic counterpart over the period $t = 1, .., T$ as:

$$\text{RMSPE} = \frac{1}{m}\sum_{j=1}^{m}\left(\frac{1}{T}\sum_{t=1}^{T}\left(\text{BTF}_{k,t}^{I} - \sum_{i=1}^{n} w_{i,j}\text{BTF}_{i,j,t}\right)^2\right)^{\frac{1}{2}}. \tag{9}$$

One particularly useful statistical measure is the ratio of post-treatment RMSPE to pre-treatment RMSPE. If the intervention occurs in period T_0, this allows us to express this ratio mathematically as,

$$\text{Post-RMSPE/Pre-RMSPE} = \frac{1}{m}\sum_{j=1}^{m}\left(\frac{\frac{1}{T-T_0}\sum_{t=T_0}^{T}\left(\text{BTF}_{k,t}^{I} - \sum_{i=1}^{n} w_{i,j}\text{BTF}_{i,j,t}\right)^2}{\frac{1}{T_0-1}\sum_{t=1}^{T_0-1}\left(\text{BTF}_{k,t}^{I} - \sum_{i=1}^{n} w_{i,j}\text{BTF}_{i,j,t}\right)^2}\right)^{\frac{1}{2}}. \tag{10}$$

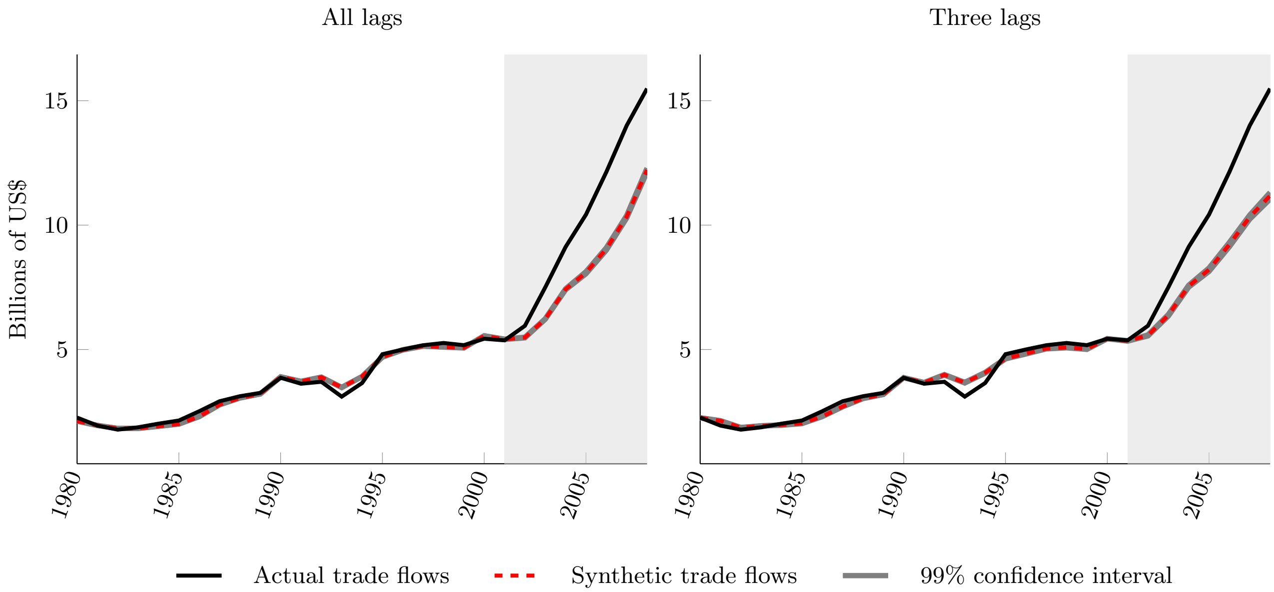
A large post-intervention RMSPE is not indicative of a large effect if the pre-treatment fit is poor, i.e. if the synthetic control does not closely reproduce the outcome of interest prior to intervention. We shall employ this ratio when comparing our synthetic models and in our placebo studies below.

[17] Alternative values of z and m tend to affect standard errors rather than the point estimates for the Bridge effect. For example, increasing z or reducing m will produce larger standard errors but does not affect our point estimates for our Bridge effect by very much.

3.2 Results

Figure 4 plots the evolution of the actual bilateral trade flows between Denmark and Sweden (solid line) and the synthetic counterfactual (dashed line) over the period 1980-2008.[18]. The dark gray area is the 99% confidence interval, and we indicate the post-Bridge period as the light gray area in the two panels in the figure. In addition to the gravity-inspired predictors described above, in the left panel we employ all outcome lags as predictors whereas in the right panel we use three lags – 1980, 1990 and 2000.

Figure 4. Average actual and synthetic bilateral trade flows between Denmark and Sweden.



At this point, we make two remarks. First, from inspection of Figure 4, we note that the pre-Bridge synthetic trade flows provide a good approximation of the actual flows regardless of the choice of lags. This is an essential pre-condition for the SCM to provide reliable post-treatment effects. Second, in sharp contrast to the pre-treatment period, actual trade flows outperform their synthetic counterparts from 2001 onwards, coinciding with the opening of the Bridge. As illustrated in Figure 4, this overperformance is substantial, with actual trade flows lying well outside the 99% confidence interval of the synthetic trade flows. Remembering that the synthetic trade flow should be interpreted as the flow that would have occurred if the Bridge had not been built, this suggests that the opening of the Bridge did indeed cause bilateral trade flows to increase.

In Table 1 we report the percentage difference between actual and synthetic bilateral trade over different periods. Consistent with Figure 4, we note that during the pre-Bridge period, that is our matching window, the difference between actual and synthetic Danish-Swedish trade was very small in both models. In the all-lags model, the difference between actual trade and our estimate of synthetic trade is just under 0.3%, whereas the equivalent figure for the three-lags model is just over -0.1%. By contrast, for the post-treatment period 2001-2008, actual trade flows overperform synthetic trade flows by 24.6% in our all-lags model. Using our alternative model with only three lags, we find a marginally larger effect of 25.5%.

A visual inspection of Figure 4, shows that the gap between actual and synthetic trade flows widens over time, suggesting a gradual Bridge effect rather than an instantaneous one. In Table 1, we report estimates

[18]We remind the reader that the dashed line in Figure 4 is the average of 500 synthetic models, as described in Subsection 3.1.

of the post-Bridge effect for three separate post-bridge subperiods – 2001-2002, 2003-2004 and 2005-2008. The results for the three subperiods indicate that the positive trade-creating effect of the bridge was indeed subject to a slow start. The percentage difference between actual and synthetic trade was, respectively, nearly 4% in both models, with the effect being only marginally smaller in the three-lags model. The subsequent subperiods indicate much larger Bridge effects of, respectively, nearly 22% and around 19%, for the all-lags and three-lags models. The Bridge effect is over 30% for both models in the last subperiod, 2005-2008. Thus, there is support in the data for a relatively modest initial Bridge effect, with a more sizable effect taking a few more years to fully materialise.

Table 1. Percentage difference between actual and synthetic Danish-Swedish bilateral trade and measures of fit.

		2001-2008			
	1980-2000	2001-2008	2001-2002	2003-2004	2005-2008
Diff. actual vs synth. (%, all lags)	0.288 (0.009)	24.563 (0.192)	3.943 (0.068)	21.794 (0.102)	31.177 (0.281)
RMSPE (all lags)	0.149 (0.000)	2.348 (0.014)	0.339 (0.003)	1.503 (0.006)	3.136 (0.020)
Post-RMSPE/Pre-RMSPE (all lags)		15.774 (0.078)	2.285 (0.022)	10.117 (0.035)	21.062 (0.109)
Diff. actual vs synth. (%, three lags)	-0.086 (0.044)	25.459 (0.305)	3.761 (0.109)	19.418 (0.249)	33.701 (0.432)
RMSPE (three lags)	0.216 (0.001)	2.503 (0.024)	0.277 (0.006)	1.373 (0.013)	3.385 (0.035)
Post-RMSPE/Pre-RMSPE (three lags)		11.632 (0.111)	1.266 (0.022)	6.339 (0.052)	15.748 (0.163)

Notes: For each of our models, the table reports the percentage difference between actual and synthetic trade for different time periods between 1980-2008, the RMSPE for each period as defined in (9), and the ratio of post-treatment RMSPE to pre-treatment RMSPE as defined in (10) for each of the post-treatment periods. Standard errors of the mean in parentheses.

As a measure of goodness-of-fit, in Table 1 we report the average value of RMSPE as defined in (9) for both the all-lags model and the three lags model. We take the average of the RMSPE of each model $j = 1, .., 500$, and compute the corresponding standard errors, which are also reported in reported in Table 1. The average RMSPE for the pre-treatment period is roughly 0.15 for the all-lags model and roughly 0.22 for the three-lags model. This indicates that the average pre-treatment fit of the all-lags model is slightly better than the three-lags model. Inspection of Figure 4 supports this finding. In Table 1, we further report the average ratio of post-RMSPE to pre-RMSPE as defined in (10). While the result of the all-lags model indicates a slightly smaller post-Bridge trade effect, its average pre-treatment fit is better. For this reason, the average ratio of the post-treatment RMSPE to pre-treatment RMSPE is higher for the all-lags model with a value of nearly 16 compared to a value of just under 12 for the three-lags model. The better pre-treatment fit of our all-lags model suggests that we may have greater confidence in the post-treatment effect. In light of this, the all-lags model is our preferred model on this occasion, however, a full analysis of the relative merits of the choice of lag structure in SCM is beyond the scope of the present paper.

We report the matrix of average non-negative weights of the pre-Bridge characteristics, $\mathbf{V}$, in Table A1 in the Appendix. We note that the weights our synthetic algorithm attaches to the gravity-inspired predictors – $\ln \text{GDP}_i \times \text{GDP}_j$, Land Border, $\ln \text{Distance}_{ij}$ and EU - are very small, and the algorithm attaches larger average weights to the outcome lags in both models. The fact that the weights attached to the outcome lags are larger than the theory-motivated predictors is not uncommon in the literature on SCM.

3.3 Robustness analysis

In this subsection, we will subject our baseline SCM to a number of standard sensitivity tests for robustness. We will begin by examining whether Danish and Swedish trade, respectively, have undergone structural change which is not unique to the Danish-Swedish bilateral trading relationship. We will then move on to analyse placebo effects, which are common within the application of SCM.

3.3.1 Structural change

A potential concern about our results obtained thus far is that the positive effect upon trade we have identified for Danish-Swedish trade represents a structural change which is not unique to this bilateral pair, but has affected Denmark's and Sweden's trade with all countries. In Figure 5 we sum up all 16 synthetic bilateral trade flows of, respectively, Sweden (left panel) and Denmark (right panel), according to (7) and (8). Similar to the Danish-Swedish synthetic model, we run an all-lags model and a three-lags model, respectively, for aggregate Swedish trade (in panel a) and aggregate Danish trade (in panel b).

Inspection of Figure 5 shows that as in the main analysis, there is a reasonably close fit between actual and synthetic trade flows in the pre-Bridge period for, respectively, Sweden and Denmark, for both models.[19] However, unlike in the main analysis, this close fit continues in the post-Bridge period, suggesting that the Bridge effect is only present for trade between Sweden and Denmark.

In Table 2 and Table 3 we report the corresponding percentage effects of aggregate Danish and Swedish trade over different periods of time. The numbers confirm that in percentage terms, neither actual aggregate Swedish nor aggregate Danish trade deviate very much from their synthetic counterfactuals in the pre-Bridge period. Aggregate Swedish trade exceeds synthetic trade by about 0.3% in the all-lags model, and falls short by -1.5% in the three-lags model. Danish aggregate trade is slightly larger than its synthetic counterpart in both models in the pre-Bridge period. We note further that in the case of Sweden in the post-Bridge period, 2001-2008, actual trade underperformed synthetic trade by, respectively, 3.8 and 4.6%, in the three-lags and all-lags models, wherea the reverse is true for Denmark, with an overperformance of 1.3% in the all-lags model and around 6.5% in the three-lags model. Looking at the post-Bridge subperiods, the underperformance of aggregate Swedish trade is greater in the immediate post-bridge years at close to 10%. Regarding model fit, we also note that the pre-treatment fit of our synthetic models as measured by the average RMSPE is poorer for our Swedish models. We note further that the pre-treatment fit, as measured by RMSPE, is better for the all-lags model, and we can therefore attach greater confidence to the results of this model. As the all-lags model shows an underperformance of around 4% for Sweden, and an overperformance of just over 1% for Denmark in the post-Bridge period, we believe we are justified in our conclusion that the evidence of a structural change for the trade of Denmark and Sweden is weak.

In Tables A2 and A3, we produce Sweden's and Denmark's trade performance (the difference between actual and synthetic trade) with individual countries in percentage terms. We refer the reader to Table A8 in the Appendix for the list of countries in our dataset and their respective ISO 3166-1 alpha 3 codes. The corresponding evolution of the two countries' actual and synthetic trade flows against all bilateral pairs are produced graphically for Sweden (Figure A1 for the all-lags model and Figure A2 for the three-lags model) and Denmark (Figure A3 for the all-lags model and Figure A4 for the three-lags model) in the Appendix. We note from Table A2 that for the post-Bridge period, Sweden's actual trade is below the synthetic trade

[19] Although in the case of the models for Sweden in panel (a), we observe a slight underperformance of actual relative to synthetic trade in the early 1990s, as the country was recovering from a severe credit crunch. The underperformance seems more pronounced in the three-lags model.

Figure 5. Aggregate Swedish (left-panel) and Danish (right-panel) trade.

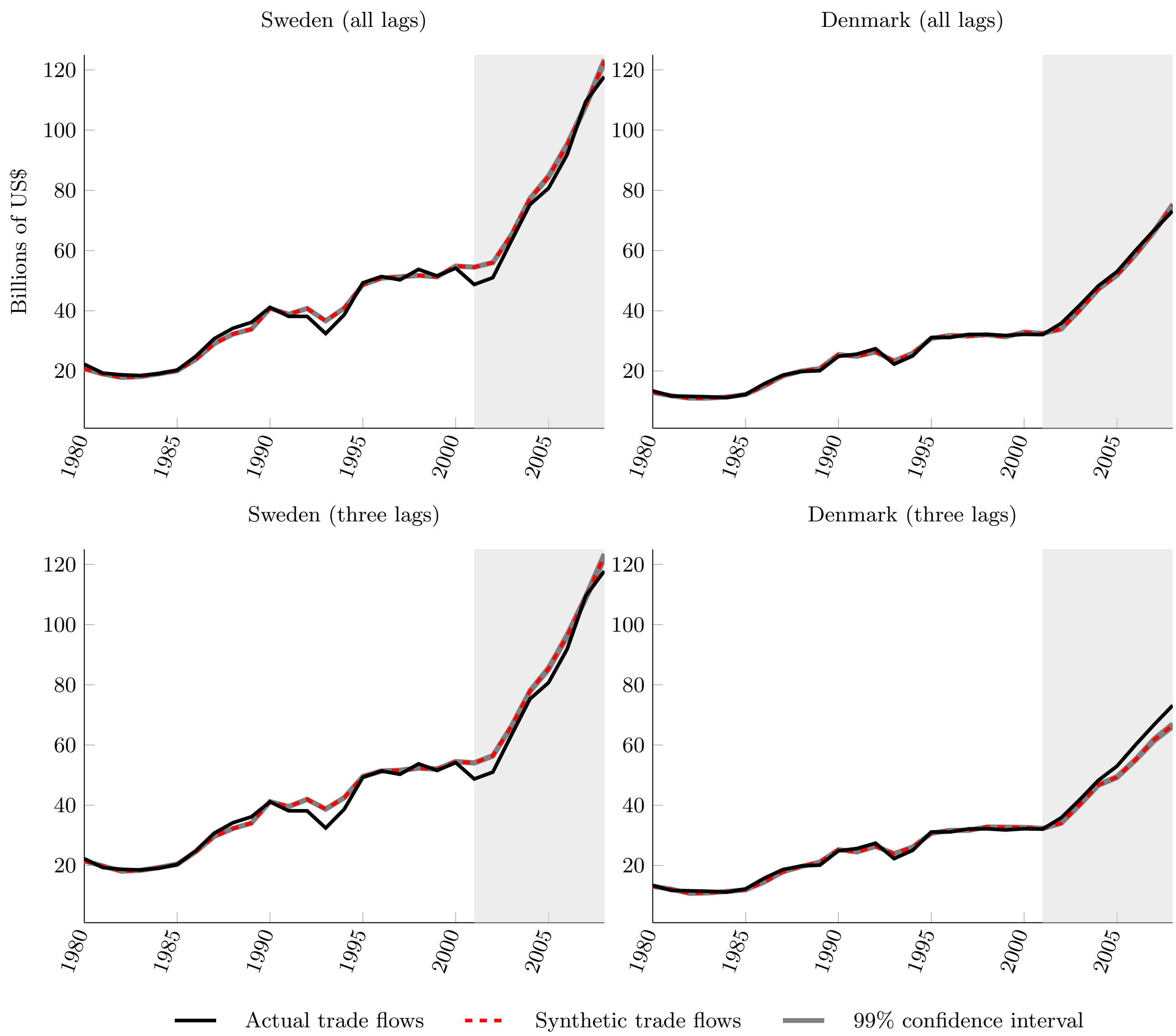


Table 2. Percentage difference between actual and synthetic aggregate Swedish trade and measures of fit.

