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Contemporary Issues in International Economics

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Abstract The contemporary economic environment is in most segments quite different than it was even two decades ago. Globalization, development of new technologies, especial in the IT sector, financial innovations, repositioning of economic powers, and new business models are only a few of many new realities. Although all listed brought numerous new possibilities and continuous economic growth, we cannot neglect the increased risks and perils of contemporary economic reality. Uncertainty and adaptation have become a mantra in the life of entrepreneurs, governments, and institutions. Through eight chapters of this monograph, different experts, researchers and scholars try to enlight contemporary economic environment from a different perspective, either from the perspective of entrepreneur, financial industry, governments or average consumer and participant in the modern economy that was very promising only a few decades ago, but more uncertain and dangerous than ever, in the present.

Keywords: • international economy • international finance • economic policy • foreign investment policy • consumer behaviour

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Content

The Impact of Systemic Stress in the Euro Area on Bilateral Exports of Goods

DEJAN ROMIH

Abstract There is a growing interest among policymakers and researchers in estimating the impact of systemic stress on the economy. In this chapter, I present main findings of a panel study designed to estimate the impact of systemic stress in the euro area on bilateral exports of goods. Using the gravity model of international trade in goods, I found that systemic stress in the euro area, measured by the Composite Indicator of Systemic Stress for the euro area, the new Composite Indicator of Systemic Stress for the euro area and the EURO STOXX 50 Volatility Index negatively affects bilateral exports of goods, which is consistent with my expectations.

Ključne besede: • euro area • exports of goods • systemic stress • composite indicator of systemic stress • gravity model of international trade

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1   Introduction

There is a growing interest among policymakers and researchers at central banks, such as the European Central Bank (ECB), in estimating the impact of systemic stress on the (real) economy. Holló et al. (2012) defined systemic stress as the extent to which systemic risk has materialised. For example, a systemic financial crisis is characterised by high systemic stress. This means that when a systemic financial crisis occurs, the functioning of the financial system is disrupted. Research has shown that systemic stress negatively affects the economy (see Chavleishvili & Manganelli, 2019; Dajčman et al., 2020; Kremer, 2016a). As a result, there is a growing need among policymakers and researchers at central banks to measure and monitor systemic stress. There are at least four alternative measures of systemic stress in the euro area used by policymakers and researchers at the ECB. These are the Composite Indicator of Systemic Stress (CISS) for the euro area – a weekly measure of systemic stress in the euro area – developed by Holló et al. (2012), the NEW CISS for the euro area – a daily measure of systemic stress in the euro area – developed by the ECB, the SovCISS for the euro area – a monthly measure of sovereign financial stress in the euro area – developed by Garcia-de-Andoain and Kremer (2018), and the EURO STOXX 50 Volatility Index (VSTOXX), which is the European version of the CBOE Volatility Index (VIX). Research has shown that systemic stress is transmittable from one country to another (see Dajčman et al., 2020; Dovern & van Roye, 2014). Dajčman et al. (2020) found that systemic stress is transmittable from the euro area to the US, and vice versa. As a result, there is a growing need among policymakers and researchers at central banks to measure and monitor systemic stress at home (e.g., in the euro area) and abroad (e.g., in the US). To this end, Kremer (2016b) developed the CISS for the US. In his paper, he studied the systemic stress in the euro area and the US, using the CISS for the euro area and the CISS for the US.

In this chapter, I present the findings of a panel study designed to estimate the impact of systemic stress in the euro area on bilateral exports of goods. To date, there is little or no evidence to suggest whether systemic stress in the euro area negatively affects bilateral exports of goods. Therefore, the purpose of this chapter is to fill the gap in the literature. Unlike many others, I do not use a binary variable, having two possible values called "systemic financial crisis" and "no systemic financial crisis." Instead of a binary variable, I use the CISS for the euro area and two alternative measures of systemic stress in the euro area, namely the NEW CISS for the euro area and the VSTOXX. As I mentioned earlier, policymakers and researchers at the ECB use all three.

The rest of this chapter is divided into five sections. Section 2 reviews the literature on the impact of (systemic) financial stress on the (real) economy, Section 3 gives the materials and methods of the panel study, Section 4 gives the result of the panel study, Section 5 discusses the results of the panel study and Section 6 concludes this chapter.

2   Literature review

By its very nature, a systemic financial crisis is a rare event. Research has shown that it negatively affects the economy as a whole (see Lo Duca et al., 2017). As a result, there is a growing need among policymakers and researchers at central banks to prevent systemic financial instability (Arsov, 2013). For example, the bankruptcy of Lehman Brothers Holdings, Inc., on 15 September 2008 was the culmination of the subprime mortgage crisis in the US, which negatively affected financial markets around the world. As investor fled to quality and safety, the contagion of fear spread from one country to another.

There is a growing body of literature on the impact of financial stress on the economy. The rest of this section focuses on the impact of systemic stress on the economic activity.

2.1   The impact of financial stress on the (real) economy

Hakkio and Keeton (2009) studied the impact of financial stress on economic activity in the US. They found that financial stress negatively affects economic activity, which is consistent with recent evidence (see Evgenidis & Tsagkanos, 2017; Ferrer et al., 2018; Galvão & Owyang, 2018). Davig and Hakkio (2010) studied the impact of financial stress on economic activity in the US in stress and non-stress regimes. They found that financial stress negatively affects economic activity in both of the regimes. However, they found that the impact of financial stress on economic activity is larger in stress regimes than in non-stress regimes. Van Roye (2013) and Aboura and van Roye (2017) found similar results for Germany and France respectively.

2.2   The impact of systemic stress on the (real) economy

Systemic stress is a type of financial stress. Policymakers and researchers, for example at the ECB, use alternative measures of systemic stress in the euro area and in other major economies, such as the US. There are at least three alternative measures of systemic stress in the US used by policymakers and researchers at the ECB. These are the CISS for the US – a weekly measure of systemic stress in the US, the NEW CISS for the US – a daily measure of systemic stress in the US – developed by the ECB, and the VIX, known as the Fear Index. Table 1A shows alternative measures of systemic stress in the euro area and the US used by policymakers and researchers at the ECB.

The body of evidence on the impact of systemic stress on the (real) economy is more limited than for the financial stress. In this subsection, I focus on studies that use the CISS (see Chatterjee idr., 2017; Chavleishvili & Kremer, 2017; Chavleishvili & Manganelli, 2019; Dajčman et al., 2020; Hartmann et al., 2013; Holló et al., 2012; Kremer, 2016a; Silvestrini & Zaghini, 2015). Holló et al. (2012) and Kremer (2016a)

studied the impact of systemic stress on industrial production in the euro area. They found that systemic stress negatively affects industrial production. Consistent with previous findings, their studies suggest that the euro area needs to rethink some of its policies. Hartmann et al. (2013) and Silvestrini and Zaghini (2015) studied the impact of systemic stress on GDP growth in the euro area in stress and non-stress regimes. They found that systemic stress negatively affects GDP growth only in stress regimes. Chavleishvili and Kremer (2017) and Chavleishvili & Manganelli (2019) studied the impact of systemic stress on GDP growth in the US and the euro area respectively. They found that systemic stress negatively affects GDP growth only in recessionary regimes. In contrast, Dajčman et al. (2020) found that systemic stress negatively affects industrial production in the euro area in recessionary and non-recessionary regimes.

3   Materials and methods

In this study, I use unbalanced panel data to estimate the impact of systemic stress in the euro area on bilateral exports of goods. The full panel consists of 1,560 country pairs for the period of 15 years (i.e., from 2000 to 2014). Each country pair consists of one exporter and one importer. These are Australia, Austria, Belgium, Brazil, Canada, China, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, India, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, the Netherlands, New Zealand, Norway, Portugal, Russia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, the UK, and the US. I selected these countries at random. In doing so, I took into account the availability of data. 19 out of these countries are members of the euro area. These are Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. In 2019, the countries in the full panel accounted for 56.65% of world GDP, 75.47% of world exports in goods and 83.41% of world population. Table 1 shows data on GDP in millions of current USD, exports of goods in millions of current USD and population in millions by country.

Table 1:   Exports of goods, GDP, and population by country, 2019

Country	GDP in millions of current USD	Exports of goods in millions of current USD	Population in millions
Australia	1,396,567.01	271,440.97	25.37
Austria	445,075.39	170,815.51	8.88
Belgium	533,254.52	314,369.21	11.49
Brazil	1,877,810.51	225,799.58	211.05
Canada	1,741,576.39	450,803.21	37.59
China	14,279,937.47	2,386,640.08	1,397.72
Cyprus	24,949.07	3,481.94	1.20
Czechia	250,686.48	156,104.42	10.67

Country	GDP in millions of current USD	Exports of goods in millions of current USD	Population in millions
Denmark	350,104.33	120,638.90	5.81
Estonia	31,471.10	14,910.31	1.33
Finland	268,966.07	72,633.13	5.52
France	2,715,518.27	597,146.50	67.25
Germany	3,861,123.56	1,460,913.26	83.09
Greece	205,326.72	36,,308.42	10.72
Hong Kong	363,016.37	547843.80	7.51
Iceland	24,836.71	5,334.35	0.36
India	2,870,504.10	331,271.58	1,366.42
Ireland	398,590.21	254662.82	4.93
Israel	394,652.21	60,229.90	9.05
Italy	2,004,913.36	513,843.21	59.73
Japan	5,064,872.88	695,179.08	126.26
Latvia	34,055.46	14,249.75	1.91
Lithuania	54,639.94	29,049.29	2.79
Luxembourg	71,104.92	23,017.15	0.62
Malta	15,215.71	3,881.61	0.50
Mexico	1,268,870.53	461,039.50	127.58
Netherlands	907,050.86	552,950.71	17.34
New Zealand	209,127.45	39,687.13	4.98
Norway	405,510.00	103,285.33	5.35
Portugal	239,510.77	64,886.27	10.29
Russia	1,687,448.53	419,850.69	144.41
Slovakia	105,119.16	84,721.51	5.45
Slovenia	54,174.23	35,845.63	2.09
South Africa	351,431.65	90,118.87	58.56
South Korea	1,646,739.22	556,667.90	51.71
Spain	1,393,490.52	329,045.24	47.13
Sweden	531,283.30	176,288.41	10.28
Switzerland	731,474.37	347,071.67	8.58
UK	2,830,813.51	476,271.23	66.84
US	21,433,224.70	1,652,437.00	328.33

Source: The World Bank Group (2021).

In this study, we use the panel data gravity model of international trade (in goods) to estimate the impact of systemic stress in the euro area on bilateral exports of goods. In doing so, I followed some of the recommendations of Santos Silva and Tenreyro (2006, 2010a, 2010b, 2011a, 2011b) and Yotov et al. (2016). Like many others, I use the Poisson Pseudo-Maximum Likelihood (PPML) regression, recommended by the

UNCTAD and the WTO (see Yotov et al., 2016). As I mentioned in Section 1, I use three alternative measures of systemic stress in the euro area, namely the CISS for the euro area, the NEW CISS for the euro area, and the VSTOXX. Today, many researchers recommend the use of the VSTOXX as an alternative to the CISS for the euro area and the NEW CISS for the euro area. The main advantage of this study is that it uses all three of them.

Like others, I use yearly data on exports of goods, GDP, population, etc. I collected these data for the same time period as Oberhofer and Pfaffermayr (2021). The panel database I use in this study includes data on nominal and real exports of goods and GDP. Some authors use data on nominal exports of goods and GDP ("nominal data"), while others use data on real exports of goods and GDP ("real data"). In this study, I use both data sets. De Benedictis and Taglione (2011) recommended the use of nominal data. According to them, the use of these data is consistent with the theory.

In the first case, in which I use nominal data, the regression equation is:

$$X_{ijt} = \exp\big[\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} +$$
$$\beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln CISS_t + \beta_9 CNTN_{ij} + \beta_{10} CNTG_{ij} + \beta_{11} LANG_{ij} +$$
$$\beta_{12} TA_{ijt} + \beta_{13} EA_{ijt} + \beta_{14} LNDL_i + \beta_{15} LNDN_j + \beta_{16} ISLN_i + \beta_{17} ISLN_j\big] \times \varepsilon_{ijt}$$
$$i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T_{ij},$$

(1)

where X_{ijt} is the value of exports of goods from country i to country j at time t in current USD; $\ln Y_{it}$ is the natural logarithm of the value of the GDP of country i at time t in current USD; $\ln E_{jt}$ is the natural logarithm of the value of the GDP of country j at time t in current USD; $\ln POP_{it}$ is the natural logarithm of the population of country i at time t; $\ln POP_{jt}$ is the natural logarithm of the population of country j at time t; $\ln AREA_{it}$ is the natural logarithm of the land area of country i at time t in square kilometres; $\ln AREA_{jt}$ is the natural logarithm of the land area of country i at time t in square kilometres; $\ln DIST_{ij}$ is the natural logarithm of the distance between the capitals of countries i and j; $\ln CISS_t$ is the natural logarithm of the value of the CISS for the euro area at time t; $CNTN_{ij}$ is a dummy variable, the value of which is 1, if countries i and j lie on the same continent, otherwise 0; $CNTG_{ij}$ is a dummy variable, the value of which is 1, if countries i and j share a common land border, otherwise 0; $LANG_{ij}$ is a dummy variable, the value of which is 1, if countries i and j share a common language, otherwise 0; TA_{ijt} is a dummy variable, the value of which is 1, if countries i and j are signatories of the same trade agreement at time t, otherwise 0; EA_{ijt} is a dummy variable, the value of which is 1, if countries i and j are members of the euro area, otherwise 0; $LNDL_i$ is a dummy variable, the value of which is 1, if country i is a landlocked country, otherwise 0; $LNDL_j$ is a dummy variable, the value of which is 1, if country j is a landlocked country, otherwise 0; $ISLN_i$ is a dummy variable, the value of

which is 1, if country i is an island country, otherwise 0; $ISLN_j$ is a dummy variable, the value of which is 1, if country j is an island country, otherwise 0; and ε_{ijt} is the error term.

In the second case, in which I use real data instead of nominal data, the regression equation is:

$$RX_{ijt} = \exp[\beta_0 + \beta_1 \ln RY_{it} + \beta_2 \ln RE_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} + \beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln CISS_t + \beta_9 CNTN_{ij} + \beta_{10} CNTG_{ij} + \beta_{11} LANG_{ij} + \beta_{12} TA_{ijt} + \beta_{13} EA_{ijt} + \beta_{14} LNDL_i + \beta_{15} LNDN_j + \beta_{16} ISLN_i + \beta_{17} ISLN_j] \times \varepsilon_{ijt}$$

$$, i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T_{ij},$$

(2)

where RX_{ijt} is the value of exports of goods from country i to country j at time t in constant USD; $\ln RY_{it}$ is the natural logarithm of the value of the GDP of country i at time t in constant USD; and $\ln RE_{jt}$ is the natural logarithm of the value of the GDP of country j at time t in constant USD.

I obtained data on the value of the GDP in current USD by country and year from the World Bank, on the value of exports of goods in current USD by country and year from the UN, on the population by country and year from the UN, on the land area in square kilometres by country and year from the World Bank, on the coordinates of the capitals by country from latlong.net, on the value of the CISS and the NEW CISS for the euro area by date from the ECB, on the value of the VSTOXX by date from Qontigo, on trade agreements and their signatories from the WTO and on languages by country from Eberhard et al. (2021). I obtained other data from other public sources.

4   Results

In this study, I test the hypothesis that systemic stress in the euro area negatively affects bilateral exports of goods. Unlike many others, I use my own panel database, which includes the CISS for the euro area, the NEW CISS for the euro area and the VSTOXX. In creating the panel database, I followed the instructions of Yotov et al. (2016). In the years following the Great Recession, there has been a growing trend among policymakers and researchers at the ECB to use the CISS as a measure of systemic financial instability. As far as I know, it was first used in this sense by the ECB in 2010. Today, there is a growing body of evidence suggesting the usefulness of the CISS as a measure of systemic financial instability.

Figure 1 shows the CISS for the euro area from January 2000 to December 2019, while Figure 2 shows its frequency distribution.

Figure 1: CISS for the euro area from January 2000 to December 2019
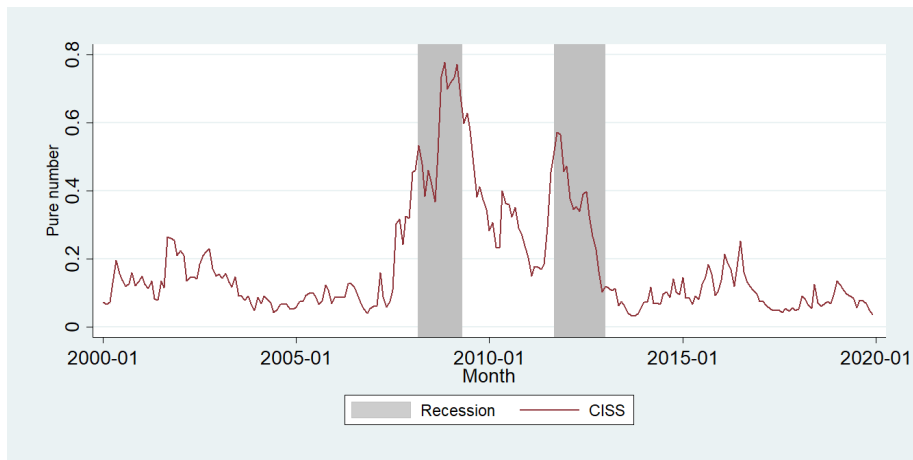
Source: ECB (2021).

As you can see from Figure 1, systemic stress in the euro area, measured by the CISS for the euro area, peaked during the Great Recession and the European debt crisis.

Figure 2: Frequency distribution of the CISS for the euro area from January 2000 to December 2019
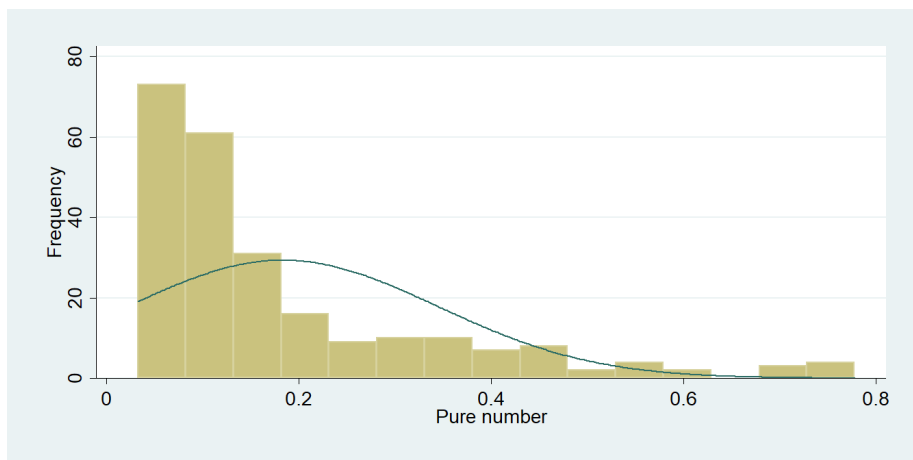
Source: Own calculations based on data from the ECB (2021).

Table 2 shows descriptive statistics for study variables.

Table 2: Descriptive statistics for study variables – full sample

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
X_{ijt}	23,384	4.95E+09	1.89E+10	77	3.97E+11
RX_{ijt}	23,384	5.18E+09	1.93E+10	94	3.56E+11
$\ln Y_{it}$	23,384	26.4719	1.8019	22.1833	30.4871
$\ln RY_{it}$	23,384	26.6309	1.7715	22.6892	30.4146
$\ln E_{jt}$	23,384	26.4721	1.8022	22.1833	30.4871
$\ln RE_{jt}$	23,384	26.6311	1.7719	22.6892	30.4146
$\ln POP_{it}$	23,384	16.4690	1.9597	12.5469	21.0377
$\ln POP_{jt}$	23,384	16.4871	1.9684	12.5469	21.0377
$\ln AREA_{jt}$	23,384	12.0682	2.4501	5.7683	16.6117
$\ln AREA_{it}$	23,384	12.0682	2.4514	5.7683	16.6117
$\ln DIST_{ij}$	23,384	8.1870	1.0877	4.0070	9.8962
$\ln CISS_t$	23,384	−1.7977	.6882	−2.7121	−.5802
$\ln NCISS_t$	23,384	−2.3007	1.2135	−4.1871	−.6045
$\ln VSTOXX_t$	23,384	3.1846	.2901	2.6415	3.6151
$CNTN_{ij}$	23,384	.4565	.4981	0	1
$CNTG_{ij}$	23,384	.0513	.2206	0	1
$LANG_{ij}$	23,384	.0898	.2859	0	1
TA_{ijt}	23,384	.5074	.5000	0	1
EA_{ijt}	23,384	.1226	.3280	0	1
$LNDL_i$	23,384	.1001	.3001	0	1
$LNDL_j$	23,384	.0996	.2995	0	1
$ISLN_i$	23,384	.1748	.3798	0	1
$ISLN_j$	23,384	.1750	.3800	0	1
$\ln REM_{it}$	23,384	18.3009	.6715	17.5092	20.1417
$\ln REM_{jt}$	23,384	18.2727	.6601	17.2964	20.1401

Source: Own calculations.

4.1 Estimation of the impact of systemic stress in the euro area on bilateral exports of goods without controlling for multilateral resistance

In this subsection, I estimate a (panel data) gravity model of international trade (in goods) without controlling for multilateral resistance (i.e., average trade barrier, see Anderson & van Wincoop, 2003). Using GPML regression, I found that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in current USD decreases by .06 per cent; see column (1) of Table 3. In other words, systemic stress in the euro area negatively affects bilateral exports of goods. I also found that if the value of the CISS for the euro area increases by one per cent, the

value of bilateral exports of goods in constant USD decreases by .04 per cent; see column (3) of Table 3. Using PPML regression, I found that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in current USD decreases by .05 per cent; see column (2) of Table 3. Contrary to the results of the GPML regression, the results of the PPML regression show that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in constant USD increases by .02 per cent; see column (4) of Table 3. In this case, you can see that using real data instead of nominal data, as recommended by De Benedictis and Taglione (2011), can be problematic. The p-values in the bottom row of columns (1), (3) and (4) of Table 3 indicate specification errors. In other words, only the first PPML specification of the (panel data) gravity model of international trade (in goods) passed the RESET test.

Table 3: Estimates of the impact of systemic stress on bilateral exports of goods – full sample (nominal and real data, CISS for the euro area)

	Nominal data		Real data	
	(1)	(2)	(3)	(4)
	GPML	PPML	GPML	PPML
$\ln Y_{it}$	0.8327***	.7504***	.8814***	.7968***
	(.0335)	(.0518)	(.0416)	(.0557)
$\ln E_{jt}$	.7283***	.8581***	.8174***	.9524***
	(.0315)	(.0628)	(.0402)	(.0695)
$\ln POP_{it}$	.1223***	.1955**	.0792**	.1822**
	(.0367)	(.0757)	(.0403)	(.0759)
$\ln POP_{jt}$	.1193***	.1167*	.0605	.0859
	(.0334)	(.0599)	(.0368)	(.0623)
$\ln AREA_{jt}$	−.1169***	−.1576***	−.1163***	−.1606***
	(.0187)	(.0477)	(.0191)	(.0488)
$\ln AREA_{it}$	−.1289***	−.1532***	−.1506***	−.1800***
	(.0200)	(.0474)	(.0204)	(.0492)
$\ln DIST_{ij}$	−.7155***	−.3036***	−.6806***	−.2647***
	(.0658)	(.0904)	(.0674)	(.0983)
$\ln CISS_{t}$	**−.0619***	**−.0495***	**−.0374***	**.0243***
	(.0127)	**(.0065)**	**(.0108)**	**(.0070)**
$CNTN_{ij}$	.3422***	.5964***	.4177***	.7260***
	(.1233)	(.1603)	(.1231)	(.1677)
$CNTG_{ij}$	1.0179***	.7305***	1.0771***	.7078***
	(.1645)	(.1329)	(.1799)	(.1384)
$LANG_{ij}$	.7593***	.4836***	.7309***	.4797***
	(.1098)	(.1345)	(.1065)	(.1410)
TA_{ijt}	−.0736	.2232*	−.0062	.2281
	(.0853)	(.1319)	(.0889)	(.1405)
EA_{ijt}	−.2001**	−.1889	−.2597***	−.2651**

	Nominal data		Real data	
	(1)	(2)	(3)	(4)
	GPML	PPML	GPML	PPML
	(.0855)	(.1260)	(.0878)	(.1324)
$LNDL_i$	$-.4795^{***}$	$-.2542^{**}$	$-.5039^{***}$	$-.2195^{*}$
	(.0924)	(.1168)	(.0961)	(.1165)
$LNDL_j$	$-.7903^{***}$	$-.1621^{***}$	$-.7761^{***}$	$-.0951$
	(.1314)	(.1444)	(.1444)	(.1483)
$ISLN_i$	$-.3403^{***}$	$-.2823^{**}$	$-.3568^{***}$	$-.3344^{***}$
	(.0890)	(.1305)	(.0899)	(.1288)
$ISLN_j$	$-.1237$	$-.3697^{***}$	$-.0747$	$-.4123^{***}$
	(.0893)	(.1178)	(.0941)	(.1283)
Constant	-16.2489^{***}	-21.5095^{***}	-18.2989^{***}	-24.6009^{***}
	(1.0473)	(1.7054)	(1.2924)	(2.1089)
Number of country pairs	1580	1580	1580	1580
Number of observations	23384	23384	23384	23384
R-squared	.5473	.7302	.5342	.7419
RESET (p-value)	.0018	.3195	.0180	.0349

Notes: Standard errors are clustered by country pair and are reported in parentheses. *** $p < .01$,
** $p < .05$, * $p < .10$.
Source: Own calculations.

4.2   Estimation of the impact of systemic stress in the euro area on bilateral exports of goods with controlling for multilateral resistance

In this subsection, I estimate a (panel data) gravity model of international trade (in goods) with controlling for multilateral resistance. Using GPML regression, I found that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in current USD decreases by .04 per cent; see column (1) in Table 4. In other words, systemic stress in the euro area negatively affects bilateral exports of goods. Contrary to the results listed in the column (1) of Table 4, the results listed in the column (3) of Table 4 show that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in constant USD increases by .04 per cent. Using PPML regression, I found that that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in current USD decreases by .06 per cent; see column (2) of Table 4. Contrary to the results listed in the column (2) of Table 4, the results listed in the rightmost column of Table 4 show that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in constant USD increases by .03 per cent. The p-values in the bottom row of columns (1) and (3) of Table 4 indicate specification errors. In other words, both PPML specifications of the regression equation pass the RESET test.

Table 4: Estimates of the impact of systemic stress on bilateral exports of goods – full sample (nominal and real data, CISS for the euro area and remoteness indices)

	Nominal data		Real data	
	(1)	(2)	(3)	(4)
	GPML	PPML	GPML	PPML
$\ln Y_{it}$	.6676***	.7717***		
	(.0467)	(.0791)		
$\ln RY_{it}$			.8725***	.8007***
			(.0407)	(.0421)
$\ln E_{jt}$	.7187***	.9240***		
	(.0447)	(.0756)		
$\ln RE_{jt}$			.8312***	.9649***
			(.0391)	(.0628)
$\ln POP_{it}$	.1294***	.1987***	.0825**	.1293*
	(.0386)	(.0754)	(.0385)	(.0721)
$\ln POP_{jt}$	.1162***	.0993	.0351	.0202
	(.0365)	(.0607)	(.0356)	(.0536)
$\ln AREA_{jt}$	−.0731***	−.1689***	−.1281***	−.1806***
	(.0194)	(.0525)	(.0184)	(.0397)
$\ln AREA_{it}$	−.1305***	−.1701***	−.1703***	−.1998***
	(.0212)	(.0481)	(.0204)	(.0365)
$\ln DIST_{ij}$	−.6762***	−.3585***	−.8563***	−.4487***
	(.0700)	(.0825)	(.0832)	(.0638)
$\ln CISS_t$	**−.03774***	**−.0551***	**.0428***	**.0325***
	(.0121)	**(.0075)**	**(.0105)**	**(.0067)**
$CNTN_{ij}$	.2673**	.5389***	.5654***	.5137***
	(.1198)	(.1490)	(.1188)	(.1421)
$CNTG_{ij}$	1.0913***	.6987***	.9239***	.6221***
	(.1807)	(.1234)	(.1763)	(.1112)
$LANG_{ij}$	.8403***	.4679***	.5044***	.2797**
	(.1226)	(.1310)	(.0972)	(.1088)
TA_{ijt}	−.0904	.2192*	.0561	.2857**
	(.0879)	(.1242)	(.0888)	(.1203)
EA_{ijt}	−.2487***	−.1390	−.2019**	−.0186
	(.0806)	(.1228)	(.0890)	(.1009)
$LNDL_i$	−.5272***	−.2674**	−.4402***	−.2094*
	(.0947)	(.1175)	(.1013)	(.1163)
$LNDL_j$	−.7427***	−.2466	−.6782***	−.0713
	(.1364)	(.1528)	(.1486)	(.1549)
$ISLN_i$	−.2371**	−.2907**	−.3948***	−.3915***
	(.0969)	(.1276)	(.0863)	(.1131)
$ISLN_j$	−.1196	−.3968***	−.1127	−.4958***

	Nominal data		Real data	
	(1)	(2)	(3)	(4)
	GPML	PPML	GPML	PPML
$\ln REM_{it}$	(.0964)	(.1261)	(.0945)	(.1371)
	−.1234***	.0251	.3680***	.3647***
	(.0247)	(.0448)	(.0660)	(.0861)
$\ln REM_{jt}$	−.0228	.0539**	.4558***	.4267***
	(.0209)	(.0211)	(.0661)	(.0769)
Constant	−9.2554***	−24.5251***	−31.4015***	−35.3893***
	(1.8150)	(2.2262)	(1.9910)	(2.5455)
Number of country pairs	1580	1580	1580	1580
Number of observations	23384	23384	23384	23384
R-squared	.5213	.7394	.5656	.7991
RESET (p-value)	.0009	.6705	.0368	.6608

Notes: Standard errors are clustered by country pair and are reported in parentheses. *** p < .01,
** p < .05, * p < .10.
Source: Own calculations.

4.3 Estimation of the impact of systemic stress in the euro area on bilateral exports of goods with and without controlling for multilateral resistance based on data for the euro area

In this subsection, I use a subsample consisting of members of the euro area. Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxemburg, the Netherlands, Portugal, and Spain joined the euro area in 1999, Greece in 2001, Slovenia in 2007, Cyprus and Malta in 2008, Slovakia in 2009, Estonia in 2011, Latvia in 2014 and Lithuania in 2015. As the study period ends in 2014, I did not include Lithuania in the subsample. In the first case, I estimate the impact of systemic stress in the euro area on bilateral exports of goods without controlling for multilateral resistance. In this case, the regression equation is:

$$X_{ijt} = \exp\big[\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 \ln POP_{jt} + \beta_5 \ln AREA_{it} + \beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln CISS_t + \beta_9 CNTG_{ij} + \beta_{10} LANG_{ij}\big] \times \varepsilon_{ijt}$$
$$i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T_{ij}.$$
, (3)

Using GPML and PPML regression, I found that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in current USD decreases by .09 per cent and .07 per cent respectively (see Table 5). In this case, the impact of systemic stress in the euro area on bilateral exports of goods is larger than in

previous cases. The reason for this is that I use a different sample of (bilateral) trade partners in this case than in the previous cases.

Table 5: Estimates of the impact of systemic stress on bilateral exports of goods – subsample (nominal data, CISS for the euro area)

	(1)	(2)
	GPML	PPML
$\ln Y_{it}$	.8458***	.9674***
	(.1052)	(.0960)
$\ln E_{jt}$	.4147***	.6428***
	(.0981)	(.1235)
$\ln POP_{it}$	.1309	.2131*
	(.1396)	(.1220)
$\ln POP_{jt}$	.5182***	.2574*
	(.1285)	(.1555)
$\ln AREA_{it}$	−.0356	−.4121***
	(.0531)	(.0710)
$\ln AREA_{jt}$	−.0753	−.1279*
	(.0604)	(.0660)
$\ln DIST_{ij}$	−.7839***	−.4562***
	(.1556)	(.0892)
$\ln CISS_t$	**−.0867***	**−.0693***
	(.0218)	**(.0102)**
$CNTG_{ij}$	.4961**	.5718***
	(.2206)	(.1261)
$LANG_{ij}$	.3434	.2064
	(.2283)	(.1355)
Constant	−16.0243***	−19.7818***
	(2.0962)	(2.1248)
Number of country pairs	306	306
Number of observations	2868	2868
R-squared	.7851	.8995
RESET (p-value)	.0661	.1706

Notes: Standard errors are clustered by country pair and are reported in parentheses. *** $p < .01$, ** $p < .05$, * $p < .10$.
Source: Own calculations.

In the second case, I estimate the impact of systemic stress in the euro area on bilateral exports of goods with controlling for multilateral resistance with remoteness indices. In this case the regression equation is:

$$X_{ijt} = \exp\left[\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 \ln POP_{jt} + \beta_5 \ln AREA_{it} + \beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln CISS_t + \beta_9 CNTG_{ij} + \beta_{10} LANG_{ij} + \beta_{11} \ln REM_{it} + \beta_{12} \ln REM_{jt}\right] \times \varepsilon_{ijt}$$

$$i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T_{ij},$$
, (4)

where

$$\ln REM_{it} = \ln\left(\frac{\sum_j DIST_{ij}}{\frac{E_{jt}}{Y_t}}\right)$$
(5)

and

$$\ln REM_{it} = \ln\left(\frac{\sum_i DIST_{ij}}{\frac{Y_{it}}{Y_t}}\right).$$
(6)

Controlling for multilateral resistance with remoteness indices, I found that systemic stress in the euro area negatively affects bilateral exports of goods. However, when PPML regression is used, the regression coefficient of −.0119 is not statistically significant (see the rightmost column of Table 6). Contrary to PPML regression, GPML regression gives a statistically significant result. However, the regression coefficient of −.0404 is higher than in the previous case.

Table 6: Estimates of the impact of systemic stress on bilateral exports of goods – subsample (nominal data, CISS for the euro area and remoteness indices)

	(1)	(2)
	GPML	PPML
$\ln Y_{it}$	.8572***	1.0342***
	(.1112)	(.0999)
$\ln E_{jt}$	.4370***	.6950***
	(.1051)	(.1220)
$\ln POP_{it}$	.1049	.1444
	(.1458)	(.1198)
$\ln POP_{jt}$	.4834***	.1957
	(.1319)	(.1481)
$\ln AREA_{jt}$	−.0278	−.4055***
	(.0541)	(.0704)
$\ln AREA_{it}$	−.0732	−.1158*
	(.0552)	(.0647)

	(1) GPML	(2) PPML
$\ln DIST_{ij}$	−.7722*** (.1527)	−.4501*** (.0912)
$\ln CISS_t$	**−.0404**** **(.0170)**	**−.0119** **(.0088)**
$CNTG_{ij}$	.5012** (.2203)	.5481*** (.1216)
$LANG_{ij}$	.3219 (.2323)	.2237 (.1357)
$\ln REM_{it}$	−.0558 (.1063)	−.0321 (.0819)
$\ln REM_{jt}$	−.0257 (.1145)	−.0650 (.0814)
Constant	−16.0243*** (2.0962)	−19.5965*** (2.1178)
Number of country pairs	306	306
Number of observations	2868	2868
R-squared	.7860	.9077
RESET (p-value)	.0933	.3591

Notes: Standard errors are clustered by country pair and are reported in parentheses. *** p < .01, ** p < .05, * p < .10.
Source: Own calculations.

In the third case, I estimate the impact of systemic stress in the euro area on bilateral exports of goods with controlling for multilateral resistance with exporter-time and importer-time fixed effects, as recommended by Yotov et al. (2016). In this case the regression equation is:

$$X_{ijt} = \exp\left[\beta_0 + \beta_1 \ln DIST_{ij} + \beta_2 \ln CISS_t + \beta_3 \ln CNTG_{ij} + \beta_4 LANG_{ij} + \pi_{it} + \rho_{jt}\right] \times \varepsilon_{ijt}$$
$$i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T_{ij}, \tag{7}$$

where π_{it} and ρ_{jt} are exporter-time and importer-time fixed effects respectively.

Controlling for multilateral resistance with exporter-time and importer-time fixed effects, I found that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in current USD decreases by 1.8 per cent (see Table 7). Considering a p-value of less than .01 (which is not unusual in the case of a large number of variables), PPML specification of the regression equation passes the RESET test.

Table 7: Estimate of the impact of systemic stress on bilateral exports of goods –
subsample (nominal data, CISS for the euro area, exporter-time and
importer-time fixed effects)

	PPML
$\ln DIST_{ij}$	−.5506***
	(.0861)
$\ln CISS_t$	**−1.8038***
	(.3161)**
$CNTG_{ij}$	.6077***
	(.0674)
$LANG_{ij}$	.2528*
	.1422
Exporter-time fixed effects	yes
Importer-time fixed effects	yes
Number of country pairs	306
Number of observations	2868
R-squared	.9769
RESET (p-value)	.0141

Notes: Standard errors are clustered by country pair and are reported in parentheses. *** $p < .01$,
** $p < .05$, * $p < .10$.
Source: Own calculations.

In the latter case, the coefficient for systemic stress is much lower than in previous
cases. This is due to the use of different variables.

4.4 Robustness check

In this subsection, I reestimate the impact of systemic stress in the euro area on bilateral
exports of goods. In doing so, I use two alternative measures of systemic stress in the
euro area, namely the NEW CISS for the euro area and the VSTOXX. Figure 3 shows
the NEW CISS for the euro area from January 2000 to December 2019, while Figure 4
shows its frequency distribution.

