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The EU Services Directive: Untapped Potentials of Trade in Services*

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November 11, 2025

Abstract

A major step towards liberalizing the EU Internal Market for services was taken in 2006 with the EU Services Directive. This study quantifies its impact on EU trade in services and real income and identifies untapped potential due to remaining administrative barriers and weak enforcement of Single Market rules. Results are based on a structural gravity model estimated at the level of industry and country-pairs over the period 1995 to 2018. A novel country-specific indicator derived from business complaints to the EU-SOLVIT mechanism assesses the quality of service sector reforms and remaining barriers to trade in services. Empirical estimates show heterogeneous effects across industries, with strong positive effects in publishing, IT and business services, but negative effects for some industries such as in wholesale and retail trade. On average, the Services Directive increased intra-EU trade in services by 4.4%, but had negligible effects on real income. If reform efforts were to match those of the strongest reformers, intra-EU export potential could increase by 6.2% and potential real income by 0.3% on average.

Keywords: Trade in services, European integration, Gravity model, Trade liberalization
JEL Codes: F15, F16, L80, C23, C50

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1 Introduction

Since the completion of the Single European Act in 1993, the EU Internal Market program forms the core of European integration based on the free movement of goods, service, persons and capital. A large number of empirical studies confirm the associated positive effects on trade integration, competition, growth and employment.[1] Despite considerable progress, recent analyses show important remaining deficits in the full realization of the Single Market. While this holds with regard to all four Single Market freedoms, the largest gap to full implementation has been found for the free movement of services (Baldwin and Wyplosz, 2019; Felbermayr and Jung, 2011; Mustilli and Pelkmans, 2013; European Commission, 2021). Integration and liberalization of the service sector have proven to be particularly difficult due to the multitude of administrative barriers, access restrictions, and different regulatory approaches in the Member States.

The most important reform step to date towards deepening the Internal Market for services was taken with the Services Directive (SD).[2] It entered into force in June 2006 and set an implementation deadline of December 29, 2009. Its intention was to advance the removal of existing obstacles to the free movement of services and the freedom of establishment of service providers, as well as to spur administrative simplification (for example, through the establishment of the so-called "Points of Single Contact" (PSC), mutual assistance between authorities). The implementation of the SD and subsequent reform efforts led to a removal of a number of obstacles, but many administrative barriers remain. Furthermore, even though the SD applies equally to all included services ("horizontal" directive) and the transposition period was set uniformly, there is still considerable heterogeneity in the transposition and implementation, as well as in the removal of barriers at the country and sector level (European Commission, 2021; Monteagudo et al., 2012; Kox and Lejour, 2006). This represents an important stumbling block to the functioning of the Internal Market for services.

This paper focuses on trade in services as reported by the Balance of Payments statistics. This database records transactions between residents and non-residents based on the center of economic interest (residence) of an institutional unit. As such, it mainly covers GATS modes 1, 2 and 4 through the International Trade in Services Statistics (ITSS), while mode 3, which refers to commercial presence, is excluded.

[1] For an overview of the results of ex-ante studies on the Single Market Program, see Baldwin and Venables (1995). More recent empirical studies include Dhingra et al. (2017), Mayer et al. (2019), Felbermayr et al. (2022) or Head and Mayer (2021).

[2] Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the Internal Market `https://eur-lex.europa.eu/legal-content/DE/TXT/?uri=celex:32006L0123)`.

Empirical evidence on the effects of the SD on trade in services in ex-post analyses is limited. Dettmer (2015) found hardly any significant effects, likely due to the short data series ending in 2010 and assuming 2006 as the implementation year, despite the Directive allowing for an implementation phase until 2009. Kern et al. (2021) used data up to 2014, setting 2010 as the date of full implementation of the Directive, and found a strong SD impact with intra-EU trade in services increasing within a 95%-confidence interval from 29% to 67% and associated welfare effects (real GDP) of 0.39% to 1.32%. Studies by Monteagudo et al. (2012) and the European Commission (2015) are based on actual changes in service trade restrictions, but are of rather limited validity due to methodological weaknesses in the specification of the gravity model. In addition, they do not comprise the full range of service industries covered by the SD. This is also the case for the most recent European Commission study (Barbero et al., 2022).

This paper provides new ex-post estimation results on realized SD trade and welfare effects within the European Union, as well as on the untapped trade and welfare potential through a more ambitious SD implementation in all Member States. It adds to the literature in several ways: First, the empirical analysis in this paper is based on consistent and comprehensive data on bilateral trade in services, including domestic flows, sourced from the OECD Inter-Country Input-Output (ICIO) tables published in November 2021. This dataset covers 66 countries at the disaggregated level of individual service industries over an extensive period from 1995 to 2018, providing an ideal basis for a more comprehensive ex-post analysis of SD trade effects.

Second, we apply a panel data structural gravity model and a triple difference-in-difference (DDD) design that accounts for domestic trade flows. The consideration of domestic trade flows follows the literature and is an important building block in econometrics to identify the effects of trade policy measures (Larch et al., 2018). Following Kern et al. (2021), we use 2010 as the treatment year, as it is the first year of SD implementation after a transition phase from 2006 to 2009. The triple difference-in-difference strategy compares post-pre treatment year intra-EU trade in service industries covered by the SD after 2009 (treatment group) with intra-EU trade in untreated industries, as well as with bilateral extra-EU trade in services and with domestic trade flows (control groups). In contrast to Kern et al. (2021), we refine the strategy by identifying industry-specific SD effects and by more carefully separating SD effects from general EU integration effects.

Third, we account for the heterogeneous quality of SD reforms across Member States by applying a novel country-specific indicator derived from business complaints on cross-border issues reported to the EU SOLVIT mechanism. The SOLVIT indicator is an improvement over previous assessments of barriers to trade in services, which focused solely on the existence of restrictions, progress in legal

transposition, and the changing number of restrictions in place (Monteagudo, 2012; European Commission, 2015; European Commission, 2021).[3] It more directly relates to relevant obstacles and impediments to cross-border business in the EU as service providers are likely to report only problem cases of high importance to the SOLVIT system. In contrast, the pure number of regulations applied in previous assessments does not reveal the stringency and trade-impeding impact of the regulations. Likewise, purely legal transposition does not ensure full compliance with SD rules in practice.

Fourth, based on the parameter estimates of a structural gravity model, the study derives general equilibrium trade and income effects of the SD implementation, as well as unexploited trade and welfare potentials, by comparing baseline scenarios of actual implementation to alternative scenarios. Specifically, we compare the baseline to an alternative scenario of "no policy change", i.e., a situation in which the SD had never been enforced, to derive realized trade flows and income effects. In a next step, the baseline results are compared to an alternative scenario of "best implementation" to derive further potentials for trade in services included by the SD and the associated income effects. General equilibrium effects are captured by changes in multilateral resistance terms in the gravity equation (relative trade costs towards third countries) as well as endogenous adjustments of incomes to the counterfactual scenarios using the approach suggested in Yotov et al. (2016).

2 The Services Directive: Historical context and detailed implementation

The integration of services within the EU initially progressed slowly, until the Lisbon Strategy in 2000 prioritized services liberalization in the Internal Market program. This initiated a process resulting in the first draft of the Services Directive (SD) in 2004, known as the "Bolkestein proposal" (European Commission, 2004). This draft faced immense controversy over the country-of-origin principle and potential impacts on public services such as education, health and water supply.[4] The European Commission revised the draft to address these concerns, preventing the inclusion of such sensitive areas and replacing the country-of-origin principle with non-discrimination and freedom of access. This led to the adoption of Directive 2006/123/EC in 2006, with an implementation deadline of December

[3]These assessments were applied in the analysis by Monteagudo et al. (2012) for the European Commission (2015), as well as by Barbero et al. (2022).

[4]The country-of-origin principle implies that any service that complies with the regulations in one EU Member State may also be offered and provided in any other Member State without further restrictions or requirements.

29, 2009. This official deadline for the legal transposition of the SD was missed by several EU member countries, but the delays were brief, and by 2010, only 3 countries were left with an incomplete transposition of the SD in legal terms. In October 2011 Austria, Germany and Greece were referred to the Court of Justice over incomplete transposition of the Directive. All three cases were closed by 2012.

The transition phase from 2006 to 2009 was notable for its detailed program of national obligations, joint implementation committees, cooperation, and "mutual evaluations" between Member States, as well as the provision of a comprehensive implementation manual (European Commission, 2008; Mustilli and Pelkmans, 2013). With its horizontal approach, the directive applies equally to all included sectors, with a uniform transition period. Despite this framework, the different assessments and mappings of administrative and legal barriers by the European Commission (European Commission 2012, 2015 and 2021) revealed that removing barriers to the Internal Market for services has been slow and very uneven across countries and sectors.

