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Expansion of the Totalization Program Using Simplified Agreements to Eliminate Dual Taxation

Abstract

The United States has signed 30 bilateral social security agreements. Some of its partner countries, such as the U.K. or Germany, have signed international agreements to eliminate double taxation for nationals working temporarily abroad with more than 50 other countries. This project analyzes the potential macroeconomic impact of expanding the countries with international social security treaties by enacting new social security totalization agreements that are simpler than the standard totalization agreements enacted so far. The focus of this project is to simulate the effect on international flows of capital of eliminating double social security taxation through enacting limited treaties with additional countries beyond the current U.S. partners. For this, we extend a theoretical model of foreign direct investment to incorporate social security international agreements with several countries. We model limited totalization agreements that only eliminate double taxation. We use the model to forecast the effects of new, more flexible totalization agreements.

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1. Introduction

The United States has signed international social security totalization agreements with 30 countries in Europe, Asia, North and South America, as well as Australia. These agreements typically state that the host country refrains from social security taxation of temporary foreign workers and that the sender country recognizes the foreign deployment in determining eligibility for and amount of social security benefits.

International social security totalization agreements signed by the U.S. benefit U.S. nationals who work temporarily in a foreign country and foreigners who work in the U.S. by avoiding dual contributions to the Social Security Administration (SSA) and the partner countries' counterpart agencies, and by reducing the risk of not meeting eligibility requirements such as the minimum number of years of contributions (Jackson and Cash 2018). By facilitating the international reallocation of workers, totalization agreements can affect multinational firms' incentives, foreign direct investment (FDI), and international capital flows. Lastly, by determining which foreign workers and which U.S. workers abroad contribute to Social Security payroll taxes, totalization agreements directly impact the revenues of the SSA.

Prados et al. (2019) showed that totalization agreements can decrease the cost of relocating managerial power and thus lead to increased flows of FDI. They also found that there is a large and statistically significant effect of these treaties on the levels of FDI by American firms abroad, and the effect size depends on the partner countries' relative characteristics. Seshadri and Guo (2020) found that, on average, totalization agreements reduce U.S. exports and increase U.S. imports and FDI.

While the U.S. has concluded totalization agreements with 30 countries, some of its partners (such as the U.K. or Germany) have signed totalization agreements with more than 50 countries. For example, Germany has signed international social security agreements with 52 countries, which include 21 countries outside of those covered by European law,[1] and a special agreement with China eliminating double taxation for temporary workers at the partner country (with no other provision about pension eligibility).[2]

In this paper, we assess the potential effects on American firms' activities abroad, international flows of capital (as FDI), and SSA revenues, of increasing the number of countries with totalization agreements with the U.S. For this, we consider a potential expansion of the totalization agreement program that allows for more flexible or limited agreements. The potential expansion studied here is one that relaxes two requirements of the current program. The first departure from traditional totalization agreements would allow the inclusion of partner countries that do not have social security systems similar to the U.S. The second would permit limited agreements that require less coordination between countries than full treaties. These would be agreements to eliminate dual social security taxation, but would not affect eligibility requirements for social security benefits. We study a variety of potential partners to characterize the likely effects of such an expansion.

[1] In European law, the countries of the European Union agree on uniform rules for social security, thus no further agreements are necessary for the countries where European law applies.

[2] German Pension Insurance: https://www.deutsche-rentenversicherung.de/DRV/EN/International/international_index.html

2. Potential expansions of the totalization program

Because of the totalization of contributions and benefits eligibility, in general, totalization agreements require a significant amount of coordination between the partner countries' social security systems. Moreover, regular totalization agreements between provident-fund countries, such as Singapore, and social-insurance countries can be challenging to coordinate or impossible to implement. Social security agreements that do not include these provisions may be simpler to conclude.

One way to make these agreements more flexible is to consider agreements that only eliminate dual taxation. We study the potential effects of concluding this kind of international social security agreement with a variety of countries not currently partners of the U.S. The selection of hypothetical partner countries for this exercise is somewhat arbitrary and not indicative of attempts to conclude agreements between these countries and the U.S. The set of hypothetical partners includes countries from regions or sociopolitical environments different from the current set of partner countries:

i. some of the remaining countries in the European Union without international agreements with the U.S.: Croatia, Estonia, Romania, Serbia;
ii. other countries that are not currently U.S. partners but have totalization treaties with some of the U.S. partner countries (such as with the U.K. and Germany): Israel, Morocco, Tunisia, Turkey;
iii. three of the largest Southeast Asian economies: Thailand, the Philippines, and Singapore.

In general, as shown in Section 4, most of these countries are smaller than the typical country in the list of U.S. totalization agreement partners.