Figure 3: NEW CISS for the euro area from January 2000 to December 2019
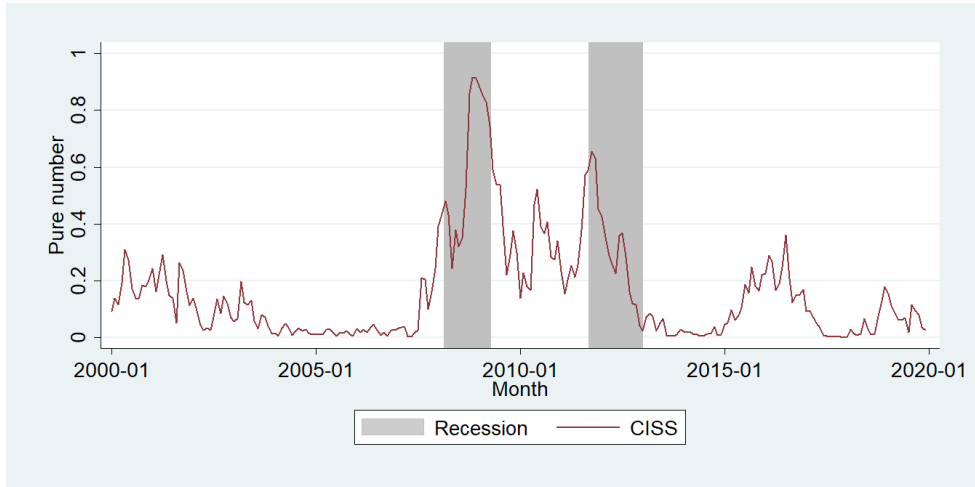
Source: ECB (2021).

Figure 3 is similar to Figure 1. As you can see from Figure 3, systemic stress in the euro area, measured by the NEW CISS for the euro area, peaked during the Great Recession and the European debt crisis.

Figure 4: Frequency distribution of the NEW CISS for the euro area from January 2000 to December 2019
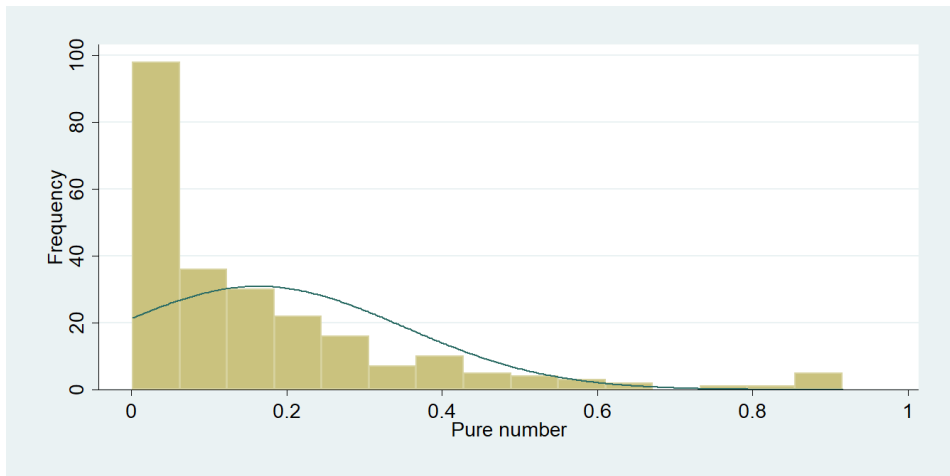
Source: Own calculations based on data from the ECB (2021).

In the first case, in which I use the NEW CISS for the euro area, the regression equation is:

$$
\begin{aligned}
X_{ijt} = \exp\big[&\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} + \\
&\beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln NCISS_t + \beta_9 CNTN_{ij} + \beta_{10} CNTG_{ij} + \\
&\beta_{11} LANG_{ij} + \beta_{12} TA_{ijt} + \beta_{13} EA_{ijt} + \beta_{14} LNDL_i + \beta_{15} LNLN_j + \beta_{16} ISLN_i + \\
&\beta_{17} ISLN_j + \beta_{18} \ln REM_{it} + \beta_{19} \ln REM_{jt} \big] \times \varepsilon_{ijt} \\
&i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T_{ij}.
\end{aligned}
$$

(8)

Figure 5 shows the VSTOXX for the euro area from January 2000 to December 2019, while Figure 6 shows its frequency distribution.

Figure 5: VSTOXX from January 2000 to December 2019
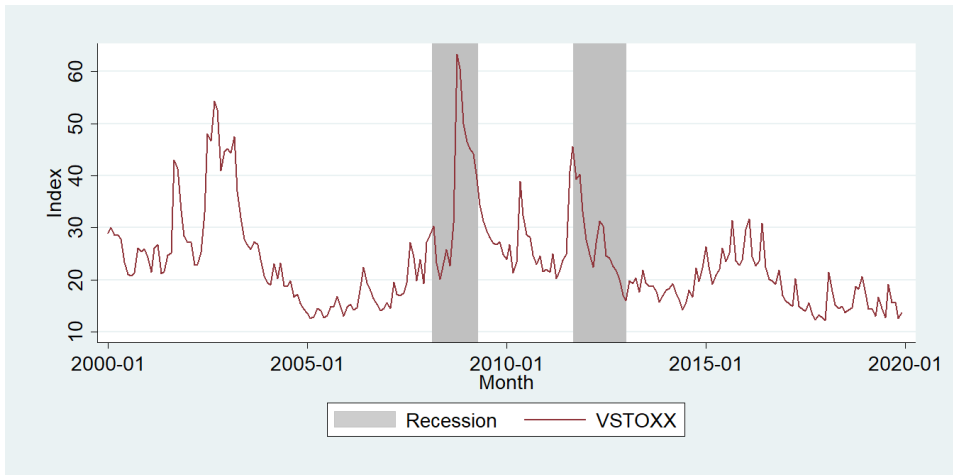
Source: Qontigo (2021).

As you can see from Figure 5, VSTOXX also peaked during the Great Recession and the European debt crisis.

Figure 6:   Frequency distribution of the VSTOXX from January 2000 to December 2019
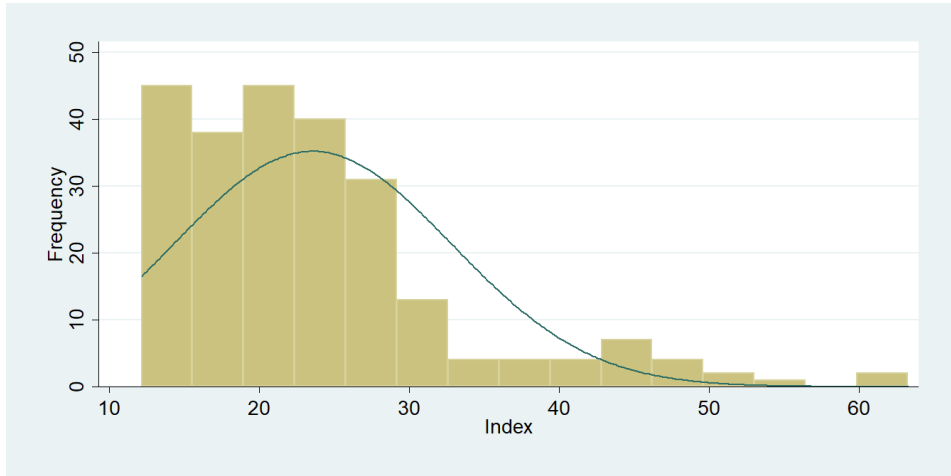
Source: Own calculations based on data from Qontigo (2021).

In the second case, in which I use the VSTOXX, the regression equation is:

$$
\begin{aligned}
X_{ijt} = \exp\big[& \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} + \\
& \beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln VSTOXX_t + \beta_9 CNTN_{ij} + \beta_{10} CNTG_{ij} + \\
& \beta_{11} LANG_{ij} + \beta_{12} TA_{ijt} + \beta_{13} EA_{ijt} + \beta_{14} LNDL_i + \beta_{15} LNLN_j + \beta_{16} ISLN_i + \\
& \beta_{17} ISLN_j + \beta_{18} \ln REM_{it} + \beta_{19} \ln REM_{jt} \big] \times \varepsilon_{ijt} \\
& i = 1, \dots, N, \; j = 1, \dots, N, \; i \neq j, \; j = 1, \dots, T_{ij}.
\end{aligned}
\tag{9}
$$

Using the NEW CISS for the euro area (VSTOXX) instead of the CISS for the euro area, I found that if the value of the NEW CISS for the euro area (VSTOXX) increases by one per cent, the value of bilateral exports of goods in current USD decreases by .01 (.03) per cent (see Table 8), which is less than in previous cases (see Sections 4.1 and 4.2).

Table 8: Estimates of the impact of systemic stress on bilateral exports of goods – full sample (nominal data, the NEW CISS for the euro area, VSTOXX and remoteness indices)

	PPML	PPML
$\ln Y_{it}$	.7615***	.7607***
	(.0501)	(.0502)
$\ln E_{jt}$	.9039***	.9030***
	(.0643)	(.0644)
$\ln POP_{it}$	.1334*	.1338*
	(.0732)	(.073)
$\ln POP_{jt}$	.05255	.0531
	(.0555)	(.0555)
$\ln AREA_{jt}$	−.1740***	−.1739***
	(.0342)	(.0342)
$\ln AREA_{it}$	−.1732***	−.1731***
	(.0363)	(.0363)
$\ln DIST_{ij}$	−.4774***	−.4780***
	(.0584)	(.0584)
$\ln NCISS_t$	**−.0129*** **	
	(.0025)	
$\ln VSTOXX_t$		**−.0256** **
		(.0120)
$CNTN_{ij}$	.4021***	.4003***
	(.1329)	(.1329)
$CNTG_{ij}$	.6480***	.6482***
	(.1075)	(.1075)
$LANG_{ij}$	.2996***	.2994***
	(.1026)	(.1023)
TA_{ijt}	.2747**	.2759**
	(.1114)	(.1113)
EA_{ijt}	.0476	.0478
	(.0996)	(.0996)
$LNDL_i$	−.2330*	−.2339*
	(.1168)	(.1168)
$LNDL_j$	−.0894	−.0903
	(.1537)	(.1538)
$ISLN_i$	−.3342***	−.3335***
	(.1099)	(.1099)
$ISLN_j$	−.4490***	−.4482***
	(.1251)	(.1251)
$\ln REM_{it}$	.3869***	.3873***
	(.0772)	(.0771)

	PPML	PPML
$\ln REM_{jt}$	.3963***	.3965***
	(.0702)	(.0703)
Constant	−33.2208	−33.0876***
	(2.2675)	(2.2651)
Number of country pairs	1580	1580
Number of observations	23384	23384
R-squared	.7895	.7895
RESET (p-value)	.2714	.2747

Notes: Standard errors are clustered by country pair and are reported in parentheses. *** $p < .01$, ** $p < .05$, * $p < .10$.
Source: Own calculations.

5 Discussion

This study helps policymakers and researches (at central banks) to understand the impact of systemic stress in the euro area on bilateral exports of goods. Using the (panel data) gravity model of international trade (in goods), I found that systemic stress in the euro area negatively affects bilateral exports of goods. Bernanke et al. (1996), who introduced the financial accelerator, offer a possible explanation for this. Krishnamurthy (2010) explained the phenomenon by analysing the subprime mortgage crisis in the US. Bernanke et al. (1996) argued that the deterioration in the credit market conditions amplifies the negative impact of a shock on the (real) economy. History provides many examples of this phenomenon (e.g., the Great Recession). Amiti and Weinstein (2011) studied the impact of the health of financial institutions (i.e., creditors) on (unilateral) exports of goods. They found that the deterioration in the health of financial institutions negatively affects (unilateral) exports of goods. They offered two possible explanations for this. The first one is that the deterioration in the health of financial institutions makes trade finance more expensive (higher prices), while the second one is that the deterioration in the health of financial institutions makes it more difficult for them to finance and provide credit to the (real) economy (lower liquidity). Many economists believe that the financial accelerator helps to explain the Great Trade Collapse (Vaubourg, 2016). Using nominal data (as recommended by the literature), I found that if the value of the CISS for the euro area increases by one per cent, the value of bilateral exports of goods in current USD decreases by .06 per cent. However, using the NEW CISS for the euro area and the VSTOXX, I got different results. In the case of the NEW CISS for the euro area, the regression coefficient is –.01, while in the case of the VSTOXX, the regression coefficient is –.03. In both cases, the regression coefficients are statistically significant.

6 Conclusions

In the years following the bankruptcy of Lehman Brothers Holdings, Inc., many policymakers, and researchers (at central banks, including the ECB) have focused on

estimating the impact of systemic stress on the (real) economy. This chapter adds to the growing body of literature on this subject. It suggests that systemic stress in the euro area negatively affects bilateral exports of goods, which is consistent with my expectations. Today we know that systemic stress negatively affects the economy. There is little or no evidence yet that would support a contrary argument. However, further research is needed to extend the current findings about the impact of systemic stress in the euro area on bilateral exports of goods, using expanded samples and other methodologies. The downside is that we still do not have a CISS for every country in the world.

The results of this study show that bilateral exports of goods are not immune to (an increase in) systemic stress in the euro area. In this study, I argue that policymakers and researchers (at central banks) need to pay heed to systemic stress in the euro area as it negatively affects bilateral trade (in goods). So therefore, there is a need among policymakers and researchers (at central banks) to introduce new measures of systemic stress for the euro area. The Covid-19 crisis has shown that financial markets are not immune to shocks.

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Appendix

Table A1: Alternative measures of systemic stress for the euro area and the US

Measure (composite indicator)	Frequency	From
Euro area		
CISS for the euro area (changing composition)	Daily (weekly)	8 January 1999
NEW CISS for the euro area (changing composition)	Daily	1 January 1999
SovCISS for the euro area (changing composition)	Monthly	September 2000
VSTOXX	Daily	4 January 1999
NEW CISS for Austria	Daily	5 January 1999
NEW CISS for Belgium	Daily	5 January 1999
NEW CISS for Finland	Daily	5 January 1999
NEW CISS for France	Daily	4 February 1985
NEW CISS for Germany	Daily	4 January 1980
NEW CISS for Ireland	Daily	5 January 1999
NEW CISS for Italy	Daily	1 January 1986
NEW CISS for Portugal	Daily	5 January 1999
NEW CISS for Spain	Daily	1 July 1999
NEW CISS for the Netherlands	Daily	5 January 1999
SovCISS for Austria	Monthly	September 2000
SovCISS for Belgium	Monthly	September 2000
SovCISS for Finland	Monthly	September 2000
SovCISS for France	Monthly	September 2000
SovCISS for Germany	Monthly	September 2000
SovCISS for Greece	Monthly	September 2000
SovCISS for Ireland	Monthly	September 2000
SovCISS for Italy	Monthly	September 2000
SovCISS for Portugal	Monthly	September 2000
SovCISS for Spain	Monthly	September 2000
SovCISS for the Netherlands	Monthly	September 2000
US		
CISS for the US	Daily (weekly)	5 January 1973
NEW CISS for the US	Daily	2 January 1980
VIX	Daily	2 January 1990

Source: ECB (2021).

The Impact of Economic Policy Uncertainty and Financial Stress in the United Kingdom on Bilateral Exports of Goods: Pre-Brexit Evidence

DEJAN ROMIH

Abstract Brexit was a wake-up call for the UK and the EU. There is a growing body of evidence that the referendum results contributed to an increase in economic policy uncertainty and financial stress (including systemic stress) in the UK. In this chapter, I present the findings of a panel study designed to estimate the impact of economic policy uncertainty and financial stress in the UK on bilateral exports of goods. Using the panel data gravity model of international trade, I found that economic policy uncertainty in the UK negatively affects bilateral exports of goods, which is consistent with my expectations. The results for financial and systemic stress are not statistically significant.

Ključne besede: • Brexit • composite indicator of systemic stress • economic policy • financial stress • gravity model of international trade • systemic stress

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1   Introduction

The UK, which became a member of the EC, now the EU, in 1973, is at the crossroads. On 23 June 2016, it held an in-out referendum, in which 51.9% of British voters voted for Brexit, i.e., the withdrawal of the UK from the EU. As of 1 February 2020, the UK is no longer a member of the EU. (The transition period lasted from 1 February 2020 to 31 December 2020.) Recent studies show that Brexit will negatively affect the British economy (see Faccini & Palombo, 2021; HM Government, 2016). Following the in-out referendum, 'Brexit uncertainty' has become a buzz phrase in the British press. There is a growing body of literature on the impact of Brexit uncertainty on the British economy (see Born et al, 2019; Nilavongse et al., 2020). This chapter contributes to the debate about the impact of economic policy uncertainty on the British economy (see Bloom et al., 2019a, 2019b; Faccini & Palombo, 2021).

In this chapter, I estimate the impact of economic policy uncertainty and financial stress (including systemic stress) in the UK on bilateral exports of goods. To my knowledge, this chapter is the first to study the impact of economic policy uncertainty and financial stress (including systemic stress) in the UK on bilateral exports of goods using the gravity model of international trade in goods. This study will help British policymakers to understand the impact of economic policy uncertainty and financial stress (including systemic stress) in the UK on bilateral exports of goods. Since Graziano et al. (2021) found that Brexit uncertainty negatively affects bilateral exports of goods; I expect that economic policy uncertainty and financial stress (including systemic stress) in the UK also negatively affect bilateral exports of goods.

The rest of this chapter is divided into five sections. Section 2 reviews the literature on the impact of economic policy uncertainty and financial stress (including systemic stress) on the economy, Section 3 gives the materials and methods of the panel study, Section 4 gives the result of the panel study, Section 5 discusses the results of the panel study and Section 6 concludes this chapter.

2   Literature review

This chapter adds to the growing body of literature on the impact of economic policy uncertainty and financial stress (including systemic stress) on the economy. Most of this literature focuses on the US (see Al Thaqeb & Algharabali, 2019; Al Thaqeb et al., in press). This is understandable given its role in the world economy (Zhang et al., 2019). In contrast, most of this section focuses on the UK and the US.

2.1   The impact of economic policy uncertainty on the economy

Economic policy uncertainty can be defined as uncertainty about the economic policy felt by households, companies, etc. According to Baker et al. (2016a), economic policy

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uncertainty can also be defined as uncertainty about who will make economic policy decisions, who will take economic policy actions, what economic policy decisions will be made, what economic policy actions will be taken, when economic policy decisions will be made, when economic policy actions will be taken, what will be the effects of economic policy decisions and what will be the effects of economic policy actions.

In recent years, there has been a growing interest among policymakers and researchers in the impact of economic policy uncertainty on the economy. The main reason for this was the Great Recession, which led to the need for action by the affected countries. Recent studies show that economic policy uncertainty negatively affects the economy. However, we do not know whether and how economic policy uncertainty in the UK affects bilateral exports of goods. The main aim of this paper is to determine whether and how the economic policy uncertainty in the UK affects bilateral exports of goods. Recent studies show that economic policy uncertainty negatively affects bilateral trade in goods (see Graziano et al., 2021; Steinberg, 2019).

Past events, such as the China–US trade war, have led to the need to monitor economic policy uncertainty. For this purpose, Baker et al. (2016a) developed a newspaper-based index of economic policy uncertainty for the US, which is popular among policymakers and researchers. It shows the share of newspaper articles in ten American newspapers, namely The Boston Globe, The Chicago Tribune, The Dallas Morning News, The Houston Chronicle, The Los Angeles Times, The Miami Herald, The San Francisco Chronicle, The Washington Post, The Wall Street Journal and USA Today, that contain the terms 'economic' or 'economy', 'uncertain' or 'uncertainty', and 'Congress', 'deficit', 'Federal Reserve', 'legislation', 'regulation' or 'White House'. Later, they developed similar indices for Australia, Brazil, Canada, China, France, Germany, India, Italy, Mexico, Russia, etc. Karnizova and Li (2014) found that the newspaper-based index of economic policy uncertainty for the US is a predictor of recessions in the US for a period of less than five quarters.

In this chapter, I use the newspaper-based index of economic policy uncertainty for the UK. It shows the share of newspaper articles in eleven British newspapers, namely The Daily Express, The Daily Mail, The Evening Standard, The Financial Times, The Guardian, The Mirror, The Northern Echo, The Sun, The Sunday Times, The Telegraph, The Times, that contain the terms 'economic' or 'economy', 'uncertain' or 'uncertainty', and 'Bank of England', 'budget', 'deficit', 'policy', 'regulation', 'spending' or 'tax'. Before the in-out referendum, Baker, Bloom and Davis also developed a newspaper-based index of Brexit-related economic policy uncertainty for the UK, which is not used in this paper. It shows the share of newspaper articles in two British newspapers, namely The Financial Times and The Times, that contain the terms 'economic' or 'economy', 'uncertain' or 'uncertainty', 'Bank of England', 'budget', 'deficit', 'policy', 'regulation', 'spending' or 'tax' and 'Brexit', 'EU' or 'European Union' (Baker et al., 2016b).

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There is a growing body of literature on the impact of economic policy uncertainty on the economy. Baker et al. (2016a) studied the impact of economic policy uncertainty on the economy in the US. They found that economic policy uncertainty negatively affects the economy, which is consistent with previous evidence (see Colombo, 2013). Caggiano et al. (2017) studied the impact of economic policy uncertainty on unemployment in the US in recession and non-recession regimes. They found that the positive impact of economic policy uncertainty on unemployment is larger in recession regimes than in non-recession regimes, which is consistent with their previous evidence (see Caggiano et al., 2014). Prüser and Schlösser (2020) studied the impact of economic policy uncertainty on the economy in the US. They found that the negative impact of economic policy uncertainty on the economy was larger during the Great Recession than during the Great Inflation or the Great Moderation. Colombo (2013) studied the impact of economic policy uncertainty in the US on the industrial production in the euro area. She found that economic policy uncertainty in the US negatively affects the industrial production in the euro area. She also found that the negative impact of economic policy uncertainty in the US on industrial production is larger than that of the economic policy uncertainty in the euro area. Prüser and Schlösser (2021) studied the impact of economic policy uncertainty on the economy in eleven members of the euro area, namely Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain. They found that economic policy uncertainty negatively affects GDP growth in all of them.

Caggiano et al. (2020) studied the impact of economic policy uncertainty in the US on industrial production in the UK. They found that the negative impact of economic policy uncertainty in the US on industrial production in the UK is larger in recession regimes than in non-recession regimes. They also studied the impact of economic policy uncertainty in the US on unemployment in the UK. They found that the positive impact of economic policy uncertainty in the US on unemployment in the UK is larger in recession regimes than in non-recession regimes. Klößner and Sekkelb (2014) studied the international transmission of economic policy uncertainty shocks. They found that the UK and the US are the main transmitters of these shocks. Bahmani-Oskooee et al. (2015) studied the impact of economic policy uncertainty on the demand for money in the UK. They found that economic policy uncertainty positively affects the demand for money, which is consistent with recent evidence (see Bahmani-Oskooee & Maki Nayeri, 2020). Altig et al. (2020) studied economic policy uncertainty in the UK and the US before and during the Covid-19 pandemic. They found that the Covid-19 pandemic has contributed to an increase in economic policy uncertainty in both countries.

2.2   The impact of financial stress on the economy

Financial stress can be defined as stress in the financial market (Hakkio & Keeton, 2009), while systemic stress can be defined as stress in the financial system (Holló et al., 2012). Today, we know that disruptions in the functioning of the financial market or

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the financial system can negatively affect the economy. There is a growing body of evidence on the impact of financial stress (including systemic stress) on the economy. Hakkio and Keeton (2009) studied the impact of financial stress on the economy in the US. They found that financial stress negatively affects the economy. Davig and Hakkio (2010) studied the impact of financial stress on the economy in the US in stress and non-stress regimes. They found that the negative impact of financial stress on the economy is larger in stress regimes than in non-stress regimes. Holló et al. (2012) studied the impact of systemic stress on the industrial production in the euro area in stress and non-stress regimes. They found that the negative impact of systemic stress on the industrial production is larger in stress regimes than in non-stress regimes.

Chatterjee et al. (2017) studied the impact of financial stress on GDP growth in the UK in stress and non-stress regimes. They found that the negative impact of financial stress on GDP growth is larger in stress regimes than in non-stress regimes. They also studied the impact of financial stress on GDP growth in the UK in recession and non-recession regimes. They found that the negative impact of financial stress on GDP growth is larger in recession regimes than in non-recession regimes.

3   Materials and methods

In this chapter, I use the gravity model of international trade in goods, developed by Tinbergen (1962), to test three hypotheses. Hypothesis 1 is that (an increase in) economic policy uncertainty in the UK negatively affects bilateral exports (of goods), Hypothesis 2 is that (an increase in) financial stress in the UK negatively affects bilateral exports (of goods) and Hypothesis 3 is that (an increase in) systemic stress in the UK negatively affects bilateral exports (of goods). To date, there is little or no evidence to conclude that (an increase in) economic policy uncertainty or financial stress (including systemic stress) in the UK negatively affects bilateral exports of goods. This means that this chapter fills a gap in the literature on the impact of economic policy uncertainty and financial stress (including systemic stress) in the UK on trade in goods. In recent years, there has been a growing debate between policymakers and researchers over whether economic policy uncertainty and financial stress (including systemic stress) negatively affect the economy. Two earlier studies found that (an increase in) systemic stress in the euro area and the US negatively affects bilateral exports of goods (see Romih et al., 2017; Romih et al., 2018). These two studies suggest that policymakers and researchers need to monitor financial stress (including systemic stress) in the euro area and the US as it can negatively affects trade in goods. The novelty of this chapter is that it studies the impact of economic policy uncertainty and financial stress (including systemic stress) in the UK on bilateral exports of goods. Figure A.1 in Appendix 1 shows bilateral exports of goods in 2018 in the case of the UK.

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In recent years, following the referendum debate between Brexiters and pro-Europeans in the UK and (the rest of) the EU there has been a growing interest between policymakers and researchers in the gravity model of international trade in goods. International economists have used the gravity model of international trade in goods to estimate the impact of 'soft' and 'hard' Brexit on bilateral exports of goods (Oberhofer & Pfaffermayr, 2021). Their studies show that Brexit will negatively affect bilateral exports (of goods).

In this chapter, I use balanced panel data to study the impact of economic policy uncertainty and financial stress (including systemic stress) in the UK on bilateral exports of goods. The panel consists of 78 country pairs for the period from 2000 to 2014. Each country pair consist of the UK and another country. In my case, these are Australia, Austria, Belgium, Brazil, Canada, China, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, India, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, the Netherlands, New Zealand, Norway, Portugal, Russia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, and the US.

To study the impact of economic policy uncertainty and financial stress (including systemic stress) in the UK on bilateral exports of goods, I use the newspaper-based index of economic policy uncertainty for the UK, developed by Baker at al. (2016a), the NEW CISS for the UK, developed by the ECB, and the CLIFS for the UK, developed by Duprey et al. (2017). In the first case, in which I study the impact of economic policy uncertainty in the UK on bilateral exports of goods, the regression equation is:

$$
\begin{aligned}
X_{ijt} = \exp\big[&\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} + \\
&\beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln EPU_t + \beta_9 CNTN_{ij} + \beta_{10} CNTG_{ij} + \beta_{11} LANG_{ij} + \\
&\beta_{12} TA_{ijt} + \beta_{13} LNDL_i + \beta_{14} LNDN_j + \beta_{15} ISLN_i + \beta_{16} ISLN_j + \beta_{17} \ln REM_{it} + \\
&\beta_{18} \ln REM_{jt}\big] \times \varepsilon_{ijt}
\end{aligned}
$$

$$
i = 1, \dots, N, \ j = 1, \dots, N, \ i \neq j, \ j = 1, \dots, T,
$$

(1)

where X_{ijt} is the value of exports of goods from country i to country j at time t in current USD; $\ln Y_{it}$ is the natural logarithm of the value of the GDP of country i at time t in current USD; $\ln E_{jt}$ is the natural logarithm of the value of the GDP of country j at time t in current USD; $\ln POP_{it}$ is the natural logarithm of the population of country i at time t; $\ln POP_{jt}$ is the natural logarithm of the population of country j at time t; $\ln AREA_{it}$ is the natural logarithm of the land area of country i at time t in square kilometres; $\ln AREA_{jt}$ is the natural logarithm of the land area of country i at time t in square kilometres; $\ln DIST_{ij}$ is the natural logarithm of the distance between the capitals of countries i and j; $\ln EPU_t$ is the natural logarithm of the value of the newspaper-based index of economic policy uncertainty for the UK at time t; $CNTN_{ij}$ is a dummy

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variable, the value of which is 1, if countries i and j lie on the same continent, otherwise 0; $CNTG_{ij}$ is a dummy variable, the value of which is 1, if countries i and j share a common land border, otherwise 0; $LANG_{ij}$ is a dummy variable, the value of which is 1, if countries i and j share a common language, otherwise 0; TA_{ijt} is a dummy variable, the value of which is 1, if countries i and j are signatories of the same trade agreement at time t, otherwise 0; EA_{ijt} is a dummy variable, the value of which is 1, if countries i and j are members of the euro area, otherwise 0; $LNDL_i$ is a dummy variable, the value of which is 1, if country i is a landlocked country, otherwise 0; $LNDL_j$ is a dummy variable, the value of which is 1, if country j is a landlocked country, otherwise 0; $ISLN_i$ is a dummy variable, the value of which is 1, if country i is an island country, otherwise 0; $ISLN_j$ is a dummy variable, the value of which is 1, if country j is an island country, otherwise 0; $\ln REM_{it}$ is the remoteness index for country i at time t, $\ln REM_{it}$ is the remoteness index for country j at time t and ε_{ijt} is the error term.

In the second case, in which I study the impact of financial stress in the UK on bilateral exports of goods, the regression equation is:

$$\begin{aligned} X_{ijt} = \exp\big[&\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} + \\ &\beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln CLIFS_t + \beta_9 CNTN_{ij} + \beta_{10} CNTG_{ij} + \\ &\beta_{11} LANG_{ij} + \beta_{12} TA_{ijt} + \beta_{13} LNDL_i + \beta_{14} LNDN_j + \beta_{15} ISLN_i + \beta_{16} ISLN_j + \\ &\beta_{17} \ln REM_{it} + \beta_{18} \ln REM_{jt} \big] \times \varepsilon_{ijt} \end{aligned}$$

$$i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T,$$

(2)

where $\ln CLIFS_t$ is the natural logarithm of the CLIFS for the UK at time t.

In the third case, in which I study the impact of systemic stress in the UK on bilateral exports of goods, the regression equation is:

$$\begin{aligned} X_{ijt} = \exp\big[&\beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} + \\ &\beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 \ln NCISS_t + \beta_9 CNTN_{ij} + \beta_{10} CNTG_{ij} + \\ &\beta_{11} LANG_{ij} + \beta_{12} TA_{ijt} + \beta_{13} LNDL_i + \beta_{14} LNDN_j + \beta_{15} ISLN_i + \beta_{16} ISLN_j + \\ &\beta_{17} \ln REM_{it} + \beta_{18} \ln REM_{jt} \big] \times \varepsilon_{ijt} \end{aligned}$$

$$i = 1, \dots, N, j = 1, \dots, N, i \neq j, j = 1, \dots, T,$$

(3)

where $\ln NCISS_t$ is the natural logarithm of the NEW CISS for the UK at time t.

In this chapter, I use the Poisson Pseudo-Maximum Likelihood (PPML) estimator, developed by Gourieroux (1984a, 1984b) and recommended by Santos Silva and Tenreyro (2006), to estimate the impact of economic policy uncertainty, financial stress and systemic stress in the UK on bilateral exports of goods. In doing so, I follow the

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recommendations in the literature (e.g., Santos Silva & Tenreyro, 2006; Yotov et al., 2016). I use the Ramsey Regression Equation Specification Error Test (RESET), developed by Ramsey (1969) and recommended by Santos Silva and Tenreyro (2006), to test the regression equations for specification errors.

I obtained data from different public sources: the value of the GDP in current USD by country and year from the World Bank, the value of exports of goods in current USD by country and year from the UN, the population by country and year from the UN, the land area in square kilometres by country and year from the World Bank, the coordinates of the capitals by country from latlong.net, the value of the CISS and the NEW CISS for the euro area by date from the ECB, the value of the VSTOXX by date from Qontigo, trade agreements and their signatories from the WTO, and languages by country from Eberhard et al. (2021). I obtained other data from other public sources. Other data was obtained from other public sources.

4   Results

Table 1 shows correlations for three study variables, while Table 2 shows descriptive statistics for all study variables.

Table 1:   Correlations for study variables

Variable	1	2	3
1. CISS for the UK	1.0000		
2. CLIFS for the UK	.8016*	1.0000	
3. (Newspaper-based) index of economic policy uncertainty for the UK	.2867*	.1488*	1.0000

Note: $*p < .05$.
Source: Own calculations.

As you can see from Table 1, CISS for the UK is positively correlated with CLIFS for the UK and the EPU Index for the UK. You can also see that CLIFS for the UK is positively corelated with the EPU Index for the UK.

Table 2:   Descriptive statistics for study variables

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
X_{ijt}	1,170	1.04E+10	1.53E+10	1.11E+08	1.05E+11
$\ln Y_{it}$	1,170	27.4572	1.6473	22.1833	30.4871
$\ln E_{jt}$	1,170	27.4572	1.6473	22.1833	30.4871
$\ln POP_{it}$	1,170	17.1841	1.5839	12.5469	21.0377
$\ln POP_{jt}$	1,170	17.1841	1.5839	12.5469	21.0377

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Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
$\ln AREA_{jt}$	1,170	12.2271	1.7645	5.7683	16.6117
$\ln AREA_{it}$	1,170	12.2271	1.7645	5.7683	16.6117
$\ln DIST_{ij}$	1,170	7.7129	1.0985	5.7732	9.8419
$\ln CLIFS_{t}$	1,170	.3068	.5736	−.5341	1.5628
$\ln NCISS_{t}$	1,170	−2.6086	1.046	−4.1509	−.8009
$\ln EPU_{t}$	1,170	4.5526	.3729	3.9051	5.0808
$CNTN_{ij}$	1,170	.6410	.4799	0	1
$CNTG_{ij}$	1,170	.0256	.1581	0	1
$LANG_{ij}$	1,170	.2308	.4215	0	1
TA_{ijt}	1,170	.7145	.4518	0	1
$LNDL_{i}$	1,170	.0513	.2207	0	1
$LNDL_{j}$	1,170	.0513	.2207	0	1
$ISLN_{i}$	1,170	.5769	.4943	0	1
$ISLN_{j}$	1,170	.5769	.4943	0	1
$\ln REM_{it}$	1,170	14.2363	3.7086	8.4905	18.0810
$\ln REM_{jt}$	1,170	14.2363	3.7086	8.4905	18.0810

Source: Own calculations.

4.1 The impact of economic policy uncertainty in the UK on bilateral exports of goods

In this subsection, I test the hypothesis that (an increase in) economic policy uncertainty in the UK negatively affects bilateral exports (of goods). Figure 1 shows economic policy uncertainty in the UK from January 2000 to December 2019.

Figure 1: Economic policy uncertainty in the UK from January 2000 to December 2019

Source: https://www.policyuncertainty.com/.

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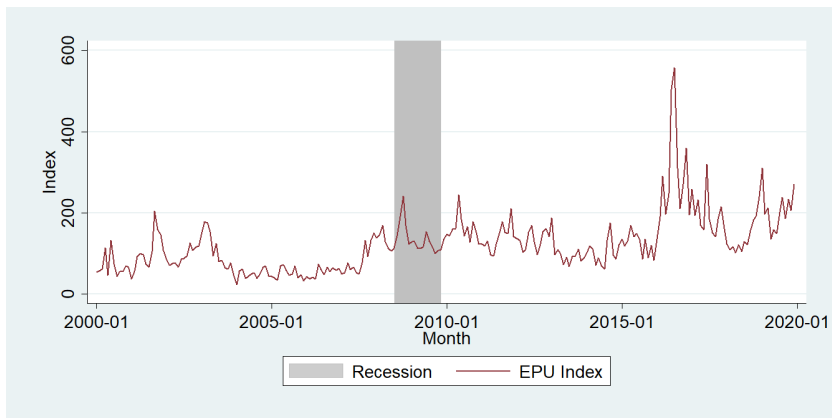
There is a growing body of evidence that Brexit contributed to an increase in economic policy uncertainty in the UK (see Bloom et al., 2019a, 2019b; Lipinska & Orak, 2020; Nilavongse et al., 2020). As you can see from Figure 1, economic policy uncertainty in the UK increased before the Brexit referendum in June 2016 (i.e., during the referendum debate). By July 2016, economic policy uncertainty in the UK was at its peak in recent memory. The referendum results were a shock for pro-Europeans on both sides of the Chanel (i.e., in Brussels and London).

Figure 2 shows the frequency distribution of the newspaper-based index of economic policy uncertainty for the UK from January 2000 to December 2019.