The 2006 SD obliges Member States to ensure the free movement of services and the freedom of establishment of services providers within their territory. Restrictions on these freedoms are excluded by a catalog of prohibited requirements defined in the Directive. These include, for example, the prohibition of an establishment requirement, prior authorization requirement or any nationality/residence requirement for the provision of a service. A complete list of impermissible requirements can be found in Art.16 Par. 2 of the SD.[5] All additional requirements are inadmissible if they are discriminatory (treat nationals and non-nationals unequally), not necessary for reasons of public policy, public security or public health protection, and not proportionate beyond the objective to be achieved. The SD therefore offers individual Member States leeway to maintain their own provisions if they comply with these principles.

Administrative simplification is another key pillar, with obligations to review procedures, establish "Points of Single Contact" and enable electronic completion of procedures. Furthermore, although its scope is broad, the SD lists a number of sectors that fall outside its scope. These include some sensitive sectors as well as sectors for which there are separate Community actions or EU legislative acts such as non-commercial services of general interest (e.g., public, cultural or educational activities), financial services, electronic communications services and networks, transport, services provided by temporary employment agencies, health care, audio-visual services, gambling, services related to public authorities, social services and private security services. In 2018, the sectors covered by the SD generated 56.3% of the gross value added of the EU services sector. Cross-border trade in services within the EU is also dominated by services included in the SD.

[5]Table 6 in Mustilli and Pelkmans (2013) also gives an overview of the prohibited barriers.

Table 1: Intra-EU exports of services by sector, 1995 to 2018.

		2018	1995 – 2006	2007 – 2018	2006 – 2010	2010 – 2014	2014 – 2018
ISIC		Share	Percentage changes				
	Included sectors	62.5	103.8	34.6	14.0	23.3	13.2
D41T43	Construction	0.5	106.0	4.4	6.0	1.9	13.9
D45T47	Wholesale and retail trade	23.3	72.3	8.9	13.1	12.4	0.1
D55T56	Accommodation and food service activities	5.0	79.0	10.8	0.8	9.9	14.9
D58T60	Publishing	4.7	108.2	50.2	12.7	25.9	25.7
D62T63	IT and other information services	8.4	299.2	193.9	42.6	51.6	55.2
D68	Real estate activities	1.1	86.8	20.1	14.1	18.6	6.3
D69T75	Professional, scientific, technical activities	11.7	177.9	36.7	3.5	40.1	15.6
D77T82	Administrative and support services	7.8	161.3	71.2	34.6	36.4	14.1
	Excluded sectors	37.5	145.9	19.5	9.8	18.8	7.4
D35	Electricity, gas	1.3	219.1	17.8	−9.7	22.6	0.6
D36T39	Water supply, sewerage, waste management	0.2	178.7	−47.4	−59.5	13.6	29.4
D49	Land transport	9.7	112.0	28.6	9.6	22.6	12.8
D50	Water transport	2.0	132.8	−19.8	17.8	−6.0	−14.0
D51	Air transport	3.2	123.3	9.0	5.2	11.4	2.5
D52	Warehousing, support activities for transport	4.2	115.9	23.5	21.8	16.9	5.1
D53	Postal and courier activities	0.6	167.2	14.7	2.4	7.7	13.7
D61	Telecommunications	2.1	249.6	42.2	30.1	10.7	5.9
D64T66	Financial and insurance activities	11.0	202.7	21.4	5.6	31.5	8.1
D84	Public administration and defence	0.4	101.8	53.2	21.6	21.5	18.6
D85	Education	0.8	138.4	49.6	30.4	17.2	17.7
D86T88	Human health and social work activities	0.4	87.8	58.9	40.8	16.1	12.0
D90T93	Arts, entertainment and recreation	1.2	124.4	15.9	7.6	4.9	20.3
D94T96	Other service activities	0.4	69.8	17.0	9.8	9.4	11.6
D97T98	Activities of households as employers	0.0	–	–	–	–	–
D35T98	**Total services**	100.0	119.0	28.5	12.3	21.5	10.9

Data Source: OECD ICIO tables (2021 release).

A share of 62.4% of intra-EU trade is accounted for by these sectors.

Table 1 provides a detailed overview of the main sectors covered and the sectors excluded by the SD and summarizes intra-EU export shares and growth rates by services sectors for the years 1995 to 2006 (period before the adoption of the SD), for the years 2007 to 2018 as well as for individual sub-periods during the implementation phase.[6]

Intra-EU exports of services increased considerably over the entire period considered. Trade in services expanded significantly faster before the adoption of the SD in 2006 than after. This change in trend applies to both the sectors included and excluded by the SD and might be partly due to the 2009 financial market crisis and its aftermath in the Euro area. Most importantly, the descriptive statistics in Table 1 show that the included sectors had lower growth rates than the excluded sectors before 2006, while the opposite is true for the whole period thereafter and for all sub-periods of the implementation phase.[7] These patterns are consistent with the finding in Kern et al. (2021) based on data from the World Input Output Database (WIOD).

3 The economic impact of the Services Directive - a literature review of previous evidence

There is some evidence available in the literature on the effects of the SD. The most important studies and results are summarized in Table 2. The diversity of results is due to different methodologies, different coverage in terms of countries, sectors, time periods as well as different coverage of modes of supply (cross-border trade, foreign direct investment). The existing empirical literature can be divided into four groups, each of which is discussed and characterized below.

The first group of empirical analyses of the SD are ex-ante studies based on the original Bolkestein proposal of 2004. They therefore assumed the full imple-

[6]It should be noted that education and health services (ISIC D85 to D88) form a borderline case. In the case of private provision, they are included by the Services Directive. However, if these services are predominantly publicly provided, they are not covered by the directive. In general, services which are predominantly supplied by the public sector exhibit very low shares in total trade in services. Furthermore, due to the higher level of aggregation, there is some imprecision in matching the service activities covered by the SD with the corresponding ISIC industry classifications in the OECD ICIO dataset. Publishing activities represented by ISIC D58 to T60 include audio-visual and broadcasting services, explicitly excluded by the SD. Professional services under the heading of ISIC-group D69 to 75 include notaries, medical professions and others, that are not part of the SD.

[7]Many of the sectors not covered by the Services Directive are governed by separate sector-specific Internal Market rules or separate directives, some of which were initiated before the Services Directive and were thus effective for these sectors before 2006.

mentation of the country-of-origin principle as initially proposed (see chapter 2). The ex-ante estimates range from a 5% to 60% increase in intra-EU trade in services and from a 20% to 40% increase in intra-EU foreign direct investments. The effects on EU-GDP were estimated to range from 0.1% to 0.8% and the increase in employment from 0.3% to 0.9%.

The second group comprises ex-ante analyses based on the finally adopted 2006 SD. Compared to the original Bolkestein draft, Copenhagen Economics (2005b) calculated between 7% and 9% lower EU-GDP effects. De Bruijn et al. (2008) and Badinger et al. (2008) concluded that the effects of the 2006 SD would be about one third lower than in the original Bolkestein draft.

All ex-ante studies have in common that they assumed a complete and homogeneous implementation of the SD in all Member States. In addition, some of them were based on the OECD's product market indices, which at the time did not reflect the regulatory situation within the EU, but rather barriers vis-à-vis third countries (Monteagudo et al., 2012). Furthermore, all ex-ante analyses with the exception of those by Copenhagen Economics, were based on the assessment of the trade or direct investment effects in Kox et al. (2004). The Kox et al. (2004) study measured barriers within the EU using a heterogeneity index that captures the differences in regulations across the Member States. Consequently, the primary focus was placed on the reduction of trade barriers through enhanced regulatory harmonization. All ex-ante studies, with the exception of the analysis by Lejour et al. (2008), measired the effects of the SD on cross-border intra-EU trade in services, excluding the impact of foreign affiliate sales and intra-EU FDI.