3. Institutional Background

3.1. Elimination of dual taxation

One of the main goals of totalization agreements is that workers pay taxes and be covered under the social security system of only one country, which is usually where they are employed — the territoriality rule. But there is an exception provided for workers sent to a country by their employer on a temporary assignment; this is referred to as the *detached worker* rule. To determine whether the detached worker rule exception applies for a specific worker, the totalization agreements refer to a concept of greater economic attachment.[3]

Totalization agreements determine that individuals pay the social security taxes to the country determined to be the one with greater economic attachment and include rules on how to make that determination: Workers who are sent temporarily abroad by their employer with the intention of being there fewer than five years are determined to have greater economic attachment to their country of origin, and so will contribute only to their national social security system. But for people hired while in the foreign country or hired by a foreign-based firm, they will be deemed to have greater economic attachment to the foreign country and will have to pay taxes to the social security agency of the foreign country.

Absent a totalization agreement, U.S. laws require that U.S. nationals who work for American firms and are sent abroad for a period of five years or less must continue contributing to U.S. Social Security. Most foreign countries would also require them to

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[3] Source: IRS https://www.irs.gov/government-entities/federal-state-local-governments/totalization-agreements.

make contributions to their local social security system and, hence, these workers are taxed doubly for social security. U.S. taxes are levied upon both workers and their employers – as is also the case in most other countries – so both the firm and the employee contribute to both systems. Totalization agreements eliminate double taxation for this group of workers.

Generally, Americans who gain employment while abroad are not required to pay contributions to the U.S. Social Security system. This is because, for them, the totalization agreement applies the territoriality rule, meaning that workers pay taxes and are covered under the social security system of only one country, usually where they are employed (the exception being for detached workers covered in the case above). The totalization agreement does not affect them.

One last case where totalization agreements avoid dual taxation is the case of workers who relocate permanently to the partner country while employed by a U.S. firm. Even though a totalization agreement does not change their tax duties to the partner country, it relieves them from their duties to U.S. Social Security. (Meijer et al. 2020)

The analogous effects apply to the partner country's nationals who come to work in the U.S.

3. 2. Social security in hypothetical partner countries

Table 1 summarizes the main characteristics of social security systems in the hypothetical partner countries we consider. Except for Singapore, which has a provident fund, the remaining countries in our list have a social insurance pension system.[4,5]

The Central Provident Fund Board of Singapore (CPF) is a compulsory comprehensive savings and pension plan for working Singaporeans and permanent residents primarily to fund their retirement, healthcare, and housing needs in Singapore. Foreigners are not mandated to pay into the system unless they gain permanent residency in Singapore.

Estonia is another case that slightly departs from traditional social insurance. The Estonian pension system was originally built on a traditional three-pillar model — the first, the state pay-as-you-go pension; the second, a mandatory funded pension and the third a voluntary funded pension. A reform in October 2020 turned the second pillar into a voluntary fund as of January 2021. (European Pensions 2021)

There is no current totalization agreement between the U.S. and Israel. A tax treaty helps in determining the fiscal residency of persons from one of these countries working or living in the partner country, but this convention does not apply to U.S. Social Security taxes or Israel's National Insurance taxes (IRS 1995). Contributing to Israel's National Insurance is mandatory only for Israeli residents, but expat workers can easily fall in this category.[6]

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[4] Estonia has a universal social insurance system. Additionally, persons born in 1983 and after who are covered by social insurance, including self-employed persons, are subject to a mandatory individual account.

[5] The 2017 reform in Morocco extended the social insurance system to also cover self-employed individuals.

[6] "An Israeli resident is a person whose life is centered in Israel. Criteria for determining this include: Israel is your permanent place of residence, where your family resides, where your children go to school, your primary place of work, or where you are studying." Source: State of Israel National Insurance Institute.

Table 1: Characteristics of social security systems in the sample countries

Country	Type of pension system	Tax Rate Overall	Wage Ceiling
Croatia	Social insurance	20.0%	$102,274
Estonia	Universal social insurance	16%, 22% [a]	No max.
Israel	Social insurance	8.5% [b]	$164,323
Morocco	Social insurance	11.9%	$8,086
Philippines	Social insurance	12.0%	$4,981
Romania	Social insurance	25.0% [c]	$61,741
Serbia	Social insurance	25.5%	$46,236
Singapore	Provident Fund	37.0% [d]	$77,176 [e]
Thailand	Social insurance	6.0%	$6,014
Tunisia	Social insurance	12.5%	No max.
Turkey	Social insurance	20.0%	$35,665
USA	Social insurance	12.4%	$132,900

Sources: International Social Security Association (ISSA), International Labour Organization (ILO; 2017), SSA (2018b, 2018c, 2019), KPMG (2021), PwC (2021).