Figure 2: Frequency distribution of the newspaper-based index of economic policy uncertainty for the UK from January 2000 to December 2019
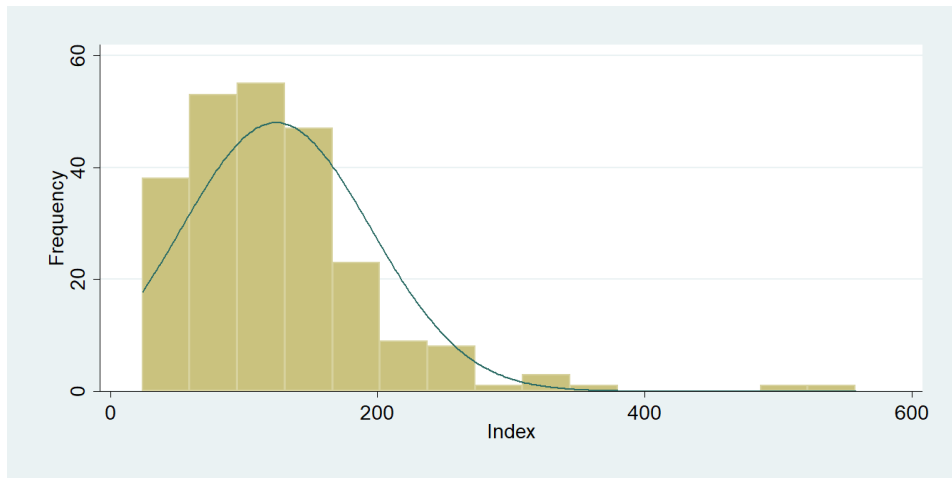
Source: Own calculations based on data from https://www.policyuncertainty.com.

Before I estimated the impact of economic policy uncertainty in the UK on bilateral exports of goods, I had estimated the basic (panel data) gravity model of international trade in goods with controlling for multilateral resistance (with remoteness indices) (the regression equation can be found in Appendix 1). In doing so, I found that the results listed in columns (1) and (2) of Table 3 are quite similar, which is a good sign. However, there are some differences. For example, the regression coefficient for distance is lower in column (2) than in column (1).

Estimating equation (1), I found that if the value of the newspaper-based index of economic policy uncertainty for the UK increases by 1%, the value of bilateral exports of goods in current USD decreases by .2%; see column (2) of Table 3. This means that

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economic policy uncertainty in the UK negatively affects bilateral exports of goods, which is consistent with my expectations.

Table 3: PPML estimates of equations (A.1) and (1)

	(1) PPML	(2) PPML
$\ln Y_{it}$	.7599***	.7742***
	(.1174)	(.1189)
$\ln E_{jt}$	.8317***	.8494***
	(.0695)	(.0685)
$\ln POP_{it}$	.0063	0.0020
	(.1760)	(.1774)
$\ln POP_{jt}$	−.0480	−.0587
	(.0685)	(.0680)
$\ln AREA_{jt}$	−.1442*	−.1468*
	(.0773)	(.0413)
$\ln AREA_{it}$	−.1466***	−.1495***
	(.0415)	(.0413)
$\ln DIST_{ij}$	−.5056***	−.7325***
	(.1424)	(.1326)
$\ln EPU_t$		−.1965***
		(.0422)
$CNTN_{ij}$	.3025	.3103
	(.3037)	(.3025)
$CNTG_{ij}$	1.0850**	1.1295**
	(.4869)	(.4916)
$LANG_{ij}$	.4515*	.4368*
	(.2573)	(.2578)
TA_{ijt}	−.1374	−.1447
	(.2103)	(.2098)
$LNDL_i$	−.6830**	−.6753**
	(.3072)	(.3106)
$LNDL_j$	−1.0846***	−1.0754***
	(.2264)	(.2287)
$ISLN_i$	−.7535**	−.7749**
	(.3156)	(.3161)
$ISLN_j$	−.4288	−.4492
	(.3085)	(.3122)
$\ln REM_{it}$	.0904	.3244***
	(.0674)	(.0753)
$\ln REM_{jt}$	.0835	.3173***
	(.0631)	(.0749)
Constant	−15.2335***	−19.7107***
	(3.5036)	(4.0158)
Number of observations	1,170	1,170
R-squared	.7909	.7939

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	(1) PPML	(2) PPML
RESET (p-value)	.1826	.2033

Notes: Regression equation (A.1) is given in Appendix 2. *** $p < .01$, ** $p < .05$, * $p < .10$.
Source: Own calculations.

4.2   The impact of financial stress in the UK on bilateral exports of goods

In this subsection, I test the hypothesis that (an increase in) financial stress in the UK negatively affects bilateral exports (of goods). Figure 3 shows financial stress in the UK from January 2000 to December 2019.

Figure 3: Financial stress in the UK from January 2019 to February 2019
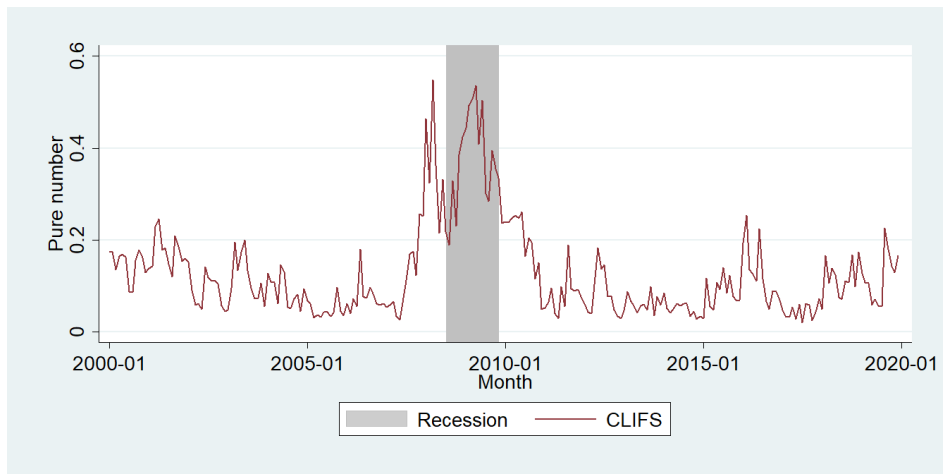
Source: ECB (2021a).

As you can see from Figures 3, financial stress in the UK also increased before the Brexit referendum. By June 2016, financial stress in the UK was at its new peak after the global financial crisis and the Great Recession. Figure 4 shows the frequency distribution of the CLIFS for the UK from January 2000 to December 2019.

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Figure 4:   Frequency distribution of the CLIFS for the UK from January 2000 to December 2019
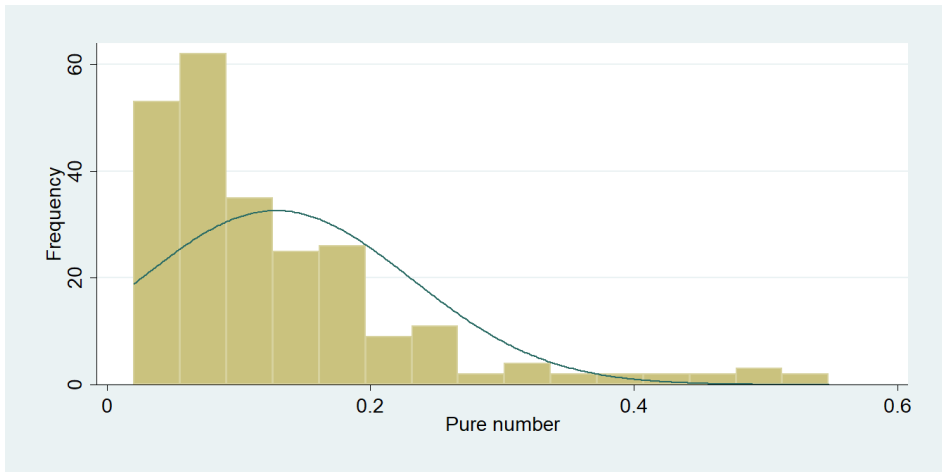
Source: Own calculations based on data from the ECB (2021a).

Estimating equation (2), I found that if the value of the CLIFS for the UK increases by 1%, the value of bilateral exports of goods in current USD decreases by .01%; see Table 4. However, the regression coefficient for financial stress is statistically not significant.

Table 4:   PPML estimates of equation (2)

	PPML
$\ln Y_{it}$	.7596***
	(.1174)
$\ln E_{jt}$	.8312***
	(.0696)
$\ln POP_{it}$	.0066
	(.1760)
$\ln POP_{jt}$	−.0476
	(.0685)
$\ln AREA_{jt}$	−.1442**
	(.0773)
$\ln AREA_{it}$	−.14662***
	(.0415)
$\ln DIST_{ij}$	−.5041***
	(.1421)
$\ln CLIFS_{t}$	−.0119
	(.0145)

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	PPML
$CNTN_{ij}$	.3030
	(.3038)
$CNTG_{ij}$	1.0840**
	(.4865)
$LANG_{ij}$	.4518*
	(.2572)
TA_{ijt}	−.1377
	(.2103)
$LNDL_i$	−.6831**
	(.3072)
$LNDL_j$	−1.0847***
	(.2264)
$ISLN_i$	−.7530**
	(.3156)
$ISLN_j$	−.4282
	(.3082)
$\ln REM_{it}$	.0887
	(.0670)
$\ln REM_{jt}$	.0817
	(.0622)
Constant	−15.1833***
	(3.4890)
Number of observations	1,170
R-squared	.7910
RESET (p-value)	.1821

Notes: *** $p < .01$, ** $p < .05$, * $p < .10$.
Source: Own calculations.

4.3 The impact of systemic stress in the UK on bilateral exports of goods

In this subsection, I test the hypothesis that (an increase in) systemic stress in the UK negatively affects bilateral exports (of goods). Figure 5 shows systemic stress in the UK from January 2000 to December 2019.

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Figure 5: Systemic stress in the UK from January 2019 to February 2019
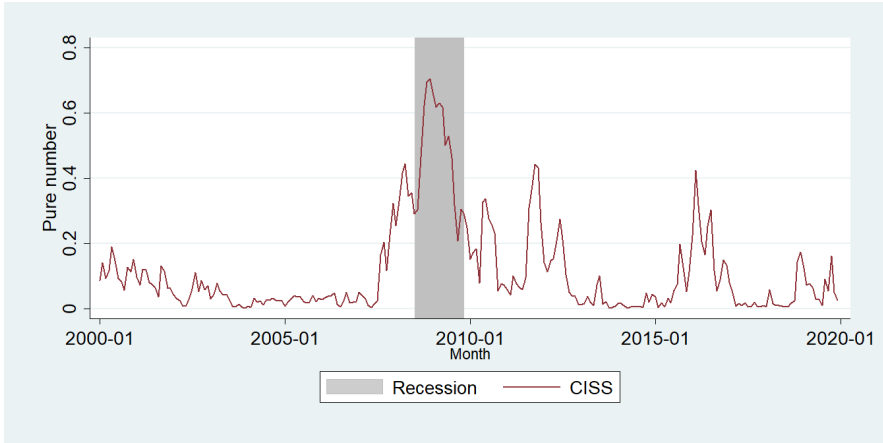
Source: ECB (2021b).

As you can see from Figure 5, Brexit, which caused political chaos in Britain and on the Continent (mainly in Brussels), contributed to the increase in systemic stress in the UK. Even before the polling stations opened, City analysts were bearish. Figure 6 shows the frequency distribution of the NEW CISS for the UK from January 2000 to December 2019.

Figure 6: Frequency distribution of the NEW CISS for the UK from January 2000 to December 2019

Source: Own calculations based on data from the ECB (2021b).

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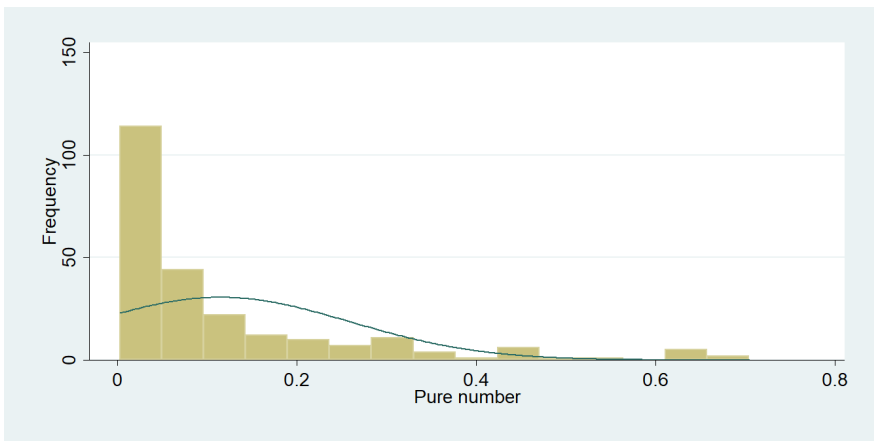
Estimating equation (3), I found that if the value of the NEW CISS for the UK increases by 1%, the value of bilateral exports of goods in current USD decreases by .01%; see column (1) of Table 5. However, the regression coefficient for systemic stress is statistically not significant. As you can see from Tables 4 and 5, the use of the CLIFS and the NEW CISS for the UK gives quite similar results, which is consistent with my expectations.

Table 5: PPML estimates of equation (3)

	(1)	(2)
	PPML	PPML
	Evidence for the UK	Evidence for the US (Romih et al., 2018)
$\ln Y_{it}$	.7606*** (.1176)	.7693*** (.1168)
$\ln E_{jt}$	.8324*** (.0693)	.7769*** (.0885)
$\ln POP_{it}$	.0061 (.1760)	.2732 (.1688)
$\ln POP_{jt}$	−.0481 (.0685)	.2000** (.1007)
$\ln AREA_{jt}$	−.1444* (.0774)	−.2017** (.0986)
$\ln AREA_{it}$	−.1469*** (.0416)	−.2065*** (.0621)
$\ln DIST_{ij}$	−.5158*** (.1422)	−.3544 (.2361)
$\ln NCISS_t$	−.0142 (.0095)	−.03271*** (0.0080)
$CNTN_{ij}$	.3044 (.3039)	1.4374** (.5950)
$CNTG_{ij}$	1.0870** (.4867)	
$LANG_{ij}$	.4509* (.2571)	.3123 (.2077)
TA_{ijt}	−.1389 (.2103)	.4346** (.2204)
$LNDL_i$	−.6825** (.3075)	−.9598*** (.3154)
$LNDL_j$	−1.0840*** (.2266)	−1.2092*** (.2193)
$ISLN_i$	−.7544** (.3156)	−.0841 (.3354)

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$ISLN_j$	−.4293	−.2144
	(.3085)	(.1825)
$\ln REM_{it}$	.1009	−.0688
	(.0678)	(.0553)
$\ln REM_{jt}$	.0939	.0040
	(.0647)	(.0333)
Constant	−15.5125***	−19.7002***
	(3.5622)	(4.2309)
Number of observations	1,170	1,201
R-squared	.7911	.8742
RESET (p-value)	.1827	.4512

Notes: *** p < .01, ** p < .05, * p < .10. In the case of the US, the CISS, developed by Kremer (2016), was used.
Source: Own calculations.

The evidence for the US (see Romih et al., 2018) shows that if the value of the CISS for the US increases by 1%, the value of bilateral exports of goods in current USD decreases by .03%. In contrast to the regression coefficient for systemic stress in the UK, the regression coefficient for systemic stress in the US is statistically significant at the 1% level. This suggests that systemic stress in the US negatively affects bilateral exports of goods.

5   Discussion

In the first part of this chapter, I studied the impact of economic policy uncertainty in the UK on bilateral exports of goods. Using the panel data gravity model of international trade in goods, I found that economic policy uncertainty in the UK negatively affects bilateral exports of goods. Since the result is statistically significant, I can accept Hypothesis 1. This has important implications for policymakers.

First, they need to monitor economic policy uncertainty in the UK. Recent research shows that economic policy uncertainty influences the decisions of households and companies (see Bloom et al. 2019a, 2019b; Kellard et al., in press).

Second, they need to prevent economic policy uncertainty in the UK. Recent research shows that economic policy uncertainty negatively affects the economy (see Lipinska & Orak, 2020; McGrattan and Waddle, 2020; Steinberg, 2019). Nilavongse et al. (2020) found that economic policy uncertainty in the UK after the in-out referendum led to the depreciation of the British pound.

In the second and third part of this chapter, I studied the impact of financial and systemic stress in the UK on bilateral exports of goods. I found that financial and

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systemic stress in the UK negatively affect bilateral exports of goods. Since both results are not statistically significant, I can reject Hypotheses 2 and 3.

6   Conclusions

Brexit was a wake-up call for the UK and the (rest of the) EU. There is a growing body of evidence that the referendum results contributed to an increase in economic policy uncertainty and financial stress (including systemic stress) in the UK, which is heavily dependent on trade with the Continent. The referendum debate between pro-Europeans and Brexiters has shown that the British society is more divided than ever. In this context, it is important to study the impact of economic policy uncertainty and financial stress (including systemic stress) on the economy. The Covid-19 recession has shown that the UK is not immune from shocks, which is logically given the role of the UK in the world.

During the referendum debate, concerns were raised about the impact of Brexit on UK's trade. After all, the UK sends two fifths of its exports to the (rest of the) EU. The referendum results also contributed to an increase in trade policy uncertainty in the UK and the (rest of the) EU, including Slovenia. The main question after the in-out referendum was whether there would be a 'no-deal' Brexit. Many economists have argued that this scenario would be detrimental to the UK. Under it, the UK would withdraw from the EU without a withdrawal agreement. The policy debate following the in-out referendum has been intense and has given rise to speculation. This chapter adds to the growing body of evidence on the negative impact of economic policy uncertainty on the economy.

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Appendices

Appendix 1

Figure A.1: Bilateral exports of goods in million USD in the case of the UK, 2018
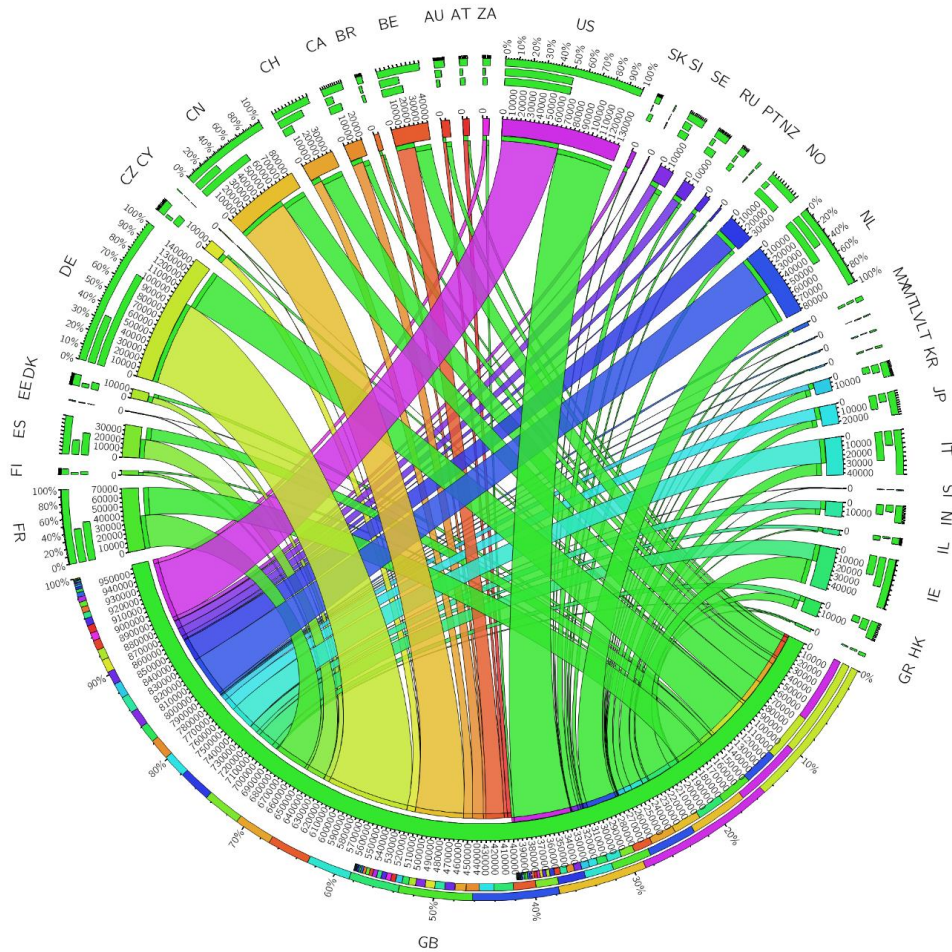
Notes: AT = Austria, AU = Australia, BE = Belgium, BR = Brazil, CA = Canada, CH =
Switzerland, CN = China, CY = Cyprus, CZ = Czechia, DE = Germany, DK = Denmark, EE =
Estonia, ES = Spain, FI = Finland, FR = France, GB = UK, GR = Greece, HK = Hong Kong, IE =
Ireland, IL = Israel, IN = India, IS = Iceland, IT = Italy, JP = Japan, KR = South Korea, LT =
Lithuania, LV = Latvia, MT = Mata, MX = Mexico, NL = Netherlands, NO = Norway, NZ =

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New Zealand, PT = Portugal, RU = Russia, SE = Sweden, SI = Slovenia, SK = Slovakia, ZA = South Africa. Data for Luxembourg were not available.
Source: https://comtrade.un.org/data/

Appendix 2

The basic regression equation is:

$$
\begin{aligned}
X_{ijt} = \exp\big[& \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln E_{jt} + \beta_3 \ln POP_{it} + \beta_4 POP_{jt} + \beta_5 \ln AREA_{it} + \\
& \beta_6 \ln AREA_{jt} + \beta_7 \ln DIST_{ij} + \beta_8 CNTN_{ij} + \beta_9 CNTG_{ij} + \beta_{10} LANG_{ij} + \beta_{11} TA_{ijt} + \\
& \beta_{12} LNDL_i + \beta_{13} LNDN_j + \beta_{14} ISLN_i + \beta_{15} ISLN_j + \beta_{16} \ln REM_{it} + \beta_{17} \ln REM_{jt} \big] \times \varepsilon_{ijt} \\
& , i = 1, \ldots, N, j = 1, \ldots, N, i \neq j, j = 1, \ldots, T.
\end{aligned}
\tag{A.1}
$$

EU Foreign Investment Policy – FDI Screening Mechanism to Advert Genuine Threats or Introducing Hidden Protectionism

ŽAN JAN OPLOTNIK, NOEMIA BESSA VILELA & NATACHA DE JESUS SILVA

Abstract For decades foreign direct investments (FDI) were privilege of companies from advanced economies, which invested in less developed economies and harvesting benefits of such activities. Leading position in capital, technology, managerial skills, etc, allowed them to penetrate markets of high potential but with less skills and lower costs (labour, raw material, etc) and standards (environmental, labour, etc.). Although USA and EU are still the far most advanced economies, adding majority of FDI to world stock and flow, since 2010, China is speeding up more than ever, investing in developed and non-developed eonomies. Only in Europe, Chinese companies invested more than 30 billion euros yearly in period from 2016 to 2018, comparing only 2 billion in 2010. That trend rised some concerns about Chinese nature of FDI, especially due to some of their peculiarities, noticed by schoolars, politician and domestic companies. In 2019 the EU issues Regulation (EU) 2019/452 that provides a framework for the screening of foreign direct investments and for cooperation.

Ključne besede: • international finance • foreign direct investments • international law • international economy

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1 Introduction

Attracting foreign direct investment (FDI) is a constant concern of national leaders, given the acknowledged importance for the economic growth of countries recipients of FDI (World Bank, 1998). However, while accepting the importance of FDI as a driver of economic growth in recipient countries, its relevance to economic growth in sending countries is less consensual. For years, the growth of foreign capital flow in form of FDI exceeded the growth of world GDP, but a trend was reversed after the emergence of the global crisis of 2008. FDI inflows for 2012 are estimated at 1.3 trillion dollars, a figure 18% lower compared to 2011 (UNCTAD, 2013) and correspond to 2.1% of world GDP. Although booming period of pre-COVID 19 years somehow reestablished willingness of some main economics to invest abroad, many countries started to having doubts if such investments are always beneficial for them. For example, some increasing concerns raised about Chinese FDI that flooded some parts of the world, especially those in Europe and more specific those in form of M&A activities. Some concerns arise due to nature of such investments, since more and more companies that were willing to invest in Europe from China, where government backed or even owned (in the last decade almost 95% of China FDI in EU were in form of M&A and only 5% were green-field investments). Many of such investments were targeting so called "*critical infrastructure*"[i] and security-related industries or high-tech sectors. Chinese outward FDI expanding rapidly since 2010 due to specific political and economic reasons. A key to China's ambitions in this context is the program called *China Manufacturing 2025 (CM2025) industrial policy initiative*, launched by Chinese government in 2015 that aims to upgrade China's industrial base (European Chamber, 2017).

But how and why the traditional EU liberal approach to capital movement and investments was shifting so much. If we look into traditional orthodox view on the benefits of free movement of capital, we can find arguments, like that*:"....if the flow of capital is unrestricted, capital can be directed to the places where it can be used most efficiently to generate the best returns, and it is thereby capable of contributing to an efficient squaring of demand and supply of capital within the Community* " (Hindelang, 2009, pg.19).

However, there are multiple reasons behind raising demands that capital flows in terms of M&A and other forms of FDI should be somehow controlled. We have to understand, that situation today is different than decades ago. Especially in the last decades of previous century, main direction of capital flows in forms of FDI were from developed economies to non-developed or developing countries. Benefits were mutual, since underdeveloped economies were lacking capital, technologies and skilled human resources and developed economies were seeking for new markets and profitable investment opportunities. However, situation changed in the last decades, since previously under-developed and developing economies became stronger and more recognizable, especially economies like China, India, and Russia. With accumulated resources, especially financial resources they

become somehow a threat to developed economies through their specific nature that drives their capital investments, like; being latecomers and strategic asset-seekers, due to their unique economic and political system backed by strong government incentives, etc. Developed economies (like EU and USA) became aware of there fragilities and weaknesses which can and should be distinguished from pure protectionism. Scholars are now addressing this topic more than ever, in sense of leaking of sensitive technology and know-how, possible infiltrations, espionage and sabotage in critical infrastructure and high-tech and IT companies, etc (see also Knoerich & Miedtank, 2018, Ufimtseva, 2020, Moran, 2017).

In March 2019, in Brussels, the European Parliament and the Council, signed the FDI Regulation (Regulation (EU) 2019/452 of the European Parliament and of the Council of 19 March 2019) establishing a framework for the screening of foreign direct investments into the Union (Warchol, 2020). The Framework Regulation was adopted in April 2019, providing Member States with an enabling framework for reviewing FDI on grounds of security and public policy and increasing cooperation between them and with the European Commission (The Commission).

This Regulation entered into force on the twentieth day following that of its publication in the Official Journal of the European Union and is applicable from October 11, 2020.

Following the Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a framework for screening of foreign direct investments into the European Union (COM/2017/0487 final - 2017/0224 (COD)), dating from September 2017. This new regime sets the minimum standards for Member States' review systems, builds an information sharing link between the 27 member states and the European Commission (EC), and established a formal mechanism for the EC and the Member States to provide feedback on FDI that occurs throughout the European Union.The Framework Regulation was designed to tackle the increasing wave of concerns that was developing all around EU caused by an increasing number of transfers of ownership of EU companies, in Particular, to Chinese Investors. This discomfort relates, mostly, to operations in sensitive and strategic sectors.

Having been taken by surprise by the COVID-19 crisis, several frailties were identified in the EU internal market, having led to the acknowledgment of the importance of building resilience in the health sector and the need to protect EU strategic assets.

The ongoing global coronavirus crisis has highlighted the need for a collective response from the international community to reinforce preparedness for this and future crises. In the 18 months between the enactment of the Regulation and its entry into force, several recommendations have influenced FDI screening regimes across the EU (Cuninghame, Dimitrou, & Fosselard, 2020). FDI screening is one of the priorities of the revision of the EU trade policy, launched on 16 June 2020, as, according to Valdis Dombrovskis it is the

launching of "a trade policy review in order to adjust the EU's approach to the global trade at this critical moment for the global economy."

2   Foreign Investment Regime

The Framework Regulation (FDI Regulation) sets a legal framework that will enable a more considerable coordination in screening FDI in the European Union. The FDI Regulation does not establish a mandatory screening mechanism to be used at EU level, but rather allows the Member States to adopt their own internal policies that will secure their own national interests, as can be read in point 8 of the preamble of the Regulation. "The framework for the screening of foreign direct investments and for cooperation should provide Member States and the Commission with the means to address risks to security or public order in a comprehensive manner, and to adapt to changing circumstances, while maintaining the necessary flexibility for Member States to screen foreign direct investments on grounds of security and public order taking into account their individual situations and national specificities. The decision on whether to set up a screening mechanism or to screen a particular foreign direct investment remains the sole responsibility of the Member State concerned."

To date, and according to the last update on the existing list of screening mechanisms notified by Member States, seventeen Member States[ii] of the EU and the United Kingdom have adopted different policies for securing their vital national security interests against FDI, ranging from screening procedures to partial or total prohibition of FDI in specific sectors of industry, notably defense (like in Czech Republic, Denmark, Germany, Spain, France, Italy, Latvia, Lithuania, Hungary, Malta, The Netherlands, Austria, Poland Portugal, Romania, Slovenia, Slovakia and Finland). It is expected that soon, most if not all EU Member States will have a screening mechanism in place.

Table 1:   Member state screening mechanisms according to Article 3.7. of regulation

Member State	Name of the National Law on screening mechanisms
Czechia	Zákon č. 34/2021 Sb. o prověřování zahraničních investic
Denmark	Lov om krigsmateriel (LBK nr 1004 af 22/10/2012); Lov om kontinentalsoklen og visse rørledningsanlæg på søterritoriet (LBK nr 1189 af 21/09/2018)
Germany	Außenwirtschaftsgesetz [vom 6. Juni 2013 (BGBl. I S. 1482), das zuletzt durch Artikel 4 des Gesetzes vom 20. Juli 2017 (BGBl. I S. 2789) geändert worden ist] §§ 4, 5, 13 und 15; Außenwirtschaftsverordnung [vom 2. August 2013 (BGBl. I S. 2865), die zuletzt durch Artikel 1 der Verordnung vom 27. Februar 2019 (BAnz AT

Member State	Name of the National Law on screening mechanisms
	06.03.2019 V1) geändert worden ist] §§ 55 bis 62 Fünfzehnte Verordnung zur Änderung der Außenwirtschaftsverordnung; Erstes Gesetz zur Änderung des Außenwirtschaftsgesetzes; Runderlass Außenwirtschaft Nr. 4/2020 Sechzehnte Verordnung zur Änderung der Außenwirtschaftsverordnung vom 26. Oktober 2020; Sechzehnte Verordnung zur Änderung der Außenwirtschaftsverordnung vom 26. Oktober 2020
Spain	Real Decreto 137/1993, de 29 de enero, por el que se aprueba el Reglamento de Armas; Real Decreto 664/1999, de 23 de abril, sobre inversiones exteriors; Ley 19/2003, de 4 de julio, sobre régimen jurídico de los movimientos de capitales y de las transacciones económicas con el exterior y sobre determinadas medidas de prevención del blanqueo de capitals; Real Decreto-ley 8/2020, de 17 de marzo, de medidas urgentes extraordinarias para hacer frente al impacto económico y social del COVID-19 Disposición final cuarta; Real Decreto-ley 11/2020, de 31 de marzo, por el que se adoptan medidas urgentes complementarias en el ámbito social y económico para hacer frente al COVID-19, Disposición transitoria segunda, Disposición final tercera; Ley 7/2010, de 31 de marzo, General de la Comunicación Audiovisual; Real Decreto-ley 34/2020, de 17 de noviembre, de medidas urgentes de apoyo a la solvencia empresarial y al sector energético, y en materia tributaria. (*ver Disposición transitoria única y Disposición final cuarta*); *Disposición transitoria única*-régimen transitorio de suspensión de liberalización de determinadas inversiones extranjeras directas realizadas por residentes de otros países de la Unión Europea y de la Asociación Europea de Libre Comercio; *Disposición final cuarta* - se modifica la Ley 19/2003, de 4 de julio, sobre régimen jurídico de los movimientos de capitales y de las transacciones económicas con el exterior; Ley 3/2013, de 4 de junio, de creación de la Comisión Nacional de los Mercados y la Competencia (Disposición adicional 9a) Ley 9/2014, de 9 de mayo, General de Telecomunicaciones
France	Code monétaire et financier, Partie législative Livre Ier, Titre V: les relations financières avec l'étranger Articles L.151-1 à L.151-7; Code monétaire et financier Partie réglementaire Livre 1er Titre V: les relations financières avec l'étranger Chapitre Ier : Investissements étrangers soumis à autorisation; Articles R.151-1 à R.153-18 Article R. 151-1 à R. 151-3 Article R. 151-4 Articles R. 151-5 à R. 151-11 Articles R. 151-12 à R. 151-16 Articles R. 151-17 et R. 151-18 Arrêté du 31 décembre 2019 relatif aux investissements étrangers en France; Article L. 233-3 du code de commerce Article L. 430-1 du code de commerce

Member State	Name of the National Law on screening mechanisms
	Article 459 du code des douanes (sanctions pénales)
Italy	Decreto-legge 15 marzo 2012, n. 21 "Norme in materia di poteri speciali sugli assetti societari nei settori della difesa e della sicurezza nazionale, nonché per le attività di rilevanza strategica nei settori dell'energia, dei trasporti e delle comunicazioni"; Modifiche alla disciplina dei poteri speciali nei settori di rilevanza strategica disposta dagli artt. 3 e 4-bis del decreto-legge 21 settembre 2019, n. 105, convertido con modificazioni dalla legge 18 novembre 2019, n. 133.; Decreto-Legge 8 aprile 2020, n. 23. "Misure urgenti in materia di accesso al credito e di adempimenti fiscali per le imprese, di poteri speciali nei settori strategici, nonché interventi in materia di salute e lavoro, di proroga di termini amministrativi e processuali." Art. 15-16; Decreto del Presidente della Repubblica 19 febbraio 2014, n. 35 "Regolamento per l'individuazione delle procedure per l'attivazione dei poteri speciali nei settori della difesa e della sicurezza nazionale, a norma dell'articolo 1, comma 8, del decreto-legge 15 marzo 2012, n. 21"; Decreto del Presidente della Repubblica 25 marzo 2014, n. 86 "Regolamento per l'individuazione delle procedure per l'attivazione dei poteri speciali nei settori dell'energia, dei trasporti e delle comunicazioni, a norma dell'articolo 2, comma 9, del decreto-legge 15 marzo 2012, n. 21"; Decreto del Presidente della Repubblica 25 marzo 2014, n. 85 "Regolamento per l'individuazione degli attivi di rilevanza strategica nei settori dell'energia, dei trasporti e delle comunicazioni, a norma dell'articolo 2, comma 1, del decreto-legge 15 marzo 2012, n. 21"; Decreto del Presidente del Consiglio dei ministri 6 giugno 2014, n. 108 "Regolamento per l'individuazione delle attività di rilevanza strategica per il sistema di difesa e sicurezza nazionale, a norma dell'articolo 1, comma 1, del decreto-legge 15 marzo 2012, n. 21"; Decreto del Presidente del Consiglio dei ministri 6 agosto 2014 "Individuazione delle modalità organizzative e procedimentali per lo svolgimento delle attività propedeutiche all'esercizio dei poteri speciali"; L'articolo 10 ter della legge 18 dicembre 2020, n.176, che ha convertito in decreto-legge 28 ottobre 2020 n.137 Decreto del Presidente del Consiglio dei Ministri 179 del 18 dicembre 2020; Decreto del Presidente del Consiglio dei Ministri n.180 del 23 dicembre 2020.
Latvia	Nacionālās drošības likums; Noteikumi par Nacionālās drošības likumā noteiktajai institūcijai iesniedzamo informāciju un darbībām ar informāciju par ārvalstu tiešajiem ieguldījumiem (Noteikumu nosaukums MK 06.10.2020. noteikumu Nr. 622 redakcijā); Ministru kabineta 2017. gada 3. oktobra noteikumi Nr. 606 "Noteikumi par Nacionālās drošības likumā noteiktajai institūcijai iesniedzamo informāciju un darbībām ar informāciju par ārvalstu tiešajiem ieguldījumiem".

Member State	Name of the National Law on screening mechanisms
Lithuania	Lietuvos Respublikos nacionaliniam saugumui užtikrinti svarbių objektų apsaugos įstatymas, Nr. IX-1132 (nauja redakcija Nr. XIII-992, nuo 2018-01-12); LRV Nutarimas dėl nacionaliniam saugumui užtikrinti svarbių objektų apsaugos koordinavimo komisijos darbo tvarkos aprašo patvirtinimo, Nr. 1540 (nauja redakcija Nr. 266, nuo 2018-03-21) Nutarimas dėl nacionaliniam saugumui užtikrinti svarbių įrenginių ir turto apsaugos zonų nustatymo, Nr. 1252 (nauja redakcija Nr. 746, nuo 2018-07-25); Lietuvos Respublikos nacionaliniam saugumui užtikrinti svarbių objektų apsaugos įstatymo Nr. IX- 1132 1, 2, 4, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20 straipsnių, 1, 2, 3, 4 priedų pakeitimo ir Įstatymo papildymo 13-1, 17-1, 19-1 straipsniais ir 5 priedu įstatymas, Nr. XIII-3257; Lietuvos Respublikos Vyriausybės nutarimas "Dėl Lietuvos Respublikos užsienio reikalų ministerijos paskyrimo atlikti funkcijas", Nr. 1072; Dėl Lietuvos Respublikos Vyriausybės 2009 m. lapkričio 25 d. nutarimo Nr. 1540 „Dėl Nacionaliniam saugumui užtikrinti svarbių objektų apsaugos koordinavimo komisijos darbo tvarkos aprašo patvirtinimo" pakeitimo", Nr. 1213.
Hungary	2018. évi LVII. törvény a Magyarország biztonsági érdekét sértő külföldi befektetések ellenőrzéséről; 246/2018. (XII.17.) Korm. rendelet a Magyarország biztonsági érdekét sértő külföldi befektetések ellenőrzéséről szóló 2018. évi LVII. törvény végrehajtásáról; 2020. évi LVIII. törvény a veszélyhelyzet megszűnésével összefüggő átmeneti szabályokról és a járványügyi készültségről (85. szakasz, 276. §-292. §); 289/2020. (VI. 17.) Korm. Rendelet a magyarországi székhelyű gazdasági társaságok gazdasági célú védelméhez szükséges tevékenységi körök meghatározásáról
Malta	ATT Nru LX tal-2020, 18 ta' Diċembru, 2020
The Netherlands	Elektriciteitswet 1998 (artikel 86f); Regeling melding wijziging zeggenschap Elektriciteitswet 1998 en Gaswet; Gaswet (artikel 66e); Regeling melding wijziging zeggenschap Elektriciteitswet 1998 en Gaswet; Telecommunicatiewet (hoofdstuk 14a); Besluit ongewenste zeggenschap telecommunicatie
Austria	Außenwirtschaftsgesetz 2011 – AußWG 2011; Investitionskontrollgesetz sowie Änderung des Außenwirtschaftsgesetzes 2011; Bundesgesetz über die Kontrolle von ausländischen Direktinvestitionen (Investitionskontrollgesetz – InvKG), StF: BGBl. I Nr. 87/2020 (NR: GP XXVII RV 240 AB 276 S. 45. BR: AB 10376 S. 910.)