The third group of studies estimated the effects of the SD by relying on assessments of the actual implementation up to 2011 (Monteagudo et al., 2012), or until 2014 (European Commission, 2015) and 2017 (Barbero et al., 2022). Measures of the actual implementation process by country and sector were taken from the comprehensive surveys and analyses of trade and establishment barriers in Member States before and after the 2009 implementation date. The effects calculated in the 2012 and 2015 update studies include both the trade liberalization effects of the SD and the liberalization effects on foreign direct investment. Their calculations are based on estimated elasticities of barriers to trade and FDI from a gravity model of trade and FDI in the pre-SD period and extrapolations based on the actual reductions of barriers to trade in services. Intra-EU trade in services increased by 7.2%, intra-EU foreign direct investment by about 4% and GDP by 0.8% as a result of the SD. While these figures reflect actual implementation up to 2014, different scenarios assuming a more ambitious dismantling of barriers suggest further potential. In the most ambitious scenario, which assumes that Member States move towards the level of restrictions of the top five most reforming countries in the EU per sector (resulting in a de facto full implementation of the

Table 2: Economic effects of the Services Directive in the literature

Source	**Method**	**Impacts (percentage changes)**		
		Intra-EU trade in services	**Intra-EU FDI in services**	**Real GDP (welfare)**
Ex-ante studies on the basis of the "Bolkestein proposal" (SD2004: including country-of-origin principle)				
Copenhagen Economics (2005a)	CGE Model (CETM)	5	-	0.6
Kox et al. (2004)	Gravity equation	30.0-60.0	20.0-40.0	
Gelauff and Lejour (2006)	CGE Model (WorldScan)	30		0.2-0.4
Lejour et al. (2008)	CGE Model (WorldScan)		20.0-35.0	0.1-0.8
Breuss and Badinger (2006)	Econometric partial equilibrium	44		0.7
Ex-ante studies on the basis of the Services Directive 2006 (SD2006)				
Copenhagen Economics (2005b)	CGE Model (CETM)			7.0-9.0 lower effects of SD2006
de Bruijn et al. (2008)	CGE model (WorldScan)	20.0-40.0		SD2004: 0.3-0.7 SD2006: 0.2-0.4
Badinger et al. (2008)	Econometric partial equilibrium	44	20	SD2004: 1.5 SD2006: 1.0
Studies on the basis of realized changes in services trade and FDI restrictions				
Monteagudo et al. (2012)	Gravity model and CGE Model (QUEST)	7.2 (Pot. 2.9-7.5)	3.8 (Pot. 1.8-8.8)	0.8 (Pot. 0.4-1.8)
European Commission (2015)	Gravity model and CGE Model (QUEST)			0.9-1.7
Barbero et al. (2022)	CGE Model (RHOMOLO)			1.5
Ex-post studies based on diff-in-diff analysis				
Kern et al. (2021)	Structural gravity model	29.0-67.0		0.39-1.32

Source: Monteagudo et al. (2012), Kern et al. (2021), Authors.

SD), additional EU-GDP gains of 1.8% could be achieved and trade could increase by another 7.5%. The most recent European Commission study by Barbero et al. (2022) is based on estimates of productivity shocks due to changes in services restrictions over the period 2006 to 2017 and simulations with a dynamic spatial general equilibrium model. They estimate the impact of SD on EU GDP to be 1.5%.

As the Commission's early studies were based on estimated elasticities in the pre-SD period, there are only two ex-post studies of the impact of the SD to date, including the analysis by Barbero et al. (2022).[8] Kern et al. (2021) examined the effect of the SD using data up to 2014, setting 2010 as the date of full implementation of the Directive. Their estimates reveal a strong SD impact on trade in services. They find an increase in intra-EU services trade from a lower bound of 29% to an upper bound of 67% with an associated effect on total welfare (real GDP) of 0.39% to 1.32%. In contrast to Monteagudo et al. (2012) and the European Commission (2015), the effects on direct investment are excluded from the analysis.

4 Structural gravity model for services trade and empirical specification

To estimate the trade and real income effects of the SD we set up a standard structural panel gravity model of bilateral industry-level services trade as formulated by Anderson and van Wincoop (2003) or Yotov et al. (2016):

$$s_{ijkt} \quad = \quad = e^{z'_{ijkt}\alpha+\beta_{ikt}+\gamma_{jkt}+\mu_{ijk}} + \eta_{ijkt}. \tag{1}$$

For a given service industry k and a given year t, s_{ijkt} measures the share of bilateral service exports of country i to country j in total world output. Since domestic trade flows are included, for each industry and year these shares sum up to 1 over all countries pairs, i.e., $\sum_{i=1}^{C}\sum_{j=1}^{C} s_{ijkt} = 1$ with C denoting the number of countries. Trade frictions enter as $z'_{ijkt}\alpha$, where z_{ijkt} represents a vector of time-varying bilateral trade barriers including the dummies of the triple difference of the SD-effect described in detail below. α is the respective vector of parameter values.

The gravity model also incudes a comprehensive set of fixed effects. μ_{ijk} denotes country pair-industry fixed effects capturing all unobserved time-invariant bilateral industry-specific trade frictions. β_{ikt} and γ_{jkt} capture inward and outward

[8] Dettmer (2015) is another example but finds hardly any significant effects. This could be attributed to the short data series ending in 2010 and the assumption of 2006 as the implementation year, despite the Directive allowing for an implementation phase until 2009.

trade resistances (i.e., the average incidence of trade costs at the exporter and the importer side in each industry) and other unidentified, unilateral determinants of trade costs.[9] Lastly, the additive error term is captured by η_{ijkt}.

The identification of the SD reform effect on services trade relies on a difference-in-difference-in-difference design as analyzed Olden and Møem (2021). In this design the set of explanatory variables is extended by year-specific treatment dummies that are interacted with EU-membership dummies and border dummies. In this way the SD reform effect is isolated from overall EU integration effects. The econometric specification of the trade barriers including the SD-treatment effects can be summarized as follows:

$$\begin{aligned} z'_{ijkt}\alpha &= \sum_{s=1996}^{2018} \alpha_{1,s} B_{ij} P_s + \sum_{s=1996}^{2018} \alpha_{2,s} B_{ij} \log(dist_{ij}) P_s + \alpha_3 B_{ij} RTA_{ijt} + \alpha_4 B_{ij} Euro_{ijt} \\ &+ \sum_{s=1996}^{2018} \alpha_{5,s} B_{ij} nonEU_{ijt} P_s + \sum_{s=1996}^{2018} \alpha_{6,s} domEU_{ijt} P_s + \\ &+ \sum_{s=2010}^{2018} \alpha_{7,s} B_{ij} EU_{ijt} SD_k P_s + const. \end{aligned} \tag{2}$$

The indicator variable B_{ij} takes a value of one for international cross-border trade flows ($i \neq j$), it is zero for domestic trade ($i = j$). By including domestic trade flows and multiplying the border dummy with all other control variables, changes in cross-border trade are estimated relative to the development of nearly frictionless domestic trade (Yotov, 2012; Bergstrand et al., 2015; Larch et al., 2019). Thus, for example, EU membership or SD reform effects should lower relative trade costs of cross-border services trade within the EU, making it an attractive alternative to purely domestic trade.

P_s represent time dummies, which take on a value of one at year s. Interacting P_s with the border dummy in the first term of equation (2) - taking account of all other control variables - captures the overall change in cross-border trade in services in each year from 1996 to 2018 that is not subject to any free trade agreement beyond the multilateral WTO agreements (GATS). The specified model also accounts for the impact of the geographical distance of trading partners, $\log(dist_{ij})$, as more distant partners are likely to have higher trade costs. Interacted with the time dummies P_s the estimated parameters reveal the change in distance-related trade costs over time. Globalization trends and technical progress - especially the digital revolution - very likely reduced the impact of distance also in the services

[9] Similar to Anderson and van Wincoop (2003) the exporter-industry-time and the importer-industry-time dummies represent solutions to the system of multilateral resistances at given trade (im)balances and thus depend on the trade friction parameters.

sector.

Most importantly, to effectively disentangle the effects of the SD from other integration effects, our model controls for joint membership in regional trade agreements, in the Eurozone and the EU (RTA_{ijt}, $Euro_{ijt}$ and EU_{ijt}), all defined as dummy variables. As to the EU dummy, the model allows for heterogeneity of the control group and includes time-variant dummy variables for country pairs involving non-EU countries ($nonEU_{ijt}$) and intra-EU domestic trade ($domEU_{ijt}$), with intra-EU cross-border trade flows as the reference group.

Both the $EURO_{ijt}$ and "EU-dummies" are designed to capture the various enlargement phases of the EU and Eurozone. Note that the RTA_{ijt} and the $EURO_{ijt}$ dummy variables equal zero for domestic trade. Furthermore, following Mayer et al. (2019), the RTA_{ijt} variable is set to zero for all countries for which EU membership replaced a regional trade agreement.