Notes: Tax rates shown are those paid for old-age, disability, and survivor benefits. All data is for 2020, except for the earnings ceiling for Romania which corresponds to 2018, inflated to 2020 RON. No max.: There are no maximum earnings used to calculate contributions. (a) The contribution rate for those born before 1983 is 16%. There is a 2% employee rate on covered earnings plus a 4% employer rate on gross payroll for the individual accounts that was mandatory for individuals born since 1983 but was made voluntary by the 2020 reform. (b) This is the maximum rate. Up to the national average monthly wage, the rate is 1.94%. Lower rates are allowed for nonresident employees. (c) For employees who work in arduous (very arduous) conditions, an employer has to additionally contribute 4% (8%) of gross payroll. (d) Citizens and permanent residents only. Reduced rates apply for low-income or old-age employees. (e) This includes additional wages. The ordinary wage ceiling is SG$72,000 (US$54,477).

4. Data and descriptive statistics

We use a combination of data sources. We obtained U.S. FDI positions from the U.S. Bureau of Economic Analysis. For stocks of FDI for all countries, we use the updated and extended version of the data set by Lane and Milesi-Ferretti (2007, 2017) and the IMF's International Investment Position (IIP). We use Penn World Table (version 10.0, Feenstra et al. 2015) and World Bank Indicators to obtain values for GDP, population, labor force, capital, and depreciation rate of capital stock. We obtained data by type of nonimmigrant visas from the U.S. Department of State. We obtain the share of managers in each hypothetical partner country[7] from ILO's labor force survey (ILOSTAT database). We use the Economic Supplement of the Current Population Survey (CPS) to estimate the share of managers in the U.S. workforce, and the earnings and payroll contributions of workers in managerial positions and of foreign workers in the U.S.

To compute the expected effective payroll tax rates, we need the average wages of managers working abroad. Prados et al. (2019) used information in certificates of coverage to estimate the average earnings of American managers working in each foreign country with a totalization agreement. We do not have that information for the selection of countries studied in this work, as there are no agreements in place yet. Therefore, we use the data from existing certificates of coverage to predict the average wage of American managers out of sample.

The impact of the COVID-19 pandemic since 2020 has been heterogeneous

[7] For Morocco, we obtain the data from Chauffour (2018).

across countries, and accounting for that in our analysis falls beyond the scope of this work. Therefore, for the quantitative exercises, we have assumed the treaties are concluded at a time when the variables of interest remain in an equilibrium similar to before the COVID-19 pandemic, and use stocks and flow values from 2019.

4.1 Country characteristics

Table 2 shows the main economic characteristics of the hypothetical partner countries, by economic activity, size, and international flows of capital. There is ample variation in the size of FDI flows from the U.S. to each of these countries, with countries such as Estonia and Croatia showing small FDI flows with the U.S., and countries where these international investments are much larger such as Singapore and Israel.

All but one of the countries that are currently totalization partners of the U.S. are considered “high income” countries by the World Bank’s definition (Prados et al. 2019). The current list of hypothetical partners is very different, with five out of 11 countries being “high income,” and the rest being in the “middle income” category. This heterogeneity provides an opportunity to study the variation in impact from these agreements.

Table 2: Economic characteristics of the sample countries

Country	GDP total[(a)]	GDP per capita[(b)]	Population (mill.)	Outward FDI stock[(c)]	Inward FDI stock[(d)]	FDI position from U.S. [(e)]	FDI position to U.S. [(f)]
Croatia	61,502	15,129	4.07	6,380	28,670	186	n.a.
Estonia	31,859	24,010	1.33	10,006	24,041	69	n.a.
Israel	399,521	44,126	9.05	97,604	113,674	33,391	13,706
Morocco	121,177	3,270	36.47	4,976	54,238	382	-27
Philippines	381,472	3,528	108.12	44,975	64,199	5,681	399
Romania	252,777	13,049	19.37	4,143	80,004	3,681	17
Serbia	52,110	7,503	6.95	3,149	31,428	383	-3
Singapore	379,005	66,450	5.70	682,753	1,068,378	263,857	26,572
Thailand	550,978	7,913	69.63	82,929	206,275	17,845	1,892
Tunisia	39,679	3,393	11.69	307	32,937	221	37
Turkey	770,821	9,239	83.43	38,386	163,898	3,881	2,664
U.S.	21,697,622	66,085	328.33	7,543,091	7,111,969		
World	88,688,490	11,558	7,673.35				
Low income[(g)]	538,395	831	647.87				
Middle income[(g)]	32,100,789	5,548	5,786.16				
High income[(g)]	55,522,861	45,857	1,210.80				

Notes: (a), (c) to (f) in millions of 2020 US$. (b) US$ of 2020. (f) Not available in original source due to small cell, to avoid disclosure of data of individual companies. (g) Includes all countries considered as "high income" (> $12,696 GNI per capita), "middle income" ($1,046 to $12,695), and "low income" (< $1,045) per the World Bank's definition.