		2001-2008			
	1980-2000	2001-2008	2001-2002	2003-2004	2005-2008
Diff. actual vs synth. (%, all lags)	0.340 (0.006)	-3.826 (0.107)	-9.740 (0.025)	-2.688 (0.059)	-2.629 (0.160)
RMSPE (all lags)	1.600 (0.002)	4.696 (0.031)	5.397 (0.015)	2.029 (0.035)	5.171 (0.052)
Post-RMSPE/Pre-RMSPE (all lags)		2.938 (0.020)	3.375 (0.009)	1.269 (0.022)	3.237 (0.033)
Diff. actual vs synth. (%, three lags)	-1.500 (0.048)	-4.599 (0.131)	-9.878 (0.076)	-3.993 (0.086)	-3.399 (0.195)
RMSPE (three lags)	2.090 (0.006)	5.237 (0.081)	5.376 (0.045)	2.958 (0.048)	5.729 (0.132)
Post-RMSPE/Pre-RMSPE (three lags)		2.516 (0.039)	2.589 (0.022)	1.418 (0.023)	2.751 (0.063)

Notes: For each of our models, the table reports the percentage difference between actual and synthetic trade for different time periods between 1980-2008, the RMSPE for each period as defined in (9), and the ratio of post-treatment RMSPE to pre-treatment RMSPE as defined in (10) for each of the post-treatment periods. Standard errors of the mean in parentheses.

Table 3. Percentage difference between actual and synthetic aggregate Danish trade and measures of fit.

		2001-2008			
	1980-2000	2001-2008	2001-2002	2003-2004	2005-2008
Diff. actual vs synth. (%, all lags)	0.167 (0.005)	1.262 (0.105)	2.328 (0.042)	3.115 (0.056)	0.338 (0.147)
RMSPE (all lags)	0.615 (0.002)	1.975 (0.032)	1.414 (0.009)	1.431 (0.021)	2.318 (0.051)
Post-RMSPE/Pre-RMSPE (all lags)		3.197 (0.048)	2.313 (0.016)	2.346 (0.035)	3.735 (0.078)
Diff. actual vs synth. (%, three lags)	0.024 (0.028)	6.487 (0.165)	2.361 (0.101)	3.659 (0.126)	8.722 (0.226)
RMSPE (three lags)	0.857 (0.004)	4.054 (0.080)	1.418 (0.019)	1.736 (0.045)	5.471 (0.112)
Post-RMSPE/Pre-RMSPE (three lags)		4.684 (0.081)	1.652 (0.020)	2.014 (0.049)	6.315 (0.114)

Notes: For each of our models, the table reports the percentage difference between actual and synthetic trade for different time periods between 1980-2008, the RMSPE for each period as defined in (9), and the ratio of post-treatment RMSPE to pre-treatment RMSPE as defined in (10) for each of the post-treatment periods. Standard errors of the mean in parentheses.

with the majority of its bilateral trading relationships for both the all-lags model and the three-lags model. From Table A3 we observe a similar pattern for Sweden's neighbour. Denmark has performed poorly in the majority of its bilateral trading relationships in the all-lags model, although the reverse is true for the three-lags model. Inspection of Table A3 shows that for the all-lags model, Denmark's trade performance with most countries has been relatively modest, although with Spain being an exception. On the other hand, in the three-lags model, we report a strong performance for Denmark against multiple pairs.

In Tables A4-A7 in the Appendix we report the average weights attached to the comparison units for, respectively, Denmark's and Sweden's synthetic models. The all-lags Danish-Swedish model is reported in the last column in Table A4 (and re-reported in Table A6 for convenience). The three-lags Danish-Swedish model is similarly reported in the last column of Table A5 (and re-reported in Table A7 for convenience). After inspection of these tables, we note that the all-lags model uses 18 of the 50 potential comparison units[20] to construct the synthetic counterfactual with relatively large average weights given to GBR-NOR (0.143), ISL-PRT (0.141) and NLD-NOR (0.298). The three-lags model uses 21 out of 50 potential comparison units

[20] Due to rounding to three decimals in the table, it is possible that some comparison units have been used in some of the 500 models but with the average weight being less than 0.001.

with heavy reliance on three comparison units — BLX-CHE (0.553), BLX-GBR (0.160) and IRL-ISL (0.146).

To conclude this analysis, we do not find systematic evidence of a general structural change in the aggregate trade of neither Denmark nor Sweden which coincided with the opening of the bridge. This supports the hypothesis that the overperformance of trade between Denmark and Sweden after the opening of the Bridge can be linked to a positive Bridge effect.

3.3.2 Placebo-in-time

We next examine the robustness of our results to the choice of matching window, and there are several issues that require further analysis. First, since the Bridge opened in July 2000, as a robustness check, we reassign the intervention year to 2000 rather than 2001 as in our baseline model. Second, as it was publicly known that the Bridge was under construction, it is possible that there were "anticipation effects" whereby exporters and importers on both sides of the border began to alter their behaviour in anticipation of lower trade costs in the future. We will test this hypothesis by reassigning our intervention years to, respectively, 1998 and 1999. Third, we reassign the intervention year to 1991. As this is ten years prior to the opening of the Bridge, any trade-creating effects are unlikely to have been contaminated by any anticipation effects. This pre-intervention year is essentially a 'false' intervention year. Should we obtain a positive effect upon trade in the false treatment period, there may be nothing unusual about the effect on trade in the real post-Bridge period, and we can be less confident about our results. This test is commonly referred to as a "placebo-in-time" test.

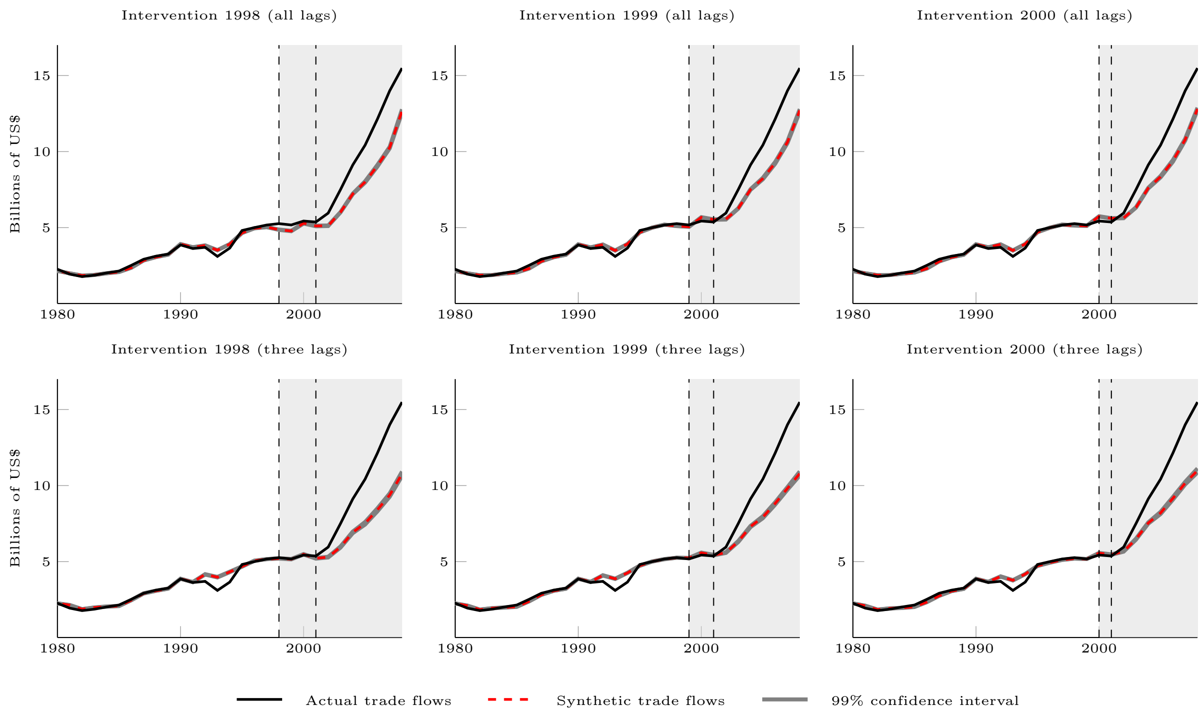
We begin by using the years 1998, 1999 and 2000 as intervention years. Formally, suppose the intervention year is x, we construct the following treatment effects,

$$\overline{\alpha}_{DNK-SWE,x-2008} = \frac{1}{m}\sum_{j=1}^{m}\left[\frac{\sum_{t=x}^{2008}\left(\mathrm{BTF}^{I}_{DNK-SWE,t} - \sum_{i=1}^{n} w_{i,j}\mathrm{BTF}_{i,j,t}\right)}{\sum_{t=x}^{2008}\sum_{i=1}^{n} w_{i,j}\mathrm{BTF}_{i,j,t}}\right], \quad x = 1998, 1999, 2000. \tag{11}$$

As the Bridge was not opened until July 2000, the years 1998, 1999 are essentially false years in which the intervention did not occur, whereas arguably the year 2000 could be a legitimate alternative to 2001 as the 'true' intervention date. Running these alternative models allows us to ascertain whether there is evidence that the Bridge effect was present in the data prior to its opening. We plot these synthetic models in Figure 6 with solid lines indicating actual trade and the synthetic models as dashed lines. The post-intervention period is indicated as the shaded area, with the area between the vertical dashed lines being the false post-treatment years. As in our baseline analysis, we construct an all-lags version and a three-lags version of these models.

We report the corresponding percentage treatment effects in Table 4. The first model reported in the table is the all-lags model with the intervention year set in 1998 (the corresponding pre-treatment period is 1980-1997). In the fifth column we report the treatment effect in the 'false years'. The first model is characterised by a small treatment effect of around 6% in the false years, however, inspection of the corresponding model in Figure 6 shows that the overperformance occurred in 1998 and 1999 whereas actual trade returned to its synthetic counterfactual in 2000 and 2001. As such, we will interpret this overperformance as a fluctuation rather than an anticipation effect of the Bridge. Looking at the remaining false treatment effects in Table 4, we note very small and mostly negative effects (with only the three-lags model with 1998 intervention year reporting a small but positive treatment). Inspection of Table 4 shows that the treatment effect in the years 2001-2008 (i.e. the 'true' Bridge effect) ranges from 20.3-34.5% and arguably reasonably close to the

Figure 6. Average actual and synthetic bilateral trade flow between Denmark and Sweden using alternative intervention years.



estimates in the baseline models above. There is strong indication that all of our models report the largest Bridge effect in the years 2005-2008 with a more modest effect in the immediate post-Bridge years (2001-2004). Moreover, similar to our baseline models reported above, we find that the all-lags models in Table 4 have better average fit with lower average pre-treatment RMSPE compared to the three-lags models. To summarise, we find that the results of the models with alternative intervention years are broadly consistent with our benchmark models, and there is not much evidence of any anticipation effects of the bridge. We also note that the exact choice of the true intervention year is not important for our overall results.

We provide a falsification test in which we reassign the intervention year to 1991. A potential caveat of running this model is that the pre-treatment matching window is considerably shorter than any of our previous models. We run an all-lags version and a three-lags version of the SCM here as well, with the all-lags model using as predictors all outcome lags between 1980-1990, and the three-lags model using outcome lags in the years 1980, 1985 and 1990. In Figure 7, we plot the synthetic models using 1991 as intervention year with the solid line indicating actual trade and the dashed line the synthetic trade. The post-intervention period is the shaded area and we have indicated the 'false' treatment period as the area between the two vertical dashed lines in the figure.

Looking first at the all-lags model, we notice a pattern that is very similar to that observed in our baseline SCM. As can be seen in panel (a) of Figure 7, there is no evidence of a false positive Bridge effect from 1991. In fact, actual trade flows underperform in the early 1990s, before returning to their synthetic counterparts in the mid-1990s.[21] It is then not until the Bridge actually opens that we begin to observe actual trade overperforming against synthetic trade. We report the corresponding percentage treatment effects in Table

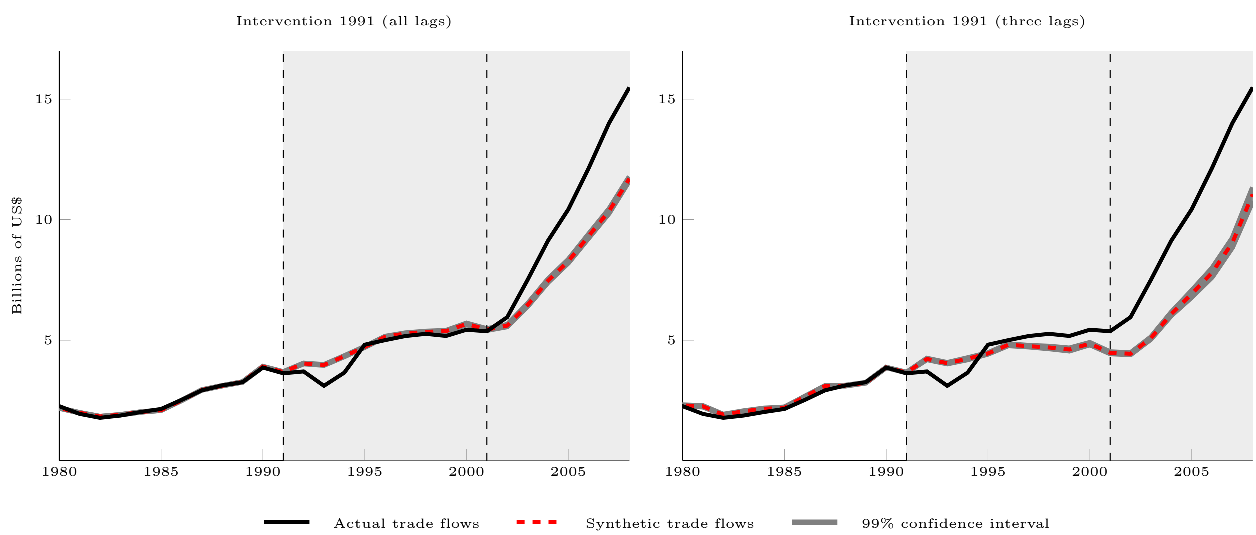
[21] The underperformance in the first half of the false treatment period is possibly the result of the early 1990s recession which was particularly severe in Sweden compared to European peer economies.

Table 4. Percentage difference between actual and synthetic Danish-Swedish trade with alternative intervention years.

				1998-2008				
Model	Pre-treatment period		Pre-treatment effect	False years	2001-2008	2001-2002	2003-2004	2005-2008
All lags	1980-1997	Diff. actual vs synth. (%)	0.766 (0.022)	6.303 (0.115)	26.024 (0.204)	10.638 (0.151)	25.664 (0.109)	30.078 (0.326)
		RMSPE	0.178 (0.001)	0.355 (0.004)	2.351 (0.016)	0.624 (0.006)	1.711 (0.006)	3.060 (0.024)
		Post-RMSPE/Pre-RMSPE		2.016 (0.023)	13.202 (0.072)	3.549 (0.038)	9.659 (0.042)	17.165 (0.104)
	1980-1998	Diff. actual vs synth. (%)	0.621 (0.020)	-1.183 (0.074)	21.846 (0.222)	2.195 (0.117)	20.755 (0.130)	27.549 (0.315)
		RMSPE	0.177 (0.000)	0.209 (0.002)	2.148 (0.017)	0.333 (0.003)	1.442 (0.008)	2.851 (0.024)
		Post-RMSPE/Pre-RMSPE		1.179 (0.013)	12.109 (0.076)	1.878 (0.017)	8.155 (0.038)	16.061 (0.107)
	1980-1999	Diff. actual vs synth. (%)	0.557 (0.020)	-5.299 (0.077)	20.314 (0.207)	0.717 (0.085)	19.393 (0.118)	25.956 (0.299)
		RMSPE	0.172 (0.000)	0.305 (0.004)	2.047 (0.017)	0.299 (0.002)	1.362 (0.007)	2.720 (0.023)
		Post-RMSPE/Pre-RMSPE		1.772 (0.025)	11.838 (0.078)	1.731 (0.012)	7.909 (0.038)	15.724 (0.109)
Three lags	1980-1997	Diff. actual vs synth. (%)	-3.208 (0.055)	0.121 (0.068)	34.499 (0.439)	7.695 (0.165)	29.026 (0.338)	44.265 (0.588)
		RMSPE	0.285 (0.002)	0.093 (0.003)	3.044 (0.031)	0.494 (0.006)	1.900 (0.018)	4.069 (0.042)
		Post-RMSPE/Pre-RMSPE		0.365 (0.016)	10.582 (0.079)	1.711 (0.015)	6.622 (0.039)	14.135 (0.115)
	1980-1998	Diff. actual vs synth. (%)	-1.999 (0.046)	-1.935 (0.076)	29.018 (0.337)	2.732 (0.147)	21.976 (0.255)	39.344 (0.457)
		RMSPE	0.250 (0.001)	0.123 (0.004)	2.787 (0.025)	0.296 (0.005)	1.533 (0.014)	3.779 (0.035)
		Post-RMSPE/Pre-RMSPE		0.524 (0.021)	11.117 (0.088)	1.172 (0.015)	6.092 (0.043)	15.081 (0.124)
	1980-1999	Diff. actual vs synth. (%)	-0.876 (0.048)	-2.241 (0.093)	25.639 (0.333)	1.678 (0.127)	18.595 (0.266)	35.130 (0.456)
		RMSPE	0.227 (0.001)	0.130 (0.005)	2.570 (0.026)	0.231 (0.005)	1.335 (0.015)	3.500 (0.036)
		Post-RMSPE/Pre-RMSPE		0.600 (0.026)	11.265 (0.104)	1.006 (0.016)	5.849 (0.052)	15.344 (0.148)

Notes: For each of our models, the table reports the percentage difference between actual and synthetic trade for different time periods between 1980-2008, the RMSPE for each period as defined in (9), and the ratio of post-treatment RMSPE to pre-treatment RMSPE as defined in (10) for each of the post-treatment periods. Standard errors of the mean in parentheses.