Member State	Name of the National Law on screening mechanisms
Poland	Ustawa z dnia 24 lipca 2015 r. o kontroli niektórych inwestycji Dz. U. 2015 poz. 1272 (wraz z późniejszymi zmianami); Rozporządzenie Rady Ministrów z dnia 27 grudnia 2018 r. w sprawie wykazu podmiotów podlegających ochronie Dz. U. 2018 poz. 2524; Ustawa z dnia 19 czerwca 2020 r. o dopłatach do oprocentowania kredytów bankowych udzielanych przedsiębiorcom dotkniętym skutkami COVID-19 oraz o uproszczonym postępowaniu o zatwierdzenie układu w związku z wystąpieniem COVID-19 Dz. U. poz. 1086; Ustawa z dnia 24 lipca 2015 r. o kontroli niektórych inwestycji Dz.U. 2020 r. poz. 117, 284 i 1086
Portugal	Decreto-Lei no 138/2014, publicado no Diário da República, 1.a série, N.o 177, 15 de setembro - que estabelece o regime de salvaguarda de ativos estratégicos essenciais para garantir a segurança da defesa e segurança nacional e do aprovisionamento do País em serviços fundamentais para o interesse nacional, nas áreas da energia, dos transportes e comunicações
Romania	Legea nr. 21 din 10 aprilie 1996 a CONCURENŢEI – Republicată Art. 47 (9)-(12)
Slovenia	Zakon o interventnih ukrepih za omilitev in odpravo posledic epidemije COVID-19 (ZIUOOPE), Official Journal No. 80/20 (adopted 29 May 2020, in force as of 31 May 2020)
Slovakia	§ 9a, § 9b, § 9c, § 9d, § 9e of Act No. 45/2011 Coll. on Critical Infrastructure as amended by the Act No. 72/2021 Coll.
Finland	Laki ulkomaalaisten yritysostojen seurannasta (172/2012) – amendment 496/2014; Laki eräiden kiinteistönhankintojen luvanvaraisuudesta (470/2019); Laki ulkomaalaisten yritysostojen seurannasta (172/2012)

Such mechanisms find its legal basis in the lettering of the Treaty of Functioning of the European Union (TFEU), especially in Article 346/1(b). which concedes each Member State the right to "*take such measures as it considers necessary for the protection of the essential interests of its security that relate to the production of or trade in arms, munitions and war material*" with the proviso that, such measures do not "*adversely affect the conditions of competition in the internal market regarding products which are not intended for specifically military purposes*".

Article 63 TFEU prohibits all restrictions on the freedom of movement of capital and payments between Member States or between Member States and third countries (Kolo & Wälde, 2008) by stating:

1. within the framework of the provisions set out in this Chapter, all restrictions on the movement of capital between Member States and between Member States and third countries shall be prohibited; and
2. Within the framework of the provisions set out in this Chapter, all restrictions on payments between Member States and between Member States and third countries shall be prohibited.

Regardless of the above-cited Article, the TFEU foresees a derogation from the prohibition there it contained. Article 65 brings for derogation from this prohibition; allowing Member States to, as long as grounded on public policy or public security, take the necessary measures.

1. The provisions of Article 63 shall be without prejudice to the right of Member States:
   (a) to apply the relevant provisions of their tax law which distinguish between taxpayers who are not in the same situation with regard to their place of residence or with regard to the place where their capital is invested.
   (b) to take all requisite measures to prevent infringements of national law and regulations, in particular in the field of taxation and the prudential supervision of financial institutions, or to lay down procedures for the declaration of capital movements for purposes of administrative or statistical information, or to take measures which are justified on grounds of public policy or public security.
2. The provisions of this Chapter shall be without prejudice to the applicability of restrictions on the right of establishment, which are compatible with the Treaties.
3. The measures and procedures referred to in paragraphs 1 and 2 shall not constitute a means of arbitrary discrimination or a disguised restriction on the free movement of capital and payments as defined in Article 63.
4. In the absence of measures pursuant to Article 64(3), the Commission or, in the absence of a Commission decision within three months from the request of the Member State concerned, the Council, may adopt a decision stating that restrictive tax measures adopted by a Member State concerning one or more third countries are to be considered compatible with the Treaties in so far as they are justified by one of the objectives of the Union and compatible with the proper functioning of the internal market. The Council shall act unanimously on application by a Member State.

Claiming public policy and public security reasons (Barnard, 2019), while deciding on matters regarding FDI, must not constitute 'a means of arbitrary discrimination or a disguised restriction on the free movement of capital and payments' as can be understood by the provisions set forth in Article 63.

Image 1: Overview of Specific Exceptions stipulated in The Treaty regarding Free Movement of Capital
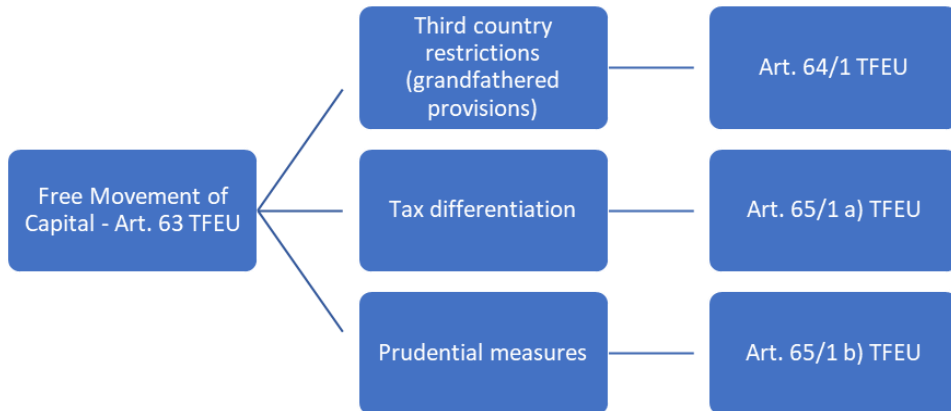
The European Court of Justice, herein after, The Court, has previously ruled on the concept of "*Public security grounds for derogating from the freedom of movement of capital*" namely in Case C-483/99 Judgment of the Court of 4 June 2002, Commission of the European Communities v French Republic, where, alongside with Case C-367/97 Judgement of the Court of 4 June 2002, Commission of the European Communities v Portugal and C-503/99 Judgment of the Court of 4 June 2002, Commission of the European Communities v Kingdom of Belgium, The Court rules on the restrictions set for the acquisition of shares, in relation to the freedom of movement of capital, guaranteed, at the time, by the EC Treaty (Kronenberger, 2003).

In particular, The Court mentions, in paragraph 47 of Case C- 483/99 that: "*In the present case, the objective pursued by the legislation at issue, namely the safeguarding of supplies of petroleum products in the event of a crisis, falls undeniably within the ambit of a legitimate public interest. Indeed, the Court has previously recognised that the public-security considerations which may justify an obstacle to the free movement of goods include the objective of always ensuring a minimum supply of petroleum products [Campus Oil, paragraphs 34 and 35). The same reasoning applies to obstacles to the free movement of capital, since public security is also one of the grounds of justification referred to in Article 73d(1)(b) of the Treaty.*"

And, in Paragraph 45 of Case C-503/99 by stating that "*The free movement of capital, as a fundamental principle of the Treaty, may be restricted only by national rules which are justified by reasons referred to in Article 73d(1) of the Treaty or by overriding*

requirements of the general interest and which are applicable to all persons and undertakings pursuing an activity in the territory of the host Member State. Furthermore, in order to be so justified, the national legislation must be suitable for securing the objective which it pursues and must not go beyond what is necessary in order to attain it, so as to accord with the principle of proportionality (see, to that effect, Joined Cases C-163/94, C-165/94 and C-250/94 Sanz de Lera and Others [1995] ECR I-4821, paragraph 23, and Case C-54/99 Église de Scientologie [2000] ECR I-1335, paragraph 18)."

The Commission, as well as the Member States have established a contact point for the implementation of this Regulation.

2.1 Procedural Aspects of the cooperation Mechanism

According to the Framework Regulation, each Member State keeps sole responsibility for its national security and the right to protect its essential security interests. The Regulation's goal is to ensure a Union-wide coordination and cooperation between Member States and the European Commission.

As a first step, following Article 6 of the FDI Regulation, it is up to the Member States to notify all other 26 Member States and the European Commission of all Foreign Direct Investments that takes place in the territory of the said Member State, which in undergoing screening. Article 6/ 1 advises Member States to include, in the notification, "*a list of Member States whose security or public order is deemed likely to be affected. As part of the notification, and where applicable, the Member State undertaking the screening shall endeavour to indicate whether it considers that the foreign direct investment undergoing screening is likely to fall within the scope of Regulation (EC) No 139/2004*".

It is provided that (for example in Theodoropoulou & Catrain, 2020), the notification by the Member State to the other Member States and the Commission (Article 9) about Foreign Direct Investments taking place, includes the following information:

  a) the ownership structure of the foreign investor and of the undertaking in which the foreign direct investment is planned or has been completed, including information on the ultimate investor and participation in the capital of Foreign Direct Investment;
  b) the approximate value of the Foreign Direct Investments;
  c) the products, services and business operations of the foreign investor and of the undertaking in which the foreign direct investment is planned or has been completed;

d) the Member States in which the foreign investor and the undertaking in which the foreign direct investment is planned or has been completed conduct relevant business operations;

e) the funding of the investment and its source, on the basis of the best information available to the Member State;

f) the date when the foreign direct investment is planned to be completed or has been completed.

It follows that the remaining Member States ought to, following Article 6/6, within fifteen calendar days following the receipt of that notice, notify the Member State undertaking the screening of Foreign Direct Investments, if applicable, of their intention to provide comments. Comments provided by the remaining Member States shall not be presented later than thirty-five calendars day after having received the initial notice from the member state. The Member States issuing the comments shall sent, simultaneously, its comments to the European Commission (Article 6/2), it is up to the Commission to notify all Members States that comments about planned foreign investment were provided. The Commission has supplementary five days to the Member States when it may issue an opinion addressed to the Member State undertaking the screening (Article 6/7, in fine). The Commission may issue an opinion: (1) irrespective of whether other Member States have provided comments; (2) following comments from other Member States. Such opinion is The Commission shall issue such opinion when at least one third of Member States consider that a FDI that is planned to take place, is likely to affect their security or public order (Article 6/3).

The Member State undertaking the screening shall take into consideration both the opinion of its peers and the Commission's. The Member State is advised to accept the Commission's opinion; choosing not to, it should provide concrete explanation on the grounds that lead to that decision (Article 6/9). Accordingly, the Regulation obliges all Member states to cooperate and share information requested. The Member State undertaking the screening shall give "due consideration" to the comments of the other Member States albeit retaining the final screening decision. The principal instruments of cooperation are mechanisms for notifications and for sharing information on FDI screening among Member States and between Member States and the Commission and the possibility for the Commission to issue non-binding opinions to Member States regarding the screening of concrete FDI projects (Schill, 2019).

The Regulation also foresees Cooperation mechanism in relation to foreign direct investments not undergoing screening, in its Article 7. In this case, as in the case of foreign investments undergoing screening, if likely to affect the security or public order, or in case a Member State holds relevant information in relation to that foreign direct investment, comments shall be provided to the Member State where the FDI is taking place. The Member State providing comments shall send those comments to the

Commission simultaneously, no later than 15 months after the Foreign Direct Investment has been completed (Article 7/ 8, in fine).

3 Special guidelines on the screening of Foreign Direct Investment in the context of the COVID 19 pandemic

Due to the pandemic situation, in March 25, 2020 the European Commission issued a communication providing guidance on the screening of Foreign Direct investiment in the COVID-19 pandemic context. The Commission calls on all Member States to develop new and solidify existing screening mechanisms in order to protect "*critical health infrastructure, supply of critical inputs, and other critical sectors*." (Crane, et al., 2000).

3.1 The EC Communication of March 25, 2020

In 2020, on the 25th of March, in light of the COVID-19 pandemics, the European Commission issued guidelines to harmonize the EU's approach to investment screening in order to protect the EU's critical assets and technologies from potential hostile takeovers and investments by non-EU companies (Berg, Forwood, Schulz, & Vangenechten, 2020). The European Commission has, for as long as one can remember, been concerned about undertakings from those European strategic industries which have been subject to the acquisition by non-European companies (Slawotsky, 2021). There is a special stress in State-Owned enterprises, even though all sorts of undertakings are mentioned (Das, 2021).

The COVID-19 crisis has caused tremendous stress and carries out severe consequences for the market economy of the Union, namely in the field of competition law (Rakic, 202). To tackle the threats faced due to the pandemics, the Commission stepped up efforts to intensify the safeguarding of EU undertakings by issuing a "Guidance for Member States concerning FDI and free movement of capital from third countries, and the protection of Europe's strategic assets, ahead of the application of Regulation (EU) 2019/452"

It can be read, in the aforementioned guidelines that "among the possible consequences of the current economic shock is an increased potential risk to strategic industries, in particular but by no means limited to healthcare- related industries.". The Commission stresses that "there could be an increased risk of attempts to acquire healthcare capacities (for example for the productions of medical or protective equipment) or related industries such as research establishments (for instance developing vaccines) via foreign direct investment.".

4   The effectiveness of the FDI screening framework

The Commission's proposal for the Framework Regulation comes to show that the EU is committed to "build an open, sustainable, fair, and rules-based order through international cooperation" and wants to "maintain an open investment environment" (COMMISSION, 2017), the provisions of the Framework Regulation may not suffice to pursue these goals effectively (Gadocha, 2020).

The Framework Regulation does not impose on the Member States the obligation to adopt the screening procedure in their national legislation. For that reason, Commission has stressed that the Member States should not only take into consideration its not-binding opinions, but also commit on their own account to take into consideration the Union's interest while conducting the screening procedure, or in general in their policy making. the Framework Regulation does not impose on the Member States the obligation to adopt the screening procedure in their national legislation.

If, on the one hand, the FDI screening regulation foresees a unified approach to the matter, providing for cooperation mechanisms, its lack of enforceability, on the other hand leaves us to wonder how effective it will actually be (Article 3). As seen above, it is up to the Member States to accept and enforce the "suggestions" of the remaining Member States, and the Commission itself, or to dully justify the reason for failing to acknowledge their "suggestions".

8   Conclusion

The EU legislator has decided merely on the contextual character of the Framework Regulation, having left, at the same time, significant margin of appreciation to the Member States regarding both the adoption of screening mechanisms in the national legislation and the procedural aspects of the screening itself. As seen throughout the work, the different Member States have enacted different laws and mechanisms to in force the Regulation.

Some issues regarding the Member States obligation to fulfil the Treaty obligation, namely dose addressed in articles 4/3 TEU and 207 TFEU may be risen in the future. Issues concerning legal uncertainty, also caused by the duality of criteria, may arise in the process of deciding to invest in the EU.
Legal uncertainty may cause unwillingness to invest in EU, and, in particular, in a specific Member State, given the number of concerns regarding actual profit.

Notes:

[i] Critical infrastructure, wheter pysical or virtual, including energy, transport, water, health,
communications, media, data processing and storage, aerospace, defense, electoral or financial
infrastructure and sensitive facilities, as well as land and real estate crucial fort he use of such
infrastructure (according to Article 4(1) of the EU Regulation.
[ii] Available online at: http://trade.ec.europa.eu/doclib/docs/2019/june/tradoc_157946.pdf (May 7,
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Benefits of Concluding the Trade Agreement between the EU and Australia

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Abstract Australia is a developed country with higher GDP per capita than Slovenia. In this context, it is of great interest to Slovenian exporters. Slovenian export to this market is growing, while imports lags behind. The price elasticity of Slovenian exports of goods to Australia is 0.9, while the income elasticity is 4.6. The price and income elasticities of goods from Australia are higher than the corresponding elasticities of Slovenian exports. Despite the higher price elasticity of Australian goods imported by Slovenia, according to the price elasticity of Slovenian exports to the Australian market, even with the same mutual price reduction the Slovenian surplus continues to rise as a result of its initial high level. Slovenian exports are also at risk of losing their potential position on the Australian market due to the intensive integration of Australia into trade partnerships with developed Pacific economies, particularly Japan and South Korea. The effect of these agreements on Slovenian exports has been growing over recent years.

Ključne besede: • international economics • price elasticity • international trade • trade liberalization

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1   Introduction

Approaching the end of the second decade of this century, intensive negotiations on a free trade agreement (FTA) between the European Union and Australia were underway to remove or substantially reduce the existing barriers to trade between members of the two markets. In April 2017, the European Commission published a comprehensive study entitled 'Ex-ante study of the EU-Australia and EU-New Zealand Trade and Investment Agreements' (European Commission, Directorate-General for Trade, 2017), which presents various aspects of the expected impact of the FTA with Australia on the European and Australian economies. The study maintains the assumption that the United Kingdom is an integral part of the EU. The results of the study show that the impact of the prospective FTA will be positive. According to different assumptions, a EU Member State's GDP is going to increase by 2.1 billion euros to 4.9 billion euros and the Australian GDP is going to increase by 2.7 billion euros to 4.2 billion euros.

The University of Adelaide published a collection of articles entitled '*Potential Benefits of an Australian - EU Free Trade Agreement: Key Issues and Options*' (Drake-Bockman, J., Messerlin, P., et al., 2018). The authors noticed that when the United Kingdom entered the then European Economic Community (EEC) in 1973, Australian foreign trade switched to Pacific countries (Puig, G. V., 2018, p. 3–7). Here came to force the complementarity between the raw materially well-supplied Australia and rapidly developing Asian countries lacking a stable supply of raw materials. The remaining Australian exports to the EU concentrated on the United Kingdom (50%), the Netherlands, Germany, France and Belgium (another 46%). Australia has reached a level of economic development where services account for 84% of added value (Drake-Brockman, J., 2018) and is of the right size for the release of trade in services with the EU, has the appropriate quality of regulation and is suitable for setting up branches of European firms ('hub quality'). Given its capabilities, the Australian economy, with some exceptions, has failed to enter into the world production chains and holds considerable reserves in the area of integration of services in these chains (Pomfret, R. and Sourdin, P., 2018).

In this article, we analyse the effects of the mutual reduction of prices or tariff rates in the potential FTA between Australia and the EU from the perspective of the small EU Member State – Slovenia. The price and income elasticity of trade between Australia and Slovenia, as well as the impact of external trade distortion due to Australian trade agreements with Japan and South Korea, is estimated by panel analysis on the Standard International Trade Classification (SITC) sectors.

2   Open questions about external trade liberalization in the modern world

Adam Smith begins his The Wealth of Nations (1776) with notation that the greatest advancement of the productive powers, and most of the skill, and prudence with which

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the work is conducted or done, seems to be contributed to by the effects of its division. He goes on to say that this division of labour, from which so many advantages derive, was not originally the fruit of any human wisdom, such as presupposes and plans that enable general prosperity. Rather, it was an inevitable, though very slow, and gradual consequence of some inclination in human nature, which has no apparent extensive benefit: an inclination to trade, bargain and exchange one thing for another. Finally, Adam Smith concludes that just as the power of exchange is what causes the division of labour, so the extent of this division must always be limited by the extent of that power or, in other words, by the extent of the market. When the market is very small, no one gets an incentive to devote themselves to a single activity, because they cannot exchange all the surplus of their work, too much for its consumption, for the needed surpluses of others.

With his theory, Adam Smith rejected the reasoning of mercantilists, who saw in international trade not the possibility of the division of labour, but the possibility of the accumulation of surpluses, wealth and political power (Mun T., 1664). If they succeeded, however, in the conditions of the golden monetary base, they found themselves experiencing inflation and consequently saw a reduction of surpluses, wealth and power (Allen W., 1991). Mercantilism has returned in the last 20 years with the systematic implementation of the exchange rate and social and environmental dumping, which is taken into account and attempts are made to eliminate it when concluding contemporary free trade agreements. Hence, the special chapters of free trade agreements aimed at protecting the environment and social cohesion (European Commission, Directorate-General for Trade, 2017).

Even if countries do not pursue a mercantilist foreign trade policy, international trade does not necessarily lead to an optimal division of labour, specialisation, economies of scale and the optimisation of prosperity at the level of all countries involved in this trade. Constraints are supply-side monopolies and demand-side monopsonies, as well as external economies or diseconomies. The corrections, however, are customs, and when implemented we are talking about so called "second best" solution (Bhagwati, J., 1964). Customs duties also serve as a protection for young industry and as a source of fiscal revenue, but the main reason for their introduction is, however, their impact on the coverage of imports by exports. Customs duties are the main lever of the classic mercantilist foreign trade policy. Economic theory shows that the introduction of customs in a small country causes a reallocation of factors of production and the entry of less efficient producers. Production volume increases and consumption decreases. If a country is large enough to be able to influence world prices with tariffs, the situation can improve when competitors do not respond to its tariff increase with countermeasures (Babić, M., 1986). Otherwise, a customs war ensues with a reduction in trade, division of labour and prosperity. A typical example was the reaction of countries that increased protectionism in the wake of the economic depression after 1929 (Kindleberger, C. P., 1973; Pollard, S., 1991). Eliminating the causes and the

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consequences of the recurrence of the customs war led to the adoption of the Bretton Woods Agreement (December 1945) and the General Agreement on Tariffs and Trade - GATT (January 1948). Both were adopted within the emerging United Nations and strongly influenced by the theories of Johan Mynard Keynes (Patinkin, D., 1991, Babić, M., 1986).

The multilateral abolition of customs duties by establishing different levels of economic integration of countries has even greater effects on economic activity and prosperity than a bilateral reduction or abolition of customs protection. In this connection, Ballasa's Theory of Economic Integration (1961) developed and took shape. Mutual multilateral abolition of customs creates a free trade zone (for example, EFTA). If countries harmonise customs protection against the rest of the world, it is a customs union (so Germany began to integrate in the 19th century). If free movement of factors of production is allowed between countries, it is a common market, and if countries also coordinate economic policy, it is an economic community (for example, the European Union).

An even higher level of integration is a monetary union with a common currency. A typical example is the Eurogroup. International economic integration has three effects: (1) liberalisation increases the volume of exports, employment and prosperity, (2) substitution replaces parts of the domestic supply with supply from imports from countries within integration and (3) distortion displaces the supply of countries outside economic integration (and replaces it with less efficient supply from countries of economic integration). The increase in the volume of mutual trade within integration depends on the change in prices caused by the abolition of customs duties and on the elasticity of supply and demand for this change in prices. The greater the overall effect, the greater the share of trade between countries before their economic integration (less distortion), the lower the share of exports and imports in the gross domestic product of a country entering economic integration (the greater the effect of economic integration on production in that country and less on its imports) and the greater the difference in costs between the Member States of emerging economic integration in the production of the same goods - the greater the impact of economic integration on the division of labour (Babić, 1986).

Regardless of whether a country benefits from the liberalisation of its international trade by bilateral or multilateral reduction of customs protection or by entering into various forms of economic integration, these effects are not evenly distributed among its inhabitants or more or less influential social groups. With the liberalisation of foreign trade, some groups gain (exporters, consumers), while others lose (less efficient suppliers of goods on the domestic market, which are now facing more effective competition). Historically, the most well-known conflict in this regard developed in the United Kingdom during the debate on the Corn Laws. Regulating the price of cereals by restricting their imports had a long tradition in the country, dating back to the 15th

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century, but created social conflict with laws passed in 1815 in favour of landowners who, during Napoleon's continental blockade, became accustomed to high grain prices. The validity of the laws lasted in various modalities until 1846. In a debate among economists, they were defended by Thomas Malthus, while their most ardent opponent was David Ricardo. The results of the discussion about Corn Laws had shown that a certain influential group, if strong and well organised enough, can change the position of a given country in international trade for a longer period of time (Hilton B., 1991).

We have already mentioned that modern mercantilism represents a serious obstacle to the conclusion of the FTA. A certain degree of caution, or accuracy, is needed when liberating foreign trade with a country pursuing a policy of exchange rates and social and ecological dumping. A country that at the cost of external social or environmental diseconomies creates a surplus in foreign trade forms a special market distortion for a partner country that has entered into such a relationship. One of the partners in foreign trade sells (exports) at prices that do not reflect production costs – a narrower definition of dumping (Viner, J., 1923, Ethier, W. J., 1982). In the case of social and ecological dumping, prices are reduced at the expense of employee poverty or at the expense of deteriorating natural living conditions in the exporting country. This dumping is made possible by inadequate regulation of the labor market or environmental management standards. In exchange rate dumping, trade partner sells complex industrial products that belong to the earlier stages of the product life cycle (Vernon, R., 1966), and require knowledge, or trained workers, at prices that do not provide workers with an income at which, measured in foreign currencies, they will be able to maintain and renew their human capital (adequate rest, additional training, health, housing, cultural and safety standards, upbringing and education of children, etc.). In addition to the policy of undervalued domestic currency exchange rates, this living standard is provided by the non-tradable sector (education, health and similar sectors, which are limited to the domestic market due to the nature of their activities) of the exporting country (Ballasa, B., 1964; Samuelson, P.A., 1964). In fact, we are talking about indirect subsidies of the tradable sector and on the other hand about indirect taxation of the non-tradable sector.

In a country that is a victim of modern dumping, the damage or loss of production and prosperity is unevenly distributed, but the negative effects accumulate in a reduction in market shares and a gradual more or less rapid economic lag and job losses. In this case, dumping must be eliminated (punished by taxes or quantitative restrictions), or it does not make sense for a country to enter into international trade liberalisation. In fact, anti-dumping measures are also effective in the context of trading in differentiated goods (Moraga-Gonzales, J.L., Viaene, J.M., 2015). Special chapters of FTAs are designed to protect the environment, social cohesion and fair competition. That is also the case in the proposed FTA between the EU and Australia (European Commission, Directorate-General for Trade, 2017). Recent analyses already show the efficiency of FTAs' labour mobility and environmental protection clauses in promoting growth in trade (Rana, A. T., 2017).

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We should note that the measures described by Paul Krugman as a strategic corporate policy supported by state subsidies (Krugman, P. A., 1990) are not part of dumping but a form of human capital engagement in a dynamic process of increasing potential gross domestic product by setting up production (the author cites the example of aircraft production), which without these state aids would not exist. In this way, a country generates growing returns and exploits economies of scale in the world market. In the late twentieth century, three competitive models of development policy or three national systems of innovation evolved: the European – based on subsidies (Jovanović, M. N., 2005), the Japanese – based on subsidies, loans, cooperation and information (Freeman, C., 1987) and the US – based on public procurement, in particular for defense purposes, and subsidies or tax reliefs for research activities at universities (Nelson, R. R., 1987)[1]. The Japanese model was in different modalities also implemented by other Far East countries. Liberalization of international trade increases the effects of development policy measures. A typical example of a successful development policy related to the liberalisation effect of economic integration is the successes of some smaller Member States of the European Union: Finland, Austria, Ireland (Bolatto, S. and Sbracia, M., 2016) and Slovenia (Križanič, F., Hodžić, S., Vojinović, B., 2021). Slovenia has also managed to increase its productivity by intensively working towards joining global value chains, which are the result of conducting the European innovation system developed in old Member States. Engaging in such a path is elaborated by Jan Hagemejer (2018).

The stable growth of international trade in goods after the Second World War stimulated a rapid increase in the volume of economic activity and a large increase in productivity based on accelerated technological progress in manufacturing (Syrquin, M., 1991). With income growth, demand shifted from agricultural products to industrial products and services (Houthakker, H.S., 1957). The latter have become an important part of reproductive demand, while the share of primary commodities in this demand has declined. With the further growth of income, the share of industrial products in the personal demand has decreased, a process described in Engel's law (Engel, E., 1895), and economic growth began to take place upon the increase in the demand for services. According to Moshe Syrquin (1991), this process took place in economically developed countries between 1960 and 1980. The theory of economic development in three phases: primary (agriculture), secondary (industry) and tertiary (services) had been finalised by Walt Whitman Rostow (1962). This theory has important implications for the study of foreign exchange. Namely, according to Adam Smith, services are not subject to international trade. He said that the work of a manufactured worker remains and is realised in some special object or sales item, which lasts at least some time after the work is done, and that on the other hand, the work of a house servant does not remain and is not realized in any special object or sales goods. His tasks usually die down the moment they end. He also said that the work of the ruler, their judges, military officers, the army and navy, priests, lawyers, doctors, and all possible scholars, bourgeois, musicians, opera singers, dancers, etc., is of the same nature (Smith, A., 1776). In the

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period before the information revolution, services appeared in the balance of current accounts as so called 'invisible exports' or 'invisible imports'. Data on foreign exchange earnings or expenditure showed that they were made to consumers abroad or that they were obtained by a domestic resident. We also cover them statistically in the same way today, but since the 1980s, the technological basis has changed, and the expansion or general use of information and telecommunications technologies has enabled the easy implementation of a whole range of services in international trade. Christopher Freeman and Charlotte Perez, emphasizing the potential of connecting services with industry and the emergence of new types of services, describe this development: the factory as a laboratory, creating computer networks and connections in research, consulting, etc. (Freeman, C., Perez, C., 1987). International trade in services has become possible in a wide variety of areas to cover final (personal, government, investment) and reproductive consumption. Restrictions on trade in services are non-tariff: recognition of diplomas, differences in state regulation (especially permits), differences in standards and restrictions on the cross-border movement of persons. The services were included in the Uruguay Round (1986-1993) of the GATT and, in an expanded form, also in the Doha Round, launched in 2001 (Hinrich Foundation, 2019). In any case, the export of services is linked to the export of the factor of production that enables it, and this is largely work. Due to transport costs, state regulation, cultural and other differences related to employee movement, some goods (goods and services) still have a nature of non-tradables (Woodland, A. D., 1968). Among these goods the share of services remains higher than in the total gross domestic product, despite all changes in the technological basis.

International trade takes place not only with goods but also with factors of production. If, before the Second World War, the majority of the international movement of capital was in a financial form (loans, shares, bonds, etc.), after the Second World War, the share of foreign direct investment (taking over ownership of production assets and land or taking over majority stakes of companies in another country) began to increase. The motives for the growth of foreign direct investment were first systematically addressed by Charles Kindleberger (1968), who discovered that it is a matter of achieving economies of scale, acquiring specific knowledge in production and marketing, diversifying the investor's capital structure, and avoiding market distortions. An important limiting circumstance of cross-border capital movements (in the form of direct investments or financial transactions) is risk assessment (Grubel, H., 1991). The conclusion of trade agreements reduces these risks and increases the potential for cross-border capital movements.

Finally, the specific topic of studying the impact of trade agreements between the EU and Australia raises the question of the position of agriculture in the Member States, and in our case, especially in Slovenia, in terms of very good natural conditions and correspondingly large advantages for agricultural production in Australia. There are two arguments for the protection of domestic agricultural production. The first is the

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importance of food supply for normal social reproduction (in this sense, a stable supply of agricultural products has a large external economy and can be considered an important part of economic infrastructure, similar to water and energy supplies). The second argument is the inherent instability of the food market. It is described by Kaldor's cobweb theorem (spider web theorem) in which supply always follows changes in demand with a delay of one year (Kaldor, N., 1934). The condition for long-term market stability is greater elasticity of demand than elasticity of supply, and the implicit conclusion is the duty of the state to intervene in market conditions with subsidies. These subsidies result in surpluses of food produced in the temperate zone, which are marketed worldwide without an economic basis and can cause serious problems in the structure of the agricultural sector of individual countries (Jovanović, M. N., 2005). Temporary, very cheap market surpluses of some Australian agricultural products placed in Slovenia can also play a similar role. The level of Slovenian self-sufficiency of food will decrease, and in the event of a shortage of these goods in the world, Slovenia is going to be hit by an inevitable and deep stagflation crisis.

3   Trade between Australia and Slovenia

Australia is an economically highly developed country. With more than 49 thousand euros GDP per capita, representing a 137% higher level than the comparable GDP in Slovenia (Table 1). It also holds nearly a quarter (24.5%) higher GDP per capita than Germany, half (49.8%) higher than the average of the Eurozone countries and a good two-thirds (68.8%) higher than the EU average. So, measured in GDP per capita, Australia is also economically more developed than Slovenia's main trading partners. With 25 million inhabitants, stable growth of real GDP (more than 2% per year), low unemployment rate (5.6% in 2017) and low inflation (between 1% and 2% annually) the Australian market is of real interest to the Slovenian economy, which is particularly involved in exports in sectors with differentiated goods (demand for these goods grows with increasing per capita income). Otherwise, the share of GDP that Australia allocates to R&D is similar to Slovenia's. Australia has a deficit in external trade (by 2017, the current account deficit had shrunk to 2% of GDP from almost 5% of GDP in 2015) while the exchange rate of the Australian dollar to the euro has remained roughly unchanged since 2014. Australia has concentrated its trade with the EU in five Western European countries and has the opportunity to increase the volume of its trade through greater geographical diversification, which would, theoretically, also result in a greater volume of exports and imports in the exchange with Slovenia.

We can see in Table 1 that Slovenia emerged from the last financial crises[2] after 2013 and, from 2014 to 2017, recorded average economic growth of more than 3% per annum. This growth was associated with a large surplus in external trade and its current account (almost 7% of GDP in 2017). Slovenia is part of the Eurozone, which faced deflationary pressures culminating in 2015. In 2017, Slovenia had lower inflation and a slightly larger unemployment rate than Australia.

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Table 1: Main indicators of the Australian and Slovenian economies

		2013	2014	2015	2016	2017
Population (millions)	Australia	23	24	24	24	25
	Slovenia	2	2	2	2	2
Real GDP growth (%)	Australia	2,2	2,6	2,5	2,6	2,3
	Slovenia	-1,0	2,8	2,2	3,2	4,8
GDP per capita (thousand euros)	Australia	48,9	46,3	46,3	46,9	49,3
	Slovenia	17.700	18.235	18.830	19.589	20.819
Unemployment rate (%)	Australia	5,7	6,1	6,1	5,7	5,6
	Slovenia	10,1	9,7	9,0	8,0	6,6
Current account (% of GDP)	Australia	-3,4	-3,1	-4,7	-3,1	-2,3
	Slovenia	3,3	5,1	3,8	4,8	6,2
Inflation (%)	Australia	2,5	2,5	1,5	1,3	2,0
	Slovenia	0,7	0,2	-0,5	0,5	1,7
R&D investment in GDP (%)	Australia	2,2	-	1,9	-	-
	Slovenia	2,6	2,4	2,2	2,0	1,9
Australian dollar for 1 euro		1,378	1,472	1,478	1,488	1,473

Data sources: European Commission, Directorate-General for Trade; IMF Data – prices, Production and Labour; ECB exchange rates; World Bank Open Data, Indicators; Statistical Office of the Republic of Slovenia, b; Bank of Slovenia, 2019, Bulletin

As we can see in Table 2 and Table 3, Slovenian exports to Australia significantly increased from 2008 to 2017. In this period, exports of goods rose by 234% while from 2014 to 2018 exports of services rose by 88%. Among the Slovenian exports of goods, the most important share on the Australian market belongs to machinery and transport equipment, followed by manufactured goods classified chiefly by material and chemical products. All these are differentiated products, and their producers invest heavily in R&D in Slovenia, which is why an additional favourable effect of the liberalisation of foreign trade is an expected increase in Slovenian exports in Australia (Kawabata, Y., Takarada, Y., 2015; Dewit, G., Leahy, D., 2016). In the services sector, the largest share of Slovenian exports belongs to tourism and transportation. Both have been increasing in recent years. Slovenian exports of services related to telecommunications are to some extent also recognised.