We use a quadruple of interactions to identify the SD effect captured by parameter $\alpha_{7,s}$ in equation (2). These include (i) the border dummy ($B_{ij} = 1$), (ii) the EU membership dummy ($EU_{ijt} = 1$), (iii) time dummies for the treatment period ($P_s = 1$, $s = 2010, ..., 2018$) and (iv) dummies for each industry covered by the SD ($SD_k = 1$, "treated sectors"). We follow Kern et al. (2021) in our choice of the treatment year 2010 as it is the first year after the official deadline for the legal transposition of the SD into national law.

The identification strategy chosen is best understood by distinguishing between three different control groups. First, service industries outside the EU are not covered by the SD-directive ($EU_{ijt} = 0$ and $B_{ijt} = 1$). Second, domestic trade flows within the EU Member States are not subject to the SD ($EU_{ijt} = 1$ and $B_{ijt} = 0$). Third, cross-country trade flows within the EU are not covered by the SD for some service industries ($EU_{ijt} = 1$, $B_{ijt} = 1$, $SD_k = 0$). Hence, the SD impact is identified in a triple difference-in-difference (DDD) setting as described by Olden and Møem (2022) and accounts for confounding EU-membership effects. The parameters $\alpha_{7,s}$ reveal the intra-EU cross-border trade effect of the services sectors included in the SD ("treated sectors") after treatment year 2010 relative to the same intra-EU-specific trade flows in the same sector and period in a scenario in which the SD had never been implemented.

According to Olden and Møem (2022), the DDD estimator can be viewed as the difference between two difference-in-difference estimators. The DDD in our case then involves (i) the difference-in-difference of treated and untreated country-pair-industries within the EU and (ii) the difference-in-difference of treated and untreated industries in non-EU and domestic trade flows. The first one (i) compares the post-pre treatment period difference of the treated ($SD_k = 1$, $EU = 1$) with the post-pre treatment period difference of the untreated sectors within the EU ($SD_k = 0$, $EU = 1$). The inclusion of the second eliminates the confounding

EU-integration effects.

This identification strategy is valid if the parallel trend assumption holds so that an unbiased prediction of the counterfactual can be derived. Olden and Møem (2021) emphasize that in a DDD-setting the parallel trend assumption holds if the difference in outcomes between service industries in the EU covered by the SD and the EU-service industries not covered trends similarly to the corresponding difference in domestic and non-EU trade flows. Formally, under the common trend assumption, the SD-effect for cross-border trade flows $i \neq j$ is measured as (see Olden and Møem, 2021, eq. 5.2):

$$\frac{E\left[s_{ijkt}|Z, B_{ij}=1, EU_{ijt}=1, SD_k=1, t>2010\right]}{E\left[s_{ijkt}|Z, B_{ij}=1, EU_{ijt}=1, SD_k=0, t>2010\right]} = e^{\alpha_{7,t}}, t \geq 2010. \tag{3}$$

In a next step, we specify an extended model to account for the heterogeneity of the SD effect across EU-destination countries. Specifically, we include an indicator that signals differences in efforts to liberalize the service sector as well as differences in the quality of SD implementation across EU countries.[10] Analyses by the European Commission (2021) and Monteagudo et al. (2012) clearly reveal very different country and sectoral patterns of service reforms following the SD implementation. It is therefore important to take this heterogeneity into account. Formally, we add to the specification described in (2) a term with variation in the *Solvit*-indicator, which is described in more detail in the next chapter:

$$\sum_{l=2}^{4} \alpha_{8,l} B_{ij} EU_{ijt} SD_k Post_t Solvit_{jtl}, t \geq 2010, \tag{4}$$

where $Post_t$ denotes a dummy variable that takes the value of 1 for the treatment period $t = 2010, ..., 2018$. This term identifies heterogeneous effects of the SD due to differences in a country's compliance with and implementation of the rules of the SD. $Solvit_{jtl}$ is a dummy variable that classifies different reform groups from weak reformers to strong reformers along the quartiles of the continuous *Solvit*-indicator with the weakest reformers in the quartile $l = 1$ as the reference group.

This formulation is robust to measurement error and erratic variations as shown by Wansbeek and Meijer (2001). Note, that the SOLVIT-mechanism starts in 2010 and refers to all service industries within the EU - treated as well as non-treated. Nevertheless, this does not confound parameter estimation of the interaction term for the treated sectors in our model specification ($\alpha_{8,s}$). The SOLVIT control

[10] This indicator should also capture any shortcomings in the implementation process, such as in the case of incomplete and late transposition of the SD in Austria, Germany or Greece (compare chapter 2).

variable, which affects all treated and non-treated industries simultaneously within the EU (base effect), is nested within importer-country industry time effects. These fixed effects form the base and capture the overall EU integration effects including SOLVIT, since the model includes non-EU and domestic trade dummies interacted with time dummies. Hence, the *Solvit*-indicator in equation (4) correctly measures the heterogeneity of the SD effect across EU Member States.

Finally, we additionally introduce industry-specific treatment effects by adding an interaction term with industry dummies ($I_k = 1..6$), which take a value of one for each respective industry k and the post-treatment period dummy ($Post_t$). Formally, the following term is added to equation (2) for treated service industries:

$$\sum_{k=1}^{6} \alpha_{9,k} B_{ij} EU_{ijt} SD_k I_k Post_t. \tag{5}$$

Equations (1) to (5) form the basis for identifying both the impact of the SD and the untapped potential due to incomplete implementation of the SD. To achieve this, we compare the estimated bilateral and domestic trade flows of actual implementation in the baseline scenario with two counterfactual scenarios. The first scenario involves calculating trade and income effects based on a "no policy change" condition, which represents a hypothetical situation in which the SD has never been implemented in any EU country. In a further step, we evaluate trade and income effects under a scenario assuming "best implementation" of the SD, as indicated by the *Solvit*-indicator of the top-performing reform group of countries. This scenario of "best SD implementation" is then compared to the baseline scenario, which reflects the actual implementation status across all countries and sectors covered by the SD. The counterfactual analysis under the second scenario provides information on the unexploited potential for intra-EU trade in services and the associated real income benefits of EU Member States, highlighting the current implementation deficits.

Based on the estimated parameters of the model the analysis incorporates general equilibrium effects of SD implementation, taking into account second-round effects from changes in multilateral resistances due to first-round SD effects. These changes may cause trade diversion from third countries and lead to trade creation with increased intra-EU trade in covered services sectors, affecting gross production and bilateral trade. Including both trade diversion and trade creation effects is essential for unbiased estimation of trade policy impacts (Allen et al., 2019; Oberhofer and Pfaffermayr, 2021). Formally, these general equilibrium effects are captured by the changes in the multilateral resistance terms of the structural gravity model. We apply the approach suggested in Yotov et al. (2016), which assumes constant industry shares in total production and hence immobile factors of production across industries.

The estimation of the welfare effects of SD implementation is based on Costinot and Rodríguez-Clare (2014). In this framework, welfare gains from any trade policy change are induced by the substitution of relatively more expensive domestic production by cheaper imports, which generate real income gains. The magnitude of this effect depends on the elasticity of substitution for different industries.

5 Data Sources and initial insights into the heterogeneity of Services Directive implementation based on SOLVIT

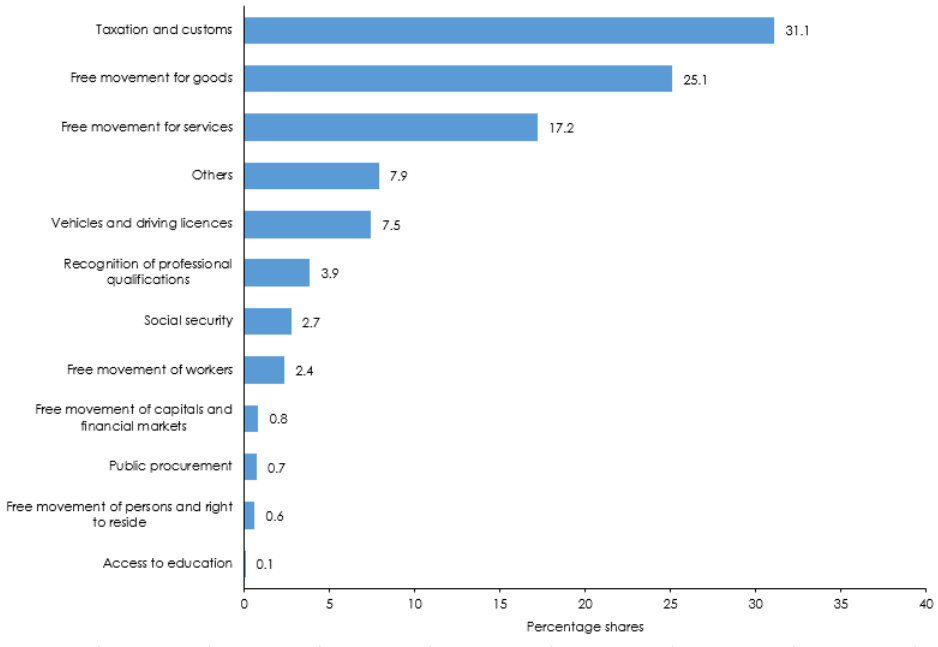
The availability of bilateral foreign trade data for services is limited, particularly at the disaggregated level of individual industries. The need for domestic trade data further constrains the database options. This study uses the 2021 release of the OECD (ICIO) data, which covers 66 countries and 23 service industries from 1995 to 2018, and is based on national and inter-country input-output tables. Its long time series and broad country coverage, as well as its coverage of domestic trade flows allow for precise estimation of trade policy effects, such as the SD. Table A1 in the appendix provides an overview of the countries covered in the estimation sample based on OECD ICIO tables. The sample includes all 27 EU member states, the remaining OECD countries and all of the important emerging non-OECD countries. As suggested in Egger et al. (2022) the empirical analysis and estimation will be based on annual services trade flows.