Figure 7. Average actual and synthetic bilateral trade flow between Denmark and Sweden using 1991 as intervention year.



5. The percentage effects for the all-lags model are consistent with the observations we have made from our visual inspection of the figure: an early underperformance of nearly 9% that tapers off, followed by an overperformance of actual trade against its synthetic counterpart of about 23.8% for 2001-2008, coinciding with the actual opening of the Bridge. The dynamics of the Bridge effect in the true treatment period display patterns very similar to our baseline model: with an initially modest Bridge effect, which then grows over time. Thus, for the all-lags model with a false intervention year, we obtain results that are consistent with our baseline model which used the true intervention year.

We also report the results of our three-lags model in panel (b) of Figure 7. We note from the figure that there is an underperformance of actual trade flows relative to their synthetic counterpart in the first half of our false treatment period similar to that observed in the all-lags model. The three-lags model then displays an overperformance of actual relative to synthetic trade beginning in the mid-1990s, followed by a very strong overperformance of in the true intervention period. The corresponding percentage effects reported in Table 5 are consistent with these observations. The Bridge effect reported for the true intervention period is around 46%, which is preceded by an overperformance of just under 10% in the five years prior. As such, although some pre-Bridge overperformance is reported in the three-lags model the magnitude clearly falls short of the overperformance reported in the true intervention period.

The pre-treatment fit as measured by the RMSPE is significantly better in the all-lags model around 0.05 compared with a value of nearly 0.17 in the three-lags model. Thus, considering the three-lags model with 1991 as intervention year, we cannot rule out that there was a positive trade effect which pre-dates the opening of the Bridge. However, given that the three-lags model has a poorer pre-treatment fit and generally reports post-Bridge trade-effects that are inconsistent with our previous models, we have greater confidence in the results of the all-lags model, and we consider the evidence of a pre-Bridge effect upon trade weak.

Table 5. Percentage difference between actual and synthetic Danish-Swedish trade using 1991 as intervention year.

		1991-2008						
	1980-1990	1991-2008	1991-1995	1996-2000	2001-2008	2001-2002	2003-2004	2005-2008
Diff. actual vs synth. (%, all lags)	0.120 (0.009)	11.389 (0.198)	-8.874 (0.062)	-2.859 (0.147)	23.804 (0.318)	2.534 (0.247)	19.423 (0.361)	31.265 (0.359)
RMSPE (all lags)	0.046 (0.001)	1.607 (0.014)	0.522 (0.003)	0.201 (0.006)	2.364 (0.022)	0.366 (0.007)	1.394 (0.021)	3.176 (0.029)
Post-RMSPE/Pre-RMSPE (all lags)		40.018 (0.585)	12.594 (0.147)	4.485 (0.133)	58.988 (0.878)	8.725 (0.164)	35.373 (0.646)	79.196 (1.169)
Diff. actual vs synth. (%, three lags)	-3.555 (0.081)	25.924 (0.329)	-8.268 (0.167)	9.762 (0.344)	45.743 (0.725)	27.021 (0.341)	48.810 (0.443)	49.554 (0.998)
RMSPE (three lags)	0.167 (0.003)	2.422 (0.023)	0.597 (0.004)	0.546 (0.011)	3.555 (0.038)	1.249 (0.012)	2.752 (0.018)	4.488 (0.061)
Post-RMSPE/Pre-RMSPE (three lags)		16.656 (0.256)	4.044 (0.057)	3.281 (0.043)	24.563 (0.389)	8.064 (0.104)	18.474 (0.253)	31.469 (0.541)

Notes: For each of our models, the table reports the percentage difference between actual and synthetic trade for different time periods between 1980-2008, the RMSPE for each period as defined in (9), and the ratio of post-treatment RMSPE to pre-treatment RMSPE as defined in (10) for each of the post-treatment periods. Standard errors of the mean in parentheses.

To summarise, in our placebo-in-time exercises, we find little evidence of any anticipation effects, or that it should matter greatly whether we define the true year of the Bridge opening as 2000 or 2001. We also find that our conclusions remain very similar even when the opening of the Bridge was reassigned to 1991, and thus using a false matching window. This is especially true in our all-lags model, but even the three-lags model, which has a poorer pre-treatment fit, points in the same direction, even though clear conclusions are more difficult to draw there.

3.3.3 Placebo-in-space

As an alternative to our placebo-in-time tests, we also reassign the treatment not in time but in space. We obtain a synthetic control estimate for all of our comparison units in the sample, which allows us to compare our estimated Danish-Swedish trade effect with the distribution of placebo effects obtained from all other bilateral trading pairs in the sample. We will deem the bridge effect significant if it is unusually large relative to the distribution of treatment effects.

As we have alluded to earlier in Section 3.1, it is not useful to compare the treatment effects without consideration of the goodness of the pre-treatment fit of each of our synthetic models. We will therefore follow the literature by comparing the average ratio of post-treatment RMSPE to pre-treatment RMSPE for all comparison units as defined in (10). When constructing the synthetic models for the other comparison units we run an experiment which mirrors the one we constructed for Danish-Swedish trade. For each comparison unit, we suppose some major infrastructure, such as a fixed link, has been put up between the members of the bilateral pair reducing the cost of trade. The set X' contains 81 comparison units (the full sample consists of 136 bilateral pairs of which 55 are excluded since they use the euro as currency in the post-treatment period). The subset $X_k^{NT'}$ comprises the bilateral pairs that do no contain any members of the bilateral pair k which will be treated as our "donor pool". The subset $X_k^{T'}$ comprises all bilateral pairs containing at least one of the members of bilateral pair k.

For each bilateral pair k, we compute 500 synthetic models, where for every model we exclude $\frac{1}{6}$th of comparison units in each k's respective donor pools. We then compute the average ratio of post-treatment RMSPE to pre-treatment RMSPE of the 500 models and the corresponding standard errors and confidence intervals. We refer to these values as placebo effects, or 'false' treatment effects and report them in Figure 8. In the left panel, we report placebo effects in which all synthetic models have been generated using all outcome lags, and in the right panel we use three lags (1980, 1990 and 2000). We highlight our treated (Danish-Swedish) unit in 'red' and in both panels, we indicate and label comparison units which received a positive weight in their respective (all-lags or three-lags) baseline Danish-Swedish models using a square marker and comparison units that our synthetic algorithm did not select are indicated as triangles. We report the 99% confidence intervals for each placebo effect in the two panels.

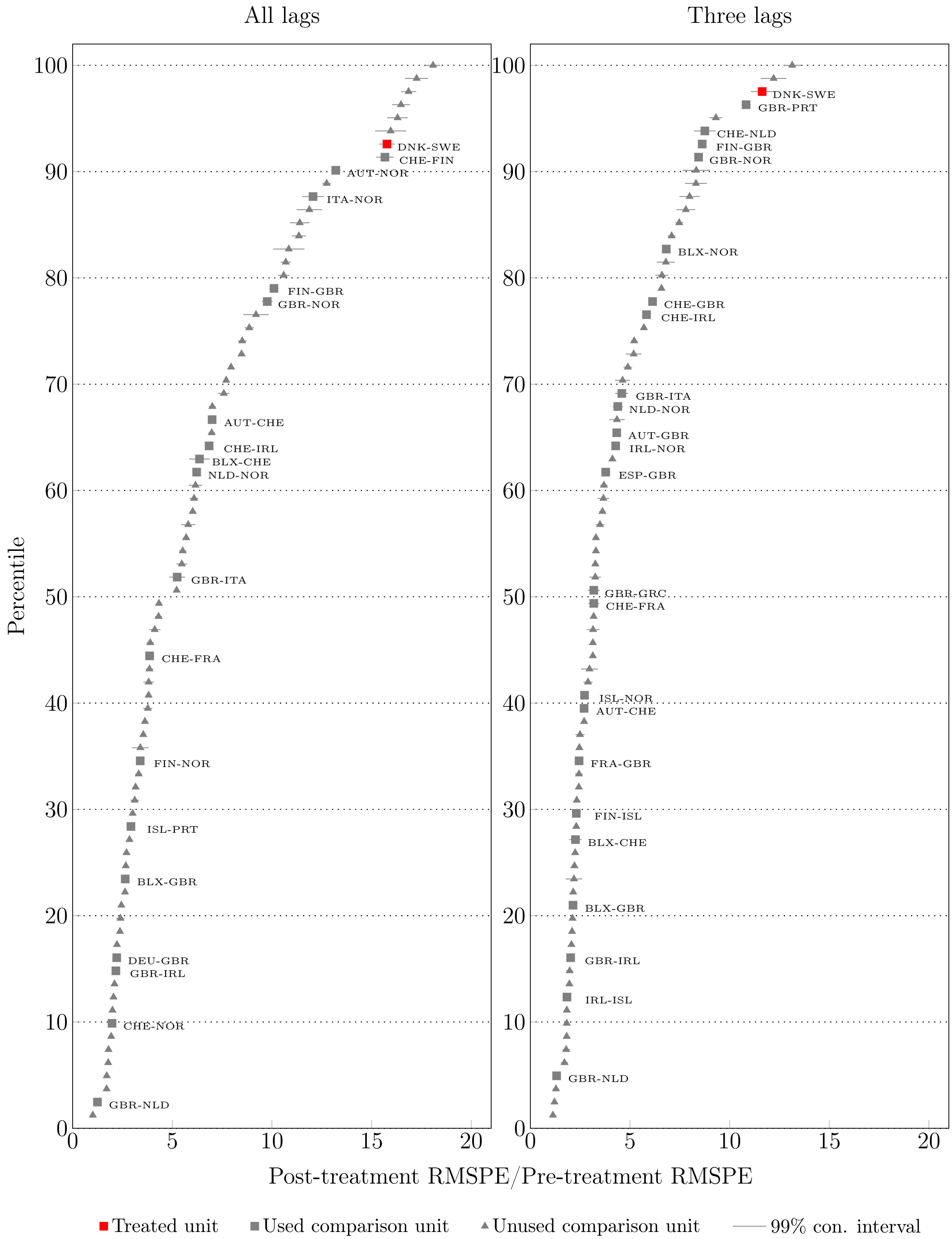
In the all-lags model, our Danish-Swedish unit ranks seventh as measured by the value of the ratio of post-treatment to pre-treatment RMSPE whereas in the three-lags model, it ranks third. The distribution of placebo effects in the all-lags model has mean 6.4 and standard deviation 4.6. The value of the Danish-Swedish post- to pre-treatment ratio is roughly 15.8 and we compute the z-score as 2.04. This gives a corresponding p-value of 0.02. The three-lags model has mean of 4.3 and standard deviation 2.8. With a post- to pre-treatment ratio for the Danish-Swedish unit of around 11.6, we can similarly calculate the z-score and p-value, respectively, as 2.66 and 0.004.

Our conclusion from this test is that the positive Bridge effect we have identified for trade between Sweden and Denmark is indeed unusually large, and the Danish-Swedish treatment effect is in the top-end of the distribution of treatments in our sample, irrespective of the choice of model.

4 Difference-in-differences

In this section, we provide further evidence of a Bridge effect using Difference-in-differences (DiD) estimators. We begin by using a DiD specification that mirrors the baseline SCM model. Thus, our DiD estimator

Figure 8. Ratio of post-treatment RMSPE to pre-treatment RMSPE for all comparison units.



The figure reports placebo effects, that is the ratio of post-treatment to pre-treatment RMSPE as defined in (10), for 81 comparison units on the horizontal axis and each unit's ranking (percentile) on the vertical axis.

regresses the average of the log of the two-way export flows on the following regressors:

$$\begin{aligned}\text{BTF}_{kt} = \beta_0 + \beta_1 \ln(\text{GDP}_{it} \times \text{GDP}_{jt}) + \beta_2\text{EU}_{kt} + \beta_3\text{Euro}_{kt} \\ + \beta_4\text{Post-Bridge} + \beta_5\text{DNK-SWE} \times \text{Post-Bridge} + \epsilon_{ijt},\end{aligned} \tag{12}$$

where $\ln(\text{GDP}_{it} \times \text{GDP}_{jt})$ is the product of the GDP of country i and country j in bilateral pair k; EU_{kt} is a dummy variable which is unity if both countries in bilateral pair k are members of the EU at time t; Post-Bridge takes the value one for the post-treatment period 2001-2008; and the interaction term DNK-SWE $\times$ Post-Bridge is one for Danish-Swedish trade after 2001. The DiD allows for greater flexibility to account for variation in the data which occurs in the post-Bridge period. For instance, in our baseline SCM, we excluded euro-pairs since the timing of the adoption of the euro nearly coincides with the opening of the Bridge. If the euro has a positive effect upon trade, this would likely inflate our comparison units. Since we do not face this restriction in standard DiD analysis, we employ euro-pairs in our baseline specification, controlling for the variation in the data by including a binary variable indicating euro membership of pair k at time t, $\text{Euro}_k t$. As a robustness check, we will run a version of our DiD without euro-pairs as in our SCM.

We run the regression by OLS with country-pair fixed effects and report the results in Table 6 column (1). The coefficients on the product of the bilateral trading pairs' GDPs is positively signed and highly significant. Similarly, the EU dummy is positive and significant. We are particularly interested in the coefficient on DNK-SWE $\times$ post-bridge, which gives us a measure of the Bridge effect mirroring our SCM. We note that this coefficient takes the value nearly 0.24 and is significant at the 1% level. This implies that the Bridge has increased Danish-Swedish bilateral trade by roughly 26.7%.[22]

In order to analyse the timing of the Bridge effect, we break the Danish-Swedish Post-Bridge interaction term into three post-Bridge subperiods – 2001-2002, 2003-2004 and 2005-2008. The coefficient estimates of the subperiods in our DiD estimator reported in column (2) are similar to our baseline estimates using the SCM. The Bridge effect is largest in the period 2005-2008 with a coefficient of 0.33 (39.4%) which is significant at the 1% level, and slightly more modest at, respectively, 0.13 (13.5%) during 2001-2002 and 0.155 (16.8%) during 2003-2004, both highly significant. Hence, positive trade effects of the Bridge are still present in the data using the DiD estimator, and the magnitude of the effects tends to be larger.

In column (3), we run a specification that mirrors our previous placebo-in-time analyses in the SCM. Specifically, we add further subperiods to examine whether the Bridge effect might have been present in the data prior to its opening. As such, we include interactions between our Danish-Swedish dummy, and separately, six year dummies, with the first three in the pre-Bridge period, and the last three in the post-Bridge period. The coefficients on the interactions with the pre-Bridge year dummies are either insignificant (for the 1998 and 2000 year dummy interactions), or negative and significant (for the 1999 year dummy interaction), indicating that there was no positive effect on trade effect prior to 2000. This provides further support to our previous conclusions from the SCM analysis in the previous section. We cover the remaining post-Bridge period with an interaction between the Danish-Swedish dummy and a dummy covering 2004-2008. This interaction term shows a very strong trade effect of 0.27 (30.7%). The remaining post-Bridge interaction terms show a positive and significant effect upon trade. We note that the timing of the positive effect upon trade is consistent with the timing of the opening of the Bridge.

Once more mirroring a placebo-in-time test conducted in the previous section, in column (4) we allow for trade effects in the 10 years prior to the opening of the Bridge. We find that Danish-Swedish trade suffered

[22] We take anti-logs of the coefficient to obtain the percentage effect.

Table 6. Difference-in-differences with average of two-way trade flows.