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Table 2:   Slovenian exports of goods to Australia

Thousand euros	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Food and live animals	519	824	449	546	722	646	885	859	1203	1263
Beverages and tobacco	198	187	201	215	223	218	221	588	325	107
Raw materials other than fuels	1	0	0	1	0	13	0	0	0	0
Mineral fuels and lubricants	0	0	0	0	0	0	0	0	0	0
Oils, fats and waxes of animal and vegetable origin	20	9	50	14	40	20	52	48	55	72
Chemical products	2962	3288	5100	8630	8665	18387	12648	15189	13138	12336
Products classified by material	8201	8207	8063	8948	8360	8830	10691	11004	9900	14567
Machinery and transport devices	13948	7929	12029	15127	40967	46037	41162	39842	48692	64366
Various products	3812	1113	2024	3326	3758	3436	3675	5283	9142	6235
Exports together	29661	21557	27916	36807	62735	77587	69334	72813	82455	98946

Data sources: Statistical Office of the Republic of Slovenia, a

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Table 3:   Slovenian exports of services to Australia

Millions of euros	2014	2015	2016	2017	2018
Transport	2,7	1,8	2,4	3,9	3,9
Travels	5,6	6,4	7,2	8,8	13,1
Compensation for the use of intellectual property	1,1	0,2	0,1	1,2	0,2
Telecommunications, computer services	0,8	1,3	0,6	0,8	1,9
Professional and business consulting	0,5	0,3	0,0	0,1	0,0
Total exports of services	11,7	10,8	15,0	19,9	22,0

Data sources: Bank of Slovenia, Financial Statistics, Economic Relations with the Rest of the
World

Table 4:   Slovenian imports of goods from Australia

Thousand euros	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Food and live animals	309	126	65	51	33	55	88	108	44	138
Beverages and tobacco	180	95	147	86	26	22	0	3	142	315
Raw materials other than fuels	4808	509	4188	3686	1411	2923	22	561	38	46
Mineral fuels and lubricants	0	0	0	0	0	0	0	0	0	0
Oils, fats and waxes of animal and vegetable origin	11	16	20	0	8	8	3	4	0	0
Chemical products	99	364	421	337	307	138	173	154	145	160
Products classified by material	59	184	362	378	254	84	142	168	768	287
Machinery and transport devices	1557	1059	741	961	544	1282	516	693	955	1514
Various products	763	164	547	150	120	529	188	215	400	639
Exports together	7786	2517	6491	5649	2703	5041	1132	1906	2492	3099

Data sources: Statistical Office of the Republic of Slovenia, a

Slovenian imports of goods from Australia fell by 60% between 2008 and 2017, in
particular, imports of food and raw materials (Table 4). In 2017, Slovenian imports of
goods from Australia represented only about 3% of Slovenian exports of goods to the
Australian market. Exports of Australian services to the Slovenian market increased by

39% from 2014 to 2018 (Table 5); nevertheless, in 2018, Slovenia had an 85% surplus of exports over imports of services in its trade with Australia. The proposed FTA between the EU and Australia also envisages facilitating the exchange of services: the unification of regulation and freer flow of persons performing services (European Commission, 2017). Given its relatively superior economic development and thus the development of its service sector, trade liberalisation will allow Australia to reduce the service trade deficit with Slovenia (Cole, M. T., Guillin, A., 2015).

Table 5: Slovenian imports of services from Australia

Millions of euros	2014	2015	2016	2017	2018
Transport	0,5	0,6	0,3	0,7	0,3
Travel	0,3	0,2	0,2	0,2	0,2
Compensation for the use of intellectual property	0,1	0,2	0,2	0,2	0,1
Telecommunications, computer services	0,3	0,4	0,4	0,3	0,2
Professional and business consulting	0,3	1,1	1,2	0,1	0,2
Total exports of services	2,3	3,4	3,3	3,3	3,2

Data sources: Bank of Slovenia, Financial Statistics, Economic Relations With the Rest of the World

We can conclude that Slovenia has exploited the economic development and growth of GDP in Australia to increase its exports of goods and services to this market. On the other hand, Australia's interest in the Slovenian economy is small and is still declining.

4 The factors of Slovenian trade with Australia

To evaluate the effects of an FTA between the EU and Australia on the trade between Australia and Slovenia, we have estimated the factors affecting Slovenian exports and imports of goods with Australia. Among these factors are the relative prices (supplemented for the exchange rate). The reduction of tariff rates is considered to have the same effect as a change in relative prices.

4.1. Methodology

How are the growth rates of Slovenian exports and imports in trade with Australia influenced by changes in relative prices and the exchange rate? How are these growth rates influenced by changes in economic growth, and how are they influenced by changes to the institutional framework? These primary questions were estimated via panel analysis for nine SITC sectors for the period from 2008 to 2017. Among the SITC sectors, we have taken into account only the ones in which trade between Australia and Slovenia existed[3].

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Slovenian exports to Australia are described by the equation:

(eau_?/eau_?(-1)-1) = f {[ppi_au?/(ppi_si_?*exr)] / [ppi_au?/(ppi_si_?*exr)](-1) - 1] + (gdp_au / gdp_au(-1)-1) - DUM + u}

Slovenian imports from Australia are described by the equation:

(iau_?/iau_?(-1)-1) = f {-[ppi_au?/(ppi_si_?*exr)] / [ppi_au?/(ppi_si_?*exr)](-1) - 1] + (gdp_si / gdp_si(-1) -1) + u}

eau_?	is the value of Slovenian exports to Australia by SITC sectors; these sectors are indicated by: '?', and eau?(- 1) represents Slovenian exports on the Australian market in the previous year.
iau_?	is the value of Slovenian imports from Australia by SITC sectors, and iau?(- 1) represents Slovenian imports from Australia in the previous year.
ppi_au_?	is the Australian producer price index by SITC sectors (designated: '?'), and ppi_au_?(-1) is the value of this index in the previous year.
ppi_si_?	is the Slovenian producer prices index by SITC by sectors (designated: '?'), and ppi_si_?(-1) is the value of this index in the previous year.
exr	is the exchange rate of the Australian dollar (in dollars per one euro), and exr(-1) is this exchange rate in the previous year.
gdp_au	is the Australian real GDP, and gdp_au(-1) is the Australian real GDP in the previous year.
gdp_si	is the Slovenian real GDP, and gdp_si(-1) is the Slovenian real GDP in the previous year.
DUM	is a dummy variable that marks the entry into force of the Australian FTA with Japan and the Australian FTA with South Korea.
u	is the unexplained residual, dependent on data errors, inadequate equation specification and the random nature of some changes of the dependent variable.

The equations were estimated on annual data that were tested for unit root relationships. In this test, the hypothesis that the series has a single root was rejected. The specificities of individual SITC sectors that could affect the bias of the final result (heteroskedasticity) were eliminated by the introduction of weights (cross-section SUR). The results of our analysis are limited to the period 2008 – 2017; however, the equations are estimated at growth rates, which shortens the period to 2009 - 2017.

4.2.   Data

The data needed for the econometric analysis of the factors of trade between Australia and Slovenia were collected from the Statistical Office of the Republic of Slovenia, Australian Official Statistics, from information from the Australian Ministry of Foreign Affairs and Trade, from the European Central Bank and IMF data. Slovenian producer prices were ranked in the SITC sectors from the level of individual products (product groups) and according to their volume in the trade between Slovenia and Australia from 2008 to 2017. According to the Combined Nomenclature, products were further grouped to appropriate NACE_2 industries[4], for which data about producer prices exist. The sum of the weighted values of products, or groups of products, under the Combined Nomenclature represents the producers' price of a given SITC sector for Slovenia – estimated according to the structure of its trade with Australia. We assume that this is a structure of goods that Slovenia can export or import to a greater extent with the South Pacific region and with Australia in particular. The Australian producer prices were calculated as a weighted average by the structure of SITC sectors (weights are the same as in the calculation of Slovenian producer prices) based on producer prices for individual products, or groups of products, as published by the Australian Statistical Office. The Australian Statistical Office publishes quarterly producer price indices for 175 products, or groups of products. For the period 2008 to 2017, we converted them into annual data by calculating the arithmetic means.

We calculated the price competitiveness variable by dividing the index of producer prices of SITC sectors in Australia with the producer price index of SITC sectors in Slovenia and with the exchange rate of the Australian dollar against the euro. We then calculated the index with the base 2008 = 100.Economic growth is, in our estimations, represented by annual growth rates of real GDP in Australia and Slovenia. The change in the institutional framework is represented by a dummy variable with zeros from 2009 to 2014 and a number 1 in 2015, 2016 and 2017. In 2015, Australian trade agreements with Japan and South Korea came into force (Australian Government, Department of Foreign Affairs and Trade, 2019).

4.3.   Elasticity of Slovenian trade with Australia

Table 6 and Table 7 show the equations that explain the growth rates of Slovenian exports and imports in trade with Australia for the period 2009 to 2017. The last lines of

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the tables show the sectors that were considered in our estimations. In the row above is a determination coefficient (R^2) indicating the percentage of growth (or decline) in exports, or imports, that was explained by the equations.

The next row above presents a Durbin-Watson statistics (DW) result, which, if it has a value of around 2, indicates that there is no first-order autoregression in the given equation. The explanation of the growth of Slovenian exports and imports in trade with Australia is good. The determination coefficient (R^2) ranges from 46% to 80%, while DW statistics are close to 2.

Table 6:   Factors of Slovenian exports to Australia

GROWTH RATES	Explanatory Variable	Regression Coefficient (t-statistics)
	Constant	0.0665 (1.7)
Competitiveness	$\dfrac{Australian\ producer\ prices}{Slovenian\ producer\ prices * exchange\ rate}$	0.9145(-1) (10.2)
Economic growth	Australian real GDP	4.6437 (3.3)
Institutional change	Australian FTA with Japan and with South Korea	-0.0412 (-2.6)
Explanation – R^2	80.1	
DW	2.3	
SITC sectors included in the analysis	Food and live animals, beverages and tobacco, chemical and related products, manufactured goods classified chiefly by material, machinery and transport equipment, miscellaneous manufactured articles	

Data source: own calculations

The lines of Table 6 and Table 7 display the independent variables (constant, relative producer prices corrected for the exchange rate, real GDP, dummy variable indicating institutional change) that influence the dependent variables (growth of Slovenian exports, or imports, to or from Australia). For each variable, the regression coefficient of influence is shown. In the case of delays of such influence (time lags), the number of years is signed in brackets next to the regression coefficients. In the case of the 'competitiveness' variable, the regression coefficient shows price elasticity, and in the case of the 'economic growth' variable, the regression coefficient shows income elasticity. In the case of the 'institutional change' variable, the regression coefficient shows the impact of the change in the institutional environment on the growth rates of Slovenian exports to Australia. In the brackets under the regression coefficients the t-values are presented, indicating the statistical significance of each explanatory variable's influence on the dependent variable.

In Tables 6 and 7 we can see that the price elasticity of Slovenian exports of goods to Australia is 0.9, while the income elasticity of these exports is 4.6, and that Slovenian exports are decreasing upon the implementation of the Australian FTA with Japan and South Korea. The price and income elasticities (5.3 and 7.5, respectively) of Slovenian imports from Australia is higher than the corresponding elasticity of Slovenian exports. This means that in segments where trade with Australia is taking place, the Slovenian economy is a more flexible partner. Our analysis confirms that higher price elasticity (the elasticity of trade) is characteristic of smaller and more open economies (Brooks, W. J., Pujolas, P. S., 2019), and that economically less developed countries have greater elasticity of trade than economically more developed countries (Imbs, J., Mejean, I., 2017). The increase in Slovenian exports and the drop in Slovenian imports in trade with Australia in the decade following 2008 was obviously the result of faster economic growth in Australia than in Slovenia[5], and to a lesser extent also the consequence of improved Slovenian price competitiveness[6].

Table 7:   Factors of Slovenian imports from Australia

GROWTH RATES	Explanatory Variable	Coefficient (t-statistic)
	Constant	0.9371 (5.3)
Competitiveness	$-\dfrac{Australianp\ producer\ prices}{Slovenian\ producer\ prices * exchange\ rate}$	-5.2568(-1) (-4.4)
Economic growth	Australian real GDP	7.4575 (1.2)
Explanation – R^2	46.1	
DW	2.3	
SITC sectors included in the analysis	Food and live animals, crude materials, inedible, except fuels, chemical and related products, manufactured goods classified chiefly by material, machinery and transport equipment, miscellaneous manufactured articles	

Data source: own calculations

4.4.   The impact of a mutual reduction of prices in Australia and Slovenia and the impact of a possible end to Slovenian discrimination on the Australian market on Slovenian trade

The model equations were used to simulate consequences of the increase in the relative prices of Australian producers relative to Slovenian producer prices and adjusted for the exchange rate and vice versa. In the case of a concluded FTA, we expect the same effect as a mutual reduction in prices would have. We also simulated the effect of Australia's trade agreements with Japan and South Korea on the ousting of the Slovenian economy from the Australian market.

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The results of a possible 1% reduction in relative prices for the Slovenian economy (the reasons may be different, from the reduction of customs duties related to the abolition of customs to a changing exchange rate, inflation rate, productivity and also to changing tastes) are shown in Table 8. The total effect on the increase in Slovenian exports to the Australian market is just under one million euros, mostly concentrated on exports of machinery and transport equipment. The increase represents 1% of Slovenian exports to this country's market. Measured as a percentage, the increase in exports is highest for beverages.

Table 8: Impact of 1% improvement in Slovenian price competitiveness on the Australian market on Slovenian exports of goods to Australia

Thousand euros	First year	Second year	Impact in percentages
Food and live animals	9	9	1
Beverages and tobacco	2	2	2
Raw materials other than fuels	0	0	0
Mineral fuels and lubricants	0	0	0
Oils, fats and waxes of animal and vegetable origin	0	0	0
Chemical products	131	156	1
Products classified by material	99	101	1
Machinery and transport devices	486	639	1
Various products	41	49	1
Exports together	767	955	1

Data source: own calculations

Table 9: Impact of a 1% improvement in Australian price competitiveness on the Slovenian market in Slovenian imports of goods from Australia

Thousand euros	First year	Second year	Impact in percentages
Food and live animals	8	12	9
Beverages and tobacco	0	0	0
Raw materials other than fuels	6	33	72
Mineral fuels and lubricants	0	0	0
Oils, fats and waxes of animal and vegetable origin	0	0	0
Chemical products	15	20	13
Products classified by material	14	26	9

Thousand euros	First year	Second year	Impact in percentages
Machinery and transport devices	44	70	5
Various products	19	44	7
Imports together	106	205	7

Data source: own calculations

The results of a possible 1% reduction in relative prices for the Australian economy on the Slovenian market are shown in Table 9. In this case, Slovenian imports will increase by a total of 205 thousand euros or 7%. The effect will be greatest in the import of machinery and transport equipment and in the import of various products, as well as in the import of raw materials other than fuels. There would be a 72% increase.

A mutual 1% reduction in prices relevant for Slovenian trade with Australia - for example, due to the mutual abolition of customs duties related to the conclusion of an EU-Australia trade agreement - would improve Slovenia's trade balance with this country (Table 10). The reason for the improvement in Slovenia's trade balance is a large surplus before the change in prices and therefore in the different basis on which this change is measured. Greater price elasticity of Slovenian imports than exports is less important in trade with Australia. Slovenia's trade balance would improve the most in the field of machinery and transport equipment, in chemical products and in products classified by material. The total effect after two years would be 0.75 million euros.

Table 10:   Impact of mutual reduction of prices by 1% on Slovenian trade balance with Australia

Thousand euros	2016	2017
Food and live animals	1	-3
Beverages and tobacco	2	2
Raw materials other than fuels	-6	-33
Mineral fuels and lubricants	0	0
Oils, fats and waxes of animal and vegetable origin	0	0
Chemical products	116	136
Products classified by material	85	75
Machinery and transport devices	442	569
Various products	22	5
Together	661	750

Data source: own calculations

The changed institutional framework of Australia's operation on the world market after the entry into force of its free trade agreements with Japan and South Korea had, in 2017, a full effect of almost 14 million or 14% less Slovenian exports to Australia than it would have been without this change (Table 11). The effect is by far the largest in the

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sale of machinery and transport equipment (9 million euros after an adjustment period of two years) and measured as a percentage in the sale of beverages (27%) and chemical products (18%). Slovenian exporters have a clear interest (Baldwin, R., Robert-Nicoud, F., 2015) in normalising their position on the Australian market and will, without reservation, support the FTA between the EU and Australia.

Table 11: Impact of Australia's free trade agreement with Japan and South Korea on Slovenian exports to Australia

Thousand euros	2016	2017	Impact in percentages
Food and live animals	-79	-127	-10
Beverages and tobacco	-19	-29	-27
Raw materials other than fuels	0	0	0
Mineral fuels and lubricants	0	0	0
Oils, fats and waxes of animal and vegetable origin	0	0	0
Chemical products	-1240	-2236	-18
Products classified by material	-924	-1450	-10
Machinery and transport devices	-4519	-9035	-14
Various products	-385	-717	-11
Exports together	-7166	-13594	-14

Data source: own calculations

5.   Concluding remarks

Since 2008, Australia has been losing its position on the Slovenian market. At the same time, Slovenia has run a strategy to promote economic growth based on exports, which has also resulted in creating trade surplus in the Australian market.

The price elasticity of Slovenian exports of goods to Australia is 0.9, while the income elasticity is 4.6. The price (5.2) and income (7.5) elasticity of Slovenian imports from Australia is higher than the corresponding elasticity of Slovenian exports.

In the case of a decrease in customs rates by 1%, Slovenian exports to Australia would increase by nearly one million euros (around 1%). Among the groups of goods according to the SITC classification, the effect will be the largest (over 0.6 million euros) in machinery and transport devices. On the other hand, Slovenian imports from Australia would increase by 0.2 million euros, or 7%, in the event of a 1% reduction in Slovenian customs rates on these imports. The impact will again be greatest in the import of machinery and transport devices.

Despite the higher price elasticity of Slovenian imports from Australia, according to the price elasticity of exports to these markets, the Slovenian surplus of trade influenced by the same mutual price reduction (for example, by 1%) is still increasing, reaching nearly 0.8 million euros in the second year after the price change.

Slovenia is losing its potential position on the Australian market due to the intensive integration of Australia into trade partnerships with developed Pacific economies, particularly Japan and South Korea. The effect of these agreements on Slovenian exports has been growing over the years. In 2017, it amounted to 14% of Slovenia's potential exports.

Notes:

[1] The Boeing-Airbus WTO dispute has shown that in 2005 the WTO started to involve in state aid regulation among various national innovation systems (BBC News, 2005).

[2] In Slovenia, the financial crisis after 2008 took place as a double-bottomed crisis.

[3] Sectors of the SITC (Standard International Trade Classification maintained by United Nations) taken into account are: food and live animals, beverages and tobacco, crude materials, inedible, except fuels, mineral fuels, lubricants and related materials, animal and vegetable oils, fats and waxes, chemical and related products, manufactured goods classified chiefly by material, machinery and transport equipment, miscellaneous manufactured articles, commodities and transactions.

[4] According to statistical classification of economic activities in the EU, products are classified in NACE (La *Nomenclature* statistique des *activités économiques* dans la *Communauté européenne*) sectors.

[5] After 2008, Australia was not exposed to discriminatory measures by the European Commission and did not experience a double bottom crisis.

[6] Slovenian producer prices were declining between 2013 and 2015 (Statistical Office of the Republic of Slovenia, b).

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Characteristics of Services and Interdependency between Export and Innovation Intensity in the Sector of the Business Services

JANEZ ROGELJ, ŠTEFAN BOJNEC & KLAVDIJ LOGOŽAR

Abstract In this chapter, we study services and their unique characteristics. We focus on characteristics of services, such as intangibility, immateriality; invisibility; perishability; temporary existence, sensitivity on time; non storability; inseparability; lack of inventory; sensibility of quality control; high degree of risk or difficulty in experimentation; no return possibility at un-satisfaction; customisation requirements; different distribution channels; and no rivalry. We also analyse the relations between exports, investments in development and innovation activities of Slovene business services sectors in two statistically different periods (2002-2008 and 2010-2016). A two-step approach to examine the firms' performance in the selected business non-financial services sectors was applied. First, we used Simple Probit model, and in the second step, Simultaneous Probit model was used. The preliminary results suggest that the investment in R&D activities encourages export behaviour and that the export behaviour encourages investment in R&D activities.

Ključne besede: • services • attributes and characteristics of services • export intensity • innovation intensity • international trade of services

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1   Introduction

The service sectors contribute to the economy more than production and agriculture sectors. The role of the service sectors increases with the level of economic development of countries. In most developed countries, their share in the gross domestic product (GDP) is more than two-thirds.

During the last two decades, the share of services and service activities in developed countries is also constantly increasing in international trade. Knowledge-based economies and demand for intangible products for the use of consumption and the investment purposes, have led to larger restructuring of many developed economies, with a shift from emphasis on industry and manufacturing to emphasis on services and service-based activities.

Throughout the history, the services were treated as unproductive, marginal, and thus irrelevant. They belonged to tertiary activity whose effects were not measured or seriously treated. However, through the economic history the importance of the services and trade in services have grown rapidly. Only in the last three decades, they have become very important subject of research paralleled with rapid information-communication technological development. However, there is still no unique definition of what the "production of services" is and how it differs from the production of goods/products.

While in the past the growth of the services has been dependent on the growth of productivity in the manufacturing sectors, this has changed completely. In the past three decades, the service activities have become the most dynamic part of the world economy. Within the world economy the so called "services revolution" has happened in that period, that is fundamental on the use of new, on knowledge and high technology-based services (Aw, Roberts, Xu 2008, p. 451-456 or Kox, Rubalcaba 2007).

The fast development of the information and communication technology (ICT) changed the services manufacturing activities so, that technology development is not the consequence, but rather precondition for higher economic growth (Braga, 1996, p. 35). Consequently, productivity of services was always smaller in the past compared to productivity of production (manufacturing). Paradoxically just rapid development of services accelerated the productivity of production activities with innovation and other high-tech services.

In addition to the wide use of know-how and innovations-based activities at manufacturing of new products, service activities can be distinguished between business and technical services, services of ICT, the services of transfer of the new technologies, banking and insurance services and education services. Those elements are triggers that change services production sectors and are pre-condition for the rapid growth of the international trade on goods and services in the past three decades.

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The objective of the chapter is to present and analyze services to better understand their meaning and contribution to innovation activities and international trade.

2   Services and service activities

The term services include the "whole spectrum of various intangible and non-tangible products and activities, difficult to define with only one definition. Services are very difficult to separate from production of goods/products because they are so connected in all possible ways." (Hill, 1977, 315).

Classical economists have defined services as products or results of work, which disappear immediately when work is finished. With such determination, services have gained characteristics such as intangibility, fleetness and perishability which are still considered as unexpired till nowadays. Because of these characteristics, services are differentiated from characteristics of production and trade of goods.

Schorra (Bateson and Hoffman, 1999, 10) pointed out the differentiation of basic characteristics of manufactured goods and services, which are all subject of supply and demand in the market with a simplistic definition: "Product is something what a consumer buys, takes away, spends and uses in whatever other way. On the other hand, everything which is not physically tangible for a consumer or cannot be taken away or physically used, we call it a service."

From the perspective of services, there are many sorts of services, which represent inputs in an activity of producing products. These are services aimed to final users, i.e., consumers or trading with them (Deardorff, 1985). As an example, a trade (exchange) of finalized product with a help of transport service can be quoted. Trade (exchange) of product relates to transport services in two ways: first, a need for exchanging (trading) products is the only source of demand for transport services, and second, existence of transport services represents basic condition for trading (exchanging) products. The company must use transport service if it needs to sell its products in a different location. For the company there are no commercial effects within whole business process without financial inputs in services.

From a perspective of supplementing activity to producing products, services can be divided into three categories (Stern and Hoekman, 1988): first, supplementary/complementary ones to production and trade with goods/products, second, compensative ones for trading with goods/products, and third, not in any relationship with production of goods/products. Role of services as inputs into activities of producing goods is supplementary (complementary) one to a production activity itself as well as to exchanging or trading with services as "finalized goods" (Hindley and Smith, 1984). Modern (mass) production of products is almost impossible without

inputs of services directly into production processes. Services are present in all phases of production process, from planning and preparation to marketing, commercial and post-production processes. From differentiation between production activities and service activities, it can be observed that trade of services runs in different ways compared to trade of goods/products. Producer of any product, which is not produced on personal demand (for the consumer known in advance), never knows who the user is, who is the final consumer and where in the world the final product is used/spent/consumed. In accordance with the international rules on money transfer, the producer gets certain payment for his good/product. This way production-consuming circle is concluded, and exchange is accomplished although producer and buyer (consumer) do not know each other.

In case of trade on services, whole process is performed differently. Because of services' characteristic of intangibility/immateriality (for example, medical consulting service is not tangible) most of commercial processes in production and supply of services are different from those involving goods/products. In comparison, performer of service (like health doctor) always knows the consumer/user (patient) of the service wherever and whenever the service is performed. In case when a supplier and a consumer/user of service come from different countries, we talk about international trade of services.

Services cannot be traded by themselves as such (e.g., the medical examination cannot be performed without people/patients). For international trade of services, it is necessary to enable international free flows of elements which are connected to services: objects, capital/money flow, information flows or people. Not all these free flows are enabled evenly by international agreements yet. Consequently, the free trade of services does not exist until completely free trade of labour force, capital and information is established. For example, we can take medical services or painting services. Since supplier and consumer of service are acquainted, they are connected. Trade of service or its exchange/execution without mutual acquaintance is normally not possible. Their direct connection (regardless of the type of connection/relationship; also, remotely through internet) is a basic condition for international trade. Therefore, no medical service could be applied on ill person without some kind of relationship.

2.1 Development of service treatment and international trade of services

Service activities were treated as unproductive throughout economic history. Such treatment of service activities came out from four economic limitations: first, by contrast to production activities - at first manufactures and later industrial production - services did not visibly and any other way contributed to increase of common welfare as a reason that they were treated as unproductive. Second, service activities were only a part of production activities since it was considered that without production of goods there would not have been any demand for services. Third, since service activities were

performed (accomplished) only in premises of production activities (manufactures) and not in premises separate from them, it was thought that the proportion (share) of services in welfare expressed only in a form of input elements in production activities (into manufacturing, industrial production). Finally, in the economic sense in comparison to production (having physical characteristics) the services were (because of their characteristics of invisibility and temporary existence) irrelevant. For (economic) welfare only physical products as a consequence of finalized activities of production counted, and which could be economically evaluated (counted, precisely determined their price value or calculated their productivity).

Because of these limitations services till the middle of 20th century belonged to so called third class (tertiary) sector. Their activities could not be classified among manufacturing or agricultural activities. Each of services was treated separately (discretely) and classified upon different keys.

Countries regulated services with various guild and other codes and legal regulations, which were valid differently from country to country. On the other side of the borders or from one state to another, international trade of services (legally) could not be carried out. Only some service activities, which were connected to interstate trade, were being carried out (for example transport services and services of physical exchange of products themselves).

Services can be included in international trade as: final product and are a subject of direct trade (for example: tourism), input into production activities and are included in indirect trade (for example: computer services, health medical services), carry out substitute function in product trade (for example: transport) or service trade (for example: telecommunication service). In each of these cases there is a trade of services among residents in some economic environment which can be inside one country, between two countries (trade between residents - non-residents) or among more countries globally (trade between residents - non-residents).

On international level, financial transfers of services in the Systems of National Accounts were defined as "invisible". Each of service sectors was treated differently in accordance with different international agreements or under principles of international organisations. As services were not treated as activities where international trade could be carried out (non-tradable), they were not treated in the GATT.

Only in 1960, a group of most developed countries within the Organisation of Economic Cooperation and Development (OECD) called for abolition of these principles which represented obstacles in international trade of services (OECD, 1961). They consensually prepared a set of instruments, which only regulated financial flows of foreign direct investments and mutual payments (OECD, 1976) for accomplished services.

Because of direct consecutiveness of performing services with production activities the problem of measuring effects of services, their share in GDP and other macroeconomic categories only began in the second half of 20th century. The biggest step was made at the time of passing the GATS, which was the first international agreement defining and more precisely regulating ways of financial flows. Significance of the GATS is based on two assumptions: first, to enable orderliness of accepted rules and regulations, and second, to encourage international economic development with successful negotiations about new mutual or multi-party agreements (also in the following negotiation steps), which would even more eliminate trade obstacles (liberalization of trade in services).

Goal of the GATS was to regulate the area of international trade of services in similar way as international trade of goods/products: without discrimination and with agreement of gradual opening of national markets in respect to services to competition from abroad. It would mean international improvement of accessibility to service markets, expansion of national treatments with foreign services and improvement of service activity offers on every level. With other words, agreement would enable a decrease of mutual obstacles in trading of services and disabling of induction and assertion of new obstacles. The agreement does not eliminate all obstacles, but merely some bigger ones, which signatory countries agreed upon. In the process of further mutual communication, it nevertheless enables further levels of liberalization of international trade of services.

During the times of globalization, free flows of three elements which services are connected to are enabled (and even not unconditionally in all countries and with internationally accepted criteria): flows of products, capital, and information. Free flow of labour among countries is not possible. International trade of services is much more complex and limited compared to international trade of goods/products.

2.2 Characteristics of services

The supply and trade of services differentiates from supply and trade of products. Hill (2004) defines supply of services as execution of limited number of tasks for solving limited number of problems of defined group of consumers (customers) in a limited time period. Market of services supply is much more multifaceted and complex compared to production supply since not even two services of the same sort are not exactly the same; services are a combination of products with characteristics of tangibility, materiality and personal approach adapted to consumers; services cannot be produced "on stock" and as such cannot be kept in accounting/business books (as on hold) as they are consumed at the exact moment they are carried out or used. There is, according to the final location of trade, difference in trade of goods/products, which can be physically touched, and trade of services, which are intangible. There were many researchers, who studied service characteristics (e.g., Wolak et al, 1998; Hill 2004), but they only focused on a few characteristics, such as intangibility, immateriality,

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invisibility, perishability, and temporary existence. Based on our research we believe there are thirteen characteristics of services worth observing:

First, intangibility/immateriality means that services cannot be materially defined or determined. As opposed to production activities where final product is a product with physical characteristics, final product in services is only accomplished work or satisfaction of some common human needs. As for example, completed purchase, supply of electricity, seeing a movie, successful data transfer or service of giving medical check are all intangible/immaterial.

Second, invisibility means that a service as such cannot be seen as it represents a term and exists in immaterialized form. Only consequences of accomplished service are visible. As for example: finished phone call, while service of enabling a phone call is invisible as the sound between two co-speakers travels invisibly. Third, perishability means that services can be carried out only once, and therefore, they are unrepeatable. Each repetition of service task means a new service task. For example, a doctor can do the same medical test on COVID-19 virus but each repetition of accomplished and paid purchase of test means a new one (service). Service has to represent much closer connection between supplier (for example doctor) and user of service (virus victim) and trust of consumers (patients) has to be much bigger since each repetition of accomplished service means new costs.

Fourth, temporary existence and sensitivity on time means that execution of services is time limited. Existence of service execution is limited till the moment it is finished. Endlessly long execution of any services is not possible. If it does not exist, it does not make any sense. Chosen time for service execution is important. It cannot be delayed with execution of some services such as for example for transport services, including transport of perishable goods, internal transports in between production lines, and services connected with marketing and other advertising businesses. For example, testing people services at the time of virus pandemic must be applied as soon as possible before virus is affected to too many people as time delay can be deadly or innovations have to be sold at the right time that competition does not grasp them.

Fifth, non-storability means that a service cannot be stored for its future use. Services are inappropriate for storage. Service can be done only once or never. Services cannot be kept on stock for later use. They can be used only at the time of order and need. For example, coordination between scientists and global health professionals to accelerating the research for developing new anti-virus vaccine during pandemic could not be kept in store.

Sixth, mutual inseparability between supplier and user (consumer) of services means that for successful trade/exchange supplier and user (consumer) have to get acquainted. To order a service consumer has to connect directly with service supplier which is not

the case when dealing with products. Services cannot be carried out without direct connection even in case of a service being carried out abroad. As for example, during the medicine exam on virus disease the doctor and the patient are connected directly as the doctor is examine the patient body.

Seventh, lack of inventory means that for service execution we normally do not need capitally intensive assets as is the case in production activities. Despite rapid technological development and the fact that to execute some services expensive and sophisticated technological devices are needed, in general for service execution we do not need large production capacities. By contrast, most services are labour intensive meaning that in service sectors number of employees is above average. Only person with relevant qualifications, knowledge and skills can carry out a service of required quality. Employees in services (like doctors in hospitals) can hardly be replaced by machines or robots. Still, the technology is developing constantly and therefore in some service professions high technology devices are irreplaceable.

Eighth, sensibility of quality control is closely connected to temporary existence/sensitivity of time. Direct quality control is different compared to production activities. In service activities, quality control can be carried out only on sample of large number of similar services or on past experience. In individual countries different criteria for execution of specific types of services developed in certain time periods. For example, the insurance services in health sectors are very different in different countries (as to compare USA and EU countries). Guild rules for some crafts are known and knowledge passed down through generations such as shoemakers and pot makers. Even today for most areas of service activities, there are no international rules on quality, but so-called codes of practice exist, and they are differing from country to country. Product salespersons are obliged to share basic data about the product with the consumers regarding international standards such as manuals and shelf life whereas for service suppliers there are no international rules. Each country has its own specific demands regarding basic data which service supplier has to quote.

Ninth, high degree of risk and difficulty of experimentation means that execution of services is always connected to high risk for consumers, as they normally do not have any guarantee that a service will be performed as agreed upon and according to their expectations. In negotiating for execution of service activity between service supplier and consumer/user asymmetric information is always present. How a service is carried out and what are its consequences is well known to the supplier but not the consumer/user as well. From the perspective of game theory, it is always a game with non-zero sum. As for example, when the new vaccine is put on the market, even tested by all medical regulation, it is always risky, if will have positive effects. Because of temporary existence and sensitivity of time experimentation new services are always risky. Certain types of service activities can only be evaluated on basis of past experience.

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Tenth, no return possibility in case of unsatisfaction derives from perishability of services and characteristic of high degree of risk. Service buyer is in no position to return or exchange the service in case it does not satisfy him or if the service differs from his expectations. One of staples of modern consumer society is a possibility of an immediate return of goods/products or money back guarantee which cannot be applied in case of services. In case of services, all risk of purchase/order is carried by a customer/buyer. As for example, if the service of the medical operation on patient is not finished successfully, it could not be replaced by another (same) one. That would be new operation / new medical service.

Eleventh, customization of requirements stems from temporary existence and sensitivity on time. Because of sensitivity on time the quality of service depends on experience, knowledge, skills, and qualification of a service supplier. They form supplier's personal characteristics. Therefore, the service execution is dependent on human factor only, as for example on the right doctor`s diagnosis. Because of perishability in services, mistakes usually cannot be fixed. Customization requirements or personal approach also derive from inseparability between service supplier and user.

Twelfth, different distribution channels are being used compared to production ones. If service supplier wants to expand its offer, different methods have to be used than in case of product. Economic science has developed some commercial methods adapted to selling and expanding service activities such as net marketing, direct marketing, and content marketing. Some services demand additional knowledge for their successful use, which is enabled directly by producers. Fair activities are aimed for such activities as part of service activities.

Thirteenth, there is no rivalry resulting from temporary existence or sensitivity on time. No rivalry exists because execution of service activity for one consumer does not minimize/limit execution of the same service activity for another consumer. Many services have characteristic of rivalry due to limited-service capacity. For example, limited number of services for vaccines at the time of virus pandemic - all people, who have access to such services on time are winners in the game of rivalry. All others have to wait for the next vaccine service delivery.

In comparison to production activities, each of described characteristics causes service activity to be executed differently, with more difficulty and with approach that is more personal. Planning, marketing, controlling and other similar activities are completely different in services compared to production. Because of these characteristics of services, there is very apparent difference between flows of goods/products and flows of services from the perspective of international trade. Consequently, productivity of services was always smaller in the past compared to productivity of production. Paradoxically, rapid development of services accelerated the productivity of production activities with innovation and other high-tech services.

3   Empirical model

At the research process we followed established and well-known theoretical cognitions scientists and researchers on theories of endogenous economic growth (Romer, 1986; Grossman and Helpman,1991), sectoral economics of goods and services, international trade on services, research and development (R&D) and innovations in firms. The focus of the existing studies at firm level is concentrated on industry production and manufacturing firms. In this study, we focus on the service sector in the Slovenian economy.

To capture any impact between export and innovation activities and investments in the R&D of firms we apply models of the endogenous economic growth, which are for such research most suitable. Romer (1986; 1996) developed the model of endogenous economic growth, where the inside source of the economic growth is foundation on accumulated knowledge, based on technology development (patents, licences etc.) and innovation activities. When developing the model, he had followed the Austro-Hungarian economist Schumpeterian (Schumpeter, 1934) views on international trade.

In later literature on endogenous theories of growth (Gallouj, 2002; Sahay, 2005; Tether, Howells, 2007) economists argue against one-way influences one-to-another. It is not necessary that innovation activities at firm level are influencing their exporting performance, it might be also opposite, that export activities are impacting innovation activities at firm level. Opening (country) economy to the foreign companies' competition and foreign markets entry could be gainful with positive results (profits, higher economy growth), which could have the consequence for innovation activities at firm level. At the same time, positive results (profit) could be reinvested in the development of firms to accelerate innovation activities. When the economists include demand on higher educated labour force, they find positive impact of innovation to export activities as vice-versa (like in Germany, Ebling and Janz, 1999). To determinate mutual impacts it turns out that the most useful are models, which use binary dependent variables, like probit or logit models.

Our empirical model is based on firm-level evidence (private and public companies) from the different services sectors. We have adopted the approach of firm level studies in the manufacturing sectors (Kumar and Siddharthan, 1994; Wakelin, 1998), and adapted (transform) them to the services sectors. Following the previous studies, we take into account that the innovation activities may depend on export activities and vice-versa for both studied periods (2002-2008 and 2010-2016), and investments in R&D in firms may depend on their export activities and vice-versa (only for the period 2010-2016).