It should be noted that the OECD ICIO trade data is based on Balance of Payment statistics and therefore does not cover the supply of services through establishments abroad (Mode 3: "commercial presence"). This is an important limitation as FDI is the preferred mode of delivery in many service industries, reaching a share of 70% of total exports in wholesale and retail trade. However, according to the Trade in Services dataset by Mode of Supply (TiSMoS), the data covered by Balance of Payment statistics still account for about 45% of total trade in services.

Data on geographical distance are drawn from Mayer and Zignago (2011), and information on bilateral Regional Free Trade Agreements (RTA) is taken from Mario Larch's Regional Trade Agreements Database (e.g., Egger and Larch, 2008).[11] Finally, substitution elasticities to calculate real income effects in our model framework are taken from Christen et al. (2019) and Felbermayr et al. (2021). Table A2 in the Appendix provides descriptive statistics on the variables used in the analysis.

[11] Access to the dataset is available at `https://www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html`

Figure 1: SOLVIT business cases by problem area, 2006 to 2018

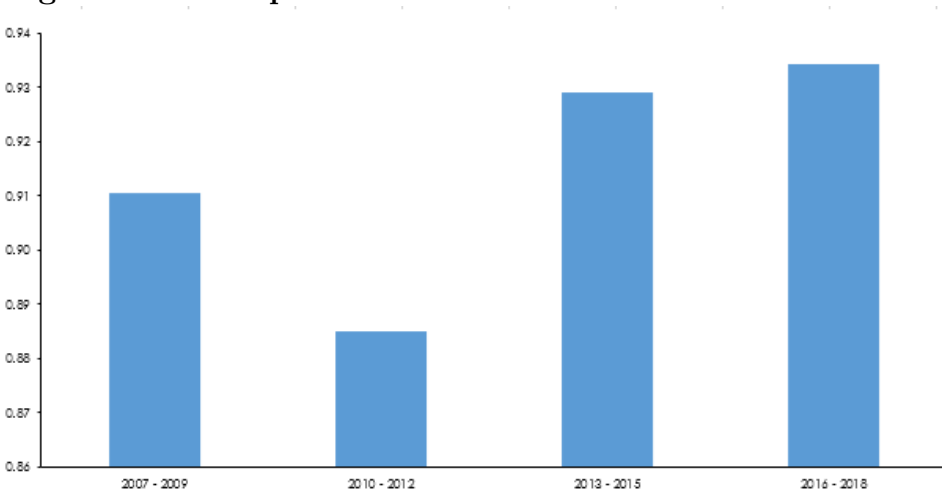


Data

Source: Single Market Scoreboard, SOLVIT business cases.

Most importantly, the study draws data from the Single Market Scoreboard on SOLVIT cases to reveal different levels of SD implementation and existing barriers to trade in services. The SOLVIT network, which deals with cross-border problems arising from the misapplication of Internal Market rules, is one of the EU's most important Internal Market institutional instruments and mechanisms. Launched in 2002, it streamlines the process by which businesses (as well as consumers) can submit complaints about infringements by national public administrations in the EU Single Market. SOLVIT centers have been established in each EU Member State, as well as in Norway, Iceland and Liechtenstein and cooperate directly with each other. In practice, complaints are first submitted to the "home center," which is responsible for reviewing and verifying cases, entering them into a central database, and forwarding them to the "lead center" - the center in the Member State where the problem originated. Our analysis focuses specifically on complaints submitted by businesses. Typically, these complaints concern issues such as inadequate transposition of EU law, national regulations that conflict with EU law, incorrect application of the law, failure to notify draft national legislation on services, and requests for clarification. Consequently, the number of cases reported to the SOLVIT network serves as a good indicator of the quality of transposition and implementation of EU directives.

Figure 2: Development of the SOLVIT indicator in the EU



Note: A higher value of the indicator signals a lower frequency of problem cases in SOLVIT.
Data Source: Single Market Scoreboard, SOLVIT business cases.

Figure 1 shows that 17.2% of the cases reported from the start of the SD in 2006 to 2018 concerned the free movement of services, 25.1% the free movement of goods and 33.1% taxes and duties (mainly problems related to VAT). Problem cases related to the free movement of workers and the recognition of professional qualifications accounted for minor shares of 2.4% and 3.9%, respectively.

The indicator calculated from SOLVIT data focuses on cases received by the lead center and is importer country-specific. We exclude complaints that do not pass verification or are transferred to other systems, and we exclude complaints related to trade in goods. Based on the number of complaints, the *Solvit*-indicator is calculated by normalizing the total number of complaints received by a country by the maximum number of cases received by any country and is defined as follows:

$$Solvit_{jt} = 1 - \left(\frac{Solv_{jt}}{Solv_{max}} \right)$$

A value of 1 indicates that there were no SOLVIT complaints in that country and that year. In general then, a higher value indicates a higher level of compliance with Single Market legislation in the area of services.

The caseload to be handled from on year to the other changes quite erratically for individual countries due to idiosyncratic reporting patterns. There are also likely to be delays between the occurrence of problems encountered in cross-border trade and the reporting, handling and resolution of SOLVIT cases. To minimize such data problems, the annual SOLVIT data are aggregated into 3-year averages

for four different time periods. Figure 2 reveals the evolution of the *Solvit*-indicator over these time intervals during the time period of SD implementation from 2007 to 2018 at the EU level. The resulting pattern represents well the empirical findings in ex-post analyses of the SD by Dettmer (2015) and Kern et al. (2021) of a slow and delayed reform process.

We have chosen to base the econometric model of SD-assessment on the grouping of countries along the quartiles of the *Solvit*-indicator. The first quartile forms the base and the corresponding dummy variable is omitted. On the one hand, the use of quartile-dummies minimizes the impact of measurement errors as suggested by Wansbeek and Meijer (2001). On the other hand, together with the comprehensive set of fixed effects, it guards against endogeneity issues concerning the *Solvit*-indicator (see Baier and Bergstand, 2007 and Oberhofer, Pfaffermayr and Sellner, 2021).

6 Trade and welfare effects of the Services Directive

6.1 Estimation results

Table 3 reports the estimation results of the empirical models outlined in chapter 4. The estimates are based on bilateral OECD ICIO trade data at the industry level reviewed above. The models are estimated by PPML with standard errors clustered by country pair and service industry to account for serial correlation of the disturbances. Since our main focus is on the effect of the SD, results for control variables are not reported.[12] Table 3 distinguishes between three model variants based on the empirical specifications summarized in equation 2, 4 and 5 in chapter 4.

The first model presents results from estimating the most parsimonious empirical specification, which excludes the *Solvit*-indicator and industry-specific SD-effects. The SD variable is interacted with the EU-dummy and with time dummies, thus capturing yearly overall SD-effects. Two important findings emerge. First, the results indicate that SD-effects vary over time, underscoring the need to account for these fluctuations. Furthermore, we find insignificant coefficients before 2014. They turn statistically significant from 2014 onward. This confirms the findings of a very slow and delayed SD reform process and supports the choice of the treatment year after the first implementation phase from 2006 to 2009 as in Kern et al. (2021).[13]

[12]The full set of results can be provided upon request.