	(1)	(2)	(3)	(4)	(5)
$\ln \text{GDP}_{it} \times \text{GDP}_{jt}$	0.537***	0.537***	0.527***	0.542***	0.563***
	(0.006)	(0.006)	(0.006)	(0.008)	(0.007)
EU_{kt}	0.177***	0.177***	0.183***	0.190***	0.219***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Euro_{kt}	0.190***	0.190***	0.171***	0.160***	
	(0.014)	(0.014)	(0.014)	(0.013)	
Post-Bridge	-0.055***	-0.055***	-0.014	-0.051***	-0.064***
	(0.012)	(0.012)	(0.011)	(0.013)	(0.013)
DNK-SWE × Post-Bridge (2001-2008)	0.237***				0.148***
	(0.047)				(0.043)
DNK-SWE × Post-Bridge (2001-2002)		0.127***		0.012	
		(0.031)		(0.032)	
DNK-SWE × Post-Bridge (2003-2004)		0.155***		0.036	
		(0.034)		(0.036)	
DNK-SWE × Post-Bridge (2005-2008)		0.332***		0.211***	
		(0.035)		(0.037)	
DNK-SWE × Pre-Bridge (1998)			-0.040		
			(0.033)		
DNK-SWE × Pre-Bridge (1999)			-0.065**		
			(0.033)		
DNK-SWE × Pre-Bridge (2000)			0.050		
			(0.033)		
DNK-SWE × Post-Bridge (2001)			0.078**		
			(0.033)		
DNK-SWE × Post-Bridge (2002)			0.088***		
			(0.033)		
DNK-SWE × Post-Bridge (2003)			0.094***		
			(0.033)		
DNK-SWE × Post-Bridge (2004-2008)			0.268***		
			(0.046)		
DNK-SWE × Pre-Bridge (1991-1995)				-0.186***	
				(0.034)	
DNK-SWE × Pre-Bridge (1996-2000)				-0.124***	
				(0.045)	
Observations	3944	3944	3944	3944	3944
R^2	0.987	0.987	0.987	0.987	0.986
Country-pair fixed effects	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Robust standard errors in parentheses
The Post-Bridge dummy covers actual or placebo intervention periods

a significant loss of around -0.19 (20.4%) in the first half of the 1990s (between 1991-1995), and a loss of -0.12 (13.2%) in the second half (1996-2000). The post-Bridge effects, which we have split into subperiods, are all positive although only the coefficient on the 2005-2008 Bridge effect is statistically significant. These findings are broadly consistent with our all-lags model with 1991 as intervention year, albeit with negative pre-Bridge effects that are substantially larger, and somewhat smaller post-Bridge effects.

In the last column, we run a version of the regression in column (1) but without the binary variable which controls for the variation in the data due to the euro. Using this specification, the Bridge effect falls from 0.24 (26.7%) to 0.15 (16%). This is because the bilateral pairs using the euro were, on average, subjected to a positive treatment effect, and therefore, our results are likely to be biased downwards without remedies to account for this variation in the data. This provides justification for our choice of excluding euro-pairs in our SCM, as this methodology does not allow us to control for the euro effect directly.

As a robustness check, we re-run the regressions in columns (1)-(4), excluding the bilateral pairs that adopted the euro in the post-intervention period in Table 7. The regression in column (1) of Table 7 is the counterpart of the regression in column (1) of Table 6 without euro-pairs. We find that the post-Bridge effect increases slightly from 0.24 (26.7%) to 0.27 (30%) but remains highly significant. The estimates of our Bridge effects by subperiod – 2001-2002, 2003-2004 and 2005-2008 – in column (2) of Table 7 are also marginally larger than their counterparts in Table 6 but remain highly significant. Our analysis of the subperiods between 1998-2003 are broadly similar without euro-pairs included although the Bridge effect now kicks in in 2000 rather than 2001, which we found in Table 6 column (3). In column (4) of Table 7 we report results for trade effects of the 1990s and we find a significant negative effect for the first half of the 1990s, and a negative and insignificant coeffienct for the last half of that decade.

Thus far we have averaged the two-way trade flows and analysed the trade effects of the Bridge on average trade flows. This strategy was pertinent to the analysis conducted using the SCM since the opening of the Bridge coincided with a depreciation of the Swedish krona. The depreciation makes analysis of directional trade flows between Denmark and Sweden problematic in the synthetic model due to the challenge of isolating the trade effects of the Bridge from any effects arising from the depreciation of the krona. However, using a model with time-varying fixed effects allows us to further analyse the direction of the Bridge effect. We run the following econometric model,

$$
\begin{aligned}
\ln \text{Exports}_{ijt} = \beta_0 + \beta_1 \ln(\text{GDP}_{ijt} \times \text{GDP}_{jit}) + \beta_2 \text{EU}_{kt} + \beta_3 \text{Euro}_{kt} + \beta_4 \ln \text{Distance}_k + \beta_5 \text{Adjacency}_k \\
+ \beta_6 \text{Post-Bridge} + \beta_7 \text{DNK-SWE} \times \text{Post-Bridge} + \beta_8 \text{SWE-DNK} \times \text{Post-Bridge} + \epsilon_{ijt}, \quad (13)
\end{aligned}
$$

where the variables $\ln \text{Distance}_k$ (the log of the weighted distance in kilometres between countries within bilateral pair k) and Adjacency_k (a binary variable taking the value one if members of bilateral pair k share a land border) are included in specifications without time-invariant fixed effects, and we also include a specific dummy for, respectively, Danish exports to Sweden and Swedish exports to Denmark, DNK-SWE and SWE-DNK, in such specifications. We report the results for the DiD estimator in (13) in Table 8. In column (1), we use country-pair fixed effects; in the second column we use importer-year- and exporter-year fixed effects; and in the last column, we use multiple layers of fixed effects, country-pair fixed effects, importer-year- and exporter-year fixed effects.

We are particularly interested in the coefficients on DNK-SWE$\times$post-bridge and SWE-DNK$\times$post-bridge, respectively, the first being our estimate of the effect of the Bridge on Danish exports to Sweden, and the second being our estimate of the effect on Swedish exports to Denmark. Inspection of these coefficients shows

Table 7. Difference-in-differences with average of two-way trade flows without euro-pairs

	(1)	(2)	(3)	(4)
$\ln \text{GDP}_{it} \times \text{GDP}_{jt}$	0.510^{***}	0.510^{***}	0.499^{***}	0.526^{***}
	(0.008)	(0.008)	(0.008)	(0.010)
EU_{kt}	0.116^{***}	0.116^{***}	0.108^{***}	0.124^{***}
	(0.018)	(0.018)	(0.018)	(0.018)
Post-Bridge	-0.002	-0.002	0.034^{***}	-0.046^{**}
	(0.014)	(0.014)	(0.013)	(0.019)
DNK-SWE × Post-Bridge (2001-2008)	0.265^{***}			
	(0.048)			
DNK-SWE × Post-Bridge (2001-2002)		0.135^{***}		0.095^{***}
		(0.027)		(0.032)
DNK-SWE × Post-Bridge (2003-2004)		0.181^{***}		0.130^{***}
		(0.032)		(0.035)
DNK-SWE × Post-Bridge (2005-2008)		0.372^{***}		0.313^{***}
		(0.033)		(0.036)
DNK-SWE × Pre-Bridge (1998)			0.000	
			(0.027)	
DNK-SWE × Pre-Bridge (1999)			-0.024	
			(0.027)	
DNK-SWE × Pre-Bridge (2000)			0.087^{***}	
			(0.028)	
DNK-SWE × Post-Bridge (2001)			0.113^{***}	
			(0.028)	
DNK-SWE × Post-Bridge (2002)			0.128^{***}	
			(0.027)	
DNK-SWE × Post-Bridge (2003)			0.146^{***}	
			(0.027)	
DNK-SWE × Post-Bridge (2004-2008)			0.336^{***}	
			(0.044)	
DNK-SWE × Pre-Bridge (1991-1995)				-0.158^{***}
				(0.033)
DNK-SWE × Pre-Bridge (1996-2000)				-0.039
				(0.043)
Observations	2349	2349	2349	2349
R^2	0.985	0.985	0.985	0.985
Country-pair fixed effects	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Robust standard errors in parentheses
The Post-Bridge dummy covers actual or placebo intervention periods

Table 8. Difference-in-differences with directional trade flows

	(1)	(2)	(3)
$\ln \text{GDP}_{it} \times \text{GDP}_{jt}$	0.537***		
	(0.005)		
EU_{kt}	0.177***		
	(0.012)		
Euro_{kt}	0.190***		
	(0.013)		
$\ln \text{Distance}_{k}$		-1.099***	
		(0.025)	
Adjacency_{k}		0.339***	
		(0.024)	
Post-Bridge	-0.055***		
	(0.011)		
DNK-SWE × Post-Bridge (2001-2008)	0.306***	0.447***	0.447***
	(0.042)	(0.089)	(0.048)
SWE-DNK × Post-Bridge (2001-2008)	0.167***	0.310***	0.310***
	(0.055)	(0.078)	(0.051)
DNK-SWE		0.388***	
		(0.050)	
SWE-DNK		0.320***	
		(0.044)	
Observations	7888	7888	7888
R^2	0.978	0.948	0.986
Country-pair fixed effects	Yes	No	Yes
Importer-year fixed effects	No	Yes	Yes
Exporter-year fixed effects	No	Yes	Yes
Year dummies	No	No	No

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Robust standard errors in parentheses

that our estimate of the Bridge effect for Danish exports to Sweden is larger than our estimate of the Bridge effect for Swedish exports to Denmark. Our estimate for the Bridge effect on Danish exports to Sweden is 0.31 (35.8%) whereas for Swedish exports to Denmark we get 0.17 (18.2%). In columns (2), in which we use time-varying importer- and exporter fixed effects, we find the Bridge effect for Danish exports to Sweden to be 0.45 (56.4%). The Bridge effect for Swedish exports to Denmark is somewhat smaller at 0.31 (36.3%). Since the specifications in column (2) do not use time-invariant fixed effects, we can include the time-invariant gravity variables ln Distance_k and Adjacency_k. The coefficient on the log of distance has the usual sign and magnitude (close to -1) and is statistically significant. Similarly, the coefficient on Adjacency is positive and significant in line with existing literature. The specification in column (3) employs multiple layers of fixed effects, the time-invariant country-pair fixed effects and the time-varying importer- and exporter fixed effects. From inspection of this column, we note that the Bridge effect estimates are the same as in specification (2), albeit with smaller standard errors.

We perform a formal test of equality of the coefficients of, respectively, the Danish and Swedish Bridge effects, or the coefficients β_7 and β_8 on DNK-SWE $\times$ post-bridge and SWE-DNK $\times$ post-bridge in (13) by applying the following general formula:

$$\frac{\beta_x - \beta_y}{\sqrt{\text{Var}[\beta_x] + \text{Var}[\beta_y] - 2 \times \text{Cov}[\beta_x, \beta_y]}}. \tag{14}$$

We obtain the relevant statistics for our specification in column (1) in Table 8 from the variance-covariance matrix generated in Stata as $\text{Var}[\beta_7] = 0.0017655$, $\text{Var}[\beta_8] = 0.0029842$ and $\text{Cov}[\beta_7, \beta_8] = 0.00011701$. Taking the coefficient estimates from column (1) gives us a t-statistic equal to 2.07 and a p-value of just under 0.019 (0.01944). The corresponding p-values for the remaining specifications in columns (2), (3), respectively, are (at 3 digits) 0.120, 0.024. Thus, the estimated Bridge effect for Danish exports to Sweden is larger and significantly different from the Bridge effect for Swedish exports to Denmark in two out of three specifications, and in one specification the effect is larger but with the difference not being significant at the 10% level.

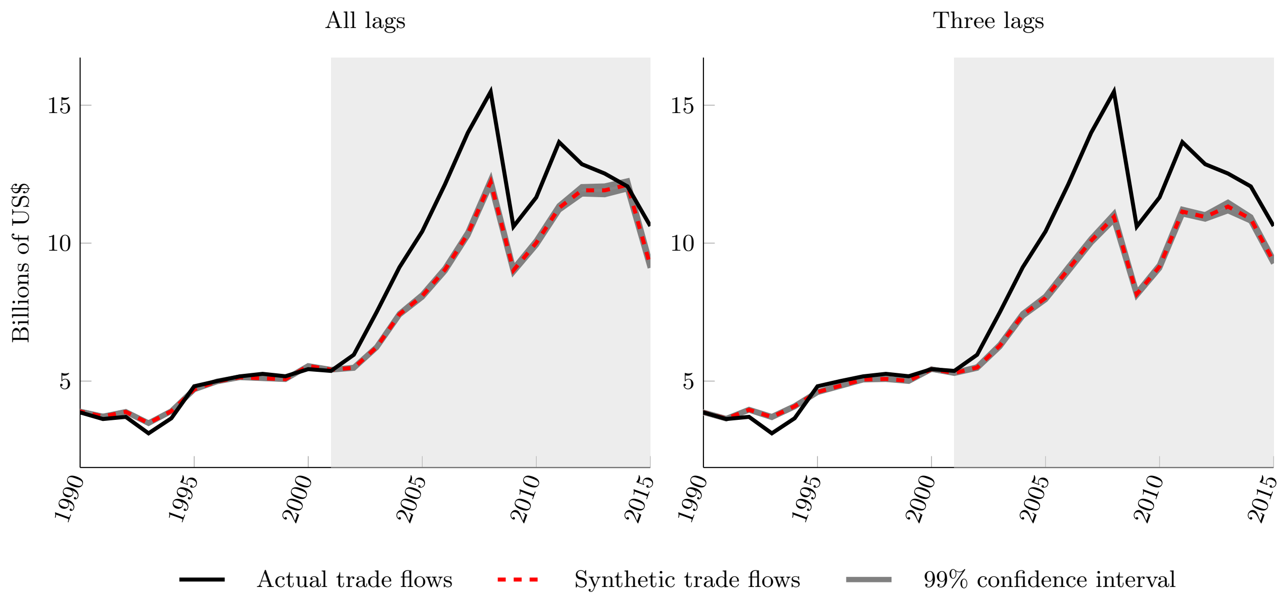
5 Further analysis

In this section, we will provide further analysis of the Bridge effect. We will begin by extending our post-Bridge period by a further seven years, 2009-2015, in Subsection 5.1. Then in Subsection 5.2, we will break down the Bridge effect in broad categories of products.

5.1 Long term effects

In our baseline analysis in our SCM and our DiD, we restricted the post-Bridge period to 2001-2008. The post-2008 period was characterised by significant volatility in the trade data, and our concern is that the weights chosen by our synthetic algorithm may not be able to simultaneously model the long-run exponential trade growth of bilateral trade and the large and potentially country-pair specific shocks, which occurred as a result of the financial crisis and its aftermath. In this section, however, we extend our post-Bridge period by seven years to 2001-2015. We present our results graphically for, respectively, our all-lags SCM and our three-lags SCM in Figure 9. As in our baseline models in Section 3, we use over 20 years of pre-Bridge data to generate our synthetic models (the reader is referred to Figure 4 for a graph of the entire pre-Bridge period). We note from Figure 9 that the gap between actual and synthetic trade flows narrows somewhat, especially after 2010 for both models. We report the corresponding percentage effects in Table 9 for several post-Bridge

Figure 9. Average actual and synthetic bilateral trade flows between Denmark and Sweden.



subperiods. The Bridge effect is largest in the 2006-2010 subperiod for both models, with a Bridge effect of 26.2% for the all-lags model and 34.7% for the three-lags model. In the last column, we report the percentage Bridge effects for 2009-2015, that is, all of our additional years, and we note that this is roughly 11.4% for the all-lags model and 18.4% for the three-lags model. As such, there is evidence that the Bridge effect remains strong even after the financial crisis, although it has decreased somewhat, especially after 2010. We find Bridge effects for 2011-2015 of, respectively, 9.5% and 15.1%, in the all-lags and three-lags models.

Table 9. Percentage difference between actual and synthetic Danish-Swedish bilateral trade and measures of fit.

		2001-2015					
	1980-2000	2001-2015	2001-2005	2006-2010	2011-2015	2001-2008	2009-2015
Diff. actual vs synth. (%, all lags)	0.288 (0.009)	17.430 (0.269)	17.597 (0.120)	26.211 (0.279)	9.451 (0.452)	24.563 (0.192)	11.355 (0.421)
RMSPE (all lags)	0.149 (0.000)	2.052 (0.017)	1.430 (0.008)	2.810 (0.020)	1.578 (0.028)	2.348 (0.014)	1.595 (0.027)
Post-RMSPE/Pre-RMSPE (all lags)		13.744 (0.089)	9.620 (0.047)	18.847 (0.103)	10.498 (0.169)	15.774 (0.078)	10.613 (0.160)
Diff. actual vs synth. (%, three lags)	-0.086 (0.044)	21.024 (0.258)	16.129 (0.215)	32.174 (0.394)	14.054 (0.289)	25.459 (0.305)	17.081 (0.290)
RMSPE (three lags)	0.216 (0.001)	2.248 (0.022)	1.339 (0.013)	3.220 (0.033)	1.688 (0.023)	2.503 (0.024)	1.904 (0.022)
Post-RMSPE/Pre-RMSPE (three lags)		10.449 (0.103)	6.195 (0.055)	14.994 (0.156)	7.833 (0.103)	11.632 (0.111)	8.852 (0.103)

Notes: For each of our models, the table reports the percentage difference between actual and synthetic trade for different time periods between 1980-2008, the RMSPE for each period as defined in (9), and the ratio of post-treatment RMSPE to pre-treatment RMSPE as defined in (10) for each of the post-treatment periods. Standard errors of the mean in parentheses.