We have to take into account two different periods (2002-2008 and 2010-2016) from the fact that in 2007 the Standard Statistical Activities (SKD 2002) have changed

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dramatically to new one (SKD 2008 - Slovenian version of NACE Rev. 2,), because Slovenia has to adjust the Slovenian Statistical Standards to the EU Statistical standards. Slovenia became the EU member in May 2004; hence, all the data had to be adjusted to new standards, especially to be consistent with new classification. The biggest transposition of the data has been in the services sectors. The transposition matrix for data has been available, but we decided to use the model for two different periods and compare them. We have also better available data in the second period (2010-2016), so we use firm-level data on investment in the R&D to see if they are dependent on export activities and vice-versa.

We define a few model specification relationships, which have to be analysed, as

$$EXP_{ij} = f\ (INNO_{ij},\ INV_{ij},\ ZNAC^{IZV}_{ij},\ SEKT^{IZV}_{j},\ EKON^{IZV})$$

where symbols mean the following:

EXP_{ij} vector of export activities of firms i (i = 1 to N_j) in sector j (j = 1 to M),

$INNO_{ij}$ vector of innovation activities for firm ij,

INV_{ij} vector of investment on R&D activities for firm ij,

$ZNAC^{IZV}_{ij}$ vector for characteristics of firm i in the sector j,

$SEKT^{IZV}_{j}$ vector for characteristics of the sector j.

$EKON^{IZV}$ vector for characteristics of the economy E^{EXP}.

The vectors $ZNAC^{IZV}_{ij}$, $SEKT^{IZV}_{j}$, and $EKON^{IZV}$ (characteristics of firms, characteristics of the sector, and characteristics of the economy) consist of the variables that are likely to affect the firms export activities. These explanatory variables are predicted as important drivers of exports by traditional and modern theory of the international trade, export behavior and investment on the R&D in firms. We will precisely determine individual vectors with the selection of relevant variables.

We examine the firms' performance in the selected business non-financial services sectors: J – Information and communication (J58.2, J61, J62, J63), L – Real estate, M - Professional, scientific and technical activities (M69 - M74), and N – Other business activities (N77, N80 - N82). All together were selected 15 services sub-sectors.

The theory of sector studies on effects of innovation on international trade or investment in R&D on firm level use several measures of export activities. We have regarded eight different measures in the form of variables (seven different measures for the period 2002-2008).

1. The ratio of exports to total sales is accepted to be appropriate measure of export performance (Wagner, 1996, or Wakelin, 1998 or Vogel and Wagner, 2011)

export intensity (EXP_{ij}) = (total exports)$_{ij}$ / (total sales)$_{ij}$
(firms i = 1, .. , N, sectors j = 1, .. ,15) with values between 0 and 1 [0 .. 1],

2. For differences in relative factor endowments we use unit labour costs as a measure for relative endowment with labour:

labour costs per unit$_{ij}$ = (total labour costs)$_{ij}$ / (total sales)$_{ij}$
(firms i = 1, .. , N, sectors j = 1, .. ,15) with values between 0 and 1 [0 .. 1],

3. The neoclassical extension of production factors to knowledge of human capital we measure with labour skills structure of employees (Oulton, 1996; Wagner, 1996). From labour we divided workers on two (three) categories, employees with university or higher degree and employees with technical skills (middle and technical school degrees, expert skills), and third group with workers with less or no education.

university$_{ij}$ = (employees with university or higher degree)$_{ij}$ / (number of employees)$_{ij}$
(firms i = 1, .. , N, sectors j = 1, .. ,15) with values between 0 and 1 [0 .. 1],
4.
tech_skills$_{ij}$ = (employees technical skills)$_{ij}$ / (number of employees)$_{ij}$
(firms i = 1, .. , N, sectors j = 1, .. ,15) with values between 0 and 1 [0 .. 1],

5. For firms in service sectors to export their services is usually associated with relatively high costs (fixed ones). This is directly related to the firm size. Total number of employees is used as a measure of firm size. This is an important factor for explaining export activities (e.g., Kumar & Siddharthan, 1994). In the relationship between exports and firm size to allow for non-linearities, we add to the list of explanatory variables the logarithm of firm size and the squared logarithm of firm size. Between exports and firm size, an inverse U-shaped relationship is expected (Kumar & Siddharthan, 1994):

size$_{ij}$ = (logarithm of the number of employees)$_{ij}$
(firms i = 1, .. , N, sectors j = 1, .. ,15)
6.
size²$_{ij}$ = (logarithm of the number of employees)$^2_{ij}$
(firms i = 1, .. , N, sectors j = 1, .. ,15)

To have the appropriate econometric results we use a two-step approach. First, we use Simple Probit model, and then in the second step, we use Simultaneous Probit model (Maddala, 1999).

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The variables we used for measuring export activities could not be dealt completely because not all the firms perform export activities. Therefore, in the model we chose (binary) variables EXP#ij so that it is:

$$EXP^{\#}_{ij} = \begin{cases} 1 \text{ if } EXP_{ij} > 0 \\ 0 \text{ if } EXP_{ij} <= 0 \end{cases}$$

With this, we formally defined "exporters" as well as "non-exporters". This enables us to use the Simple Probit model.

7. The studies on effects of innovation on international trade on the sector level use several measures of export activities. We used the ratio of exports to total sales, which is generally taken as appropriate measure of export performance (Wagner, 1996, or Wakelin, 1998 or Vogel and Wagner, 2011). Following the studies of Entorf et al. (1988) in the next step, we define function, which explains innovation activities:

$$INOV_{ij} = g (EXP_{ij}, ZNAC^{INOV}_{ij}, SEKT^{INOV}_{j}, EKON^{INOV})$$

where we have:

EXP_{ij} — vector of export activities of firms i (i = 1 to N_j) in sector j (j = 1 to M),

$ZNAC^{IZV}_{ij}$ — vector for characteristics of firm i in the sector j,

$SEKT^{IZV}_{j}$ — vector for characteristics of the sector j.

$EKON^{IZV}$ — vector for characteristics of the economy E^{EXP}.

The chosen measures for the innovation activities $INOV_{ij}$ are the function of the export activities, characteristics of firms $ZNAC^{IZV}_{ij}$, characteristics of the sector $SEKT^{IZV}_{j}$, and characteristics of the economy $EKON^{IZV}$.

Regarding service firms, only a few service subsectors are performing innovation activities, and product innovation can hardly be distinguished from process innovations (Licht et al., 1997).

innovation intensity $(INNO_{ij})_{ij} = $ (innovations expenditure)$_{ij}$ / (total sales)$_{ij}$ (firms i = 1, .. , N, sectors j = 1, .. ,15) with values between 0 and 1 [0 .. 1],

8. As a novelty in the theory, we added an additional important measure. The investment activities are very important for the development of the firms, and we assume they are in relations with the export activities. For this variable we put together four different statistical elements from the R&D base: the investments in employees for R&D activities, the investments in new technical equipment for R&D activities, investment in

services to other firms for the purpose of the R&D activities in firm, and investment in R&D as other costs for R&D activities. In this part total investment in IT can also be included because the investments in IT have significant impact on fast development of ICT, as have been discussed by Licht and Moch (1997). We define the relationship with assuming that more the firms invested in R&D activities more are export oriented (and vice-versa), especially is this the characteristic of small, export-oriented countries, such as Slovenia (during the last two decades more than 80% of goods and services have been exported annually). Because of data availability, we use this data only for the period 2010-2016.

investments intensity (INV_{ij}) = (expenditure for R&D activities)$_{ij}$ / (total sales)$_{ij}$
(firms i = 1, .. , N, sectors j = 1, .. ,15) with values between 0 and 1 [0 .. 1],

9. Additionally, we added one more variable as a dummy variable. We divided 15 services sub-sectors into three different groups:
   a. group of firms, which do not have any innovation nor any investment in R&D activities and do not export their services (e.g., firms in L - real estate sub-sector), all together five sub-sectors,
   b. group of firms, which do not have any innovation nor any investment in R&D activities but are exporting their services (e.g., firms in M73 - advertising and market research sub-sector), all together five sub-sectors, and
   c. group of firms, which do have innovation or investment in R&D activities and are exporting their services (e.g., firms in J61 - telecommunications sub-sector), all together five sub-sectors.

sub-sector$_{ij}$ = (dummy for sub-sectors)$_{ij}$
(firms i = 1, .. , N, sub-sectors j = 1, .. ,3) with values between 1 and 3 (group of point a. with value = 1, group of point b. with value = 2 and group of point c. with value = 3),

The variables we used for measuring export activities, innovation and investments in R&D intensities could not be dealt completely because all the firms do not perform export or innovation activities or invest in R&D. So in the model we chose (binary) variables $EXP\#_{ij}$, $INNO\#_{ij}$ and $INV\#_{ij}$ so that it is:

$$EXP^{\#}_{ij} = \begin{cases} 1 & \text{if } EXP_{ij} > 0 \\ 0 & \text{if } EXP_{ij} <= 0 \end{cases}$$

$$1 \text{ if } INNO_{ij} > 0$$

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$$INNO^{\#}_{ij} = \quad 0 \text{ if } INNO_{ij} <= 0$$

$$INV^{\#}_{ij} = \quad \begin{array}{l} 1 \text{ if } INV_{ij} > 0 \\ 0 \text{ if } INV_{ij} <= 0 \end{array}$$

With this, we formally defined in addition to "exporters" also "non-exporters", in addition to "innovators" also "non-innovators", and in addition to "firms which invest in firms R&D" also "firms which do not invest in firms R&D". This enables us to use the Simultaneous Probit model in the second step.

4   Data set

Data used was collected for two periods: from 2002 to 2008 and from 2010 to 2016. For the first longer period with more stable data, we use data on every second year, that is 2002, 2004, 2006 and 2008, while for the second period 2010, 2012, 2014 and 2016. We have to take into account two different periods from the fact, that at 2007 the Standard Statistical Activities (SKD 2002) have changed dramatically to new one (SKD 2008 - Slovenian version of NACE Rev. 2), and the Slovenian Statistical Standards were adjusted to the EU Statistical standards. Slovenia become the member of the EU in May 2004; hence all the data have to be adjusted to new standards, especially with new classification.

To run the model, we have used 5 different databases with the data on firms micro level. For all of them we have the same encrypted code (ID of firm) for each chosen year (different for the period 2002-2008 and for the period 2010-2016) so that we could combine/merge them. Because of the availability of appropriate data, we used slightly different databases for different periods (2002-2008 and for 2010-2016). In the end, we have two big databases for both periods with all the necessary variables. Because of differences in classification for two periods, it scientifically would not be correct if we just merged them, but it is correct that we compare the econometric results from both investigated periods.

From Statistical Office of the Republic of Slovenia (SORS) we used data from the following data basis: SSP - structural statistics of firms, ZUN TRG - database on international trade on goods and services, SRDAP - statistics register on active employees (labour force), RRD - database on firms R&D activities, and INOV - database on innovation activities in firms.

5   Descriptive statistics

The descriptive statistics are presented and described separately for two investigated periods: 2002-2008 and 2010-2016.

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First, the database for the period 2002-2008 contains N = 11,352 firms. The number of firms over the years decreased from 3,447 in 2002 to 2,513 in 2008. This is not in accordance with our expectations that the number of firms should increase over the years, since the Slovenian economy had grown in that period (before and at the time of integration Slovenia into the EU).

From all the firms in this periods only 231 (2.0%) of them reported export and innovation activities (their export was have been > 0), only 613 (5.4 %) of them reported, that they exported services, but did not have any innovation activities. Among all other firms, nine out of ten (10.241 – 90.2%) reported, that they did not export anything to foreign markets, only 267 of them reported innovation activities. The services sector has not been developed very much at that time.

Second, the database for the period 2010-2016 is used for studying two descriptive statistics: export - innovation relationship, and export - investments in R&D relationship. The database consists of N = 73,721 observations in the panel dataset of firms.

For the export - innovation relationship, the number of observations compared to the previous period, increased substantially for each of the measure. This is probably the consequence of the change of statistical classification and the faster growth of the Slovenian economy within the EU immediately after entering the EU. The number of firms over the years increased from 16,681 in 2010 to 19,823 in 2014 but declined to 18,874 in 2016.

From all the firms only 401 (0.5%) firms reported export and innovation activities (their export was > 0), but there were many more firms with exported services (and did not have any innovation activities), i.e., 17,041 (23.1%) or almost a quarter of all of firms. Only 68 (0.1 %) firms reported that they did have innovation activities but did not export any services. Among all other firms, a little less than 3 quarters of them (56,211 or 76.3%) reported that they did not export anything to foreign markets and did not have innovation activities at that period. We divided firms in three groups by a separator based on characteristics of their performance. Separator = 1 contains of firms from group a. (see Dummy, variable no. 9), separator = 2 contains of firms from group b., and separator = 3 contains of firms from group c.

In the group a. were included 13,304 (18.0%) firms (group a. assumes no innovation activities and are not exporters), in the group b. were included 48,121 (65.3%) firms (group b. assumes no innovation activities and are exporters), and in the group c. were included 12,296 (16.7%) firms (group c. assumes innovation activities and are exporters). So, the biggest group b. contains of firms, which do not report any innovation activities, but are exporting their services abroad. This is in line with the

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characteristic of Slovenian economy, which is mostly export oriented, not only for goods, but also, as we confirmed here, for services.

For the export - investments in R&D relationship, we use the same database with the same number of observations. From all the firms in this period, 9,872 (13.4%) firms reported export (export > 0) and did have investments in R&D. There were little less firms, 7,570 (10.3%), which reported export of services (and did not have any investments in R&D). Almost quarter of all firms, 17,826 (24.2 %), reported, that they did have investments in R&D, but did not export any services. All other firms, a little more than half of them, 38,453 or 52.2%, reported, that they did not have exporting anything to foreign markets and did not have investments in R&D at that period. Almost a quarter of all firms are exporters (23.6%) and more than a third of them did have investments in R&D (37.6 %), which is very encouraging for business performance.

6   Econometric Results with a Simple Probit model

The econometric results are presented in three phases for the Slovenian services sector. Different models on the same big database are estimated
   a. export behaviour on innovation activities for the period 2002-2008,
   b. export behaviour on innovation activities and investment in R&D activities for the period 2010- 2016, and
   c. innovation activities and investment in R&D activities on export behaviour for the period 2010- 2016,

A two-step estimation approach was applied for each of all three phases. First, we use Simple Probit model to analyse one influence/impact to another (e.g., presence of export activities taking innovation activities as given (and vice-versa), then in the second step we use Simultaneous Probit model (Maddala, 1999).

In regression calculations, we use Likelihood Ratio Chi-Square test that at least one of the predictors` regression coefficient is not equal to zero. The number in the parentheses indicates the degrees of freedom of the Chi-Square distribution used to test the Likelihood Ratio Chi-Square statistics and is defined by the number of predictors in the model.

When computing the model, we used given alpha (α) significance level as 0.1 for all calculations. We used z test statistics, which is the ratio of the Coefficient to the Standard error of the respective predictor. The z value follows a standard normal distribution that is used to test against a two-sided alternative hypothesis that the Coefficient is not equal to zero.

For the testing on the null hypothesis for regression coefficients, we use z test statistics: p > I z I measure. This is the probability the z test statistics would be observed under the

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null hypothesis that a particular predictors regression coefficient is zero, given the rest of the predictors are in the model. For a given alpha level ($\alpha = 0.1$), $p > I z I$ determines whether the null hypothesis can be rejected. If $p > I z I$ is less then alpha, ($p > I z I < \alpha = 0.1$) then the null hypothesis can be rejected, and the parameter estimate is considered statistically significant at the alpha significance level.

Considering the interpretation of the data, it is important to know, that the Probit model regression coefficient interpretation is not similar as at common linear regression models. At given predictor a positive coefficient means that an increase in the predictor leads to an increase in the predicted probability. A negative coefficient means that an increase in the predictor leads to a decrease in the predicted probability (in: UCLA Academic Technology Services, 2010).

We use of three different models to analyse mutual relationships:
a. Export behaviour on innovation activities for the period 2002-2008
   We start with a Probit model of the decision to export and of the decision of innovation activities, and vice-versa.

   The latent model gives the export equitation

   $$EXP_{ij} = C + \alpha \times INNO_{ij} + \beta \times ZNAC^{IZV}_{ij} + u_{ij}$$

   where we have:

   EXP_{ij} vector of export activities of firms i (i = 1 to N_j) in sector j (j = 1 to M),

   $INNO_{ij}$ vector of innovation activities of firm i in the sector j,

   $ZNAC^{IZV}_{ij}$ vector for characteristics of firm i in the sector j,

   α , β parameters to be estimated (computation),

   C regression constant, and

   u_{ij} error term, which is assumed to be iid N(0, σ_u).

   The export measure EXP_{ij} cannot be observed completely. The observed model is given by the binary choice

   $$EXP^{\#}_{ij} = \begin{cases} 1 & \text{if } EXP_{ij} > 0 \\ 0 & \text{if } EXP_{ij} <= 0 \end{cases}$$

   formally defining an exporter and non-exporter. Results of the Maximum Likelihood estimation for the period 2002 to 2008 are summarized in Table 1 (for the years 2002 and 2004) and in Table 2 (for the years 2006 and 2008).

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Table 1:   Simple Probit model estimates for the years 2002 and 2004

Year:	2002			2004		
Variables	Coeffic.	Standard error	p > I z I	Coeffic.	Standard Error	p > I z I
Innovation intensity	2.150	0.716	0.003	0.464	1.906	0.808
Labour costs per unit	-4.319	1.054	0.000	-4.888	1.184	0.000
Firm size (log)	2.087	0.626	0.001	0.930	1.628	0.568
Firm size squared (log)	-0.222	0.087	0.011	0.009	0.226	0.969
Constant	-4.085	1.150	0.000	-2.752	2.756	0.318
Log Likelihood	-55.101			-21.471		
N	146			129		
LR chi2(5)*	70.16			68.35		

Source: own calculations

Among the results in Tables 1 and 2 predictors University education and Tech skills education were omitted. At the set out alpha significance level to 0.1, their estimated regression coefficients failed to reject the null hypothesis and can be concluded that their regression coefficients have not been found to be statistically different from zero given all other predictors in the model.

Table 2:   Simple Probit model estimates for the years 2006 and 2008

Year:	2006			2008		
Variables	Coeffic.	Standard error	p > I z I	Coeffic.	Standard Error	p > I z I
Innovation intensity	-	-	-	-	-	-
Labour costs per unit	-8.239	0.688	0.000	-6.358	0.486	0.000
Firm size (log)	0.384	0.213	0.071	0.376	0.177	0.033
Firm size squared (log)	0.053	0.038	0.159	0.024	0.030	0.438
Constant	-2.030	0.298	0.000	-2.060	0.246	0.000
Log Likelihood	-168.801			-255.355		
N	2 626			2 513		

LR chi2(5)*	537.82	592.39

Source: own calculations

The results of the Simple Probit model support the hypothesis, that the innovation activities encourage export behaviour, but only in the year 2002. Innovation activities have clear, positive impact on export activities, which can be seen from positive coefficient on innovation intensity (coefficient 2.15 in 2002). It means that any additional unit of innovation activity in 2002 would increase the export activity for $F_{(2,15)} = 0.984$ (98.4%!). The results for 2004 cannot be explained because the risk level in much higher than allowed, 10% level (coefficient is 0.464 at the risk level $p > I z I = 0.808 > 0.1$).

The results for the years 2006 and 2008 confirm that the innovation intensity parameter estimate is considered statistically non-significant at the alpha level as a reason that theoretical expectation related to this coefficient was rejected.

The calculated regression coefficient in the model shows that higher costs per unit cause significant decrease the probability for export activities in all analysed years. The regression coefficients are negative suggesting that any additional labour costs per unit would decrease the probability for the export activity.

The regression coefficients pertained to firm size predictors in all analysed years, except for 2004, are significantly positive. This means that any additional employee per unit would increase the probability for the export activity.

b. In investigation of the export behaviour on innovation and investment in R&D activities for the period 2010-2016, we start with a Probit model of the decision to export and the decision of innovation or/and investment in R&D activities (and vice-versa).

The export equitation is given for both innovation and investments in R&D activities by the latent models:

$$EXP_{ij} = C + \alpha \times INNO_{ij} + \beta \times ZNAC^{IZV}_{ij} + u_{ij}$$

$$EXP_{ij} = C + \alpha \times INV_{ij} + \beta \times ZNAC^{IZV}_{ij} + u_{ij}$$

where are:
EXP_{ij} vector of export activities of firms i (i = 1 to N_j) in sector j (j = 1 to M),
$INNO_{ij}$ vector of innovation activities of firm i in the sector j
INV_{ij} vector of investment on R&D activities of firm i in the sector j,

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$ZNAC^{IZV}_{ij}$ vector for characteristics of firm i in the sector j,
α , β parameters to be estimated,
C   regression constant, and
u_{ij} error term, which is assumed to be iid $N(0, \sigma_u)$.

The export measure EXP_{ij} cannot be observed completely. The observed model is given by the binary choice (for both models):

$$EXP^{\#}_{ij} = \begin{cases} 1 & \text{if } EXP_{ij} > 0 \\ 0 & \text{if } EXP_{ij} <= 0 \end{cases}$$

formally defining an exporter and non-exporter. The results of the Maximum Likelihood estimation for the period 2010-2016 are summarized in Table 3 (for the years 2010 and 2012) and in Table 4 (for the years 2014 and 2016). The left part of Tables presents results for innovation activities and the right part of Tables presents results for investment in R&D activities.

Table 3: Simple Probit model estimates for the years 2010 and 2012, relationship between investment intensity or innovation intensity and export activities

	2010		Year	2012	
	16 681		No. of firms	18 343	
	"INVESTOR"	"INNOVATOR"	Firm, that is	"INVESTOR"	"INNOVATOR"
	export activities		Impact on	export activities	
	-7308.74	-7302.52	Likelihood	-8629.17	-8636.76
	1883.29	1895.72	LR chi2(n)*	1968.88	1953.68
	Coeffic. / $p > I z I$	Coeffic. / $p > I z I$		Coeffic. / $p > I z I$	Coeffic. / $p > I z I$
	0.299 / 0.028		Investment intensity	0.609 / 0.000	
		2.206 / 0.000	Innovation intensity		0.142 / 0.158
Probability	17.8	17.8	Probability influence in %	20.9	21.7
Constant	-1.649 / 0.000	-1.632 / 0.000		-1.516 / 0.000	-1.503 / 0.000
Labour costs per unit	-0.830 / 0.000	-0.832 / 0.000	st. deviation	-0.838 / 0.000	-0.840 / 0.000
	0.055	0.055		0.053	0.053
University	0.359 / 0.000	0.353 / 0.000		0.323 / 0.000	0.322 / 0.000

	2010				Year	2012			
education		0.074		0.074	st. deviation		0.072		0.072
Tech skills education	0.638	0.000	0.629	0.000		0.627	0.000	0.625	0.000
		0.073		0.073	st. deviation		0.070		0.070
Firm size (log)	0.438	0.000	0.437	0.000		0.510	0.000	0.513	0.000
		0.030		0.030	st. deviation		0.029		0.029
Firm size squared (log)	-0.021	0.010	-0.022	0.007		-0.038	0.000	-0.038	0.000
		0.008		0.008	st. deviation		0.008		0.008

Source: own calculations

The estimated Simple Probit models support the hypothesis that the innovation and investment in R&D activities encourage export behaviour in the period 2010-2016. Innovation, as well as investments in R&D activities have significantly positive impact on probability of export activities in firms in all four analysed years.

Table 4: Simple Probit model estimates for the years 2014 and 2016, relationship between investment intensity or innovation intensity and export activities

	2014				Year	2016			
	19 823				No. of firms	18 874			
	"INVESTOR"		"INNOVATOR"		Firm, that is	"INVESTOR"		"INNOVATOR"	
	export activities				Impact on	export activities			
	-9866.30		-9877.67		Likelihood	-10058.17		-7308.74	
	2276.62		2253.89		LR chi2(n)*	2392.37		1883.29	
	Coeffic.	$p > I z I$	Coeffic.	$p > I z I$		Coeffic.	$p > I z I$	Coeffic.	$p > I z I$
	0.758	0.000			Investment intensity	0.717	0.000		
			0.223	0.493	Innovation intensity			1.164	0.011
Probability		22.4		22.7	Probability influence in %		26.7		26.8
Constant	-1.348	0.000	-1.334	0.000		-1.244	0.000	-1.227	0.000

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	2014			Year	2016			
Labour costs per unit	-0.638	0.000	-0.644	0.000		-0.707	0.000	-0.712	0.000
		0.046		0.046	st. deviation		0.044		0.044
University education	0.191	0.003	0.189	0.003		0.179	0.006	0.180	0.065
		0.065		0.065	st. deviation		0.066		0.006
Tech skills education	0.472	0.000	0.468	0.000		0.491	0.000	0.485	0.000
		0.063		0.063	st. deviation		0.064		0.064
Firm size (log)	0.464	0.000	0.470	0.000		0.459	0.000	0.465	0.000
		0.028		0.027	st. deviation		0.027		0.027
Firm size squared (log)	-0.040	0.000	-0.040	0.000		-0.036	0.000	-0.039	0.000
		0.008		0.008	st. deviation		0.008		0.008

Source: own calculations

For all analyzed years, the calculation shows that innovation activities in firms have a positive effect on export activities in firms. The more the firms invest in innovation activities, the greater is the probability that they will perform export activities. The estimated probabilities by the years are the following: 17.8% in 2010, 21.7% in 2012, 22.7% in 2014, and 26.8% in 2016. The probability has increased permanently over the analyzed years, which is very positive effect from the Slovenian services sectors to export activities.

The calculation shows that investment in R&D activities in firms have a positive effect on export activities in firms. The more the firms invest in R&D the greater is the probability that they will perform export activities. The estimated probabilities by the years are the following: 17.8% in 2010, 20.9% in 2012, 22.4% in 2014, and 26.7% in 2016. The probability has increased permanently over the analyzed years, which is also very positive effect from the Slovenian services sectors to export activities.

A statistically positive regression coefficients pertained to innovation intensity are found for the years 2010 (coefficients 2.206) and 2016 (0.717), but not for 2012 and 2014 when we can reject the null hypothesis.

A statistically positive regression coefficients pertained to investment intensity are found for the years 2010 (coefficients 0.299), 2012 (0.609), 2014 (0.758) and 2016 (0.717). The more the firms invest in R&D, the greater is the probability that they will perform export activities. The probability has increased permanently, except in 2016. The probability almost tripled from 2010 to 2016.

The estimated models show that higher costs per unit significantly decrease the probability for export activities in the analyzed years in both relationships. The regression coefficients are negative, between -0.63 and -0.84, which means that any additional labor costs per unit would strongly decrease the probability for the export activity.

The regression coefficients pertained to the shares of higher education show that the higher (better) educational structure of employees in the analyzed years and in both relationships encouraged export activities. They have a clear positive impact: the coefficient for the share of employees with technical education is between 0.47 and 0.63, and for the share with university education is between 0.17 and 0.36. This means that each additional unit of the educational structure in the analysed years in both relationships increased the probability of the firm's export activity. Therefore, higher average education increases the probability for export behaviour.

The size of the firm slightly encouraged export activities in the analysed years and the relationships. They have a clear positive impact, and the regression coefficients are around 0.45. This means that any additional increases in the size of the firm in the analysed years in both relationships increased the probability of the firm's export activity or larger than the firm was, the more likely it is that it will be an exporter.

c. Innovation and investment in R&D on export activities for the period 2010-2016.
We start with a Probit model regarding the decision for investment in R&D activities and the decision of export activities, and vice-versa.

The innovation and investment in R&D equitation is given by the latent models

$$INNO_{ij} = C + \gamma \times EXP_{ij} + \delta \times ZNAC^{INOV}_{ij} + u_{ij}$$

$$INV_{ij} = C + \gamma \times EXP_{ij} + \delta \times ZNAC^{INOV}_{ij} + u_{ij}$$

where we have:

$INNO_{ij}$ vector of innovation activities of firm i in the sector j, (i = 1 to N_j) in sectorj (j = 1 to M),

INV_{ij} vector of investment on R&D activities firm ij, (i = 1 to N_j) in sector j (j =1 to M),

EXP_{ij} vector of export activities of firm i in the sector j,

$ZNAC^{IZV}_{ij}$ vector for characteristics of firm i in the sector j,

α , β parameters to be estimated,

C   regression constant and

u_{ij} error term is assumed to be iid N(0, σ_u).

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The innovation measure $INNO_{ij}$ and investment on R&D measure INV_{ij} cannot be observed completely. The observed models are given by the binary choice:

$$INNO^{\#}_{ij} = \begin{cases} 1 & \text{if } INNO_{ij} > 0 \\ 0 & \text{if } INNO_{ij} <= 0 \end{cases}$$

$$INV^{\#}_{ij} = \begin{cases} 1 & \text{if } INV_{ij} > 0 \\ 0 & \text{if } INV_{ij} <= 0 \end{cases}$$

formally defining an innovator and non-innovator, and separately investor on R&D and non-investor in R&D. The results of the Maximum Likelihood estimation for the period 2010-2016 are summarized in Table 5 (for the years 2010 and 2012) and in Table 6 (for the years 2014 and 2016).

For the years 2010 and 2012 the calculation (the right side of Tables) shows that no impact can be found of export behaviour on innovation activities. Therefore, the null hypothesis can be rejected. However, for the years 2014 and 2016 there is a minor impact of export behavior in firms on innovation activities (coefficient 0.3 in 2014 and 0.28 in 2016).

The calculation shows (on the left side of Tables) that export activities have a positive effect on the probability of investment in R&D behavior in firms in 2012 and 2014, but the coefficients are small (mirror impact). In the year 2010, there is a small negative coefficient (-0.025).

The calculations of the Simple Probit model do not support the hypothesis, that for the period 2010-2016 export behavior encourages innovation activities. The coefficients are almost zero (< 0.01), so we cannot find any impact.

However, the calculations do support the hypothesis, that for the period 2010-2016 the export behavior encouraged investment in R&D activities. Export behaviors have significantly positive impact on the probability of investment in R&D activities in firms in the analyzed years (probability coefficients are 44.0 in 2010, 35.8 in 2012, 33.0 in 2014, and 33.3 in 2016). These results confirmed that more the firms perform export activities, the greater is the probability that they will invest in R&D activities.

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Table 5: Simple Probit model estimates for the years 2010 and 2012, relationship between export behavior and investment intensity or innovation intensity

	2010				Year	2012			
	16 681				No. of firms	18 343			
	"EXPORTER"				Firm, that is	"EXPORTER"			
Activities:	Investment in R&D		Innovation activ.		Impact on	Investment in R&D		Innovation acti.	
	-9614.07		-288.64		Likelihood	-10369.05		-286.37	
	3614.85		614.72		LR chi2(n)*	3651.62		710.56	
	Coeffic.	p > I z I	Coeffic.	p > I z I		Coeffic.	p > I z I	Coeffic.	p > I z I
	-0.025	0.631	0.308	0.148	export intensity	0.183	0.000	0.178	0.371
Probability		44.0		< 0.01	Probability influence in %		35.8		< 0.01
Constant	-0.982	0.000	-15.293	0.000		-1.035	0.000	16.158	0.000
Labour costs per unit	-0.591	0.000	-0.383	0.167		-0.677	0.000	0.147	0.576
		0.048		0.277	st. deviation		0.049		0.263
University education	0.311	0.000	10.047	0.000		0.27	0.39	10.215	0.000
		0.057		2.255	st. deviation		0.25		2.481
Tech skills education	0.436	0.000	10.054	0.000		0.34	0.44	10.772	0.000
		0.057		2.193	st. deviation		0.23		2.412
Firm size (log)	0.840	0.000	1.730	0.000		2.56	1.52	2.034	0.000
		0.030		0.237	st. deviation		0.95		0.263
Firm size squared (log)	-0.083	0.000	-0.143	0.000		7.76	3.22	-0.174	0.000
		0.010		0.034	st. deviation		3.74		0.036

Source: own calculations

From the right sides of both Tables, we can see positive regression coefficients (around 0.3) on export intensity, but the null hypothesis can be rejected for the years 2010 and 2012.

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From the left sides of both Tables, we can see positive regression coefficients on export intensity, but only for the years 2012 and 2012 (coefficients 0.183 in 2012, and 0.187 in 2014), but the null hypothesis can be rejected for the years 2010 and 2016.

Table 6: Simple Probit model estimates for the years 2014 and 2016, relationship between export behaviour and investment intensity or innovation intensity

	2014				Year	2016			
	19 823				No. of firms	18 874			
	"EXPORTER"				Firm, that is	"EXPORTER"			
Activities:	Investment in R&D		Innovation activ.		Impact on	Investment in R&D		Innovation activ.	
	-10170.02		-346.12		Likelihood	-9985.01		-7308.74	
	4945.26		913.98		LR chi2(n)*	4697.92		1883.29	
	Coeffic.	p > I z I	Coeffic.	p > I z I		Coeffic.	p > I z I	Coeffic.	p > I z I
	0.145	0.000	0.298	0.073	export intensity	0.038	0.344	0.276	0.093
Probability		33.0		-	Probability influence in %		33.3		-
Constant	-1.287	0.000	-0.832	0.000		-1.319	0.000	-0.832	0.000
Labour costs per unit	-0.730	0.000	-0.033	0.893		-0.687	0.000	-0.193	0.456
		0.047		0.242	st. deviation		0.047		0.259
University education	0.305	0.000	5.055	0.000		0.400	0.000	3.592	0.002
		0.063		1.396	st. deviation		0.066		1.140
Tech skills education	0.385	0.000	5.723	0.000		0.454	0.065	4.656	0.000
		0.062		1.328	st. deviation		0.000		1.078
Firm size (log)	0.866	0.000	2.757	0.000		0.849	0.000	2.152	0.000
		0.030		0.342	st. deviation		0.030		0.241
Firm size squared (log)	-0.084	0.000	-0.295	0.000		-0.075	0.000	-0.194	0.000
		0.010		0.049	st. deviation		0.010		0.033

Source: own calculations

The estimated models show that higher costs per unit significantly decrease the probability for export activities in the analyzed years in both relationships. The coefficients are negative, between -0.59 and -0.73, which means that any additional labor costs per unit would strongly decrease the probability for the export activity. This is according to the theoretical assumption that any additional employee would increase the costs for labor force in firm and consequently lover the firm competitiveness, especially in foreign markets.

The regression coefficients pertained to the shares of higher education show that the higher (better) educational structure of employees in the analyzed years in both relationships encouraged export activities. They have a significantly positive impact: the coefficient for the share of employees with technical education is between 0.38 and 0.44, and for the share with university education is between 0.27 and 0.40. This means that each additional unit of the educational structure in the analyzed years in both relationships increased the probability of the firm's innovations or investments in R&D. So higher average education increases the probability for innovation and investments in R&D activities.

The regression coefficients for the size of the firm slightly encouraged export activities in the analyzed years in both relationships. They have a significantly positive impact, and the coefficients are around 0.85. This means that any additional increase in the size of the firm in the analyzed years in both relationships increased the probability of the firm's innovation and investments in R&D activities, or the larger the company was, the more likely was to perform innovation and investments in R&D activities.

7   Econometric Results with a Simultaneous Probit model

In the second step, we generalized the model and used Simultaneous Probit model (Maddala, 1999) with the two equations (continuous functions). The export equitation is given for both innovation and investments in R&D by the latent models in the first and the second EXP_{ij} equations. We used innovation and investments in R&D activities as endogenous variables in the third $INNO_{ij}$ and fourth INV_{ij} equations:

$$EXP_{ij} = C + \alpha \times INNO_{ij} + \beta \times CFIRM^{IZV}_{ij} + u_{ij}$$

$$EXP_{ij} = C + \gamma \times INV_{ij} + \delta \times CFIRM^{IZV}_{ij} + v_{ij}$$

$$INNO_{ij} = C + \varepsilon \times EXP_{ij} + \theta \times CFIRM^{INOV}_{ij} + z_{ij}$$

$$INV_{ij} = C + \eta \times EXP_{ij} + \rho \times CFIRM^{INOV}_{ij} + w_{ij}$$

where we have:

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EXP_{ij}	vector of export activities of firms i (i = 1 to N_j) in the sector j (j = 1 to M),
$INNO_{ij}$	vector of innovation activities of firm i in the sector j
INV_{ij}	vector of investment on R&D activities of firm i in the sector j,
$CFIRM^{IZV}_{ij}$	vector for characteristics of firm i in the sector j,
α , β, γ, δ	parameters to be estimated,
ε , θ, η, ρ	parameters to be estimated,
C	regression constant and
u_{ij}, v_{ij}, z_{ij}, w_{ij}	error term is assumed to be iid $N(0, \sigma_u)$.

The variables we used for measuring export activities, innovation and investments in R&D intensities could not be delt completely because all the firms do not perform export and innovation activities and the activities of the R&D. So in the model we chose (binary) variables $EXP^{\#}_{ij}$, $INNO^{\#}_{ij}$ and $INV^{\#}_{ij}$ so that it is:

$$EXP^{\#}_{ij} = \begin{array}{l} 1 \ \ if \ \ EXP_{ij} \ > \ 0 \\ 0 \ \ if \ \ EXP_{ij} \ <= 0 \end{array}$$

$$INNO^{\#}_{ij} = \begin{array}{l} 1 \ \ if \ \ INNO_{ij} \ > \ 0 \\ 0 \ \ if \ \ INNO_{ij} \ <= 0 \end{array}$$

$$INV^{\#}_{ij} = \begin{array}{l} 1 \ \ if \ \ INV_{ij} \ > \ 0 \\ 0 \ \ if \ \ INV_{ij} \ <= 0 \end{array}$$

With this we formally defined beside "exporters" also "non-exporters", beside "innovators" also "non-innovators" and beside "firms who invests in firms R&D" also "firms who do not invest in firms R&D". This way enables us to use the Simultaneous Probit model (in the second step).