Sources: World Development Indicators, World Bank. Lane and Milesi-Ferretti (2017). Bureau of Economic Analysis. Data corresponds to 2019 except FDI stock (2015).

5. Quantitative impact of expansion of totalization program

5.1 Impact on SSA's payroll tax receipts

By their nature, totalization agreements can change the composition and size of flows of SSA payroll tax receipts and benefit payments. By eliminating double taxation, new totalization agreements can decrease the SSA payroll tax receipts as individuals from partner countries who are already working temporarily in the U.S. and who qualify for elimination of dual taxation at the time of the treaty (*detached workers*) would not be required to contribute to SSA anymore. [8] Another potential source of impact on SSA's finances to consider is U.S. nationals employed by American firms and relocated permanently to a foreign country (Meijer et al. 2020).

To quantify the expected impact on SSA's net cash flow corresponding to the *detached workers*, we proceed in two steps. First, we estimate the number of temporary workers from the countries of interest who could potentially benefit from a totalization agreement between their country of origin and the U.S. Second, we estimate the average contribution to SSA (OASDI plus Medicare tax) from these workers. The estimated upper bound to the total foregone annual revenue equals the average foregone payroll contribution times the number of potentially eligible workers.

To estimate the number of foreign temporary workers who could potentially benefit from a totalization agreement, we use data on certain types of nonimmigrant

[8] SSA's revenues are not affected by new foreign temporary workers coming to the U.S. as a consequence of a new totalization agreement, but only by forgone revenues from some temporary foreign workers already employed in the U.S.

visas, by nationality, issued by the U.S. Department of State. We consider the visa categories most likely to be granted to temporary workers who might benefit from the totalization agreements, like some L, H, and E categories.[9] Though not everyone with these kinds of visas currently in the U.S. would necessarily be covered by a new totalization agreement, this information serves as an upper bound.

Table 3: Total number of temporary workers with non-immigrant visas potentially valid in 2021, by country

	Country	**Number of nonimmigrant visas**
Africa	Morocco	194
	Tunisia	132
Asia	Israel	4,025
	Philippines	5,133
	Singapore	3,137
	Thailand	1,131
Europe	Croatia	261
	Estonia	128
	Romania	1,671
	Serbia	1,604
	Turkey	2,906
	Total	20,322

Source: U.S. Department of State, Visa Statistics FY 2019 and FY2020.

Note: These values include visas issued in each of the following categories that could still be valid in 2021: E-1, E-2, H1-B, H1-B1, H2-B, L-1, and L- 2. To compute these values, we took into account the maximum validity of each nonimmigrant visa category (U.S. Department of State 2021a, 2021b, 2021c). For example, H1-B visas have longer validity, so a worker who obtained an H1-B visa in 2019 could still have a valid visa in 2021. In contrast, H2-B visas, for example, are only valid for one year.

[9] These are the same categories used in Prados et al. (2019) for a similar purpose.

We use data from the Current Population Survey to estimate the annual revenue SSA would forego from potential totalization agreements with these countries. This would correspond to the contributions to OASDI and Medicare tax from temporary workers currently on the U.S., which is a way to capture those who would not change their decision to relocate to the U.S. due to the potential totalization agreement (Meijer et al. 2020). The subsample of recently relocated foreigners (since 2018) from the countries in our list has very few observations, 196 from all 11 countries and five years. We estimate the average annual contribution to SSA, accounting for the OASDI earnings limit, to be $5,624.75 (in 2020 US$). If the totality of the workers with nonimmigrant visas in Table 3 are currently contributing to SSA and were to qualify for elimination of dual taxation, SSA would forego, on average, $114.3 million in annual payroll tax revenue from those workers. These are strong assumptions, so that amount is an upper bound. Presumably, more workers could relocate to the U.S. because of the treaty, but that would not directly affect SSA's cash flow.

The potential effects of this type of agreement on SSA cash flows due to U.S. nationals living abroad long-term are not as straightforward. Some U.S. nationals who move or moved abroad permanently have sufficient quarters of contributions to OASDI to qualify for and collect pension benefits from SSA in the future, even if they stop contributing as a consequence of a new international social security agreement. We assume the net impact from this on SSA revenues to be null. However, some U.S. nationals who relocate or have relocated abroad temporarily may not qualify for SSA benefits in the future. For this subset of cases, a new agreement would imply a net increase in SSA revenues because those are workers who made contributions to SSA in the past but will not receive a payment in the future. We have no data to estimate this effect. Lastly, if a U.S. national relocates permanently abroad before ever contributing to SSA, with no totalization agreement they will have to contribute to OASDI and will benefit from a pension benefit from SSA in the future. With a simplified agreement with no totalization but only elimination of dual taxation, this worker will not contribute to OASDI nor collect any benefits. In net, this does not affect SSA cash flow.