We also run a DiD using the additional post-Bridge years, and report the results in Table 10. We note from column (1) of the table that the Bridge effect for the whole period is around 0.26 (29.7%), and therefore somewhat larger than in the SCM specifications. For the DiD model, we further note that the Bridge effect is again largest in the 2006-2010 subperiod with a value of 0.34 (40.6%), and falls somewhat in the 2011-2015 to 0.21 (23.1%).

Table 10. Difference-in-differences with average of two-way trade flows – longer period

	(1)	(2)	(3)
$\ln \text{GDP}_{it} \times \text{GDP}_{jt}$	0.528***	0.528***	0.528***
	(0.006)	(0.006)	(0.006)
EU_{kt}	0.158***	0.158***	0.158***
	(0.014)	(0.014)	(0.014)
Euro_{kt}	0.199***	0.199***	0.199***
	(0.013)	(0.013)	(0.013)
Post-Bridge	-0.096***	-0.096***	-0.097***
	(0.011)	(0.011)	(0.011)
DNK-SWE × Post-Bridge (2001-2015)	0.260***		
	(0.037)		
DNK-SWE × Post-Bridge (2001-2005)		0.231***	
		(0.039)	
DNK-SWE × Post-Bridge (2006-2010)		0.341***	
		(0.054)	
DNK-SWE × Post-Bridge (2011-2015)		0.208***	
		(0.037)	
DNK-SWE × Post-Bridge (2001-2008)			0.303***
			(0.047)
DNK-SWE × Post-Bridge (2009-2015)			0.211***
			(0.033)
Observations	4896	4896	4896
R^2	0.985	0.985	0.985
Country-pair fixed effects	Yes	Yes	Yes
Year dummies	No	No	No

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Robust standard errors in parentheses

Summarising our findings for this subsection, we find evidence that the Bridge effects remains large even after the financial crisis, albeit somewhat smaller than before the financial crisis for both our SCM and DiD estimates. There may be many reasons for a slightly smaller Bridge effect in the long term. First, the transport infrastructure of our comparison units may have been subject to gradual improvement. The Bridge, by contrast, may be seen as a one-off improvement, and gradual improvements elsewhere may lead to catch-ups. Second, the financial crisis destroyed trade among many country-pairs. It is possible that such trade destruction may have disproportionately benefited more established business relationships through consumer loyalty and general inertia. If the Bridge had facilitated new trading relationships, it is therefore possible that the trade destruction between Denmark and Sweden was larger than elsewhere.

5.2 Product-level Bridge effects

We next turn to product-level trade flows to explore whether the magnitude of the Bridge effect depends on product characteristics.

Decomposing the bridge effect using the Rauch classification

In the first such analysis, we decompose the Bridge effect by using the well-known Rauch classification. Rauch (1999) classifies goods into three broad categories: 1) products traded on organised exchanges, 2) products that are reference priced, and 3) all other products. The first two categories are meant to capture homogeneous (or roughly homogeneous) products, while the third captures the idea of differentiated products where brands and product networks are important. Trade of differentiated products require the establishment of bilateral networks with importers often having to source their products at the plant level. By contrast, goods that are traded on organised exchanges or whose prices are quoted in major trade publications do not require such extensive networks as products can be ordered directly. We group products traded on organised exchanges and those that are reference priced into one category, which we label homogeneous goods. We perform our analysis using our DiD estimator as it allows us to use formal inferential techniques to compare the Bridge effect across different product classifications.

We match our product-level data at the 4 digit SITC rev. 2 with classifications from Rauch (1999). Our data contains 786 4-digit products, of which 704 are classified according to their broad groups in Rauch (1999). We exclude the 82 unclassified products for the purposes of our product-level regression. The bulk of trade is in products that are classified as differentiated. For example, in the year 2000, 67% of the value of total trade in the full sample was in differentiated products. We construct binary variables for each product category and interact these respective variables with our Bridge effect − DNK-SWE × post-Bridge. We present our results in column (1) in Table 11. The point estimate for the Bridge effect for differentiated products is 0.21 (23%), whereas for homogeneous products the point estimate is somewhat lower at 0.16 (17.1%), although the difference between the coefficients is not statistically significant at the 10% level.

Theoretically, it is possible that the maritime border represents a greater obstacle to trade in differentiated products since importers and exporters have to source their products at the plant level. As homogeneous products can be ordered directly on exchanges or through other direct means, there is a reduced need for interaction between importers and exporters and the benefits of the Bridge are less obvious. If the Bridge effect for differentiated products is larger, this would lend support to the hypothesis that the Bridge has increased face-to-face interaction. We find only weak evidence that the Bridge effect for differentiated products is larger, however.

Table 11. DiD with product-level trade flows

	(1)	(2)	(3)
$\ln \text{GDP}_{it} \times \text{GDP}_{jt}$	0.510^{***}	0.495^{***}	0.507^{***}
	(0.003)	(0.004)	(0.003)
EU_{kt}	0.179^{***}	0.174^{***}	0.183^{***}
	(0.008)	(0.009)	(0.008)
Euro_{kt}	0.113^{***}	0.106^{***}	0.109^{***}
	(0.007)	(0.008)	(0.007)
Post-Bridge	0.008	-0.021^{***}	-0.004
	(0.006)	(0.007)	(0.006)
DNK-SWE × Post-Bridge (2001-2008) × Homogeneous	0.158^{**}		
	(0.073)		
DNK-SWE × Post-Bridge (2001-2008) × Differentiated	0.208^{***}		
	(0.022)		
DNK-SWE × Post-Bridge (2001-2008) × Bulky		0.245^{***}	
		(0.026)	
DNK-SWE × Post-Bridge (2001-2008) × Non-bulky		0.127^{*}	
		(0.068)	
DNK-SWE × Post-Bridge (2001-2008) × Durable			0.103^{***}
			(0.027)
DNK-SWE × Post-Bridge (2001-2008) × Semi-durable			0.232^{***}
			(0.038)
DNK-SWE × Post-Bridge (2001-2008) × Non-durable			0.056
			(0.048)
Observations	2649237	2262841	1943058
Pseudo R^2	0.944	0.932	0.947
Country-pair-product fixed effects	Yes	Yes	Yes
Year dummies	No	No	No

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Robust standard errors in parentheses

Decomposing the Bridge effect: Bulky v. non-bulky goods

We next examine whether the Bridge effect is sensitive to freight costs. From a theoretical perspective, there is no unambiguous answer as to how the Bridge might affect trade of bulky goods (low freight costs) or non-bulky goods (high freight costs). On the one hand, the absence of a land Bridge would have increased freight costs, thus incentivising bulk shipments to minimise costs. If this is the case, the Bridge might have disproportionately benefited the trade of goods with high freight costs, or non-bulky goods. On the other hand, capacity constraints on the ferries might have restricted the ability to exploit economies of scale in freight. As such, the Bridge might then become more valuable to bulk shipments. Following an approach similar to that of Berthelon and Freund (2008), we obtain a measure of shipping costs (cost of insurance and freight) from US customs data by computing the CIF/FOB ratio for US imports from the EU. We use US data to avoid any potential endogeneity between such measures and the transport infrastructure in Denmark and Sweden. We classify products with a CIF/FOB ratio below median as 'bulky' and those with a ratio above median as 'non-bulky'. We are able to classify 602 out of 786 products into these two groups, in which exactly half of the products (301) are bulky. The 602 products represent 67% of total trade in our sample in the year 2000, and trade of bulky products represents 64% of trade out of these 602 classified products. We interact the corresponding binary variables with DNK-SWE × Post-Bridge to generate a Bridge effect for, respectively, bulky and non-bulky products. As in the previous subsection, we exclude products that we are not able to classify according to the two groupings. We report the results in column (2) in Table 11. The point estimate for the Bridge effect for bulky products exceeds that for non-bulky products: the Bridge effect for bulky products is 0.25 (27.8%) and 0.13 (13.5%) for non-bulky products and so the Bridge effect for bulky products is nearly twice that for non-bulky products, lending support to the hypothesis of capacity constraints on ferries preventing the exploitation of economies of scale in freight. The difference between the two coefficient estimates is statistically significant from each other at the 10% level (with a p-value of 0.051).

Decomposing the Bridge effect: Durable v. non-durable goods

We lastly decompose our products into durability using the UN's Classification of Individual Consumption According to Purpose (COICOP), which classifies products into durables, semi-durables, and non-durables. Durables and semi-durables are distinct from non-durables in that they can be used repeatedly or continuously for a period of one year or more, whereas non-durables can be used only once. Durables, such as cars, washing machines, fridges and televisions tend to have a higher purchase price. Semi-durables differ from durables in that their expected services life is usually considerably shorter (although more than a year), and their purchase prices are lower. We use concordance tables to match the COICOP products with their corresponding SITC rev. 2 product at the 4-digit level of aggregation. Out of the 786 4-digit products, 510 are classified into the three broad categories, 147 of which are durable, 147 semi-durable and 216 non-durable. The 510 classified products represent 76% of total trade in the full sample in the year 2000, of which roughly 34% represents trade in durable products, 41% in semi-durable products, and 25% in non-durables in the year 2000. We define the corresponding binary variables and interact them with DNK-SWE × Post-Bridge to obtain Bridge effects by product classification. Our results are reported in Table 11 column (3), and as in our previous specifications we use only data which has been classified. The point estimate for our Bridge effect is largest for semi-durables at 0.23 (26.1%). The corresponding Bridge effects for durables and non-durables, respectively, are 0.10 (10.8%) and 0.06 (5.8%). The difference between the point estimate for the Bridge effect for semi-durable products is statistically significant from, respectively, durables and non-durables at the 1% level (with p-values of 0.003 and 0.002). While the point estimate for durables is larger than that of non-durables, the difference is not statistically significant at the 10% level.

6 Concluding remarks

There are many examples throughout history in which land bodies separated by water have been joined by bridges, tunnels and causeways in order to reduce barriers to trade. However, little evidence exists as to whether their construction attains their intended trade objectives. In this paper, we use the opening of the Øresund Bridge as a quasi-natural experiment to estimate the effect of a fixed link on bilateral trade using a SCM. We find that bilateral trade between Denmark and Sweden was around 24.6% larger than it would have been in the counterfactual world where the Bridge had not been built. We supplement our estimations using a standard DiD, which yields a very similar trade effect. We find evidence, using our SCM, that the Bridge effects was gradual, and it took several years for the full effect to materialise, a finding which is backed up by our results from the DiD. We subject our SCM to standard falsification effects such as a placebo-in-time test and a placebo-in-space test. Our results show that the positive effects on aggregate trade between Denmark and Sweden which coincide with the Bridge are robust to the choice of matching window. Similarly, computing placebo effects for all of our comparison units shows that the Danish-Swedish bilateral pair is in the top of the distribution of placebo effects. Our DiD is similarly robust against standard sensitivity tests including product-level estimation. While our baseline results focus on the short- to medium term effects of the Bridge (2001-2008), we also extend our period of estimation with seven additional years (2009-2015). Our results show that the Bridge effect remains sizeable and statistically significant even after the financial crisis, although there are signs of a small decrease in the coefficient estimates.

The trade-boosting effects of the Bridge may be a useful point of comparison with other fixed links such as the Channel Tunnel between the UK and France or the Fehmarn Belt Fixed Link, which is currently under construction between Denmark and Germany. It is important to note that Sweden and Denmark – as joint members of the EU, and sharing a common political, economic, cultural and linguistic background – had rather low *other* trade barriers between them when the fixed link was built. Before the Bridge, the Danish-Swedish boundary was already characterised by a well-established and efficient transport infrastructure in the form of frequent ferry and hydrofoil services. The fact that we find such a substantial trade effect of the Bridge suggests the costs associated with inter-modal changes and waiting times when crossing a sea barrier should not be ignored.

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Appendix

Table A1. Matrix of non-negative average weights of each pre-bridge characteristic in benchmark synthetic model.

Predictor	Weight (all lags)	Weight (three lags)
$\ln \text{GDP}_i \times \text{GDP}_j$	< 0.001 (0.000)	< 0.001 (0.000)
Land Border	< 0.001 (0.000)	< 0.001 (0.000)
$\ln \text{Distance}_{ij}$	< 0.001 (0.000)	0.001 (0.000)
EU	< 0.001 (0.000)	< 0.001 (0.000)
$\text{BTF}_{DNK-SWE,1980}$	0.011 (0.000)	0.065 (0.000)
$\text{BTF}_{DNK-SWE,1981}$	0.009 (0.000)	-
$\text{BTF}_{DNK-SWE,1982}$	0.009 (0.000)	-
$\text{BTF}_{DNK-SWE,1983}$	0.010 (0.000)	-
$\text{BTF}_{DNK-SWE,1984}$	0.011 (0.000)	-
$\text{BTF}_{DNK-SWE,1985}$	0.012 (0.000)	-
$\text{BTF}_{DNK-SWE,1986}$	0.018 (0.000)	-
$\text{BTF}_{DNK-SWE,1987}$	0.028 (0.000)	-
$\text{BTF}_{DNK-SWE,1988}$	0.037 (0.000)	-
$\text{BTF}_{DNK-SWE,1989}$	0.040 (0.000)	-
$\text{BTF}_{DNK-SWE,1990}$	0.056 (0.000)	0.600 (0.002)
$\text{BTF}_{DNK-SWE,1991}$	0.051 (0.000)	-
$\text{BTF}_{DNK-SWE,1992}$	0.061 (0.000)	-
$\text{BTF}_{DNK-SWE,1993}$	0.045 (0.000)	-
$\text{BTF}_{DNK-SWE,1994}$	0.058 (0.000)	-
$\text{BTF}_{DNK-SWE,1995}$	0.082 (0.000)	-
$\text{BTF}_{DNK-SWE,1996}$	0.085 (0.000)	-
$\text{BTF}_{DNK-SWE,1997}$	0.089 (0.000)	-
$\text{BTF}_{DNK-SWE,1998}$	0.092 (0.000)	-
$\text{BTF}_{DNK-SWE,1999}$	0.093 (0.000)	-
$\text{BTF}_{DNK-SWE,2000}$	0.103 (0.000)	0.333 (0.002)

Notes: The table reports the average weights associated with each pre-Bridge characteristic for the all-lags and three-lags models, respectively, used in the benchmark synthetic models in Section 3.2.

Table A2. Sweden against individual pairs

Diff actual vs synth.	AUT	BLX	CHE	DEU	ESP	FIN	FRA	GBR	GRC	IRL	ISL	ITA	NLD	NOR	PRT
All lags															
1980-2000	0.165	-0.272	0.632	0.374	-0.499	0.767	0.283	1.478	-0.514	-0.237	-0.717	-0.281	-1.014	0.527	-0.672
	(0.028)	(0.011)	(0.013)	(0.007)	(0.014)	(0.010)	(0.014)	(0.014)	(0.046)	(0.028)	(0.149)	(0.018)	(0.031)	(0.010)	(0.040)
2001-2008	-6.055	7.578	-32.587	-2.201	4.369	10.298	-0.914	-28.696	-28.003	-34.220	40.122	1.165	-14.579	2.213	-19.181
	(0.205)	(0.138)	(0.123)	(0.065)	(0.149)	(0.300)	(0.076)	(0.267)	(0.131)	(0.225)	(0.398)	(0.044)	(0.094)	(0.246)	(0.257)
Three lags															
1980-2000	-4.732	1.371	-0.695	-0.914	-9.852	-6.512	-5.760	4.076	-14.570	-6.345	-2.737	-10.541	7.168	-0.827	-13.247
	(0.060)	(0.043)	(0.050)	(0.019)	(0.059)	(0.019)	(0.087)	(0.034)	(0.114)	(0.056)	(0.181)	(0.038)	(0.073)	(0.038)	(0.048)
2001-2008	-1.285	15.979	-33.242	-10.171	-2.315	-2.222	10.343	-27.848	-11.444	-33.084	14.232	-11.041	-4.814	6.151	-30.993
	(0.316)	(0.189)	(0.204)	(0.217)	(0.359)	(0.158)	(0.431)	(0.244)	(0.288)	(0.337)	(0.388)	(0.137)	(0.152)	(0.171)	(0.180)

Table A3. Denmark against individual pairs

Diff actual vs synth.	AUT	BLX	CHE	DEU	ESP	FIN	FRA	GBR	GRC	IRL	ISL	ITA	NLD	NOR	PRT
All lags															
1980-2000	-0.116	-0.125	-0.436	-0.020	-0.641	0.726	-0.069	1.152	0.176	-0.957	0.253	0.155	0.061	0.014	-1.401
	(0.053)	(0.018)	(0.033)	(0.005)	(0.013)	(0.023)	(0.013)	(0.023)	(0.068)	(0.030)	(0.161)	(0.016)	(0.008)	(0.015)	(0.061)
2001-2008	-6.017	-0.568	-26.834	-0.990	24.473	0.755	-12.880	-14.405	-5.499	-7.475	-3.437	0.770	10.173	0.178	-25.011
	(0.245)	(0.129)	(0.262)	(0.140)	(0.118)	(0.126)	(0.175)	(0.343)	(0.211)	(0.236)	(0.223)	(0.109)	(0.162)	(0.146)	(0.213)
Three lags															
1980-2000	-5.910	0.103	7.725	3.794	-8.921	-3.550	0.923	-2.255	-31.747	-29.090	3.505	-0.621	-0.634	9.592	-24.363
	(0.066)	(0.048)	(0.114)	(0.028)	(0.076)	(0.069)	(0.060)	(0.033)	(0.384)	(0.226)	(0.305)	(0.049)	(0.069)	(0.037)	(0.183)
2001-2008	-8.947	19.465	-21.454	5.708	43.596	-9.266	1.635	-12.655	-25.679	12.749	-5.366	2.076	11.527	15.606	-39.989
	(0.266)	(0.327)	(0.279)	(0.181)	(0.644)	(0.296)	(0.329)	(0.212)	(0.495)	(0.399)	(0.357)	(0.326)	(0.264)	(0.380)	(0.238)

Table A4. Average weights attached to comparison units in the Swedish synthetic all-lags models.