Again, we use three different models to analyze mutual relationships on combined database for all four measured periods. Combined database includes (combines) data from all four separated databases from each year, as example combined database for the period 2002-2008 have all data for the years 2002, 2004, 2006, and 2008.

Note that not all firms have been in the database for all four years - some of them can be in the database just for a single year or two, and some of them can be in the database for all four analyzed years: 2002, 2004, 2006, and 2008 database or in 2010, 2012, 2014, and 2016 database. Note also that firms from the databases 2002-2008 are in no relations to firms from the databases 2008-2016, as explained in the section "Empirical model".

The two-step results are summarized in Tables 7, 8 and 9. Table 7 shows the relation between export and innovation activities for the years in the period 2002-2008, Table 8

the same relation for the years in the period 2010-2016, and Table 9 for the relation between export activities and investment in in R&D activities for the years in the periods 2010- 2016.

The left part of Tables presents the relations of innovation/ investment in R&D activities with export behavior, and on the right part the opposite relations.

a. relation between innovation and export activities for the analyzed years in the period 2002-2008

The Simultaneous Probit model supports the hypothesis (see Table 7, the left side), that the innovation activities encourage export behavior. Innovation intensity has significantly positive impact on export activities (coefficient 1.95): any additional unit of innovation activity in all four analyzed years in the period 2002-2008 would substantially increase probability for the export activity.

The model results for the analyzed years in the period 2002-2008 (see Table 7, the right side) cannot support the hypothesis that the export behavior encourages innovation activities, and the null hypothesis can be rejected.

Table 7: Simultaneous "Probit" model estimates for the relationship between export behavior and innovation activities for the years in the period 2002-2008 year

model:	"exporters"			"innovators"		
Variables	coeff.	standard Error	p > I z I	coeff.	standard error	p > I z I
Export intensity				-0.337	0.525	0.521
Innovation intensity	1.947	0.741	0.009			
Labour costs per unit	-3.973	0.774	0.000	-0.314	0.246	0.202
Tech skills education				1.778	0.502	0.000
University education				1.691	0.486	0.001
Firm size (log)	1.091	0.510	0.032	1.254	0.267	0.000
Firm size squared (log)	-0.082	0.072	0.254	-0.113	0.039	0.003
Constant	-2.633	0.903	0.004	-4.848	0.551	0.000
Likelihood	-62.843			-318.629		
N	244			2,046		
LR chi²(5)	78.50			94.84		

Source: own calculations

The results show that higher costs per unit significantly decrease the probability for export activities for all four analyzed years in the period 2002-2008. The regression

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coefficients are negative (the coefficient -3.97 is very high on the left side, and -0.31 on the right side of Table 7), that means that any additional unit of labor costs per unit would decrease the probability for the export activity quite strongly.

The shares of higher education confirmed the impact only for the exporters innovators (on the right side of Table 7). The regression coefficients show that the higher (better) educational structure of employees in all analyzed years from 2002 to 2008 encouraged innovation activities. They have a clear positive impact as the regression coefficient for the share of employees with technical education is 1.78, and for the share with university education is 1.70. This means that each additional unit of the educational structure in all analyzed years from 2002 to 2008 increased the probability for the firm`s innovation activities or for the firm's export activities. The higher average education increases the probability for export and for innovation behavior.

The size of the firm slightly encouraged innovation (the left side of Table 12) and export activities (the right side of Table 12) in all analyzed years from 2002 to 2008. The regression coefficients (1.09 and 1.25) have a significantly positive impact. This means that any additional increase in the size of the firm in all analyzed years from 2002 to 2008 increased the probability of the firm's innovation and export activities or larger than the company was, the more likely was that it would be an innovator/exporter.

b. The relation between export and innovation activities for the analyzed years in the period 2010-2016

The results of the Simultaneous Probit model support the hypothesis (see Table 83, the left side) that the innovation activities encourage export behavior. For all analyzed years, the results show that innovation activities in firms have a positive effect on export activities in firms. The more the firms invest in innovation behavior, the greater is the probability influence (i.e., 22.1%) that they will perform export activities.

The model results for the four analyzed years in the period 2010-2016support the hypothesis (see Table 8, the right side) that the export behavior encourages innovation activities. The results show that export activities in firms have a significantly positive effect on innovation activities in firms. However, the model as a whole indicates very low probability influence (<0.001%).

Table 8: Simultaneous "Probit" model estimates for the years in the period 2010-2016. The relationship between export behaviour and innovation activities

model:	"exporters"			"innovators"		
Variables	coeff.	Standard Error	variables	coeff.	standard Error	p > I z I
Export intensity				0.256	0.088	0.004
Innovation intensity	0.771	0.193	0.000			
Labour costs per unit	-0.716	0.024	0.000	-0.075	0.128	0.557
Tech skills education	0.255	0.034	0.000	5.848	0.770	0.000
University education	0.560	0.033	0.000	6.379	0.738	0.000
Firm size (log)	0.467	0.014	0.000	1.965	0.120	0.000
Firm size squared (log)	-0.035	0.004	0.000	-1.778	0.017	0.000
Constant	-1.417	0.033	0.000	-11.735	0.784	0.000
Probability influence in %	22.1			< 0.001		
Likelihood	36,141.43			1,299.96		
N	73,721			73,721		
LR chi^2(5)	8386.02			3078.96		

Source: own calculations

Innovation intensity has significantly positive impact on export activities (coefficient 0.77). This means that any additional unit of innovation activity in all four analyzed years in the period 2010-2016 increased the probability of the export activity. Higher labor costs per unit significantly decrease the probability for export activities for all 4 analyzed years in the period 2010-2016. The regression coefficient is negative (coefficient -0.72 on the left side) that means that any additional labour costs per unit would decrease the probability for the export activity.

The higher shares of higher education and the higher (better) educational structure of employees in all analyzed years from 2010 to 2016 encouraged innovation and export activities. They have a significantly positive impact. The regression coefficient for the share of employees with technical education on innovation is 5.85, which is quite high, on export activities is 0.26, and for the share with

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university education on innovation is 6.38 (higher than that with technical education) and on export activities is 0.56. This means that each additional unit of the educational structure in all analyzed years from 2010 to 2016 increased the probability of the firm's innovation/export activities. The higher average education increases the probability for innovation/export behavior. The size of the firm encouraged innovation (the left side in Table 8) and export activities (the right side of the same table) in all analyzed years from 2010 to 2016. They have a significantly positive impact, and the regression coefficients are 0.47 and 1.97, respectively. This means that any additional increase in the size of the firm in all analyzed years from 2010 to 2016 increased the probability of the firm's innovation and export activities or larger than the firm was, the more likely it is that it will be an innovator/exporter.

c. The relation between export activities and investment in R&D activities for the analyzed years in the period 2010-2016

The Simultaneous Probit model supports the hypothesis (see Table 9, the left side) that the investment in R&D activities encourages export behavior. For all analyzed years from 2010 to 2016 the regression coefficients show that investment in R&D activities in firms have a positive effect on export activities. The more the firms invest in R&D behavior, the greater is the probability that they will perform export activities: the probability influence is estimated at 22.4%.

The estimated model for all four analyzed years in the period 2010-2016 supports the hypothesis (see Table 9, the right side) that the export behavior encourages investment in R&D activities. For all analyzed years, the regression coefficients show that export behavior in firms has a positive effect on investment in R&D activities. The more the firms export, the greater is the probability that they will perform investment in R&D activities: the probability influence is estimate at 36.1%.

Investment intensity in R&D activities has a significantly positive impact on export activities (coefficient 0.55). This means that any additional unit of investment intensity in R&D activities in all four analysed years in the period 2010-2016 increased the probability of the export activity.

The regression model for all four analyzed years in the period 2010-2016 cannot support the hypothesis (see Table 9, the right side) that the export intensity behavior encourages the investment in R&D activities. The regression coefficient (0.07) indicates that the export intensity activities in firms have very small and negative effect on investment in R&D activities.

The estimated model suggests that higher labor costs per unit significantly decrease the probability for export activities for all four analyzed years in the period 2010-

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2016. The regression coefficients are negative (-0.71 on the left side and -0.70 on the right side of Table 14) that means that any additional unit of labour costs per unit decreased the probability for the export activity.

Table 9: Simultaneous "Probit" model estimates for the years in the period 2010-2016. The relationship between export behaviour and investment in R&D activities

model:	"exporters"			"investors in R&D"		
Variables	coeff.	standard error	p > I z I	coeff.	standard Error	p > I z I
Export intensity				-0.073	0.525	0.521
Investment intensity	0.550	0.071	0.000			
Labour costs per unit	-0.714	0.024	0.000	-0.700	0.023	0.000
Tech skills education	0.256	0.034	0.000	0.307	0.030	0.000
University education	0.566	0.033	0.000	0.385	0.030	0.000
Firm size (log)	0.463	0.014	0.000	0.823	0.015	0.000
Firm size squared (log)	-0.034	0.004	0.000	-0.078	0.005	0.000
Constant	-1.432	0.033	0.000	-1.130	0.029	0.000
Probability influence in %	22.4			36.1		
Likelihood	36,121.05			-40,397.17		
N	73,721			73,721		
LR chi²(5)	8,426.79			16,801.48		

Source: own calculations

The higher shares of higher education and the higher (better) educational structure of employees in all analyzed years from 2010 to 2016 encouraged investment in R&D activities and export activities. They have a significantly positive impact. The coefficient for the share of employees with technical education on investment in R&D activities is 0.31 and on export activities is 0.26 and in the share with university education on investment in R&D activities is 0.39 (higher that with technical education) and on export activities is 0.57. This means that each additional unit of the educational structure in all analyzed years from 2010 to 2016 increased the probability of the firm's

investment in R&D / export activities. The higher average education increased the probability for investment in R&D activities / export behavior.

The size of the firm encouraged investment in R&D activities (the left side in Table 9) and export activities (the right side of the same table) in all analyzed years from 2010 to 2016. They have a significantly positive impact: the regression coefficients are 0.82 and 0.46, respectively. This means that any additional increase in the size of the firm in all analyzed years from 2010 to 2016 increased the probability of the firm's investment in R&D activities and export activities or the larger the company was the more likely was to conduct an investment in R&D activities/export behavior.

8   Conclusion

Through the economic history, the importance of services and trade in services has grown rapidly. Classical economists have defined services as products or results of work, which disappear in the moment the work is accomplished, which is still valid that services differ from production and trade of goods. Service activities are taking more important role in the international economic development. Their share in GDP of developed countries is constantly increasing in the last two decades. Trade of services runs in different ways compared to trade of goods/products. Producer of any product, which is not made-to-order, never knows who the end user/consumer is, and where in the world the final product is used/spent/consumed. The difference between activity of service and its final result or accomplished service means change of state compared to originally one, because original state cannot be regained.

For international trade of services international free flows of elements, which are connected to services such as objects, capital, information flows or people, are needed. Not all these free flows have been enabled evenly by international agreements yet. Consequently, the free trade of services does not exist until completely free trade of labor force, capital and information exists. Because of these limitations services belonged to so called third class (tertiary) sector till the middle of 20th century. Their activities could not be classified among production or agricultural activities. Each of services was treated separately (discretely) and classified using different criteria.

According to the final location of trade, there is a difference in trade of goods/products, which can be physically touched, and trade of services, which are intangible. The following thirteen characteristics of services have been defined: intangibility and immateriality; invisibility; perishability; temporary existence, sensitivity on time; non storability; inseparability; lack of inventory; sensibility of quality control; high degree of risk and difficulty in experimentation; customization requirements; different distribution channels; and no rivalry. Rapid development of services accelerated the productivity of production activities with innovation and other high-tech services.

Through a two-step research that was conducted based on the Simple Probit model as a first step and the Simultaneous Probit model as a second step, the relations between exports, investments in development and innovation activities in the selected business non-financial services sectors in two periods (2002-2008 and 2010-2016) was examined.

The results of the Simple Probit model suggest that the innovation activities encourage export behavior. Innovation activities have clear, positive impact on export activities. It was established that higher costs per unit cause significant decrease of probability for export activities in all analyzed years and any additional labor costs per unit would decrease the probability for the export activity. On the other hand, any additional employee per unit would increase the probability for the export activity. The results show that the higher (better) educational structure of employees encourage export activities. Each additional unit of the educational structure in the analyzed years increased the probability of the firm's export activity. Therefore, higher average education increases the probability for export behavior.

The estimated Simple Probit models also support the hypothesis that the innovation and investment in R&D activities encourage export behavior. Innovation as well as investments in R&D activities have significantly positive impact on probability of export activities in firms. The more the firms invest in R&D, the greater the probability that they will perform export activities. The probability has increased permanently, except in 2016. The probability almost tripled from 2010 to 2016.

The size of the firm slightly encouraged export activities in the analyzed years and the relationships. Any additional increases in the size of the firm increased the probability of the firm's export activity or larger than the firm was, the more likely it is that it will be an exporter.

The Simultaneous Probit model supports the hypothesis that the innovation activities encourage export behavior. Innovation intensity has significantly positive impact on export activities and any additional unit of innovation activity in the period 2002-2008 would substantially increase probability for the export activity. The model results for the period 2002-2008 do not support the hypothesis that the export behavior encourages innovation activities.

The shares of higher education confirmed the impact only for the exporters innovators. The higher (better) educational structure of employees in all analyzed years from 2002 to 2008 encouraged innovation activities. Each additional unit of the educational structure increased the probability for the firm`s innovation activities or for the firm's export activities. The higher average education increases the probability for export and for innovation behavior. The higher shares of higher education and the higher (better) educational structure of employees in all analyzed years from 2010 to 2016 encouraged

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innovation and export activities. They have a significantly positive impact. Each additional unit of the educational structure in all analyzed years from 2010 to 2016 increased the probability of the firm's innovation/export activities. The higher average education increases the probability for innovation/export behavior.

The size of the firm slightly encouraged innovation and export activities in all analyzed years from 2002 to 2008. Any additional increase in the size of the firm in increased the probability of the firm's innovation and export activities or larger than the company was, the more likely was that it would be an innovator/exporter.

The results of the Simultaneous Probit model also support the hypothesis that the innovation activities encourage export behavior. For all analyzed years, the results show that innovation activities in firms have a positive effect on export activities in firms. The more the firms invest in innovation behavior, the greater is the probability influence that they will perform export activities.

The model results for the four analyzed years in the period 2010-2016 support the hypothesis that the export behavior encourages innovation activities. The results show that export activities in firms have a significantly positive effect on innovation activities in firms. However, the model as a whole indicates very low probability influence.

The size of the firm encouraged innovation and export activities as well in all analyzed years from 2010 to 2016. Any additional increase in the size of the firm in all analyzed years from 2010 to 2016 increased the probability of the firm's innovation and export activities or larger than the firm was, the more likely it is that it will be an innovator/exporter.

Further, the Simultaneous Probit model supports the hypothesis that the investment in R&D activities encourages export behavior. In all analyzed years from 2010 to 2016 we found that investment in R&D activities in firms have a positive effect on export activities. The more the firms invest in R&D behavior, the greater is the probability that they will perform export activities. Also, the estimated model for all four analyzed years in the period 2010-2016 support the hypothesis that the export behavior encourages investment in R&D activities. The more the firms export, the greater is the probability that they will perform investment in R&D activities.

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The Role of Strategic Alliances in Inter-organizational Learning in International Business

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Abstract The paper studies strategic alliances and their role in inter-organizational learning in international firms. The importance of strategic alliances in global economy has increased. Strategic drivers for interfirm cooperation between alliance partners are market growth, cost reduction, reducing risk, and access to knowledge. The author focuses on inter-organizational interaction among alliance partners, which is motivated by the desire to gain access to new knowledge and transfer existing knowledge between partners. Alliances are a powerful means of enhancing organizational learning and knowledge-based capability. The challenges of integrating knowledge intensive activities in international strategic alliances are also discussed. Integrating those activities between international firms is more difficult due to alliance partners' differences in national, organizational, and professional culture. International strategic alliances are critically important to firm success by facilitating knowledge integration..

Ključne besede: • strategic alliances • inter-organizational learning • international business

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1 Introduction

Alliances are a complex organizational phenomenon. Utilized across a broad range of contexts, alliances can involve a wide variety of configurations of partners, involve the pursuit of a multitude of specific goals, and exhibit various levels of commitment and investment from partners. Strategic alliances have emerged in recent years as common and important structural vehicles for business development (Albers et al., 2016). Strategic alliances are purposive relationships between firms that share compatible goals and strive for mutual benefits (Ireland et al., 2002; Mohr and Spekman, 1994).

To understand why strategic alliances occur or are preferred as a modality in business transactions, it is necessary to distinguish between two main choices of firms in business dealings with other parties. These choices are markets or hierarchies (Williamson, 1985). Market transactions refer to a firm's free choice of trading partners based on the evaluations of costs and benefits of its partner each time. Accordingly, the firm chooses its business counterparts without any long-time commitments and restrictions. Hierarchies mean organizational structures established to control production and distribution activities in-house, rather than dealing with other parties to reduce the risk and uncertainties involved in business transactions. Between these two opposing business modalities, strategic alliances are viewed as quasi-hierarchies or hybrid arrangements (Contractor and Lorange, 1988).

From the standpoint of the number of participants, strategic alliances can be distinguished as dyadic relationships where only two parties are involved or as multiple relationships involving three or more. From the standpoint of resource commitment, firms can allocate either some equity or no equity at all, but they still apportion some of their resources to the alliance and share some of their capabilities with their partners. (Culpan, 2009).

The strategic drivers for interfirm cooperation, manifested in a variety of alliance arrangements fall into four broad categories of motives (Contractor and Reuer, 2014):
1. market growth or revenue enhancement as a consequence of the cooperation;
2. efficiency or cost reduction;
3. sharing or reducing risk; and
4. access to knowledge or learning.

The predominant method of distinguishing alliances is based on their legal foundation - contracts and equity investments - often denoted as the alliance's "governance structure" (Contractor and Lorange, 1988; Das and Teng, 2001; Gulati, 1998; Yoshino and Rangan, 1995). There are three common sets of criteria for distinguishing types of alliances:
- Activity-domain-based classifications of alliances focus on differences in the tasks partners pursue jointly, such as research and development, co-marketing, production, and back-office processes. Social network authors often refer to this aspect of the alliance as the tie content (Todeva and Knoke, 2005).

- Partner-characteristics-based classifications focus on traits of the individual organizations involved in the alliance, such as their industry affiliation, or relative position in the value chain of their industry - distinguishing horizontal, vertical, and lateral alliances (Baum et.al, 2000); their geographic location - distinguishing domestic and international, or proximate and distant alliances, (Sorenson and Stuart, 2001); and partners' institutional context - identifying unique properties of public-private partnerships (Rufin and Rivera-Santos, 2012).
- Alliance-structure-based classifications focus on how the relationships among partners are organized and managed. Numerous proposals have been advanced for classifying alliance governance structures (Child and Faulkner, 1998; Yoshino and Rangan, 1995), but some consensus has emerged for basing structural distinctions on the legal basis of the alliance - either entirely informal relationships (Kreiner and Schultz, 1993), formal contractual agreements (Reuer and Ariño, 2007), deals involving minority equity investments in partner organizations (Gulati and Singh, 1998), or partnerships involving the formation of an equity joint venture (Das and Teng, 2001; Lyons, 1991).

An alliance is an inter-organizational embrace between two or more organizations that remain distinct, except that they cooperate for a specific joint purpose. Each partner's strategic goals amount to:

1. maximizing the joint net value or net benefits resulting from the cooperation (Zajac and Olsen, 1993; Colombo, 2003);
2. appropriation of a goodly share of the net benefits created (Gulati and Singh, 1998); and
3. minimizing each partner's own costs and risk.

Appropriation of the benefits from an alliance can take several forms. It can involve financial gains such as profits and equity growth on the shares held in an equity-based joint venture or royalties earned on technology licenses (Contractor et al, 2011). Alliance benefits could also accrue from earning profit mark-ups on outsourced components or products traded between the allies in supply chain partnerships (Wathne and Heide, 2004; Kaufman et al., 2000; Jeffries and Reed, 2000). Alternatively, the benefit each partner derives from an alliance may be nonfinancial, but no less important, such as learning valuable process techniques or other knowledge from the alliance partner.

Knowledge is a key resource that contributes to corporate renewal and competitive advantage. In particular, international acquisitions are often motivated by the desire to gain access to new knowledge and transfer existing knowledge between the acquiring and the acquired firms (Björkman et al., 2007; Bresman et al., 1999; Empson, 2001; Ranft and Lord, 2002).

Multinational enterprises will increasingly need to form alliances in order to have the resources to be truly globally competitive; yet the inappropriate choice of an alliance

partner could turn out to be even more costly and risky than trying to cope alone (Brouthers et al, 1995). International alliances are critically important to firm success (Glaister and Buckley, 1999). Serving as a conduit through which knowledge flows between firms (Madhavan et al., 1998) is one way how strategic alliances facilitate knowledge integration.

Interfirm collaboration has become a vital aspect of national and international strategy and operations. Williamson's Transaction Cost Economics acknowledged the existence of 'hybrids', such as joint ventures and strategic alliances, existing somewhere between markets and hierarchies (Pitelis and Teece, 2018).

2 Inter-organizational interaction among alliance partners

Although interfirm collaboration is not new in business, the unique features of today's strategic business alliances include their utilization in large scales and scopes and for an enduring period as a strategic tool to gain or sustain competitive advantages for companies (Culpan, 2009).

Contractor et al. (2011) seek to uncover what factors influence the degree of inter-organizational interaction among alliance partners and what the optimal level of this interaction should be. Some degree of interfirm interaction is always necessary, yet they argue that there exists a curvilinear correlation in this relationship. There are obviously multiple costs of interaction (i.e., coordination, information leakage, risk partner opportunism, etc.), as well as costs of lack of interaction (i.e., miscommunication, lost opportunities, transaction costs, etc.).

Alliance interaction is conceptually interesting due to its virtually intangible, yet critical dimension of the alliance tie. Contractor et al. (2011) draw on transaction cost theory and the knowledge-based and resource-based views of the firm to explore the optimal level of inter-organizational interaction as a function of four dimensions: technology characteristics, coordination costs and risks, agreement provisions, and firm and industrial sector features.

Inter-organizational relations are structurally interesting because they form organizational networks that allow us to assess how dense networks are, who the brokers in the network are, the different subgroupings in the network, and where firms are positioned in a given network (Baum and Rowley, 2008; Kilduff and Tsai, 2003). Das and Teng (2002) argue that all alliances proceed through a formation stage, an operation stage, and an outcome stage. During the formation stage, the alliance partners seek to negotiate the alliance and begin implementing the agreement that they have entered. The formation stage is marked by the calculated expectation that the alliance partners will not experience inordinate degrees of relational risk and performance risk (Das and Teng, 1996) as well as inefficiency and inequity (Ring and Van de Ven, 1994).

At the operation stage, the alliance partners implement the contractually binding commitments they have made. Implementing the agreements may be either a smooth or a conflict-prone affair. This stage enables member firms to solidify their perceptions about their partner. It also may lead one or both member firms to engage in content learning, while simultaneously promoting alliance management learning. The success or failure of an alliance is determined at the outcome stage, where it can either be stabilized, reformed, enter a state of progressive decline, or eventually be terminated (Das and Teng, 2002). The particular outcome would depend, first, on whether the alliance has experienced a learning related discrepancy and, second, on the ability of the members to effectively cope with that discrepancy.

To understand alliance learning, we need to recognize that the different stages of alliance evolution (formation, operation, and outcome) describe unique sets of alliance conditions (Doz, 1996; Das and Teng, 2002). Alliance conditions are defined by three categories (Das and Teng, 2000):
1. collective strengths of the alliance;
2. inter-partner conflicts; and
3. interdependencies among the alliance partners.

Collective strengths define the extent of value creation by the alliance partners as they work together. This requires the willingness and the ability to learn from one's partner while also assisting the partner to learn. The alliancing firms may be able to maximize value creation through their interactions. The greater the difference in the absorptive capacities of the member firms, the lower would be the collective strengths of the alliance (Das and Kumar, 2007). The collective strengths of an alliance are the aggregated resource endowments of partner firms in relation to the specific strategic objectives that they aim to pursue jointly. The resource-based view of the firm suggests that alliances are formed to obtain access to other firms' critical resources (Das and Teng, 2000). The purpose is to have sufficient resources to pursue value-creating strategies. Bringing complementary resources into an alliance is considered a key determinant of economic rent generated from alliances. The chances of success increase when the collective strengths of the partner firms are enhanced by combining their market power, technology, and other key resources.

The second alliance condition variable, inter-partner conflicts, refers to the degree of divergence in partners' preferences, interests, and practices in an alliance (Hardy and Phillips, 1998). Inter-partner conflicts are an important aspect of alliances because effective cooperation demands a relatively low level of conflict. Inter-partner conflicts stem from differences in strategic objectives among partner firms (Khanna et al., 1998), incompatibility in national and corporate cultures of the parent organizations (Ariño and de la Torre, 1998; Kumar and Nti, 2004; Parkhe, 1991), differing alliance horizons (Das, 2006), political activity among the alliance management team members (Pearce, 1997), and their experience in managing alliances. While there are various reasons for

inter-partner conflicts, they seem to fall into three principal categories. First, partner firms may have very different organizational routines, technologies, decision making styles, and preferences that do not fit very well (Olk, 1997). When firms are vastly different, it takes more money, time, and effort to coordinate their efforts. When firms scramble to have it their own individual way, conflicts inevitably arise. The second source of inter-partner conflicts has to do with the private interests and opportunistic behavior of partner firms, which are emphasized in transaction cost economics. Firms may have incompatible alliance goals that prompt maximizing their private benefits without advancing the common benefits of partners. Firms may also behave opportunistically to appropriate partners' tacit knowledge and know-how and deliver substandard products. The third type of inter-partner conflicts arise from outside the alliance. Partner firms may be fierce competitors in the same market, so that their separate interests may clash (Das and Teng, 2002).

Interdependencies define the extent to which the alliance members can benefit from their cooperation. The interdependencies may be either symmetric or asymmetric. When symmetric, there are benefits for both members in continuing with the alliance. In the symmetrical condition, the alliance members learn from each other in ways that are both equitable and efficient (Das and Kumar, 2007). According to the resource dependence theory, firms attempt to manage their dependence on other firms by engaging in various interfirm relationships. In any relationship, the need for another firm's resources creates a sense of dependence. Although dependence on other firms is a prerequisite for a firm to consider alliances, unidirectional dependence or asymmetrical dependence is not always sufficient for alliance formation. The extreme of asymmetrical dependence is when A depends on B while B does not at all depend on A. No alliance will be formed under this condition. Only when the partners mutually depend on each other will cooperation take place.

3   Strategic alliances in international business

Strategic alliances have become increasingly common due to globalization, deregulation, developments in information and transportation technology and the rise of new market economies. Challenging strategic decision-making processes that accompany alliances become much more complex in a global context with vastly different and varying environmental factors at play. A key question in strategy formulation is to identify the nature of value creation as embedded in various locations. But it is more than geography that matters; locations are infused with values, institutions, and practices that form the infrastructure in which assembly decisions are embedded (Dacin, 2011).

When firms decide to go international for various strategic objectives, they might choose to have full managerial control and acquire a firm or develop a new wholly owned subsidiary, but alternatively they might engage in different degrees of

cooperation with other firms (Kogut and Singh, 1988). Generally, firms get involved in inter-organizational relationships abroad to minimize firm costs, create discriminating alignment between host country uncertainties and firm control, and learn from its partners (Aguilera, 2011). A wide range of inter-organizational relationships falls on the global market to multinational hierarchy spectrum, ranging from supplier relationships (Dyer and Chu, 2000) to multinational business groups (Colpan et al., 2010).

Global strategic alliances are defined as the relatively enduring interfirm cooperative arrangements, involving cross-border flows and linkages that utilize resources and governance structures from autonomous organizations headquartered in two or more countries, for the joint accomplishment of individual goals linked to the corporate mission of each sponsoring firm (Parkhe, 1991). The global business environment is changing in several respects that favor contractual alliances over the equity joint ventures alternative. As an overall trend, worldwide enforcement of intellectual property laws grows better each year. Expropriation hazards have significantly diminished over the past 20 years, and arbitration clauses better protect the value of foreign assets (Contractor and Reuer, 2014). Another quiet trend that marginally promotes the transferability of knowledge in organizationally more distant contractual alliances is the increasing codification of unregistered corporate capability (Contractor and Lorange, 2002). Global supply chain alliances that would have been considered too risky or unmanageable due to foreign exchange, political risks, and international logistics risks are now possible because of better operations research methodologies (Ding et al., 2007).

To develop and exploit a competitive advantage, firms must possess resources that can be used to create inimitable and rare value for customers. The increasing complexity of markets, because of accelerating and rapid globalization, make it difficult for firms to have all the resources necessary to compete effectively in many markets (Ariño and de la Torre, 1998). In some settings, firms acting independently rarely have the resources needed for competitive parity, much less competitive advantage. Alliances provide access to information, resources, technology and markets. Information and technology as well as special access to a market can all be considered resources.

Strategic alliances' value-creating potential makes them an important source of competitive advantage (Das and Teng, 2001; Larsson et al., 1998). The firm that can effectively cope with environmental uncertainty and ambiguity, proactively reposition in competitive markets, and minimize transaction costs through strategic alliances increases the probability of maintaining competitive advantages.

The motives to form strategic alliances revolve around expectations to gain production efficiencies and the resultant lower costs; to expedite access to technology, markets, and customers; to promote organizational learning; to expand strategic competencies; and to stay competitive. These and other motives represent the bright side of alliances.

According to Brouthers et al. (1995), strategic alliances should be utilized when:
- complementary skills are offered by the partners;
- cooperative cultures exist between the firms;
- the firms have compatible goals; and
- commensurate levels of risk are involved.

Complementary skills make an important contribution to the success of a strategic alliance. The first step in finding a partner with complementary skills is to conduct a comprehensive search. Partner selection based solely on the size of the financial contribution to the alliance is risky. The basis of review should include an examination of skills, technologies, and markets.

The first key to creating cooperative cultures is the concept of symmetry. Strategic alliances work better when there is only a small difference in the size of both firms. Similarly, financial resources and the internal working environment of firms should be comparable. Alliance partners should possess a mutual sense of trust. Symmetry must also exist at the top level of management in form of peer relationships between the top executives of alliance partners. These relationships are especially important in alliances that are dissimilar in size. Cooperative alliance cultures can become especially difficult to maintain between firms originating in different countries.

The alliance is more likely to fail if it does not advance both firms' strategic goals. Each company should evaluate the general goals the strategic alliance has for each partner. Firms involved in alliances must have goals that support each other, not compete with each other. Competitive goals are counterproductive and result in alliance failure. Goals that are complementary help the firms involved achieve success.

Strategic alliances must be structured to distribute risks between partners. The fact that successful alliances must share risks, also means that this sharing and equality of risks must be maintained.

To increase a firm's chance to form a successful international strategic alliance its management must be aware of (Brouthers et al. 1995):
1. Complementary Skills: Alliances should be formed only with firms that can contribute to the strength of the venture. The skills, experience, and know-how must be specific and applicable to the products or services being offered. Managers should choose to form alliances only with firms that fulfil a specific need. Without the addition of new skills, there is little need for the firms to work together.
2. Cooperative Cultures: Management must be cognizant of the importance of cooperation in successful international strategic alliances. Management of one firm should not take the 'lead' role and teach the other alliance partners all they know but learn nothing themselves. Cooperation is a two-way street and management

must look for opportunities to learn from alliance partners. Management must also be careful that employees involved in the alliance are sensitive to any existing cultural differences.

3. Compatible Goals: Prior to forming an alliance, management must be sure their participation is based on their firm's goals, and not just a convenient, spur-of-the-moment decision. Management must have goals for both the alliance and the firm as a whole. Strategic objectives should be fulfilled through the alliance that could not have been achieved without the international strategic alliance. Conflicting goals of partner firms may result in poor performance of the alliance itself or restrict the results of the alliance so only one alliance partner benefits.

4. Commensurate Levels of Risk: Management should consider the risks involved. Management must not enter alliances in which they may be called on to contribute more money than the firm can comfortably afford, either at the outset or in the future. In addition, management must be careful: not all knowledge, experience, and know-how is contained in the alliance, and the partner firms must keep non-alliance information out of the hands of alliance partners. In many instances, alliances are formed to reduce risks, but while reducing some risks, such as political exposure, alliances also create their own set of risks. Giving away corporate competencies, or finding that financial pressures increase because of partner problems, are two major risk areas.

Strategic alliances are known to be risky. Unless there is a real resources shortage, be it skills, technology, or finance, strategic alliances should be avoided. If shortages exist then the company should look for complementary skills, cooperative cultures, compatible goals, and commensurate risk levels (Brouthers et al, 1995). Alliances can share both financial and competitive risks, thereby reducing the overall level of risk of each. If there is nothing at risk, the incentive to stay together is reduced. Thus, strategic alliances must provide for a clear distribution of risks. The company must not view the initial investment as the only risk. To be successful, each firm in the partnership must have equivalent levels of risk within the alliance.

Many alliance studies point to high failure rates (Kale et al., 2002), to high transaction costs involved in negotiating and monitoring alliance deals (Argyres and Mayer, 2007), and to problematic uncertainties related to the appropriation of alliance benefits (Park and Ungson, 2001). Studies have shown that between 30% and 70% of alliances fail; meaning, they neither meet the goals of their parent companies nor deliver on the operational or strategic benefits they purport to provide (Bamford et al., 2004). Alliance termination rates are reportedly over 50% (Lunnan and Haugland, 2008), and in many cases forming such relationships have resulted in shareholder value destruction for the companies that engage in them (Kale et al., 2002).

This creates a paradox for firms. On the one hand, companies face significant obstacles in ensuring sufficient success with alliances. On the other hand, they need to form a

greater number of alliances than before and must increasingly rely on them as a means of enhancing their competitiveness and growth. If this is indeed the case, managers need a better understanding of what really underlies alliance success. The cost of failure can be substantial. Several factors, including the inherent conflict resulting from goal divergence, partner opportunism and cultural differences contribute to alliance failure (Doz, 1996; Kale et al., 2000).

Alliance conditions are the characteristics of an alliance at any given moment in the life of the alliance. Das and Teng (2002) propose three variables that systematically capture the key aspects of alliance conditions: collective strengths (positive effects of alliances), interpartner conflicts (negative effects of alliances), and interdependencies (the need for alliances).

The collective strengths of an alliance are the aggregated resource endowments of partner firms in relation to the specific strategic objectives that they aim to pursue jointly. The resource-based view of the firm suggests that alliances are formed to obtain access to other firms' critical resources (Das and Teng, 2000). The purpose is to have sufficient resources to pursue value-creating strategies. Bringing complementary resources into an alliance is considered a key determinant of economic rent generated from alliances. The chances of success increase when the collective strengths of the partner firms are enhanced by combining their market power, technology, and other key resources. Interpartner conflicts refer to the degree of divergence in partners' preferences, interests, and practices in an alliance (Hardy and Phillips, 1998). Interpartner conflicts are an important aspect of alliances because effective cooperation demands a relatively low level of conflict. Interdependencies refer to a condition in which both parties benefit from dealing with each other (Levine and White, 1961). Although dependence on other firms is a prerequisite for a firm to consider alliances, unidirectional dependence or asymmetrical dependence is not always sufficient for alliance formation. Only when the partners mutually depend on each other will cooperation take place.

4   Knowledge integration through strategic alliances

Alliances are a powerful means of enhancing organizational learning, technological leadership and knowledge-based capability. Close interaction between partners can complement internal development and allow faster access to new technologies located beyond the boundaries and abilities of an individual firm (Hipkin and Naudé, 2006).

Resource-based view contemplates that the possession of unique and inimitable resources of a firm leads its sustainable competitive advantage; therefore, it is important for the firm to exploit such resources fully and build a resource-base (Culpan, 2009). To acquire and develop such resources, in addition to developing their own resources, firms can build strategic alliances with others who have such complementary resources and

knowledge. Several authors used resource-based view when analyzing strategic alliances (Park et al., 2004; Mesquita et al.,2008).

Knowledge-based view emphasizes knowledge creation and sharing through strategic alliances. Several studies of strategic alliances have identified the sharing of knowledge (including technology, know-how and organizational capability) as their dominant objective (Ciborra, 1991; Dyer and Nobeoka, 2000; Inkpen and Crossan, 1995; Kale et al., 2000; Khanna et al., 1998; Larsson et al., 1998; Lyles, 1988; Mody, 1993; Mowery et al., 1998; Simonin, 1999). Among these studies, the great majority have adopted an organizational learning perspective: assuming that the goal of strategic alliances is to acquire the knowledge of alliance partners.

Network organization theory, on the other hand, focuses on the relationships among multiple network members and demonstrates how the member firms benefit from exchanges among themselves (Bogatti and Foster, 2003). Findings of Rosenkopf and Padula (2008) suggest an important contingency for the endogeneity (growth from within) perspective: structural homophily (sameness) predicts shortcut formation but not alliance formation within clusters.

Muthusamy and White (2005) examined the effects of social exchange processes between alliance partners on the extent of learning and knowledge transfer in a strategic alliance. Their empirical examination results revealed that social exchanges such as reciprocal commitment, trust and mutual influence between partners are positively related to learning and knowledge transfer in strategic alliances. Grant and Baden-Fuller (2004) argued that the primary advantage of alliances over both firms and markets is in accessing rather than acquiring knowledge. Building upon the distinction between the knowledge generation (exploration) and knowledge application (exploitation), they showed that alliances contribute to the efficiency in the application of knowledge: first, by improving the efficiency with which knowledge is integrated into the production of complex goods and services, and second, by increasing the efficiency with which knowledge is utilized. These static efficiency advantages of alliances are enhanced where there is uncertainty over future knowledge requirements and where new products offer early-mover advantages.