5.2 Impact of elimination of dual taxation on international flows of capital

International social security agreements eliminating double taxation of temporary workers abroad reduce the burden of payroll taxation for a firm's employees assigned abroad, thus these agreements can reduce the costs of relocating a firm's production abroad. To evaluate the effects of this kind of potential totalization agreements we use a model of FDI where payroll taxes may distort the compensation of managers and skilled workers relocated abroad and the firms' decisions about such relocations.

We use a version of the Prados et al. (2019) model based on the quantitative framework of the world allocation of firm-embedded productivity developed by Burstein and Monge-Naranjo (2009). We adapted this model to incorporate the impact that U.S. and foreign social security and income taxes have on firms, and measure the distortions of the compensation of managers and skilled workers, which depend on the existence of totalization agreements between countries. The idea behind these models is that firm-embedded productivity connects to the management know-how and skills of individuals leading the firm. Management know-how is similar to codified technological knowledge, as it can be reallocated across sectors, and to some extent, countries.

The model accounts for limited span of control by introducing management know-how as an additional factor of production. This assumption reflects that managerial know-how, which shapes the firm's productivity, is difficult to reproduce at the affiliate level: A manager with certain abilities can control only a limited number of inputs to production at a given location.

In the model, firms are teams of managers, workers, and capital. Each country has domestic supplies of labor and of management skills, both of which can change over time. Managers can reallocate their skills and lead firms in foreign countries, where they face country-specific taxes. Capital can also be reallocated across countries. This reallocation of productive resources across borders gives rise to FDI.

Prados et al. (2019) show that if a country is a net sender of managers to a host country, the model predicts that, by decreasing the foreign payroll tax rate for managers in the host country, the totalization agreement increases the foreign share of production controlled by the sender country. This increase will be larger with higher ratios of capital, labor endowments, and country-specific productivity of the sender country to the host country. The U.S. is a net source of FDI to all of the countries in our list, as seen in Table 2.

The model predicts that the increase in the share of foreign-controlled capital in the host country, given a decrease in the tax on foreign managers in that country, will be higher the more productive is the economy of the host country, the less productive is the sender country, the higher is the ratio of the workforce size in host country relative to sender country, and the higher is the sender country’s tax on local managers.

5.2.1 Changes in effective tax rates due to elimination of double taxation

Due to the differences in payroll contribution rates and earnings in different countries, an agreement to avoid double social security taxation between the U.S. and a new partner country would have a different impact on the effective rates for Americans abroad or for foreigners in the U.S. However, for countries with no earnings cap for old-age pension contributions, the changes in effective tax rates are the same for workers from both partner countries.

To account for cases when the workers affected by totalization agreements have salaries above the contribution caps for social security, we follow Prados et al. (2019) and estimate the average effective social security tax rates after considering the earnings caps and other rules governing social security contributions.[10] We compute the current average effective tax rates for each of our hypothetical partner countries and what these would be under agreements to eliminate dual social security taxation. We compute the effective tax rates as the combination of employer and employee contributions, as in the model, both components affect the incentives of employer and employees, thus potentially impacting the multinational allocation of managerial power and multinational production.

We predict the average earnings of American workers in the set of countries of interest using data obtained from SSA about the earnings of American workers abroad covered by totalization agreements. We estimate a linear relationship between per capita GDP of the host country and the average compensation of American workers abroad. We use the estimation results from that regression to input the average

[10] Totalization agreements cover the U.S. Medicare portion of social security taxes. Therefore, in the calculations for the U.S. Social Security payroll taxes, we include the 12.4% OASDI tax (subject to an earnings cap) and the 2.9% Medicare tax on earnings.

earnings of American workers in countries with no totalization agreements. Table 4 shows the resulting effective tax rates for American workers abroad.[11] To approximate domestic effective tax rates of foreigners, we assume foreign managers earn the same salary in the U.S. as in their home countries, and compute effective rates in Table 5.