Comparison units	AUT	BLX	CHE	DEU	ESP	FIN	FRA	GBR	GRC	IRL	ISL	ITA	NLD	NOR	PRT	DNK
AUT-CHE	0.165 (0.000)	0.025 (0.003)	0.011 (0.002)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.005 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.000)
AUT-GBR	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.040 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.031 (0.001)	0.000 (0.000)	0.000 (0.000)	0.020 (0.001)	0.000 (0.000)	0.000 (0.000)	0.004 (0.000)	0.000 (0.000)
AUT-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
AUT-NOR	0.009 (0.002)	0.000 (0.000)	0.083 (0.008)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.033 (0.002)
BLX-CHE	0.028 (0.001)	0.000 (0.000)	0.116 (0.001)	0.082 (0.005)	0.000 (0.000)	0.040 (0.004)	0.004 (0.001)	0.137 (0.010)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.036 (0.003)	0.000 (0.000)	0.023 (0.002)
BLX-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.188 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)
BLX-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
BLX-NOR	0.061 (0.001)	0.047 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.015 (0.000)	0.004 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.042 (0.001)	0.000 (0.000)
CHE-DEU	0.000 (0.000)	0.002 (0.000)	0.009 (0.000)	0.122 (0.003)	0.000 (0.000)	0.001 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)
CHE-ESP	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-FIN	0.000 (0.000)	0.011 (0.001)	0.002 (0.001)	0.000 (0.000)	0.114 (0.004)	0.006 (0.002)	0.080 (0.007)	0.000 (0.000)	0.000 (0.000)	0.020 (0.002)	0.005 (0.000)	0.056 (0.008)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.035 (0.003)
CHE-FRA	0.001 (0.000)	0.094 (0.001)	0.059 (0.000)	0.198 (0.004)	0.000 (0.000)	0.199 (0.002)	0.186 (0.001)	0.073 (0.002)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.076 (0.001)	0.000 (0.000)	0.138 (0.001)	0.000 (0.000)	0.152 (0.001)
CHE-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.039 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-GRC	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-IRL	0.002 (0.000)	0.007 (0.002)	0.000 (0.000)	0.000 (0.000)	0.220 (0.004)	0.000 (0.000)	0.028 (0.003)	0.000 (0.000)	0.086 (0.001)	0.360 (0.001)	0.000 (0.000)	0.000 (0.000)	0.051 (0.003)	0.000 (0.000)	0.000 (0.000)	0.007 (0.002)
CHE-ISL	0.007 (0.002)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.064 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-ITA	0.005 (0.000)	0.000 (0.000)	0.020 (0.001)	0.339 (0.004)	0.000 (0.000)	0.019 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.007 (0.001)	0.000 (0.000)	0.002 (0.000)	0.007 (0.001)	0.000 (0.000)
CHE-NLD	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-NOR	0.333 (0.003)	0.001 (0.000)	0.818 (0.001)	0.001 (0.000)	0.000 (0.000)	0.198 (0.005)	0.145 (0.009)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.055 (0.001)	0.524 (0.006)	0.000 (0.000)	0.009 (0.001)	0.746 (0.002)	0.013 (0.002)
CHE-PRT	0.042 (0.004)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.007 (0.001)	0.000 (0.000)
DEU-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.110 (0.001)	0.000 (0.000)	0.001 (0.000)	0.022 (0.000)	0.005 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.027 (0.000)	0.000 (0.000)	0.006 (0.001)	0.000 (0.000)	0.002 (0.000)
DEU-ISL	0.006 (0.001)	0.113 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.022 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
DEU-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ESP-GBR	0.000 (0.000)	0.142 (0.001)	0.000 (0.000)	0.000 (0.000)	0.089 (0.001)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.004 (0.000)	0.003 (0.000)	0.000 (0.000)	0.002 (0.000)	0.239 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ESP-ISL	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.196 (0.010)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ESP-NOR	0.000 (0.000)	0.229 (0.006)	0.000 (0.000)	0.000 (0.000)	0.007 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.351 (0.002)	0.000 (0.000)	0.000 (0.000)	0.085 (0.008)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FIN-GBR	0.027 (0.001)	0.000 (0.000)	0.005 (0.000)	0.165 (0.005)	0.000 (0.000)	0.559 (0.004)	0.175 (0.002)	0.202 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.215 (0.004)	0.000 (0.000)	0.122 (0.003)
FIN-ISL	0.010 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.284 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FIN-NOR	0.003 (0.000)	0.133 (0.010)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.001 (0.000)	0.000 (0.000)	0.002 (0.001)	0.019 (0.002)	0.000 (0.000)	0.017 (0.003)
FRA-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FRA-ISL	0.210 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.437 (0.003)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.035 (0.003)	0.000 (0.000)
FRA-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.011 (0.001)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)
GBR-GRC	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.061 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GBR-IRL	0.002 (0.000)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.072 (0.001)	0.011 (0.001)	0.000 (0.000)	0.007 (0.000)	0.000 (0.000)	0.005 (0.001)	0.081 (0.002)	0.005 (0.001)	0.000 (0.000)	0.080 (0.002)
GBR-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.043 (0.004)	0.000 (0.000)
GBR-ITA	0.009 (0.000)	0.029 (0.001)	0.000 (0.000)	0.005 (0.001)	0.000 (0.000)	0.000 (0.000)	0.006 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.008 (0.000)	0.001 (0.000)	0.024 (0.001)	0.000 (0.000)	0.057 (0.001)
GBR-NLD	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.029 (0.002)	0.000 (0.000)	0.007 (0.001)	0.036 (0.001)	0.062 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.057 (0.000)	0.000 (0.000)	0.083 (0.001)	0.000 (0.000)	0.050 (0.002)
GBR-NOR	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.138 (0.002)	0.000 (0.000)	0.130 (0.001)	0.000 (0.000)	0.476 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.243 (0.001)	0.000 (0.000)	0.143 (0.001)
GBR-PRT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.223 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.038 (0.001)	0.000 (0.000)
GRC-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.020 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GRC-NOR	0.219 (0.004)	0.004 (0.001)	0.048 (0.005)	0.000 (0.000)	0.436 (0.007)	0.024 (0.003)	0.424 (0.008)	0.001 (0.000)	0.128 (0.001)	0.010 (0.001)	0.029 (0.000)	0.408 (0.007)	0.000 (0.000)	0.000 (0.000)	0.108 (0.008)	0.000 (0.000)
IRL-ISL	0.018 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.031 (0.004)	0.001 (0.000)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
IRL-NOR	0.000 (0.000)	0.009 (0.003)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.107 (0.008)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ISL-ITA	0.017 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.065 (0.003)	0.000 (0.000)	0.347 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)
ISL-NLD	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.028 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.125 (0.005)	0.278 (0.004)	0.045 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ISL-NOR	0.008 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ISL-PRT	0.000 (0.000)	0.033 (0.003)	0.016 (0.003)	0.000 (0.000)	0.037 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.021 (0.002)	0.297 (0.001)	0.000 (0.000)	0.000 (0.000)	0.028 (0.003)	0.013 (0.003)	0.141 (0.005)
ITA-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.001)	0.000 (0.000)	0.015 (0.002)
NLD-NOR	0.000 (0.000)	0.294 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.025 (0.000)	0.004 (0.000)	0.000 (0.000)	0.708 (0.001)	0.371 (0.002)	0.000 (0.000)	0.298 (0.002)
NOR-PRT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.143 (0.003)	0.000 (0.000)

Notes: The table reports the list of potential comparison units (first column) together with the corresponding average weights used in the synthetic algorithm for all country pairs involving Sweden in the all-lags model. Standard errors in parentheses.

Table A5. Average weights attached to comparison units in the Swedish synthetic three-lags models.

Comparison units	AUT	BLX	CHE	DEU	ESP	FIN	FRA	GBR	GRC	IRL	ISL	ITA	NLD	NOR	PRT	DNK
AUT-CHE	0.007 (0.001)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.436 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.216 (0.012)	0.000 (0.000)	0.001 (0.001)
AUT-GBR	0.018 (0.004)	0.058 (0.005)	0.000 (0.000)	0.000 (0.000)	0.022 (0.004)	0.000 (0.000)	0.111 (0.003)	0.000 (0.000)	0.006 (0.001)	0.008 (0.002)	0.000 (0.000)	0.091 (0.007)	0.003 (0.001)	0.000 (0.000)	0.013 (0.002)	0.001 (0.000)
AUT-ISL	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.060 (0.003)	0.041 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.007 (0.001)	0.000 (0.000)
AUT-NOR	0.323 (0.008)	0.012 (0.001)	0.010 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.001)	0.000 (0.000)	0.068 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)
BLX-CHE	0.105 (0.001)	0.063 (0.002)	0.196 (0.001)	0.091 (0.006)	0.000 (0.000)	0.214 (0.005)	0.006 (0.001)	0.344 (0.006)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.001 (0.000)	0.000 (0.000)	0.018 (0.002)	0.000 (0.000)	0.533 (0.002)
BLX-GBR	0.000 (0.000)	0.057 (0.001)	0.000 (0.000)	0.103 (0.002)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.251 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.015 (0.002)	0.003 (0.001)	0.000 (0.000)	0.160 (0.001)
BLX-ISL	0.000 (0.000)	0.007 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.001)	0.020 (0.002)	0.132 (0.008)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
BLX-NOR	0.013 (0.002)	0.014 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.027 (0.004)
CHE-DEU	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.266 (0.001)	0.000 (0.000)	0.012 (0.001)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.063 (0.001)	0.000 (0.000)	0.047 (0.001)	0.001 (0.000)	0.000 (0.000)
CHE-ESP	0.002 (0.000)	0.020 (0.001)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-FIN	0.000 (0.000)	0.007 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-FRA	0.004 (0.000)	0.000 (0.000)	0.006 (0.001)	0.100 (0.008)	0.000 (0.000)	0.292 (0.002)	0.003 (0.000)	0.110 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.288 (0.003)	0.000 (0.000)	0.009 (0.001)
CHE-GBR	0.000 (0.000)	0.015 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.196 (0.002)	0.006 (0.002)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.003 (0.001)	0.023 (0.002)	0.000 (0.000)	0.004 (0.001)
CHE-GRC	0.008 (0.003)	0.009 (0.000)	0.002 (0.001)	0.000 (0.000)	0.009 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.010 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-IRL	0.001 (0.000)	0.108 (0.003)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.542 (0.002)	0.001 (0.000)	0.000 (0.000)	0.302 (0.005)	0.004 (0.001)	0.000 (0.000)	0.003 (0.001)
CHE-ISL	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.038 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)
CHE-ITA	0.004 (0.000)	0.000 (0.000)	0.046 (0.000)	0.021 (0.002)	0.025 (0.001)	0.031 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.028 (0.002)	0.000 (0.000)	0.004 (0.001)	0.013 (0.000)	0.000 (0.000)
CHE-NLD	0.000 (0.000)	0.145 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.032 (0.003)
CHE-NOR	0.311 (0.006)	0.009 (0.000)	0.682 (0.004)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.035 (0.001)	0.023 (0.003)	0.000 (0.000)	0.000 (0.000)	0.334 (0.005)	0.000 (0.000)
CHE-PRT	0.008 (0.002)	0.008 (0.000)	0.114 (0.010)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.011 (0.001)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.048 (0.005)	0.000 (0.000)
DEU-GBR	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.024 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.006 (0.000)	0.000 (0.000)	0.000 (0.000)
DEU-ISL	0.000 (0.000)	0.006 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.027 (0.003)	0.006 (0.002)	0.004 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
DEU-NOR	0.000 (0.000)	0.008 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.028 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)
ESP-GBR	0.000 (0.000)	0.060 (0.001)	0.000 (0.000)	0.000 (0.000)	0.065 (0.001)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.018 (0.002)	0.000 (0.000)	0.000 (0.000)	0.047 (0.001)
ESP-ISL	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.012 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.010 (0.003)	0.000 (0.000)
ESP-NOR	0.000 (0.000)	0.007 (0.000)	0.000 (0.000)	0.000 (0.000)	0.434 (0.009)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.009 (0.003)	0.002 (0.000)	0.034 (0.004)	0.005 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FIN-GBR	0.001 (0.001)	0.006 (0.001)	0.004 (0.001)	0.013 (0.003)	0.000 (0.000)	0.012 (0.002)	0.550 (0.002)	0.019 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.015 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.017 (0.003)
FIN-ISL	0.001 (0.000)	0.006 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.182 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)
FIN-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.037 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.438 (0.007)	0.000 (0.000)	0.000 (0.000)
FRA-GBR	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.006 (0.002)	0.001 (0.000)	0.000 (0.000)	0.006 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.003 (0.000)
FRA-ISL	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.033 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.019 (0.004)	0.000 (0.000)	0.019 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.009 (0.003)	0.000 (0.000)
FRA-NOR	0.000 (0.000)	0.018 (0.001)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.010 (0.001)	0.000 (0.000)	0.000 (0.000)	0.004 (0.000)	0.001 (0.000)	0.000 (0.000)	0.478 (0.005)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)
GBR-GRC	0.246 (0.001)	0.145 (0.002)	0.001 (0.000)	0.000 (0.000)	0.214 (0.003)	0.106 (0.001)	0.074 (0.003)	0.000 (0.000)	0.228 (0.000)	0.232 (0.001)	0.000 (0.000)	0.223 (0.002)	0.058 (0.001)	0.000 (0.000)	0.283 (0.000)	0.015 (0.001)
GBR-IRL	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.037 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.166 (0.001)	0.090 (0.001)	0.000 (0.000)	0.030 (0.001)
GBR-ISL	0.000 (0.000)	0.007 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.013 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GBR-ITA	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.067 (0.002)	0.000 (0.000)	0.001 (0.000)	0.067 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.038 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)
GBR-NLD	0.000 (0.000)	0.012 (0.001)	0.000 (0.000)	0.013 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.007 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.010 (0.001)	0.000 (0.000)	0.050 (0.002)
GBR-NOR	0.003 (0.000)	0.003 (0.000)	0.019 (0.002)	0.498 (0.006)	0.000 (0.000)	0.008 (0.002)	0.043 (0.004)	0.416 (0.010)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.016 (0.001)	0.000 (0.000)	0.004 (0.001)	0.000 (0.000)	0.042 (0.005)
GBR-PRT	0.104 (0.004)	0.093 (0.004)	0.000 (0.000)	0.000 (0.000)	0.108 (0.007)	0.025 (0.002)	0.007 (0.002)	0.000 (0.000)	0.017 (0.002)	0.020 (0.002)	0.000 (0.000)	0.084 (0.005)	0.007 (0.001)	0.000 (0.000)	0.036 (0.003)	0.019 (0.001)
GRC-ISL	0.000 (0.000)	0.004 (0.000)	0.001 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.026 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.220 (0.004)	0.000 (0.000)
GRC-NOR	0.000 (0.000)	0.005 (0.000)	0.001 (0.000)	0.000 (0.000)	0.005 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.699 (0.006)	0.022 (0.003)	0.012 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)
IRL-ISL	0.024 (0.001)	0.020 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.005 (0.001)	0.000 (0.000)	0.000 (0.000)	0.025 (0.001)	0.122 (0.003)	0.344 (0.004)	0.000 (0.000)	0.000 (0.000)	0.014 (0.001)	0.000 (0.000)	0.146 (0.001)
IRL-NOR	0.019 (0.002)	0.034 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.129 (0.012)	0.003 (0.000)	0.000 (0.000)	0.020 (0.002)	0.001 (0.001)	0.000 (0.000)	0.003 (0.001)
ISL-ITA	0.001 (0.001)	0.004 (0.000)	0.018 (0.002)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.167 (0.011)	0.004 (0.001)	0.157 (0.004)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.206 (0.010)	0.000 (0.000)
ISL-NLD	0.000 (0.000)	0.007 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ISL-NOR	0.001 (0.000)	0.011 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.019 (0.002)	0.043 (0.003)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.030 (0.003)
ISL-PRT	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.020 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ITA-NOR	0.000 (0.000)	0.006 (0.000)	0.083 (0.003)	0.000 (0.000)	0.115 (0.007)	0.000 (0.000)	0.077 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.563 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
NLD-NOR	0.000 (0.000)	0.162 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.111 (0.007)	0.000 (0.000)	0.000 (0.000)	0.008 (0.001)
NOR-PRT	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.151 (0.007)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)

Notes: The table reports the list of potential comparison units (first column) together with the corresponding average weights used in the synthetic algorithm for all country pairs involving Sweden in the three-lags model. Standard errors in parentheses.