[13]Unreported results with treatment year 2007 reveal negative and mostly insignificant co-

Table 3: Estimation results

	Model 1			Model 2			Model 3		
	Parameter		sd	Parameter		sd	Parameter		sd
Border*EU*SD*2010	-0.022		0.029	-0.040		0.030	0.035		0.073
Border*EU*SD*2011	0.005		0.030	-0.013		0.031	0.062		0.073
Border*EU*SD*2012	0.043		0.032	0.025		0.033	0.098		0.075
Border*EU*SD*2013	0.033		0.034	-0.026		0.041	0.056		0.079
Border*EU*SD*2014	0.065	*	0.035	0.006		0.042	0.089		0.081
Border*EU*SD*2015	0.105	***	0.039	0.045		0.044	0.127		0.082
Border*EU*SD*2016	0.144	***	0.039	0.093	**	0.044	0.172	**	0.080
Border*EU*SD*2017	0.136	***	0.043	0.086	*	0.046	0.164	**	0.080
Border*EU*SD*2018	0.110	**	0.044	0.059		0.048	0.137	*	0.082
Border*EU*SD*$Post_{2009}$*I1							-0.203	***	0.074
Border*EU*SD*$Post_{2009}$*I2							-0.303	***	0.078
Border*EU*SD*$Post_{2009}$*I3							0.099		0.084
Border*EU*SD*$Post_{2009}$*I4							0.017		0.089
Border*EU*SD*$Post_{2009}$*I5							-0.244	***	0.077
Border*EU*SD*$Post_{2009}$*I6							-0.111		0.081
Border*EU*SD*$Post_{2009}$*SOLVIT 2 (medium-weak)				0.071	**	0.033	0.058	*	0.032
Border*EU*SD*$Post_{2009}$*SOLVIT 3 (medium-strong)				0.122	***	0.046	0.100	**	0.044
Border*EU*SD*$Post_{2009}$*SOLVIT 4 (strong)				0.150	***	0.058	0.117	**	0.056

Notes: The gravity models are estimated using the ppmlhdfe package of the STATA econometrics software (Correia et al., 2020) on $2,068,968$ observations. *, ** and *** indicate statistical significance at the 10%-, 5%- and 1%-level, respectively. All control variables as well a comprehensive set of fixed effects are included (compare chapter 4, equation 2 and equation 4). 2010 is specified as the year of treatment in Models 1 to 3. Standard errors are clustered by country pair-industry accounting for correlation over time within each industry country pair cell.

Model 2 includes differences in service sector liberalization efforts across countries as represented by the *Solvit*-indicator, but still ignores differential impacts across the treated service industries. Different "reform classes" ranging from weak reformers to strong reformers are defined using the quantiles of the *Solvit*-indicator and are interacted with the SD variable (see equation (4) in chapter 4). The annual base effects now reveal the impact of the SD in the case of very poor reform progress ($Solvit = 1$). As we move from poor to best reformers in terms of SD implementation, the SD-effects on exports in the sectors covered by the SD are significantly higher increasing the SD-effect by 7 to 16 percent.

The common trend assumption is central for the proper identification of treatment effects in difference-in-difference models. Olden and Møen (2022) argue that the triple difference does not require two parallel trend assumptions. Rather, it requires that the relative outcome of the treated industries and untreated industries in the EU trend in the same way as the relative outcome of these two groups of industries in the case of Extra-EU trade and domestic trade. It is common practice to visually and statistically test for pre-existing differences in trends, known as "pre-trends", in order to assess the plausibility of the parallel trends assumption. Accordingly, we estimate a model with interaction terms between the EU, the treatment and time dummies referring to the pre-treatment period. Testing for pre-treatment trends is then equivalent to testing the null hypothesis that these interaction terms are equal to zero and are statistically insignificant. Roth et al. (2023) suggest to use event-study plots to display the estimated coefficients in cases with multiple pre-treatment years.

Figure 3 presents the event study plot and displays the effect of the SD including interactions of time dummies and the treatment indicator for the pre-treatment years (1995 to 2009) as well as the two-sided 95% confidence interval of the estimates. Since the SD-effect is based on the average of a ratio, the standard deviations are derived by the delta method. Confirming the common trend assumption, Figure 3 reveals statistically insignificant effects prior to the treatment year 2010.[14]

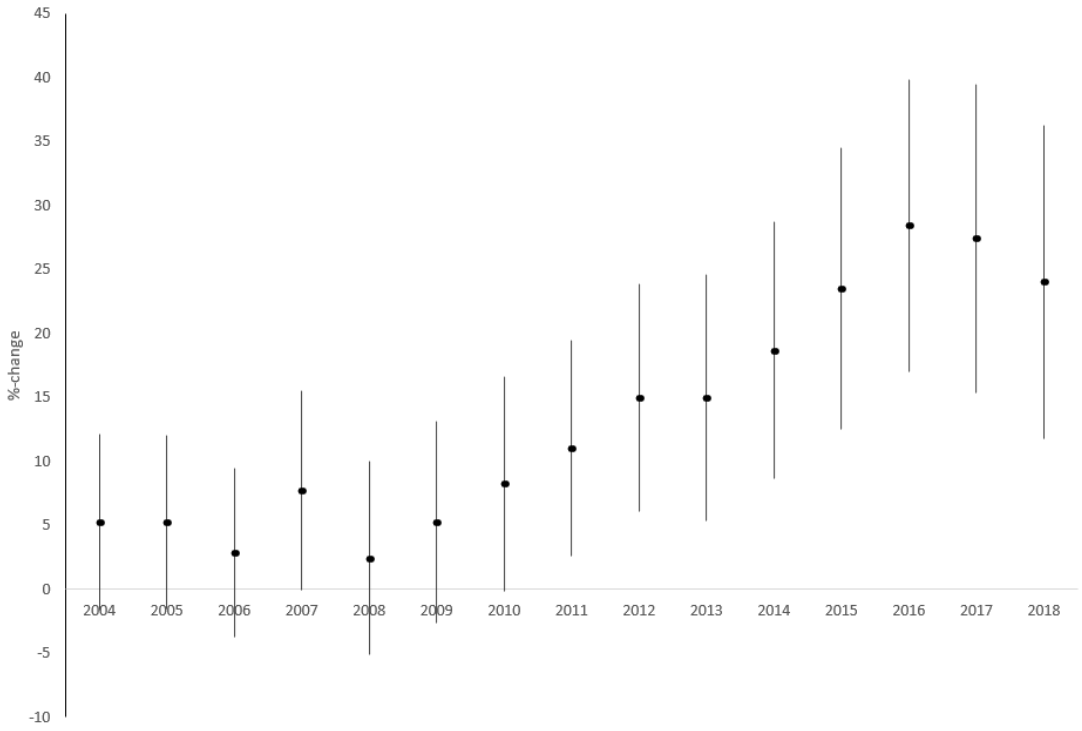
Given the validity of the common trend assumption, Model 3 in Table 3 additionally accounts for differences of SD effects across the treated sectors. Model 3 is the most comprehensive model and corresponds to the specifications outlined in equation (2) including the additional term outlined in equation (5) in chapter 4.

The findings unequivocally underscore the necessity to account for this heterogeneity at the sector level. Relative to the base (business support and administrative activities), four out of six service industries exhibit a reduced SD-effect.

efficients before 2011. Thereafter, they become positive and statistically significant from 2015 onward.

[14]We do not report common trend effects before the year 2004 to avoid confounding effects caused by the EU enlargement in 2004 when comparing trends in the period 1995-2003.

Figure 3: Common Trend Assumption: Event Study Plot



Note: Vertical bands denote the 95%-confidence interval, i.e., +-1.96 times the standard error of each point estimate.