Table 4: Predicted average effective tax rates for U.S. nationals working abroad

Destination country	Wage ceiling	Tax rate	Predicted earnings of American managers abroad under TA	American abroad, under TA, with *greater economic attachment* to the foreign country		American abroad, under TA, with *greater economic attachment* to the U.S.		American abroad without TA	
				Implied tax	**Implied tax rate**	**Implied tax**	**Implied tax rate**	**Implied tax**	**Implied tax rate**
Croatia	102,274	20.0%	208,771	20,455	9.8%	23,208	11.1%	43,663	20.9%
Estonia[a]	No max.	16.0%	233,549	37,368	16.0%	24,150	10.3%	61,517	26.3%
Romania	61,741	25.0%	205,359	15,435	7.5%	23,078	11.2%	38,514	18.8%
Serbia	46,236	25.5%	191,546	11,790	6.2%	22,630	11.8%	34,420	18.0%
Israel	164,323	8.5%	288,031	13,967	4.8%	26,220	9.1%	40,187	14.0%
Morocco	8,086	11.9%	179,564	961	0.5%	22,282	12.4%	23,244	12.9%
Tunisia	No max.	12.5%	180,004	22,501	12.5%	22,295	12.4%	44,795	24.9%
Turkey	35,665	20.0%	193,988	7,133	3.7%	22,700	11.7%	29,834	15.4%
Thailand	6,014	6.0%	190,354	361	0.2%	22,595	11.9%	22,956	12.1%
Philippines	4,981	12.0%	180,024	598	0.3%	22,296	12.4%	22,893	12.7%
Singapore	77,176	37.0%	328,746	28,555	8.7%	27,767	8.4%	56,322*	17.1%*
U.S.[b]	137,700	12.4% +2.9%							

Sources: SSA (2018a, 2018b, 2019), ISSA, State of Israel National Insurance Institute, CPS, E.P. (2021), Central Provident Fund Board of Singapore, Congress of the Philippines (2019).
Note: (a) We assume workers opt out of the voluntary individual accounts (6% contribution). (b) For the U.S., the OASDI rate is 12.4% on earnings below $137,700 in 2020, and there is a

[11] Based on the average earnings for workers in managerial occupations estimated using the CPS, the effective social security tax rate of American managers in the U.S. is 14.2%.

Medicare tax of 2.9% on all earnings. An additional Medicare surcharge tax 0.9% of earnings applies for income above $200,000 (single) or $250,000 (married, filing jointly). We compute the effective tax rates for workers filing single. * These values correspond to Americans who permanently relocate to Singapore. CMF contributions are only mandatory for Singapore citizens and permanent residents, therefore the implied tax and tax rate for foreign workers who are in Singapore temporarily would equal $27,767 and 8.4% respectively. (CPF)

Table 5: Predicted average effective tax rates for nationals of partner countries working in the U.S.

Destination country	Wage ceiling	Tax rate	Average earnings of foreign managers in the U.S. under TA	Foreigner in the U.S., under TA, with greater economic attachment to the foreign country		Foreigner in the U.S., under TA, with greater economic attachment to the U.S.		Foreigner in the U.S. without TA	
				Implied tax	Implied tax rate	Implied tax	Implied tax rate	Implied tax	Implied tax rate
Croatia	102,274	20.0%	123,130	20,455	16.6%	18,839	15.3%	39,294	31.9%
Estonia[a]	No max.	16.0%	123,130	19,701	16.0%	18,839	15.3%	38,540	31.3%
Romania	61,741	25.0%	123,130	15,435	12.5%	18,839	15.3%	34,274	27.8%
Serbia	46,236	25.5%	123,130	11,790	9.6%	18,839	15.3%	30,629	24.9%
Israel	164,323	8.5%	123,130	10,466	8.5%	18,839	15.3%	29,305	23.8%
Morocco	8,086	11.9%	123,130	961	0.8%	18,839	15.3%	19,800	16.1%
Tunisia	No max.	12.5%	123,130	15,391	12.5%	18,839	15.3%	34,230	27.8%
Turkey	35,665	20.0%	123,130	7,133	5.8%	18,839	15.3%	25,972	21.1%
Thailand	6,014	6.0%	123,130	361	0.3%	18,839	15.3%	19,200	15.6%
Philippines	4,981	12.0%	123,130	598	0.5%	18,839	15.3%	19,437	15.8%
Singapore	77,176	37.0%	123,130	28,555	23.2%	18,839	15.3%	47,394	38.5%
U.S.[b]	137,700	12.4% +2.9%							

Sources*:* SSA (2018a, 2018b, 2019), ISSA, State of Israel National Insurance Institute, CPS.

Note: (a) See Appendix A.1 (b) For the U.S., the OASDI rate is 12.4% on earnings below $137,700 in 2020, and a Medicare tax of 2.9%. An additional Medicare surcharge tax 0.9% of earnings applies for income above $200,000 (single) or $250,000 (married, filing jointly). We compute the effective tax rates for workers filing single.

5.2.2 Individual expansions

We simulate the effects from expanding the totalization program (by concluding international social security agreements to eliminate dual taxation) for each of the countries listed in Section 2. We follow the parameterization of the model in Prados et al. (2019).

