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Estimating the Effects of the Totalization Agreements

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Beginning in the late 1970s, the United States established a network of Social Security agreements that coordinate the U.S. Social Security program with the comparable programs of other countries. These international Social Security agreements, often called the "totalization agreements," have three main purposes. First, they eliminate dual Social Security taxation, the situation that occurs when a worker from one country works in another country and is required to pay Social Security taxes to both countries on the same earnings. Second, the agreements help fill gaps in benefit protection for workers who have divided their careers between the U.S. and another country. Finally, totalization agreements permit unrestricted payment of benefits to residents of the two countries.

Conceptually, by reducing the tax and increasing benefit protection for U.S. citizens working in other countries and vice versa, the totalization agreements should have a positive effect on U.S. citizens working in countries that have signed such an agreement with the U.S., as well as the citizens from those countries working in the U.S. By promoting international labor mobility, the totalization agreements could also affect foreign direct investment (FDI) and bilateral trade.

On the one hand, the totalization agreements may increase bilateral trade if the increased international labor mobility helps reduce the transaction cost of international trade. On the other hand, the totalization agreements may reduce trade if factor mobility and trade are substitutes. For example, if the totalization agreement between Italy and the U.S. makes it easier for Boeing to send its engineers to Italy and produce airplanes there, it may reduce the number of airplanes exported from the U.S. to Italy. A reduction in U.S. exports is often perceived as contributing to fewer U.S. jobs, but this view ignores the fact that Boeing's physical presence in Italy might mean more airplane sales for Boeing and fewer for Airbus. Factor mobility and trade may also be complements. Additionally, FDI is generally associated with higher domestic employment.

Quantitatively, the potential effects of a totalization agreement depend on at least three factors: the size of the population considering working abroad, the size of the Social Security taxes and benefits relative to other costs and benefits affecting their decisions, and the sensitivity of FDI and bilateral trade to international labor mobility. In 2016, the total number of non-U.S. beneficiaries of the totalization agreements was 226,924. This is an approxi-

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mate lower-bound estimate of the total number of workers previously employed under a totalization agreement. The economic impact of a totalization agreement at a particular point of time depends on the number of U.S./foreign workers currently participating in the agreement.

This paper estimates the effects of the totalization agreements empirically. For each country that has ever signed a totalization agreement with the U.S., referred to as the "treated country," this method constructs a synthetic control country as the weighted average of other countries that have not signed a totalization agreement with the U.S. The weights are chosen such that the synthetic control country mimics the behavior of the treated country in terms of the outcome variable of interest before the totalization agreement entered into force. The totalization agreement's effects are then measured by the differences in the outcome variable between the treated and the synthetic country since the agreement entered into force. Once we have a synthetic control for each treated country, we pool the pairs of countries together and estimate a totalization agreement's average effects by running difference-in-differences (DID) type regressions.

Relative to DID, the synthetic control method has at least two advantages. First, instead of simply assuming that the treated country shares the same trend with the control countries in the absence of a totalization agreement, the synthetic control method weights the control countries properly to explicitly ensure that the resulting synthetic control country does share the same trend with the treated country before the totalization agreement entered into force. Secondly, in addition to the average effect, the synthetic control method is able to estimate the effect for each treated country/agreement. This allows us to study whether and how the effect varies across countries/agreements.

Empirically, we find that, on average, the totalization agreements reduce U.S. exports and increase U.S. imports and FDI. The effect on exports are more significant both economically and statistically, while the effects on imports and FDI are not significant statistically until the fifth year after an agreement entered into force.

Specifically, U.S. exports to treated countries increase by about 50 percent on average in the six years between the year leading to the agreement and the fifth year after the agreement. In the absence of the agreement, the estimates suggest that the U.S. exports to those countries would double. This implies the totalization agreements reduce the growth of U.S. exports during the six years by about 50 percent on average.

Moreover, we find the effects are quite different across countries/agreements. For example, although most of the totalization agreements are estimated to reduce U.S. exports, the estimates suggest an increase in U.S. exports due to the totalization agreements with Finland, Ireland, and the Czech Republic. Similarly, contrary to the average effect that sees an increase in U.S. imports, the estimates suggest a decrease in U.S. imports due to the totalization agreements with countries such as Italy, Germany, Norway, Sweden, Portugal, South Korea, and Australia. ❖

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