Table A6. Average weights attached to comparison units in the Danish synthetic all-lags models.

Comparison units	AUT	BLX	CHE	DEU	ESP	FIN	FRA	GBR	GRC	IRL	ISL	ITA	NLD	NOR	PRT	SWE
AUT-CHE	0.021 (0.001)	0.059 (0.002)	0.007 (0.001)	0.018 (0.004)	0.000 (0.000)	0.000 (0.000)	0.051 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.018 (0.002)	0.002 (0.000)	0.036 (0.003)	0.000 (0.000)	0.001 (0.000)
AUT-GBR	0.001 (0.000)	0.021 (0.001)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.013 (0.001)	0.024 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
AUT-ISL	0.002 (0.001)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.092 (0.007)	0.009 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)
AUT-NOR	0.165 (0.001)	0.085 (0.004)	0.545 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.001)	0.001 (0.000)	0.000 (0.000)	0.002 (0.000)	0.090 (0.006)	0.002 (0.001)	0.032 (0.004)	0.000 (0.000)	0.033 (0.002)
BLX-CHE	0.003 (0.000)	0.025 (0.001)	0.017 (0.000)	0.035 (0.003)	0.000 (0.000)	0.016 (0.001)	0.001 (0.000)	0.712 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.096 (0.001)	0.107 (0.001)	0.000 (0.000)	0.023 (0.002)
BLX-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)
BLX-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.203 (0.009)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
BLX-NOR	0.021 (0.000)	0.000 (0.000)	0.000 (0.000)	0.393 (0.005)	0.000 (0.000)	0.000 (0.000)	0.245 (0.002)	0.064 (0.005)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.009 (0.001)	0.021 (0.002)	0.006 (0.001)	0.000 (0.000)	0.000 (0.000)
CHE-DEU	0.001 (0.000)	0.000 (0.000)	0.006 (0.000)	0.221 (0.001)	0.000 (0.000)	0.000 (0.000)	0.031 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.009 (0.000)	0.000 (0.000)	0.010 (0.000)	0.001 (0.000)	0.000 (0.000)
CHE-ESP	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-FIN	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.055 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.014 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.035 (0.003)
CHE-FRA	0.007 (0.000)	0.044 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.041 (0.000)	0.008 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.058 (0.000)	0.003 (0.000)	0.000 (0.000)	0.000 (0.000)	0.152 (0.001)
CHE-GBR	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-GRC	0.545 (0.003)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.216 (0.006)	0.000 (0.000)	0.016 (0.003)	0.000 (0.000)	0.298 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.037 (0.003)	0.000 (0.000)
CHE-IRL	0.000 (0.000)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.160 (0.001)	0.000 (0.000)	0.000 (0.000)	0.021 (0.002)	0.000 (0.000)	0.000 (0.000)	0.007 (0.002)
CHE-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.040 (0.003)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-ITA	0.000 (0.000)	0.000 (0.000)	0.041 (0.000)	0.071 (0.007)	0.000 (0.000)	0.000 (0.000)	0.030 (0.001)	0.001 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.014 (0.001)	0.000 (0.000)	0.019 (0.001)	0.003 (0.000)	0.000 (0.000)
CHE-NLD	0.003 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-NOR	0.006 (0.001)	0.000 (0.000)	0.079 (0.005)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.008 (0.002)	0.000 (0.000)	0.000 (0.000)	0.014 (0.000)	0.347 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.013 (0.002)
CHE-PRT	0.071 (0.002)	0.001 (0.001)	0.458 (0.003)	0.000 (0.000)	0.018 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.016 (0.001)	0.000 (0.000)	0.108 (0.007)	0.008 (0.001)	0.397 (0.001)	0.000 (0.000)
DEU-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)
DEU-ISL	0.104 (0.001)	0.102 (0.002)	0.003 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.083 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.000)	0.159 (0.004)	0.008 (0.001)	0.053 (0.005)	0.000 (0.000)	0.000 (0.000)
DEU-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.100 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.047 (0.001)	0.000 (0.000)	0.000 (0.000)
ESP-GBR	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.025 (0.002)	0.062 (0.000)	0.000 (0.000)	0.028 (0.001)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)	0.005 (0.000)	0.000 (0.000)
ESP-ISL	0.032 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ESP-NOR	0.000 (0.000)	0.232 (0.001)	0.000 (0.000)	0.000 (0.000)	0.102 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.008 (0.000)	0.147 (0.002)	0.017 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.001)	0.000 (0.000)
FIN-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.076 (0.001)	0.000 (0.000)	0.046 (0.006)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.051 (0.001)	0.002 (0.000)	0.000 (0.000)	0.122 (0.003)
FIN-ISL	0.000 (0.000)	0.001 (0.001)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.113 (0.010)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.065 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FIN-NOR	0.001 (0.000)	0.109 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.015 (0.001)	0.012 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.019 (0.000)	0.000 (0.000)	0.096 (0.004)	0.076 (0.003)	0.000 (0.000)	0.017 (0.003)
FRA-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.011 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FRA-ISL	0.064 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.582 (0.006)	0.000 (0.000)	0.008 (0.002)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.524 (0.004)	0.000 (0.000)
FRA-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.023 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GBR-GRC	0.016 (0.001)	0.010 (0.001)	0.000 (0.000)	0.000 (0.000)	0.055 (0.002)	0.000 (0.000)	0.084 (0.005)	0.000 (0.000)	0.037 (0.001)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)
GBR-IRL	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.016 (0.000)	0.000 (0.000)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.070 (0.000)	0.000 (0.000)	0.000 (0.000)	0.080 (0.002)
GBR-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.007 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GBR-ITA	0.000 (0.000)	0.004 (0.000)	0.000 (0.000)	0.197 (0.001)	0.000 (0.000)	0.000 (0.000)	0.018 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.042 (0.000)	0.003 (0.000)	0.041 (0.000)	0.000 (0.000)	0.057 (0.001)
GBR-NLD	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.011 (0.000)	0.000 (0.000)	0.065 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.050 (0.002)
GBR-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.059 (0.002)	0.000 (0.000)	0.011 (0.000)	0.000 (0.000)	0.209 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.009 (0.001)	0.000 (0.000)	0.143 (0.001)
GBR-PRT	0.007 (0.000)	0.001 (0.000)	0.000 (0.000)	0.027 (0.003)	0.017 (0.002)	0.000 (0.000)	0.114 (0.002)	0.000 (0.000)	0.011 (0.000)	0.000 (0.000)	0.000 (0.000)	0.089 (0.001)	0.209 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GRC-ISL	0.001 (0.000)	0.000 (0.000)	0.039 (0.005)	0.000 (0.000)	0.018 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.340 (0.008)	0.000 (0.000)	0.596 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.059 (0.006)	0.000 (0.000)
GRC-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.007 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
IRL-ISL	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.032 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.238 (0.006)	0.029 (0.004)	0.020 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)
IRL-NOR	0.000 (0.000)	0.024 (0.002)	0.000 (0.000)	0.003 (0.001)	0.028 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.184 (0.004)	0.000 (0.000)	0.000 (0.000)	0.267 (0.005)	0.000 (0.000)	0.125 (0.001)	0.000 (0.000)
ISL-ITA	0.010 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.019 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ISL-NLD	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.535 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ISL-NOR	0.003 (0.001)	0.174 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.148 (0.001)	0.001 (0.000)	0.106 (0.001)	0.000 (0.000)	0.003 (0.001)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)
ISL-PRT	0.002 (0.000)	0.000 (0.000)	0.005 (0.001)	0.000 (0.000)	0.000 (0.000)	0.739 (0.004)	0.000 (0.000)	0.062 (0.002)	0.000 (0.000)	0.024 (0.003)	0.063 (0.001)	0.003 (0.001)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.141 (0.005)
ITA-NOR	0.023 (0.001)	0.278 (0.001)	0.001 (0.000)	0.016 (0.002)	0.002 (0.000)	0.000 (0.000)	0.462 (0.004)	0.000 (0.000)	0.063 (0.000)	0.000 (0.000)	0.010 (0.000)	0.328 (0.003)	0.001 (0.000)	0.607 (0.002)	0.006 (0.001)	0.015 (0.002)
NLD-NOR	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.077 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.007 (0.000)	0.000 (0.000)	0.187 (0.001)	0.128 (0.003)	0.000 (0.000)	0.298 (0.002)
NOR-PRT	0.099 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.055 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.027 (0.002)	0.000 (0.000)

Notes: The table reports the list of potential comparison units (first column) together with the corresponding average weights used in the synthetic algorithm for all country pairs involving Denmark in the all-lags model. Standard errors in parentheses.

Table A7. Average weights attached to comparison units in the Danish synthetic three-lags models.

Comparison units	AUT	BLX	CHE	DEU	ESP	FIN	FRA	GBR	GRC	IRL	ISL	ITA	NLD	NOR	PRT	SWE
AUT-CHE	0.000 (0.000)	0.002 (0.000)	0.009 (0.001)	0.047 (0.004)	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.001)	0.000 (0.000)	0.001 (0.001)
AUT-GBR	0.008 (0.002)	0.025 (0.005)	0.000 (0.000)	0.000 (0.000)	0.015 (0.003)	0.024 (0.005)	0.038 (0.008)	0.000 (0.000)	0.004 (0.001)	0.005 (0.001)	0.000 (0.000)	0.039 (0.008)	0.036 (0.007)	0.000 (0.000)	0.008 (0.002)	0.001 (0.000)
AUT-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.025 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.284 (0.010)	0.016 (0.003)	0.050 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.514 (0.006)	0.000 (0.000)
AUT-NOR	0.590 (0.004)	0.042 (0.004)	0.147 (0.012)	0.000 (0.000)	0.000 (0.000)	0.035 (0.004)	0.009 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.030 (0.003)	0.002 (0.001)	0.006 (0.001)	0.000 (0.000)	0.000 (0.000)
BLX-CHE	0.003 (0.000)	0.040 (0.001)	0.042 (0.001)	0.001 (0.001)	0.000 (0.000)	0.197 (0.002)	0.035 (0.001)	0.626 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.037 (0.001)	0.058 (0.001)	0.197 (0.003)	0.000 (0.000)	0.533 (0.002)
BLX-GBR	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.026 (0.003)	0.000 (0.000)	0.001 (0.000)	0.004 (0.000)	0.118 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.011 (0.001)	0.000 (0.000)	0.000 (0.000)	0.160 (0.001)
BLX-ISL	0.004 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.019 (0.002)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.060 (0.006)	0.064 (0.006)	0.037 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.025 (0.004)	0.000 (0.000)
BLX-NOR	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.062 (0.006)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.005 (0.001)	0.050 (0.005)	0.000 (0.000)	0.027 (0.004)
CHE-DEU	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.138 (0.003)	0.000 (0.000)	0.000 (0.000)	0.018 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.024 (0.001)	0.000 (0.000)	0.003 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-ESP	0.000 (0.000)	0.000 (0.000)	0.059 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.005 (0.000)	0.000 (0.000)	0.000 (0.000)	0.017 (0.001)	0.000 (0.000)	0.000 (0.000)
CHE-FIN	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-FRA	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.129 (0.003)	0.000 (0.000)	0.001 (0.000)	0.003 (0.000)	0.056 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.001)	0.000 (0.000)	0.005 (0.001)	0.000 (0.000)	0.009 (0.001)
CHE-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.001)	0.001 (0.000)	0.000 (0.000)	0.004 (0.001)
CHE-GRC	0.095 (0.008)	0.003 (0.001)	0.025 (0.005)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-IRL	0.004 (0.000)	0.002 (0.001)	0.001 (0.000)	0.000 (0.000)	0.043 (0.002)	0.161 (0.005)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.088 (0.002)	0.000 (0.000)	0.000 (0.000)	0.040 (0.003)	0.068 (0.007)	0.000 (0.000)	0.003 (0.001)
CHE-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.011 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-ITA	0.000 (0.000)	0.000 (0.000)	0.020 (0.000)	0.209 (0.005)	0.000 (0.000)	0.000 (0.000)	0.024 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.013 (0.001)	0.000 (0.000)	0.019 (0.000)	0.000 (0.000)	0.000 (0.000)
CHE-NLD	0.000 (0.000)	0.001 (0.000)	0.014 (0.001)	0.000 (0.000)	0.000 (0.000)	0.023 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.004 (0.001)	0.437 (0.002)	0.000 (0.000)	0.032 (0.003)
CHE-NOR	0.016 (0.003)	0.000 (0.000)	0.811 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.005 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.011 (0.001)	0.011 (0.002)	0.000 (0.000)	0.008 (0.001)	0.000 (0.000)	0.000 (0.000)
CHE-PRT	0.001 (0.001)	0.000 (0.000)	0.019 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
DEU-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)
DEU-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.009 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
DEU-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ESP-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.047 (0.001)
ESP-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ESP-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FIN-GBR	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.003 (0.001)	0.004 (0.001)	0.115 (0.010)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.017 (0.003)
FIN-ISL	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.093 (0.009)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.001 (0.000)
FIN-NOR	0.003 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
FRA-GBR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)
FRA-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.016 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.002)	0.000 (0.000)	0.004 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.006 (0.002)	0.000 (0.000)
FRA-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GBR-GRC	0.258 (0.001)	0.834 (0.002)	0.000 (0.000)	0.344 (0.004)	0.590 (0.001)	0.252 (0.001)	0.873 (0.002)	0.193 (0.003)	0.268 (0.001)	0.352 (0.002)	0.000 (0.000)	0.913 (0.001)	0.745 (0.002)	0.000 (0.000)	0.371 (0.001)	0.015 (0.001)
GBR-IRL	0.000 (0.000)	0.008 (0.000)	0.000 (0.000)	0.147 (0.003)	0.000 (0.000)	0.002 (0.000)	0.000 (0.000)	0.010 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.096 (0.001)	0.000 (0.000)	0.000 (0.000)	0.030 (0.001)
GBR-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.097 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GBR-ITA	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.091 (0.006)	0.000 (0.000)	0.000 (0.000)	0.034 (0.001)	0.013 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.002 (0.000)
GBR-NLD	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.003 (0.000)	0.002 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.050 (0.002)
GBR-NOR	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.023 (0.003)	0.000 (0.000)	0.000 (0.000)	0.005 (0.000)	0.001 (0.000)	0.000 (0.000)	0.009 (0.001)	0.000 (0.000)	0.042 (0.005)
GBR-PRT	0.022 (0.002)	0.073 (0.007)	0.000 (0.000)	0.049 (0.005)	0.045 (0.004)	0.085 (0.004)	0.153 (0.014)	0.028 (0.003)	0.014 (0.001)	0.019 (0.002)	0.000 (0.000)	0.121 (0.011)	0.112 (0.010)	0.000 (0.000)	0.024 (0.002)	0.019 (0.001)
GRC-ISL	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.005 (0.001)	0.000 (0.000)	0.202 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.029 (0.003)	0.000 (0.000)
GRC-NOR	0.018 (0.003)	0.004 (0.001)	0.000 (0.000)	0.000 (0.000)	0.285 (0.008)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.037 (0.005)	0.041 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.008 (0.002)	0.000 (0.000)
IRL-ISL	0.118 (0.003)	0.132 (0.003)	0.003 (0.000)	0.000 (0.000)	0.012 (0.002)	0.190 (0.003)	0.000 (0.000)	0.000 (0.000)	0.099 (0.004)	0.522 (0.004)	0.519 (0.002)	0.000 (0.000)	0.040 (0.001)	0.195 (0.003)	0.050 (0.003)	0.146 (0.001)
IRL-NOR	0.047 (0.001)	0.002 (0.001)	0.038 (0.001)	0.000 (0.000)	0.091 (0.003)	0.084 (0.006)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.044 (0.004)	0.003 (0.000)	0.000 (0.000)	0.005 (0.001)	0.125 (0.005)	0.000 (0.000)	0.003 (0.001)
ISL-ITA	0.011 (0.003)	0.005 (0.002)	0.000 (0.000)	0.000 (0.000)	0.060 (0.006)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.418 (0.011)	0.003 (0.001)	0.002 (0.000)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)	0.164 (0.009)	0.000 (0.000)
ISL-NLD	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ISL-NOR	0.014 (0.002)	0.023 (0.002)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.055 (0.004)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.046 (0.005)	0.061 (0.005)	0.000 (0.000)	0.012 (0.001)	0.034 (0.003)	0.000 (0.000)	0.030 (0.003)
ISL-PRT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.021 (0.003)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
ITA-NOR	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.025 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
NLD-NOR	0.000 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.022 (0.003)	0.007 (0.001)	0.000 (0.000)	0.008 (0.001)
NOR-PRT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.037 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)

Notes: The table reports the list of potential comparison units (first column) together with the corresponding average weights used in the synthetic algorithm for all country pairs involving Denmark in the three-lags model. Standard errors in parentheses.