Following Burstein and Monge-Naranjo (2009), we compute s_j, the share of firm-embedded productivity in each country *j* controlled by U.S. firms, as:

$$s_j = \frac{Inward\ FDI\ from\ U.S. to\ j\ - Outward\ FDI\ from\ j\ to\ U.S.}{Total\ Capital\ Stock\ in\ country\ j}$$

To infer the endowment ratios of firm-embedded productivity, we use the information about the share of foreign-controlled inputs, *s,* and the aggregate product of each country on the benchmark year to compute the ratio of firm-embedded productivity endowments, following Prados et al. (2019). We back up the capital tax rates from the no-arbitrage condition in Prados et al. (2019). We assume an international real interest rate of r^*=2%. We obtain average capital depreciation rates by country from the Penn World Table.

We use the effective rates computed in Tables 4 and 5 to calculate the differentials in effective payroll tax rates on foreign managers implied by the implementation of the totalization agreements, shown in Table 6. These differentials indicate that the totalization agreements made FDI flows between the U.S. and the partner countries less expensive, indicating that both inward and outward FDI flows should increase in the U.S. as a result.

The relevant tax rates for the simulation exercises take into account that Americans temporarily abroad are considered to have greater economic attachment to the U.S. (and foreigners temporarily in the U.S. have greater economic attachment to the partner country) because they are considered *detached workers,* and the territoriality rule applies for workers who relocate abroad permanently or for longer than five years.

Table 6 shows that in the cases of Morocco, Thailand, and the Philippines the change in effective tax rate as a consequence of such an agreement would be very close to zero for the case when the U.S. is the source of investments and the partner is the host country, a preliminary indication that the incentives for further FDI are small. This happens because the wage ceiling for social security contributions in these countries is relatively low compared to the expected level of earnings of American managers there. Therefore, eliminating dual taxation for them while the U.S. remains their country of greater economic attachment does not affect their contributions significantly. In Singapore, an international agreement would not change the effective contribution rate for American detached workers, because only citizens and permanent residents must contribute to the country's provident fund. The biggest changes in effective tax rates that would arise from an international agreement would be with Estonia, Tunisia, and Croatia, which are also the three countries on our list that receive the smaller amount of FDI from the U.S., as seen in Table 2.

Table 6: Changes in implied effective tax rate (in percentage points) as consequence of totalization agreements implementation

	Source country: U.S.			**Host country: U.S.**	
Host country:	***Detached workers***	***Long-term workers***	**Source country:**	***Detached workers***	***Long-term workers***
Croatia	-9.8%	-11.1%	Croatia	-15.3%	-16.6%
Estonia	-16.0%	-10.3%	Estonia	-15.3%	-16.0%
Romania	-7.5%	-11.2%	Romania	-15.3%	-12.5%
Serbia	-6.2%	-11.8%	Serbia	-15.3%	-9.6%
Israel	-4.8%	-9.1%	Israel	-15.3%	-8.5%
Morocco	-0.5%	-12.4%	Morocco	-15.3%	-0.8%
Tunisia	-12.5%	-12.4%	Tunisia	-15.3%	-12.5%
Turkey	-3.7%	-11.7%	Turkey	-15.3%	-5.8%
Thailand	-0.2%	-11.9%	Thailand	-15.3%	-0.3%
Philippines	-0.3%	-12.4%	Philippines	-15.3%	-0.5%
Singapore	0.0%	-8.4%	Singapore	-15.3%	-23.2%

The model predicts the net effect of these changes in the effective cost of managerial know-how reallocation. The condition on the effective rates for there to be a transfer of firm-embedded productivity — or relocation of productive activity — from the U.S. to a partner country *j* that is not compensated by an investment in the opposite direction (therefore, $s>0$), is: $\left(1-\tau_j^D\right)/(1-\tau_{US}^F) > (1-\tau_j^F)/(1-\tau_{US}^D)$, where τ^D is the effective tax rate on domestic managers, τ^F is the effective tax rate on foreign managers, and the subscripts *US* and *j* indicate the U.S. and the partner country, respectively (Prados et al. 2019). Without an international agreement, this condition holds for all hypothetical partner countries, indicating that the U.S. has incentives to operate affiliates in all these countries, which is backed up by the U.S.' FDI position, a proxy of this activity. With an agreement to eliminate dual taxation, given the effective tax rates in Tables 4 and 5, this condition only holds for Israel, Morocco, Thailand, and the Philippines, meaning it would increase American firms' incentives to engage in FDI in those countries. For the rest of the countries, the relative change in effective tax rates does not generate a net increase in U.S. FDI.

Table 7 shows the simulated effects of social security agreements to eliminate double taxation with this set of hypothetical partner countries. We can classify the countries according to some characteristics:

i. Those hypothetical partners currently with low levels of FDI from the U.S. (less than US$300 million): Croatia, Estonia, and Tunisia. Serbia falls in this category in some recent years. The combined asset position of the U.S. in these countries was, on average, US$842 million between 2016 and 2020, which represented less than 0.04% of the countries' capital levels.

ii. The countries for which the agreement would not significantly impact the effective tax rate of detached workers: Morocco, Thailand, Philippines, Singapore.

iii. Countries with existing FDI flows and significant changes in effective tax rate: Israel, Romania, and Turkey.