However, in order to capture the overall effect, these sector-specific parameters must not only be interpreted in relation to the base industry, but all other interaction effects in the model must also be taken into account. Such interaction effects include the base effect of the SD in a given year and the interaction effects across different SOLVIT reform groups. In order to facilitate interpretation, Table 4 presents the overall effect for all treated services industries and SOLVIT-classes. The findings indicate a substantial positive impact on business support and administrative activities (the base against which all other service industries are compared). A clear positive SD-impact is also identified for publishing, information technology (IT), and professional services. Among the service industries that are adversely affected in the group of poor reformers, accommodation and food services are the only ones that are negatively affected, even among the group of best reformers. However, the estimation of these effects is often imprecise, and confidence intervals tend to be wide. In instances where the estimated effects are negligible or negative, the majority of the confidence intervals include zero, thereby

Table 4: Heterogeneous SD effects across treated service industries and SOLVIT-quartiles

		SOLVIT											
		1.Qrt			2.Qrt			3.Qrt			4.Qrt		
		est.	lo.	up.	est.	lo.	up.	est.	lo.	up.	est.	lo.	up.
45T47	Wholesale and retail trade	−6.7	−15.8	2.4	−0.8	−9.9	8.2	3.3	−7.2	13.9	5.0	−7.0	17.0
55T56	Accomm. and food services	−16.7	−27.0	−6.3	−10.8	−21.0	−0.7	−6.7	−18.2	4.9	−5.0	−17.7	7.8
58T60	Publish., audiov. and broad. act.	23.5	11.2	35.8	29.4	17.5	41.2	33.5	19.8	47.3	35.2	21.3	49.2
62T63	IT and other information services	15.4	1.3	29.4	21.2	8.2	34.2	25.4	11.0	39.8	27.0	12.3	41.8
68	Real estate activities	−10.7	−20.9	−0.6	−4.9	−15.0	5.2	−0.7	−12.2	10.8	0.9	−11.9	13.7
69T75	Professional, scientific and techn. act.	2.6	−8.8	14.0	8.5	−2.3	19.2	12.6	1.0	24.2	14.3	1.3	27.3
77T82	Business support and admin. act.	13.7	−2.3	29.7	19.5	3.2	35.9	23.7	6.4	40.9	25.4	6.9	43.8

Notes: QER. abbrivates Qaurtiile. Est. refers to the estimated marginal effect corresponding to an industry/quartile cell, while "lo." and "up." denote the lower and upper bound of 95%-confidence intervals derived by the delta-method.

indicating insignificant SD-effects in these industries. For the 3rd and 4th-SOLVIT-quartile the 95%-confidence intervals for four out of seven service industries do not contain zero (publishing, IT-services, Professional services and business support. Overall, the significant SD effects in this specification range from 12.6 to 35.2 percent.

All parameter estimates reported in Tables 3 and 4 capture direct trade effects of the SD and do not yet take any type of general equilibrium effects into account. The general equilibrium counterfactual analysis presented in the following sub-chapters will offer a comprehensive overview of the total (direct and indirect) effects for particular scenarios. These calculations will be based on our preferred Model 3 and the counterfactual analyses described in chapter 4.

6.2 Trade effects and trade potentials

Table 5 reports aggregated bilateral general equilibrium trade effects derived from the counterfactual analyses for the two alternative scenarios: a scenario of "no policy change" displaying realized impacts of the SD and potential trade effects in a scenario of "best SD implementation". It summarizes the effects for seven service industries covered by the SD and reveals impacts on intra-EU trade, trade between the EU and the rest of the world (ROW), and trade among ROW countries. The construction sector had to be excluded due to problems with the relevant trade data in the OECD ICIO database.

In addition, we present direct effects for each scenario that serve as the basis for calculating the general equilibrium effects. The reported values are percentage changes in bilateral trade, derived by comparing the counterfactual predictions with the baseline estimates. All presented results are calculated as weighted averages of the bilateral trade effects for each industry within each individual Member State. The weights are based on trade flows from the counterfactual situation in the first scenario of "no policy change" and on baseline trade flows in the second scenario of "best SD implementation.[15]

A critical consideration in the interpretation of results pertains to the distinctive attributes of the services in question. These activities frequently necessitate personal interaction, a foundation of trust, and a comprehensive understanding of local customer preferences. Consequently, foreign direct investment (FDI) frequently becomes the preferred mode of delivery, which can theoretically substitute for or complement cross-border trade (Christen and Francois, 2017; Kern et al., 2021). The data in this analysis is limited to observing changes in service trade reported in Balance of Payments statistics (modes 1, 2 and 4) and negative trade

[15]For econometric estimation and for solving the structural gravity model all trade flows are normalized by world production.

effects could occur if FDI substitutes cross-border trade flows. Therefore, the resulting effects must be strictly interpreted as effects on trade in services, without accounting for SD-induced FDI flows.

Turning to the general equilibrium results for the first scenario (see the upper panel of Table 5), we find that the SD increased intra-EU trade by 4.4%. The impacts are very heterogeneous across SD services sectors. The SD effect on intra-EU trade was highly positive for publishing activities (24.99%), business support and administrative services (16.48%), IT and information services (13.98%) as well as professional, scientific and technical activities (5.9%). Negative effects were observed for accommodation and food services, real estate activities as well as for wholesale and retail activities. Referring back to Table 1, wholesale and retail trade accounts for the largest trade share in intra-EU cross-border trade. Although this sector has benefited significantly from the rise of e-commerce, distribution services remain among the sectors with the highest level of trade restrictiveness within the EU (OECD, 2023) and are most affected by regulatory barriers to e-commerce (Coad and Duch-Brown, 2017), supporting our findings.

In theory, any deepening of the EU integration process produces trade creation, enhancing intra-EU trade at the expense of trade with non-EU countries. Regarding the impacts of the SD, the results in Table 5 confirm this assertion for all sectors, revealing a positive SD effect. The empirical gravity model specified in this study also allows for the derivation of SD effects on total EU imports, as indicated by ROW-EU trade effects in column 6 of Table 5. We observe that trade-diverting effects were generally more pronounced for EU imports from the ROW than for EU exports to the ROW. However, these trade diversion effects were relatively small and were more than compensated by the positive effects of the SD on intra-EU exports. The SD effects on trade among ROW countries were minimal.

The results for the second counterfactual scenario of "best SD implementation" are displayed in the lower panel of Table 5. The counterfactual sets the *Solvit*-indicator for all EU countries to the level of the group of best reformers in the sample (group 4) and compares it to the baseline scenario that accounts for the implementation of the SD. Thus, it reflects possible trade potentials in a situation of "best implementation" of SD targets so far. Best compliance with the rules of the SD in all EU members would increase services trade in the internal market by another 6.17%. Since this counterfactual analysis assumes a uniform increase in reform efforts the resulting trade potentials are similar across the services sectors within the scope of the SD.

Enhancing services sector reforms and implementing the SD more effectively could also redirect some trade from third countries towards intra-EU trade ("EU-ROW" and "ROW-EU" rows in Table 5, "best SD implementation"). Trade di-

Table 5: General equilibrium trade effects in different counterfactual scenarios

		Country pairs				
		Direct Effects	Gereral equilibrium effects			
ISIC	Sector	EU-EU	EU-EU	EU-ROW	ROW-EU	ROW-ROW
		Impact of SD in percent "No policy change"				
		Percentage changes				
45T47	Wholesale and retail trade	-2,62	-2.38	0.15	-0.04	0.01
55T56	Accomm. and food services	-12.30	-8.82	0.45	2.62	-0.02
58T60	Publishing activities	33.44	24.99	-2.75	-2.64	0.17
62T63	IT and other information services	21.20	13.98	-1.54	-3.44	0.38
68	Real estate activities	-7.08	-6.05	-0.07	1.19	-0.06
69T75	Prof., scientific and tech. activities	7.85	5.90	-0.54	-1.11	0.00
77T82	Business support and admin. activities	20.73	16.48	-1.23	-1.94	0.11
	Total	6.18	4.4	-0.5	-1.1	0.1
		Potentials "Best SD implementation"				
		Percentage changes				
45T47	Wholesale and retail trade	7.29	6.80	-0.50	-0.35	-0.02
55T56	Accomm. and food services	7.73	5.93	-0.26	-1.61	0.01
58T60	Publishing activities	6.15	5.41	-0.68	-0.27	0.05
62T63	IT and other information services	7.34	4.86	-0.64	-1.59	0.22
68	Real estate activities	7.88	7.31	0.08	-1.31	0.06
69T75	Prof., scientific and tech. activities	6.46	6.17	-0.41	-0.42	0.04
77T82	Business support and admin. activities	6.29	6.15	-0.41	-0.11	0.05
	Total	6.97	6.17	-0.47	-0.56	0.03

Notes: Weighted averages of all bilateral trade effects of each industry. The weights are based on counterfactual trade flows in the s
change" and on baseline trade flows in the scenario of "best SD implementation".

version effects would remain quite moderate and would be more than offset by positive effects of intra-EU export potentials.

6.3 Real income effects

Table 6 presents the general equilibrium effects of the SD on real incomes for the two different counterfactual scenarios. Following the Approach of Costinot and Rodríguez-Clare (2014), the real income effects reflect a reduction of domestic trade flows that translate into welfare effects of the SD. The table reports the long-run welfare effects across services activities covered by the SD for the EU as well as for the ROW. These welfare changes depend on the elasticity of substitution in each of the services sectors besides the change in domestic trade flows.

In this modeling framework, changes in domestic and cross-border trade flows result from declines in the relative prices of traded goods, driven by service sector reforms and trade liberalization following the implementation of the Services Directive (SD). By reducing cross-border barriers, exports and imports become less costly for EU members, leading to a decrease in relative prices for traded services. As a result, exports increase at the expense of domestic trade, and imports substitute for less efficient and more expensive domestic production. This, in turn, depresses service prices and has a positive effect on real income. Thus, in this model framework, changes in welfare can be interpreted as changes in real income.