Figure A1. The evolution of Swedish actual and synthetic trade against individual bilateral pairs (all lags)

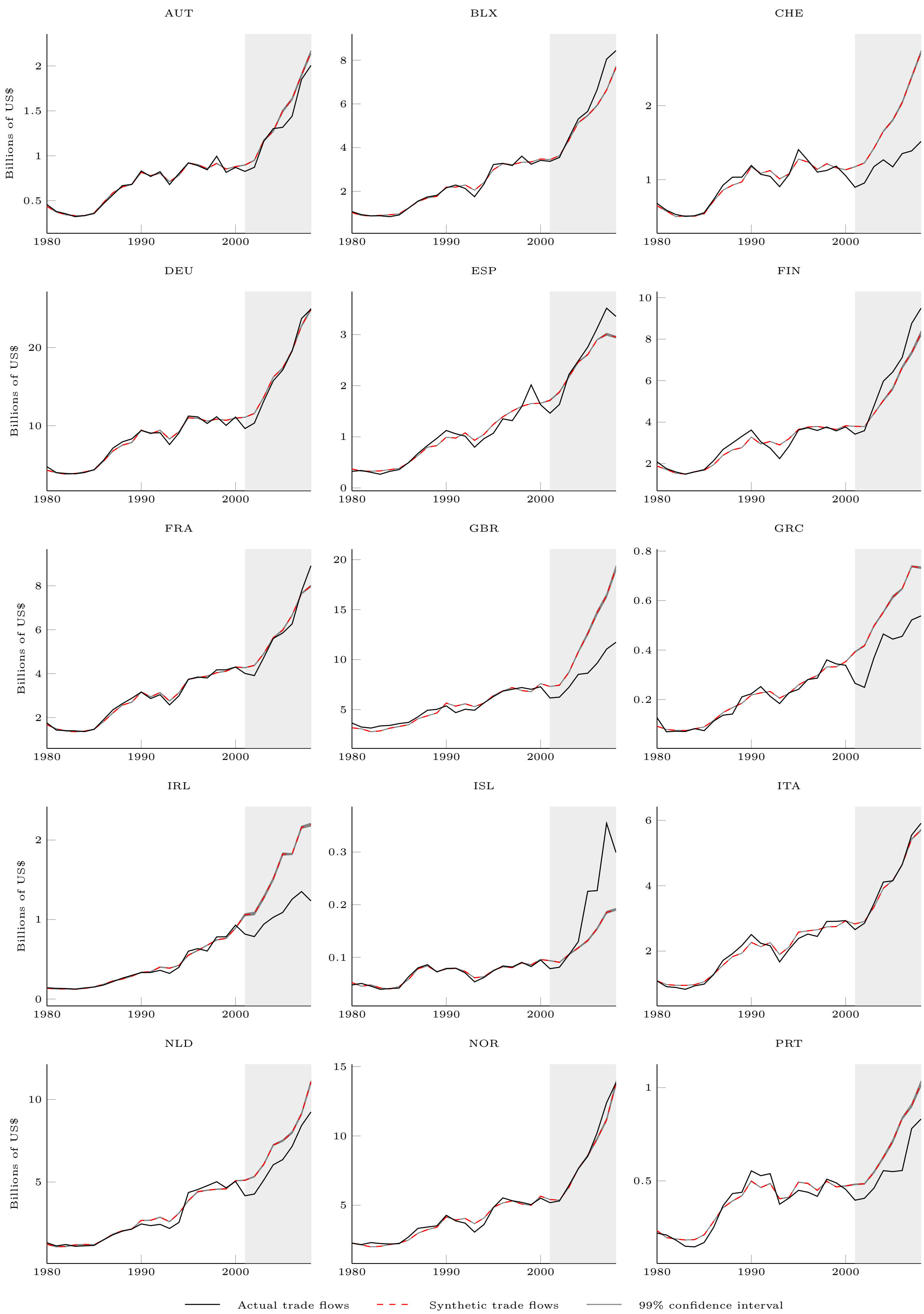

Figure A2. The evolution of Swedish actual and synthetic trade against individual bilateral pairs (three lags)

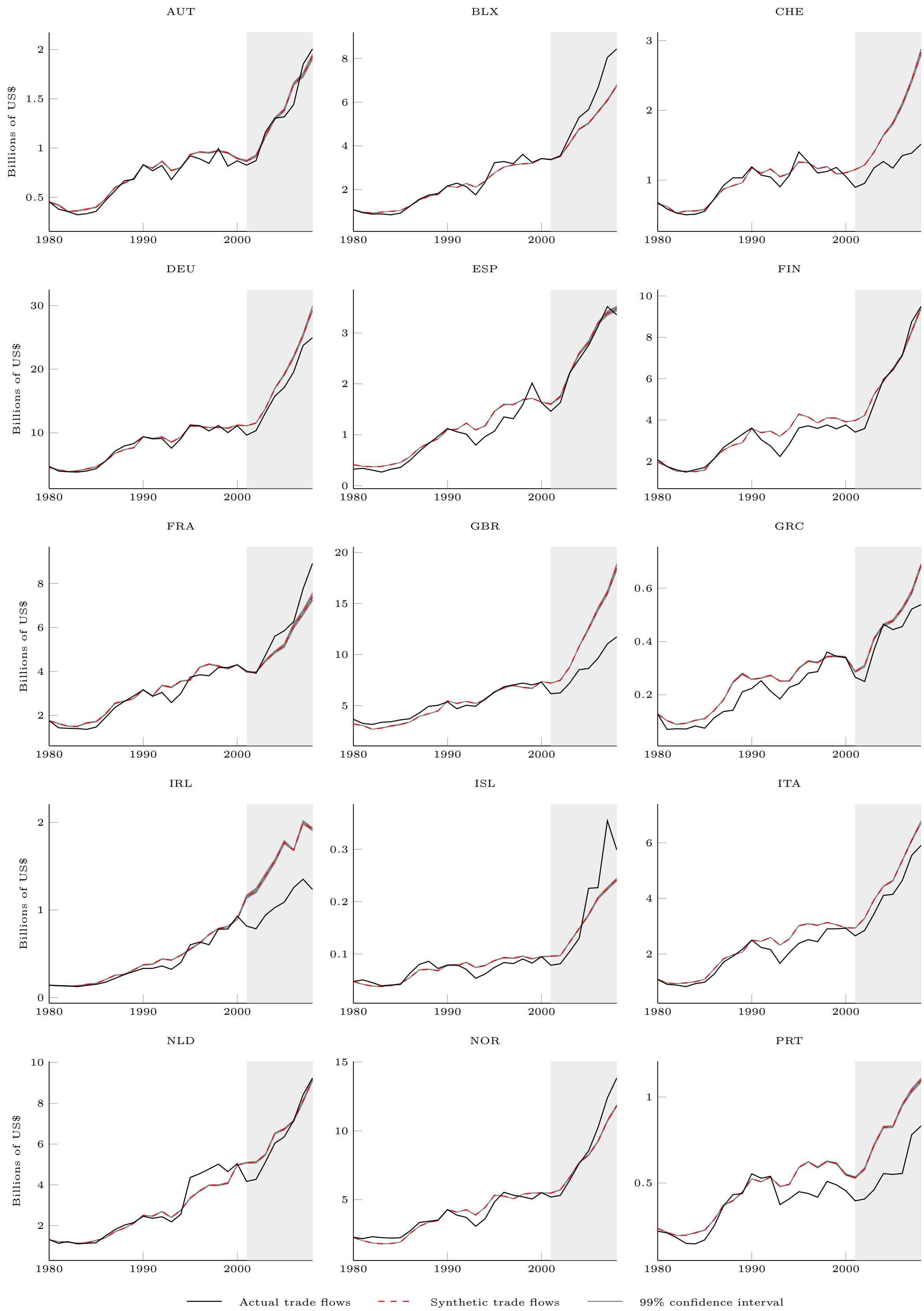

Figure A3. The evolution of Danish actual and synthetic trade against individual bilateral pairs (all lags)

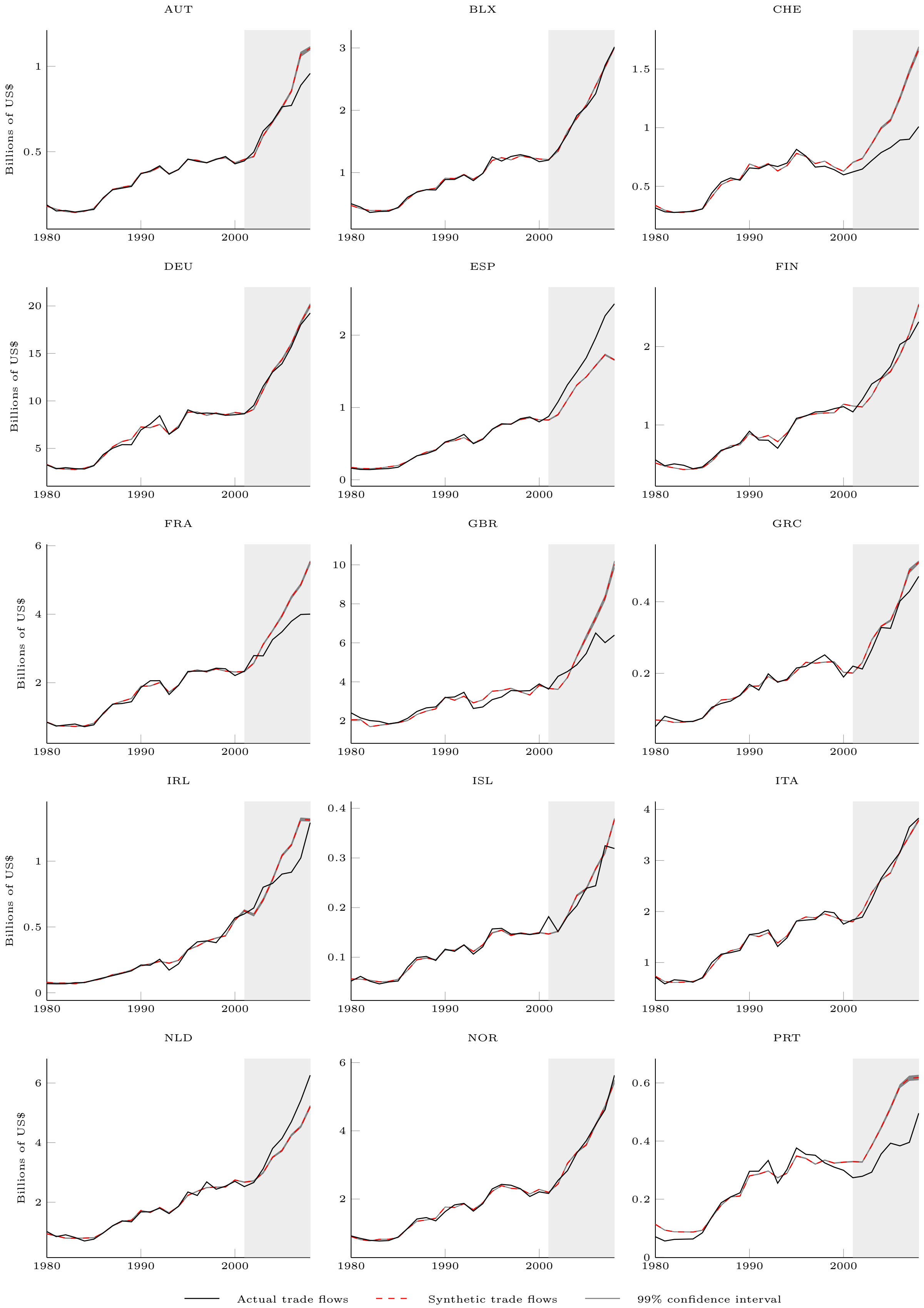

Figure A4. The evolution of Danish actual and synthetic trade against individual bilateral pairs (three lags)

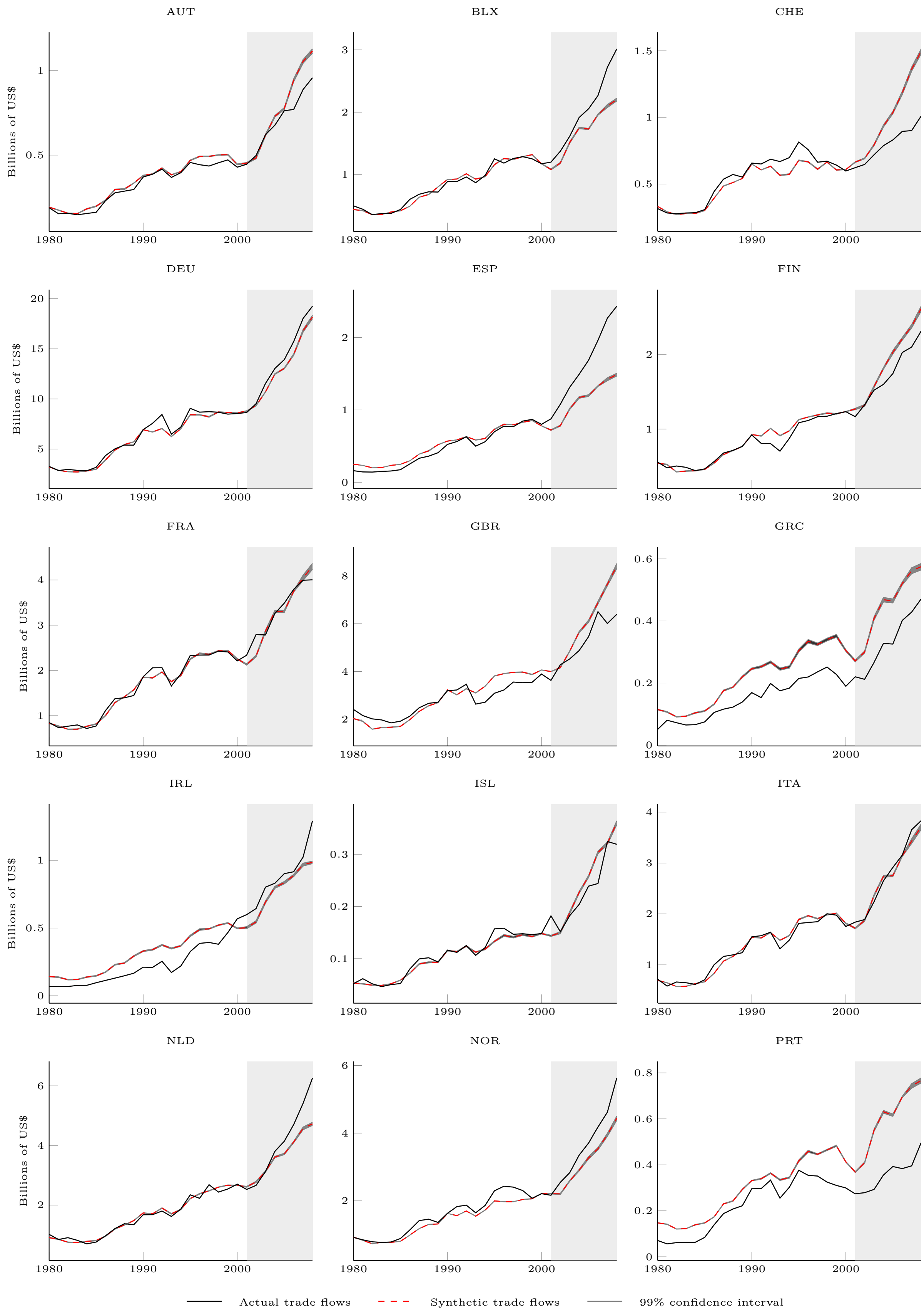

Table A8. Countries used in our dataset and their International Organization for Standardization (ISO) codes

Country	ISO code
Austria	AUT
Belgium-Luxembourg	BLX
Switzerland	CHE
Germnay	DEU
Denmark	DNK
Spain	ESP
Finland	FIN
France	FRA
United Kingdom	GBR
Greece	GRC
Iceland	ISL
Ireland	IRL
Italy	ITA
Netherlands	NLD
Norway	NOR
Portugal	PRT
Sweden	SWE

Table A9. Data and data sources

Data	Data sources
Trade costs	ESCAP-World Bank trade cost database
Gravity variables (GDP, distance, land border)	Centre d'Études Prospectives et d'Informations Internationales
Bilateral trade	UN Comtrade
Product-level trade	UN Comtrade
Rauch product classification	Rauch (1999)
Freight cost	US Customs data (US Census Bureau)
Durability classification	United Nations statistics