Table 7: Results from simulated agreements with hypothetical partner countries

	Current share of capital corresponding to U.S. firms	Change in FDI from U.S. (mill.US$ of 2020)	Change in share of capital controlled by U.S. firms
Estonia	0.03%	-	
Croatia	0.03%	-	
Israel	1.21%	1822.7	6.4%
Morocco	0.03%	3.1	0.8%
Philippines	0.19%	27.5	0.5%
Romania	0.20%	-	
Serbia	0.04%	-	
Singapore	10.37%	-	
Thailand	0.25%	44.5	0.3%
Tunisia	0.07%	-	
Turkey	0.02%	-	

The relative changes in tax rates derived from a new agreement are not large enough to incentivize U.S. firms to relocate multinational production to those countries that currently receive low levels of FDI from the U.S. (first group). The existing equilibrium indicates there is not enough country-embedded productivity or managerial shortage in those countries to cause higher levels of FDI from the U.S. The agreement affects relocation costs for American firms and for firms in the partner country, but not enough to compensate for the lack of relative advantage of those countries as hosts of U.S. investment.

For the second group of partner countries, concluding a treaty does not much affect the effective tax rate of American managers abroad. But the U.S. would continue to relocate multinational production to Morocco, the Philippines, and Thailand. However, the changes generated by such an agreement would be modest in size, as seen in Table 7. The share of capital controlled by U.S. firms would increase by an average 0.5

percent in those countries (of an already low base of capital share of U.S. forms of less than 0.2% on average).

Lastly, among the countries where an agreement would significantly decrease the cost of relocating managerial power, only in the case of Israel would it generate an increase in relocation of multinational production from the U.S. In that case, the agreement would have an impact of 6% on the amount of net FDI they receive from the U.S.

6. Conclusions

We analyzed the potential effects of expanding the SSA totalization program to allow the conclusion of agreements to only eliminate dual social security taxation. We studied the consequences for SSA and multinational production of expanding this program to 11 new hypothetical partner countries: Croatia, Estonia, Israel, Morocco, Philippines, Romania, Serbia, Singapore, Thailand, Tunisia, and Turkey. These countries' varied characteristics with respect to social security systems and economy allow us to generate a range of outcomes.

We study the potential effect to SSA's revenues if the U.S. were to eliminate dual taxation with all these countries. We estimate the maximum lost revenues at $114.3 million a year. This is a nonbinding upper bound for two reasons: First, this estimate assumes that all (recent) temporary workers from those countries currently in the U.S. would qualify for Certificates of Coverage under a new agreement. Second, we do not have enough information about American expats to estimate the potential gain to SSA from the likely small set of Americans permanently abroad who would stop contributing to SSA and be ineligible to receive benefits from SSA in the future.

For relocation of multinational production, we see that there are mixed effects to be expected from this kind of agreement, depending on the characteristics of the partner country: In several cases, we do not find that this kind of agreement would affect the flows of FDI between the U.S. and the partner countries. This is mostly in cases where the partner country is receiving very little FDI in the status quo, or in cases where an agreement like this would not affect the relocation costs by much due to them being already low. In a few cases, we find that there would be a small effect of some relocation of American subsidiaries to partner countries. And only in one case, Israel, the characteristics of the economy combined with the change in relocation costs derived from the agreement would imply that U.S. FDI flows increase to that destination.

Note that the type of limited agreement studied in this report does not address the issue of portability of social security benefits, which may be important for some migrant workers.

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Appendix A.1: Computation of effective tax rate for Estonia

In Estonia, there is no cap on the earnings subject to these contributions, but the minimum monthly earnings used to calculate contributions is 470 Euro. The contribution for the universal social insurance is zero for employees and 16% for employers. Additionally, there is a 2% employee contribution on covered earnings plus a 4% employer rate on gross payroll for the individual accounts that were mandatory for persons born after 1982, but since the 2020 reform (effective January 2021) are now voluntary for all. (ISSA 2021 and E.P. 2021)

We use the data and subsample in Section 5.1 to estimate the distribution of birth years of the temporary workers currently in the U.S. The average birth year of this subsample is 1984, with 35% of the sample born before 1983. There will be no equilibrium in the fraction of workers moving to or from Estonia who are mandated to contribute to their individual accounts until everyone born before 1983 stops relocating. We cannot know when that will be or what pattern this will follow. Therefore, we simulate the effect of enacting an international social security agreement between the U.S. and Estonia as if the distribution of ages were like the one currently in the data. We use this information to compute the effective tax rates.