The EU-level impact on real incomes represents the weighted averages of the real income effects across each service sector and individual Member State. The results mirror the heterogeneity of the trade effects of the SD across sectors and countries. Positive impacts range from 0.12% for professional, scientific and technical activities to 1.0% for publishing activities. Negative real income effects are observed for wholesale and retail trade, accommodation and food services, as well as real estate activities. Given the high weight of wholesale and retail trade in total intra-EU trade, the trade-weighted average across sectors and EU members is essentially zero.

In a scenario of best compliance (lower panel of Table 6), real income effects range from 0.16% for business support services to 0.35% in the wholesale and retail, and real estate sectors. Overall, the analysis of untapped income potentials reveals that better implementation of the SD would yield additional income gains of 0.28%. ROW countries are generally unaffected by the SD in both scenarios.

The results of our analysis are differ from findings of ex-post studies in the literature. However, comparisons with these studies are limited due to different methodological approaches. Additionally, differences arise from using trade-weighted averages instead of simple averages in the aggregation across countries and sectors. The resulting SD trade effects in our analysis, as well as in the European Commission's ex-post studies, are very small compared to Kern et al. (2021).

Table 6: General equilibrium real income effects in different counterfactual scenarios

ISIC	Sector	EU	ROW
		Impact of SD "No policy change"	
		Percentage changes	
45T47	Wholesale and retail trade	-0.14	0.00
55T56	Accomm. and food services	-0.31	0.00
58T60	Publishing activities	1.00	0.06
62T63	IT and other information services	0.52	-0.01
68	Real estate activities	-0.30	0.09
69T75	Professional, scientific and technical activities	0.12	0.01
77T82	Business support and admin. activities	0.26	0.02
	Total	-0.01	0.03
		Potential "Best SD implementation"	
		Percentage changes	
45T47	Wholesale and retail trade	0.35	0.01
55T56	Accomm. and food services	0.19	0.00
58T60	Publishing activities	0.33	0.01
62T63	IT and other information services	0.25	-0.01
68	Real estate activities	0.35	-0.09
69T75	Professional, scientific and technical activities	0.18	0.00
77T82	Business support and admin. activities	0.16	0.00
	Total	0.28	-0.02

Notes: Weighted averages of all bilateral trade effects of each industry. The weights are based on counterfactual trade flows in the s change" and on baseline trade flows in the scenario of "best SD implementation". Substitution elasticities are taken from Christen Felbermayr et al. (2021).

While the general methodological approach in Kern et al. (2021) is similar to the empirical model applied in this study, discrepancies to our study in the resulting trade effects are due to their different strategies used to identify the SD effect and the exclusion of heterogeneous industry-specific effects.

7 Conclusions

The most important reform step to date in liberalizing and deepening of the EU Internal Market for services was taken with the EU Services Directive (SD). It entered into force in June 2006 and was implemented - in legal terms - in most EU countries by 2010. This paper takes stock of the trade and welfare gains achieved and quantifies unexploited potential gains due to implementation deficits. The SD excludes some service industries. However, the industries covered by the SD accounted for 62% of total intra-EU services exports. The estimation results are based on a theory-consistent specification of the gravity model at the industry and country level over the period 1995 to 2018. It takes into account the heterogeneous effects across the services sectors included in the SD. Moreover, the analysis uses a novel country-specific indicator derived from business complaints on cross-border trade issues reported to the EU SOLVIT mechanism. In this way, all estimated effects take into account the heterogeneous degree and quality of SD implementation across Member States. According to this indicator as well as previous findings in the literature, implementation of the SD and reform progress have been limited, slow, and highly uneven across countries and sectors.

The paper finds that the SD has generated benefits in terms of increased services trade and real income gains only in some of the service industries. The estimates indicate positive trade and welfare effects for the publishing activities, IT and other information services, professional, scientific and technical activities as well as for business support services. Adverse impacts are found in wholesale and retail trade, which plays a crucial role in the total trade in services. In this area, trade-restrictive regulations still need to be adjusted to align with the objectives of the SD. General equilibrium trade results - based on weighted averages of the bilateral trade effects of each industry - indicate that the SD increased overall intra-EU exports by 4.4% and had no impact on real incomes compared to a counterfactual situation of "no policy change".

The findings also suggest that improvements in compliance with and implementation of SD rules could be an important source of additional trade growth and associated real income gains. In a counterfactual scenario of "best SD implementation" which assumes that all EU Member States increase their reform efforts to the level of the strongest reforming countries in the sample, the analysis finds an intra-EU export potential of 6.17% and potential real income effects of 0.28%.

Real income potentials range from 0.16% in the sector of business support and administrative services to 0.35% in wholesale and retail, as well as in the real estate sectors. In particular, the positive effects of trade and real income extend to the services sectors covered by SD that were previously negatively affected.

Trade diversion effects were found to be rather moderate. Deeper and stronger services sector reforms in the EU are therefore unlikely to entail high costs for non-EU countries in the rest of the world (ROW). At the sectoral level, the identified trade and income effects of SD implementation are most promising in the IT and information sector as well as the group of professional, scientific and technical activities, as these activities are essential inputs for many other sectors and key drivers of competitiveness and productivity. Last not least, the analysis provides evidence of the importance and positive impacts of informal and faster solution mechanisms such as the SOLVIT mechanism to address potential problems in cross-border trade in services.

The counterfactual scenario of "best implementation" in the analysis reflects potentials of adopting the highest standards of SD regulations so far achieved by Member States. Nevertheless, there is still room for improvement to unlock additional opportunities. Concurrently, the measurement and monitoring of barriers to trade in services at the disaggregated level of countries and sectors should continue, using better indicators and improved data accessibility for research. Finally, policy must consider complementary EU legislative acts, regulations, and directives that are essential for the full effectiveness of the SD. These range from competition policy to regulations concerning infrastructure investments (especially in electronic communications) to the implementation of the Digital Single Market.

8 References

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A Appendix

Table A1: Countries covered in the estimation sample

	EU-28		Non-EU
AUT	Austria	AUS	Australia
BEL	Belgium	ARG	Argentina
BGR	Bulgaria	BRA	Brazil
HRV	Croatia	BRN	Brunei Darussalam
CYP	Cyprus	KHM	Cambodia
CZE	Czech Republic	CHL	Chile
DNK	Denmark	COL	Colombia
EST	Estonia	CRI	Costa Rica
FIN	Finland	CHN	China
FRA	France	IND	India
DEU	Germany	IDN	Indonesia
GRC	Greece	ISR	Israel
HUN	Hungary	HKG	Hongkong
IRL	Ireland	JPN	Japan
ITA	Italy	KAZ	Kazakhstan
LVA	Latvia	KOR	Korea
LTU	Lithuania	LAO	Laos
LUX	Luxembourg	MYS	Malaysia
MLT	Malta	MEX	Mexico
NLD	Netherlands	MAR	Morocco
POL	Poland	MMR	Myanmar
PRT	Portugal	NZL	New Zealand
ROU	Romania	NOR	Norway
SVK	Slovak Republic	PER	Peru
SVN	Slovenia	PHL	Philippines
ESP	Spain	RUS	Russia
SWE	Sweden	SAU	Saudi Arabia
GBR	United Kingdom	SGP	Singapore
		ZAF	South Africa
		CHE	Switzerland
		TWN	Taiwan
		THA	Thailand
		TUN	Tunisia
		TUR	Turkey
		USA	United States
		VNM	Vietnam

Table A2: Descriptive statistics

	mean	std	min	max
Trade flows*100	0.024	0.531	0.00	47.86
Zero trade-dummy	0.009	0.095	0.00	1.00
SD-industry dummy	0.022	0.148	0.00	1.00
Border-dummy	0.985	0.123	0.00	1.00
EU-Dummy	0.125	0.331	0.00	1.00
Domestic non-EU-dummy	0.005	0.074	0.00	1.00
Non-EU-dummy	0.859	0.348	0.00	1.00
Log Distance	8.444	1.103	1.90	9.89
EURO-dummy	0.042	0.202	0.00	1.00
RTA-dummy	0.275	0.447	0.00	1.00
Solvit				
1. quartile	0.006	0.077	0.00	1.00
2. quartile	0.006	0.079	0.00	1.00
3. quartile	0.005	0.074	0.00	1.00
4. quartile	0.005	0.070	0.00	1.00

Notes: The sample includes 2,068,968 observations used for estimation. Trade flows are normalized by world trade and for each industry and year add up to 100.