When firms enter alliances, the changes in knowledge structures may occur at different levels, and in varying degrees. First, by gaining knowledge from the alliance, the partners may reshape their strategy and the means of implementation. Alternatively, they may create a new knowledge structure in the alliance that they may help their performance. Finally, they may also develop skills for managing alliances effectively (Das and Kumar, 2007).

Das and Kumar (2007) stress that it is important to note, first, that organizational learning is both intra-organizational as well as inter-organizational, and that an adequate

framework of learning dynamics would need to encompass the interrelationships between these different levels (Argote et al., 2003; Holmqvist, 2003). Intra-organizational learning is a multilevel process that simultaneously and collectively involves the individual, the group, and the organization. Inter-organizational learning is dependent on the learning strategies pursued by the different organizations. Integrative learning strategies will lead to collective knowledge development whereas distributive learning strategies may prevent that from occurring. Second, learning intent does not imply that valid learning will occur. Third, learning is a costly process because, in order to be effective, it involves a degree of institutionalization – a multilevel process necessitating the integration of individual, group, and organizational level perspectives.

Authors have identified three different kinds of learning that occur in strategic alliances (Kale et al., 2000; Parise and Henderson, 2001:
1. content learning;
2. partner-specific learning; and
3. alliance management learning.

Content learning refers to the ability of an alliance firm to acquire and internalize knowledge from its partner. This type of learning may alter the bargaining power among the member firms if one of the partners outlearns the other (Hamel, 1991; Inkpen and Beamish, 1997). The firm that outlearns its partner may apply the knowledge it has gained to other product domains, leading to superior economic performance. This will also afford the opportunity to either abandon its alliance partner or renegotiate for more favorable terms of collaboration. All this will have major strategic implications for the member firms as well as alliance evolution (Das and Kumar, 2007).

Partner-specific learning has two components: learning from a partner and learning about a partner. While learning from a partner is undoubtedly a significant issue in alliances, learning about a partner is no less important. Learning about one's partner is crucial because the motivation and ability of a member firm to act in ways that will maximize joint value creation are clearly of some importance in sustaining and deepening commitment in the alliance. Partner-specific learning entails the use of the alliance as a mechanism for learning about the motivation and capability of the partner to maximize value creation (Das and Kumar, 2007).

Alliance management learning relates to a firm's ability to manage alliances effectively. According to Zollo and Winter (2002) alliance management learning is a dynamic capability through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness. Alliance management learning is significant because it is an essential ingredient for enhancing an organization's long-term competitive ability (Ireland et al., 2002).

The knowledge-based literature identifies two conceptually distinct dimensions of knowledge management. First, those activities that increase an organization's stock of knowledge. Second, those activities that deploy existing knowledge to create value. In relation to strategic alliances, this distinction between knowledge generation and knowledge application corresponds to a key distinction in the ways in which knowledge is shared among alliance partners. Knowledge generation points to alliances as vehicles of learning in which each member firm uses the alliance to transfer and absorb the partner's knowledge base. Knowledge application points to a form of knowledge sharing in which each member firm accesses its partner's stock of knowledge to exploit complementarities, but with the intention of maintaining its distinctive base of specialized knowledge (Grant and Baden-Fuller, 2004).

Alliances provide a foundation for organizational learning, with each firm gaining access to the knowledge of other alliance participants (Inkpen, 2001). Knowledge is transferred through mutual interdependence, problem solving and observations of alliance activities and outcomes (Inkpen, 1996). When a firm learns from an alliance, that knowledge can be internalized and applied outside the alliance's current activities. Thus, an alliance offers an attractive opportunity to gain access to skills that would not have been acquired had the alliance not been formed (Inkpen, 2001; Khanna et al., 1998).

International alliances offer firms opportunities to draw upon knowledge and capabilities not currently controlled or available within their home country (OECD, 2000). However, international alliances also bring challenges not found within domestic alliances. Research has shown that differences in national culture can disrupt collaboration and learning between alliance partners (Lane and Beamish, 1990; Parkhe, 1991; Lyles and Salk, 1996; Hennart and Zeng, 2002).

Despite globalization, country differences persist and powerfully influence strategic decisions and outcomes (Tong et al., 2008). In recent years, the availability of improved country data has been a spur to researchers to include country-specific data and use differences between the countries of alliance partners as explanatory variables. These can include measures for the level of intellectual property protection by countries (Ginarte and Park, 1997), as well as data banks tracking each nation's institutional and cultural factors (Berry et al., 2010).

Sirmon and Lane (2004) suggest three possible sources of partners' differences: national, organizational and professional. National culture refers to deeply set values that are common to the members of a nation (Hofstede, 1991; Hill, 2012). It is a system of shared norms, values, and priorities that constitute a "design for living" for a people (Hill, 2012). The influence of national culture is strong and long lasting. Laurent (1983)

found that managers of multinational organizations retain many of their original national values despite routinely working in culturally diverse situations.

Cultural distance can be measured by the indices provided by the GLOBE (Global Leadership & Organizational Behavior Effectiveness) project (House et al., 2004). The GLOBE project has moved beyond Hofstede's (Hofstede et al., 1990) approach and has conceptualized and developed measures of nine cultural dimensions. These are aspects of a country's culture that distinguish one society from another and have important managerial implications. As opposed to Hofstede's four dimensions (uncertainty avoidance, power distance, individualism, masculinity, and long-term orientation), GLOBE scores have nine cultural dimensions: assertiveness, institutional collectivism, in-group collectivism, future orientation, gender egalitarianism, humane orientation, performance orientation, power distance, and uncertainty avoidance. GLOBE studies cultures in terms of their cultural practices (the way things are) and their cultural values (the way things should be).

Definitions of organizational culture revolve around shared group meaning (Hofstede et al., 1990; Golden, 1992; Ostroff et al., 2002). Organizational culture forms a type of social control that identifies appropriate behaviors and attitudes for organization members to display (O'Reilly and Chatman, 1996). Similarity of partners' organizational culture increases partner learning, satisfaction and effectiveness of interactions, whereas differences in organizational culture decrease these positive outcomes. Decreased learning, satisfaction and effectiveness of interactions are expected to inhibit the business processes used to share, combine, and leverage resources such as knowledge, relationships and physical assets (Sirmon and Lane, 2004).

Professional culture is another important type of culture that can affect international alliances. A professional culture exists when a group of people who are employed in a functionally similar occupation share a set of norms, values and beliefs related to that occupation. Professional cultures develop through the socialization that individuals receive during their occupational education and training (Jordan, 1990). When international alliance partners require employees from different professional cultures to interface in the primary value-creating activity of the alliance, the results are expected to be disappointing. According to Sirmon and Lane (2004) employees lack a common basis from which to interact effectively - first, individuals from separate professional cultures lack a shared set of basic knowledge because their occupational socialization involved different content material, which is reinforced by different professional experiences; second, these individuals often lack experience communicating with an audience outside their professional culture. Thus, communication between individuals from separate professional cultures is impaired.

5 Conclusions

Alliances are a complex organizational phenomenon. Utilized across a broad range of contexts, alliances can involve a wide variety of configurations of partners, involve the pursuit of a multitude of specific goals, and exhibit various levels of commitment and investment from partners. The strategic drivers for interfirm cooperation, manifested in a variety of alliance arrangements fall into four broad categories of motives: market growth or revenue enhancement as a consequence of the cooperation; efficiency or cost reduction; sharing or reducing risk; and access to knowledge or learning.

Interfirm collaboration has become a vital aspect of national and international strategy and operations. Several studies of strategic alliances have identified the sharing of knowledge (including technology, know-how and organizational capability) as their dominant objective. Alliances provide a foundation for organizational learning, with each firm gaining access to the knowledge of other alliance participants. Knowledge is transferred through mutual interdependence, problem solving and observations of alliance activities and outcomes. When a firm learns from an alliance, that knowledge can be internalized and applied outside the alliance's current activities. Thus, an alliance offers an attractive opportunity to gain access to skills that would not have been acquired had the alliance not been formed.

Three different kinds of learning occur in strategic alliances: content learning, partner-specific learning, and alliance management learning. Content learning refers to the ability of an alliance firm to acquire and internalize knowledge from its partner. Partner-specific learning has two components: learning from a partner and learning about a partner. Alliance management learning relates to a firm's ability to manage alliances effectively.

Building upon the distinction between the knowledge generation and knowledge application alliances contribute to the efficiency in the application of knowledge: first, by improving the efficiency with which knowledge is integrated into the production of complex goods and services, and second, by increasing the efficiency with which knowledge is utilized. These static efficiency advantages of alliances are enhanced where there is uncertainty over future knowledge requirements and where new products offer early-mover advantages.

Firms get involved in inter-organizational relationships abroad to minimize firm costs, create discriminating alignment between host country uncertainties and firm control, and learn from its partners. International alliances offer firms opportunities to draw upon knowledge and capabilities not currently controlled or available within their home country. Integrating knowledge intensive activities between international firms is more difficult due to partners' differences in national, organizational, and professional culture. Those differences can disrupt collaboration and learning between alliance

partners. However, cultural differences are not always a source of conflict or uncertainty in cross-national ventures. Under some circumstances, conflict might be a positive process mechanism for organizational learning, because conflict is likely to lead to the need for more interaction and communication between the partners, and ultimately more effective knowledge acquisition.

Multinational enterprises will increasingly need to form alliances in order to have the resources to be truly globally competitive; yet the inappropriate choice of an alliance partner could turn out to be even more costly and risky than trying to go it alone. It is beneficial to know the best practices of managing a single alliance between two or more firms. However, firms also benefit significantly by assuming a portfolio approach to alliances in the future; most firms engage in more than one alliance. Each individual alliance is important, and a firm certainly needs to have a sound strategic logic for its alliance and adopt appropriate best practices in each stage of its life cycle. Nevertheless, a firm can gain additional advantages by considering its entire set of individual alliances as one portfolio and managing it as such.

Strategic alliances are known to be risky. Unless there is a real resources shortage, be it skills, technology, or finance, strategic alliances should be avoided. If shortages exist then the company should look for complementary skills, cooperative cultures, compatible goals and commensurate risk levels. A large number of alliance studies point to high failure rates, to high transaction costs involved in negotiating and monitoring alliance deals, and to problematic uncertainties related to the appropriation of alliance benefits. In response, they often provide suggestions for the selection of partners and legal structures to reduce failure risks, transaction costs, and misappropriation.

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The Impact of Economic Policy Uncertainty in the United States on Unemployment of Black and White Americans: Pre-pandemic Evidence

DEJAN ROMIH, MOJCA RAMŠAK & ALENKA KAVKLER

Abstract This paper examines the impact of economic policy uncertainty in the United States on unemployment of black and white Americans before the COVID-19 pandemic/recession. Our evidence shows that a positive economic policy uncertainty shock leads to an increase in the unemployment rate for members of both racial groups, which is in line with our expectations. However, our evidence also shows that economic political uncertainty in the United States is affecting the unemployment rate of black Americans faster and more strongly.

Ključne besede: • black American • economic policy uncertainty • unemployment • United States • white American

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1   Introduction

Economic policy uncertainty has become a hot topic in recent years, following the Great Recession. Many politicians and policymakers believe that economic policy uncertainty contributed to a slower recovery of the labour market after the Great Recession (Baker et al., 2016). However, it is unclear whether this is true or not. There is a growing literature on the impact of economic policy uncertainty on the labour market (see, e.g., Baker et al., 2016; Caggiano et al., 2017, 2019).

This paper examines the impact of economic policy uncertainty in the United States on unemployment of black and white Americans before the COVID-19 pandemic/recession. As far as we know, this is the first study on this subject, so its purpose is to fill the gap in the literature. This study asks whether and how economic policy uncertainty in the United States affects unemployment of members of both racial groups. In this way, it contributes to the literature on unemployment of black and white Americans and on the impact of economic policy uncertainty in the United States on the labour market. As the labour market in the United States continues to improve, unemployment of black Americans, who are believed to be the last hired and the first fired (Couch & Fairlie, 2010), remains a big issue for politicians and policymakers in the United States.

The rest of this paper is divided into five sections. Section 2 reviews the literature on the unemployment of black and white Americans and on the impact of economic policy uncertainty in the United States on the labour market. Section 3 gives the methods we use in our research. Section 4 gives the results. Section 5 discusses them. Section 6 concludes this paper.

2   Literature review

2.1   The unemployment of black and white Americans

Southern landowners discovered early in colonial America that using African slaves to work their land might maximize their profits, and a set of laws was enacted to rationalize perpetual race-based enslavement. These rules became tougher over time, and black American labourers were increasingly dehumanized after each real or imaginary slave insurrection. Slave revolts terrified the political establishment, not only because of the physical danger they posed to a minority white elite (white Americans), but also because they revealed the violence required to keep slavery alive. It took nearly a century of agitation, resistance, political organizing, and the nation's worst conflict to put an end to that "most peculiar institution". However, the Confederacy's defeat did not end the influence of southern landowners or their racial superiority ideology. When the Civil War ended, Confederate officers returned to their estates and erected "black codes" restricting black people's ability to own property, teach, preach, or travel. In other words, the new rules revoked freshly liberated slaves' freedom and punished

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anyone who refused to comply. Thousands of liberated individuals were murdered in the initial years after liberation for attempting to flee plantations or refusing to labour on the terms imposed. The treatment of black American employees in the South is the beginning of the story of race and labour in America. The region's cultural isolation from the rest of the country, but continued political and economic dominance, remains to this day. When black Americans travelled north in the twentieth century, they found more personal freedom – but also continued discrimination and unequal access to economic possibilities – as a result of two world wars and the Great Depression. Business interests used race and ethnic divides to weaken labour solidarity in the decades between the two wars. Some unions supported integration, while others opposed it. Conservative politicians used racial stereotypes and white fear and anxieties to divide working people even after civil rights laws made racial discrimination illegal in the 1960s. They are still doing so today (AFL-CIO, 2021).

The United States saw the widest gap in unemployment rates for black and white Americans in five years in June 2020, underscoring an uneven nascent recovery from historic job losses triggered by the COVID-19 pandemic. Jobless rates for both groups fell in June, but the rate for white Americans came down at a much faster rate. The unemployment rate for white Americans fell from 12.4% to 10.1%, while the unemployment rate of black Americans fell from 16.8% to 15.4%, according to data released by the Labor Department. At 5.3 percentage points, the gap is now the widest since May 2015 and exposes an important economic component of racial inequality at a pivotal moment in US race relations. The country has been rocked by nationwide protests over police brutality against black Americans in 2020. The COVID-19 pandemic brought an abrupt end to the record-long US economic expansion just as it was creating better job opportunities for black American workers and other minorities. Job losses fell hardest on women and workers of colour. As the labour market recovers, black American workers are seemingly among the last to benefit, repeating the pattern typically seen following a recession. The unemployment rate for black American men rose in June 2020 to 16.3%, the highest level since the fall of 2011. Black American workers now have the highest unemployment rate compared to other ethnic or racial groups. The unemployment rate for Hispanics fell from 17.6% in May 2020 to 14.5% in June 2020. The unemployment rate for Asian Americans fell from 15% to 13.8% (Marte, 2020).

Figure 1 shows the average unemployment rate for black Americans in 2019 by state.

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Figure 1: The average unemployment rate for black Americans by state, 2019
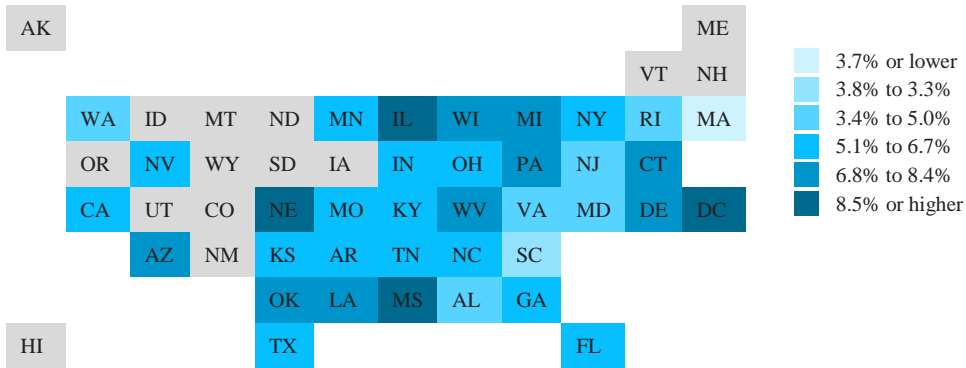
Notes: AL = Alabama, AK = Alaska, AR = Arkansas, AZ = Arizona, CA = California, CO = Colorado, CT = Connecticut, DC = District of Columbia, DE = Delaware, FL = Florida, GA = Georgia, HI = Hawaii, IA = Iowa, ID = Idaho, IL = Illinois, IN = Indiana, KS = Kansas, KY = Kentucky, LA = Louisiana, MA = Massachusetts, MD = Maryland, ME = Maine, MI = Michigan, MN = Minnesota, MO = Missouri, MS = Mississippi, MT = Montana, NC = North Carolina, ND = North Dakota, NE = Nebraska, NH = New Hampshire, NJ = New Jersey, NM = New Mexico, NV = Nevada, NY = New York, OH = Ohio, OK = Oklahoma, OR = Oregon, PA = Pennsylvania, RI = Rhode Island, SC = South Carolina, SD = South Dakota, TN = Tennessee, TX = Texas, UT = Utah, VA = Virginia, VT = Vermont, WA = Washington, WI = Wisconsin, WV = West Virginia, WY = Wyoming. States for which there is no data are marked in grey.
Source: U.S. Bureau of Labor Statistics (2020).

In 2019, the average unemployment rate for black Americans was the highest in District of Columbia (12.1%) and lowest in Massachusetts (3.7%). In 2019, the average unemployment rate for black Americans was 8.5% or higher in four states, namely District of Columbia, Illinois, Mississippi and Nebraska.

Figure 2 shows the difference between the average unemployment rate for black Americans and the average unemployment rate for white Americans in 2019 by state.

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Figure 2: The difference between the average unemployment rate for black Americans and the average unemployment rate for white Americans by state, 2019
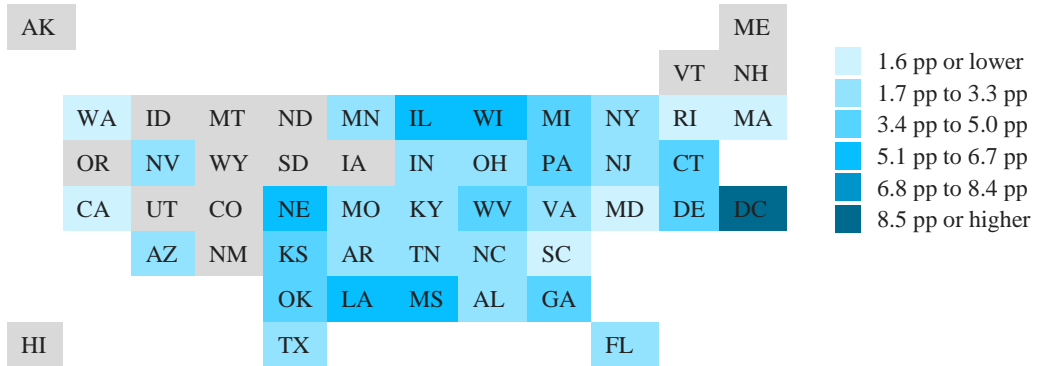
Notes: See Figure 1.
Source: U.S. Bureau of Labor Statistics (2020).

In 2019, the difference between the average unemployment rate for black Americans and the average unemployment rate for white Americans was the largest in District of Columbia (10.2 pp) and the smallest in Washington (–0.1 pp).

In every recession there are the same disparities. After the global financial crisis, for example, 23.8% of jobless black American workers received unemployment vs. 33.2% for white American workers. In the 1950s, an average of 50% of jobless people were able to regularly access benefits; by the end of 2019, that average had fallen to 28% of workers. The states that have made the deepest cuts to their unemployment programs are mostly in the South and have a higher share of black American residents. In states such as Florida and North Carolina, fewer than 12% of jobless individuals received benefits in 2019. The inequity in unemployment benefits is all the more damaging because black American workers have been more likely to be unemployed in both the current downturn and in past recessions. Even when the economy is healthy, black unemployment is dramatically higher – often double – that of white unemployment. The gap cannot be explained by gender, age or education level. Even when black American workers do obtain benefits, they often receive smaller payments than white American workers, since the benefits are determined by salary and black American workers earn less at every education level. When we look back in the history, we see that the origins of some of these barriers were driven by racism and xenophobia. The Social Security Act established unemployment insurance, in 1935, as a joint federal-state system. It had a narrow definition of who deserved benefits: full-time breadwinners who had been momentarily laid off but would return to work as soon as business picked up. This

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definition deliberately excluded agricultural and domestic workers, jobs held predominantly by black Americans, from its purview (Kofman & Fresques, 2020).

Historically, the labour force participation rate (the proportion of people working or looking for work as a percentage of the civilian noninstitutional population) for black men has been lower than the rate for all men. In 2019, the rate for black men was 64.8%, which was 4.4 percentage points lower than the rate of 69.2% for men overall. Black women have typically had higher labour force participation rates than all women, though the difference is not as great. In 2019, the labour force participation rate for black women was 60.5%, while the rate for all women was 57.4%. The labour force participation rate for all men has generally been on a downward trend since 1972. In contrast, the participation rate for all women increased dramatically from the 1970s through the 1980s, before slowing in the 1990s. After reaching a peak in 1999, labour force participation among women began a gradual decline, before levelling off in recent years (Brundage, 2020: 4).

In 2019, foreign-born non-Hispanic black Americans were more likely to participate in the labour force than were all foreign born (70.8% versus 66.0%). By contrast, native-born black Americans were about as likely as all native born to participate in the labour force (61.1% and 62.5%, respectively). The foreign born are people who reside in the United States but who were not US citizens at birth. Specifically, they were born outside the United States (or one of its outlying areas such as Puerto Rico or Guam), and neither parent was a US citizen. The foreign born include legally admitted immigrants, refugees, temporary residents such as students and temporary workers, and undocumented immigrants. The native born are people born in the United States or one of its outlying areas such as Puerto Rico or Guam or, if born abroad, had at least one parent who was a US citizen (Brundage, 2020: 5). Greater educational attainment is generally associated with a higher likelihood of labour force participation. In 2019, 77.9% of black Americans with an advanced degree (master's, professional, or doctoral degree) and 77.4% of black Americans with a bachelor's degree participated in the labour force, compared with 58.9% of black Americans with a high school diploma and 37.3% of black Americans with less than a high school diploma (Brundage, 2020: 6). In 2019, 28% of employed black Americans worked in the education and health services industry, higher than the national average for that industry (23%). Another one-fifth of employed black Americans worked in retail trade (10%) and in leisure and hospitality (10%). Employed black Americans were less likely to work in professional and business services, manufacturing, and construction than were all employed people (Brundage, 2020: 8). About one-fourth of black American wage and salary workers usually worked a non-daytime schedule in 2017–2018, compared with 16% of all workers. 9% of black American workers usually worked evenings, 5% worked nights, and 4% worked an irregular schedule. The remaining black American workers had a rotating shift, split shift, or some other schedule (Brundage, 2020: 11).

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2.2 The impact of economic policy uncertainty in the United States on the labour market

Baker et al. (2016) examined the impact of economic policy uncertainty on employment in the United States and found that a positive economic policy uncertainty shock leads to a decrease in the employment rate, which is consistent with the growing pre-pandemic evidence on this subject. Caggiano et al. (2017) examined the impact of economic policy uncertainty on unemployment in the United States and found that a positive economic policy uncertainty shock leads to an increase in the unemployment rate in both good and bad times. Caggiano et al. (2019) examined the impact of economic policy uncertainty in the United States on unemployment in Canada and the United Kingdom and found that a positive economic policy uncertainty shock in the United States leads to an increase in the unemployment rate in Canada and the United Kingdom in both good and bad times.

Figure 3 shows the newspaper-based index of economic policy uncertainty for the United States, developed by Baker et al. (2016), from January 1985 to November 2019.

Figure 3: The newspaper-based index of economic policy uncertainty for the United States from January 1985 to November 2019
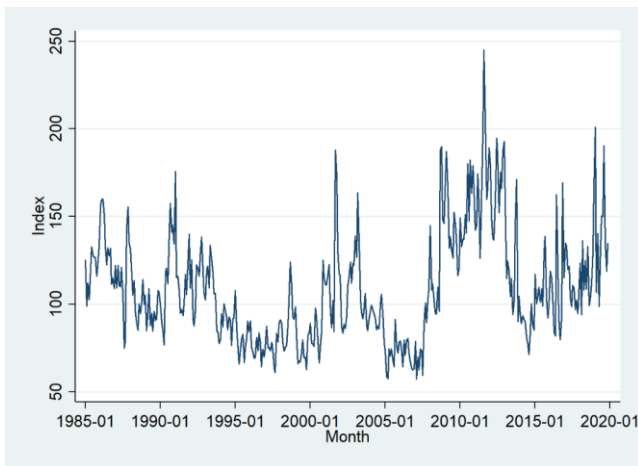
Source: Federal Reserve Bank of St. Louis (2021a).
Figure 3 shows that the newspaper-based index of economic policy uncertainty for the United States was the highest in August 2011 (245.1) and the lowest in February 2007 (57.2).

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3   Methods

We test two hypotheses. The first one says that economic policy uncertainty in the United States negatively affects unemployment of black Americans, while the second one says that economic policy uncertainty in the United States negatively affects unemployment of white Americans. We use a reduced-form vector autoregressive (VAR) model with the order p, denoted by VAR(p), which can be written as:

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + e_t, \, t = 1, \ldots, T,$$

where y_t is a $k \times 1$ vector of endogenous variables, c is a $k \times 1$ vector of constants, A_i is a time-invariant $k \times k$ matrix of coefficients and e_t is a $k \times 1$ vector of error terms.

We first examine the impact of economic policy uncertainty in the United States on unemployment of black Americans, and then the impact of economic policy uncertainty in the United States on unemployment of white Americans. In both cases we use a VAR model with five variables. These are the newspaper-based index of economic-policy uncertainty at time t, denoted by epu_t, the logarithm of the S&P 500 at time t, denoted by $s\&p_t$, the effective federal funds rate at time t, denoted by ffr_t, the logarithm of the unemployment rate for black and white Americans at time t, denoted by un_black_t and un_white_t respectively, and the logarithm of the index of industrial production at time t, denoted by ip_t (see Table 1). We use monthly data from January 1985 to November 2019.

Table 1 describes the variables epu_t, $s\&p_t$, ffr_t, un_black_t, un_white_t and ip_t. Variables un_black_t, un_white_t and ip_t are seasonally adjusted.

Table 1:   Description of variables

Variable	Description	Source
epu_t	Index of economic policy uncertainty for the United States, monthly, not seasonally adjusted	Federal Reserve Bank of St. Louis
$s\&p_t$	Logarithm of the S&P 500, monthly, not seasonally adjusted	Federal Reserve Bank of St. Louis
ffr_t	Effective federal funds rate, monthly, not seasonally adjusted	Federal Reserve Bank of St. Louis
un_black_t	Logarithm of the unemployment rate for black Americans, monthly, seasonally adjusted	Federal Reserve Bank of St. Louis
un_white_t	Logarithm of the unemployment rate for white Americans, monthly, seasonally adjusted	Federal Reserve Bank of St. Louis
ip_t	Logarithm of the index of industrial production, 2012=100, monthly, seasonally adjusted	Federal Reserve Bank of St. Louis

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Based on the information criteria, we selected a VAR model with four lags. In this study, we use two VAR(4) models. The first VAR(4) model, which includes the variable un_black_t, can be written as:

$$epu_t = c_1 + a^1_{1,1} epu_{t-1} + a^1_{1,2} s\&p_{t-1} + a^1_{1,3} ffr_{t-1} + a^1_{1,4} un\_black_{t-1} + a^1_{1,5} ip_{t-1} + \cdots + a^4_{1,1} epu_{t-4} + a^4_{1,2} s\&p_{t-4} + a^4_{1,3} ffr_{t-4} + a^4_{1,4} un\_black_{t-4} + a^4_{1,5} ip_{t-4} + e_{1,t}$$
,
$$s\&p_t = c_2 + a^1_{2,1} epu_{t-1} + a^1_{2,2} s\&p_{t-1} + a^1_{2,3} ffr_{t-1} + a^1_{2,4} un\_black_{t-1} + a^1_{2,5} ip_{t-1} + \cdots + a^4_{2,1} epu_{t-4} + a^4_{2,2} s\&p_{t-4} + a^4_{2,3} ffr_{t-4} + a^4_{2,4} un\_black_{t-4} + a^4_{2,5} ip_{t-4} + e_{2,t}$$
,
$$ffr_t = c_3 + a^1_{3,1} epu_{t-1} + a^1_{3,2} s\&p_{t-1} + a^1_{3,3} ffr_{t-1} + a^1_{3,4} un\_black_{t-1} + a^1_{3,5} ip_{t-1} + \cdots + a^4_{3,1} epu_{t-4} + a^4_{3,2} s\&p_{t-4} + a^4_{3,3} ffr_{t-4} + a^4_{3,4} un\_black_{t-4} + a^4_{3,5} ip_{t-4} + e_{3,t}$$
,
$$un\_black_t = c_4 + a^1_{4,1} epu_{t-1} + a^1_{4,2} s\&p_{t-1} + a^1_{4,3} ffr_{t-1} + a^1_{4,4} un\_black_{t-1} + a^1_{4,5} ip_{t-1} + \cdots + a^4_{4,1} epu_{t-4} + a^4_{4,2} s\&p_{t-4} + a^4_{4,3} ffr_{t-4} + a^4_{4,4} un\_black_{t-4} + a^4_{4,5} ip_{t-4} + e_{4,t}$$
,
$$ip_t = c_5 + a^1_{5,1} epu_{t-1} + a^1_{5,2} s\&p_{t-1} + a^1_{5,3} ffr_{t-1} + a^1_{5,4} un\_black_{t-1} + a^1_{5,5} ip_{t-1} + \cdots + a^4_{5,1} epu_{t-4} + a^4_{5,2} s\&p_{t-4} + a^4_{5,3} ffr_{t-4} + a^4_{5,4} un\_black_{t-4} + a^4_{5,5} ip_{t-4} + e_{5,t}$$
, $t = 5, \ldots, 419$.

We use the Cholesky decomposition. The order of the variables is the same as in Baker et al. (2016). The difference is that we use the unemployment rate instead of the employment rate.

The second VAR(4) model, which includes the variable un_white_t instead of the variable un_black_t, can be written as:

$$epu_t = c_1 + a^1_{1,1} epu_{t-1} + a^1_{1,2} s\&p_{t-1} + a^1_{1,3} ffr_{t-1} + a^1_{1,4} un\_white_{t-1} + a^1_{1,5} ip_{t-1} + \cdots + a^4_{1,1} epu_{t-4} + a^4_{1,2} s\&p_{t-4} + a^4_{1,3} ffr_{t-4} + a^4_{1,4} un\_white_{t-4} + a^4_{1,5} ip_{t-4} + e_{1,t}$$
,
$$s\&p_t = c_2 + a^1_{2,1} epu_{t-1} + a^1_{2,2} s\&p_{t-1} + a^1_{2,3} ffr_{t-1} + a^1_{2,4} un\_white_{t-1} + a^1_{2,5} ip_{t-1} + \cdots + a^4_{2,1} epu_{t-4} + a^4_{2,2} s\&p_{t-4} + a^4_{2,3} ffr_{t-4} + a^4_{2,4} un\_white_{t-4} + a^4_{2,5} ip_{t-4} + e_{2,t}$$
,
$$ffr_t = c_3 + a^1_{3,1} epu_{t-1} + a^1_{3,2} s\&p_{t-1} + a^1_{3,3} ffr_{t-1} + a^1_{3,4} un\_white_{t-1} + a^1_{3,5} ip_{t-1} + \cdots + a^4_{3,1} epu_{t-4} + a^4_{3,2} s\&p_{t-4} + a^4_{3,3} ffr_{t-4} + a^4_{3,4} un\_white_{t-4} + a^4_{3,5} ip_{t-4} + e_{3,t}$$
,

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$$un\_white_t = c_4 + a_{4,1}^1 epu_{t-1} + a_{4,2}^1 s\&p_{t-1} + a_{4,3}^1 ffr_{t-1} + a_{4,4}^1 un\_white_{t-1} +$$
$$a_{4,5}^1 ip_{t-1} + \cdots + a_{4,1}^4 epu_{t-4} + a_{4,2}^4 s\&p_{t-4} + a_{4,3}^4 ffr_{t-4} + a_{4,4}^4 un\_white_{t-4} +$$
$$a_{4,5}^4 ip_{t-4} + e_{4,t}$$

,

$$ip_t = c_5 + a_{5,1}^1 epu_{t-1} + a_{5,2}^1 s\&p_{t-1} + a_{5,3}^1 ffr_{t-1} + a_{5,4}^1 un\_white_{t-1} + a_{5,5}^1 ip_{t-1} +$$
$$\cdots + a_{5,1}^4 epu_{t-4} + a_{5,2}^4 s\&p_{t-4} + a_{5,3}^4 ffr_{t-4} + a_{5,4}^4 un\_white_{t-4} + a_{5,5}^4 ip_{t-4} + e_{5,t}$$
$$, t = 5, \dots, 419.$$

4 Results

Racial discrimination is a big problem for the black American community (Clayton, 2020). Davis (2020) found that black Americans are more pessimistic than white Americans about the state of racial affairs in the United States. Research shows that black American workers are often victims of racial discrimination in the workplace. This is especially true for black American blue-collar workers. Some researchers believe that black American blue-collar workers are among the first to be fired. They also believe that black American blue-collar workers are often in fear for their job. The COVID-19 pandemic/recession has been hard on black American low-wage workers. The recession has been accompanied by a rise in the unemployment rate for black Americans and has had an impact on black American blue-collar neighbourhoods. Our research contributes to the debate over the situation of black Americans in the workforce.

Table 2 shows descriptive statistics for the six variables we use in our research.

Table 2: Descriptive statistics

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
epu_t	419	109.1111	31.83032	57.20262	245.1267
$s\&p_t$	419	6.784432	.7398415	5.190899	8.05229
ffr_t	419	3.590072	2.78632	.07	9.85
un_black_t	419	2.365985	.2500422	1.686399	2.821379
un_white_t	419	1.61118	.2520748	1.131402	2.219203
ip_t	419	4.441754	.2106613	4.025769	4.705482

Source: See Table 1.

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4.1 The impact of economic policy uncertainty in the United States on unemployment of black Americans

Figure 4 shows the unemployment rate for black Americans from January 1985 to November 2019.

Figure 4: Unemployment rate for black Americans from January 1985 to November 2019
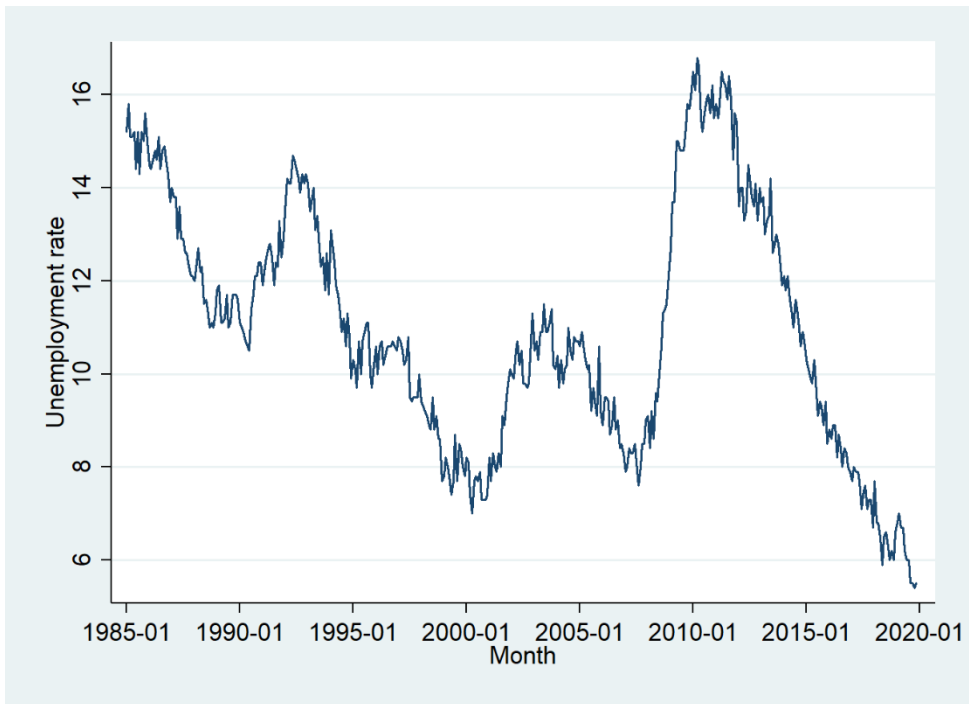
Source: Federal Reserve Bank of St. Louis (2021b).

Figure 4 shows that the monthly unemployment rate for black Americans was the highest in March 2010 (16.8%) and the lowest in October 2019 (5.4%).

Figures 5 and 7 show the orthogonalized impulse response graphs in two cases. In the first case, we examine the impact of economic policy uncertainty in the United States on unemployment of black Americans, while in the second case, we examine the impact of economic policy uncertainty in the United States on unemployment of white Americans.

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In both cases, the data refer to the period before the COVID-19 pandemic/recession. Both VARs are stable.

Figure 5: The orthogonalized impulse response graphs in the first case
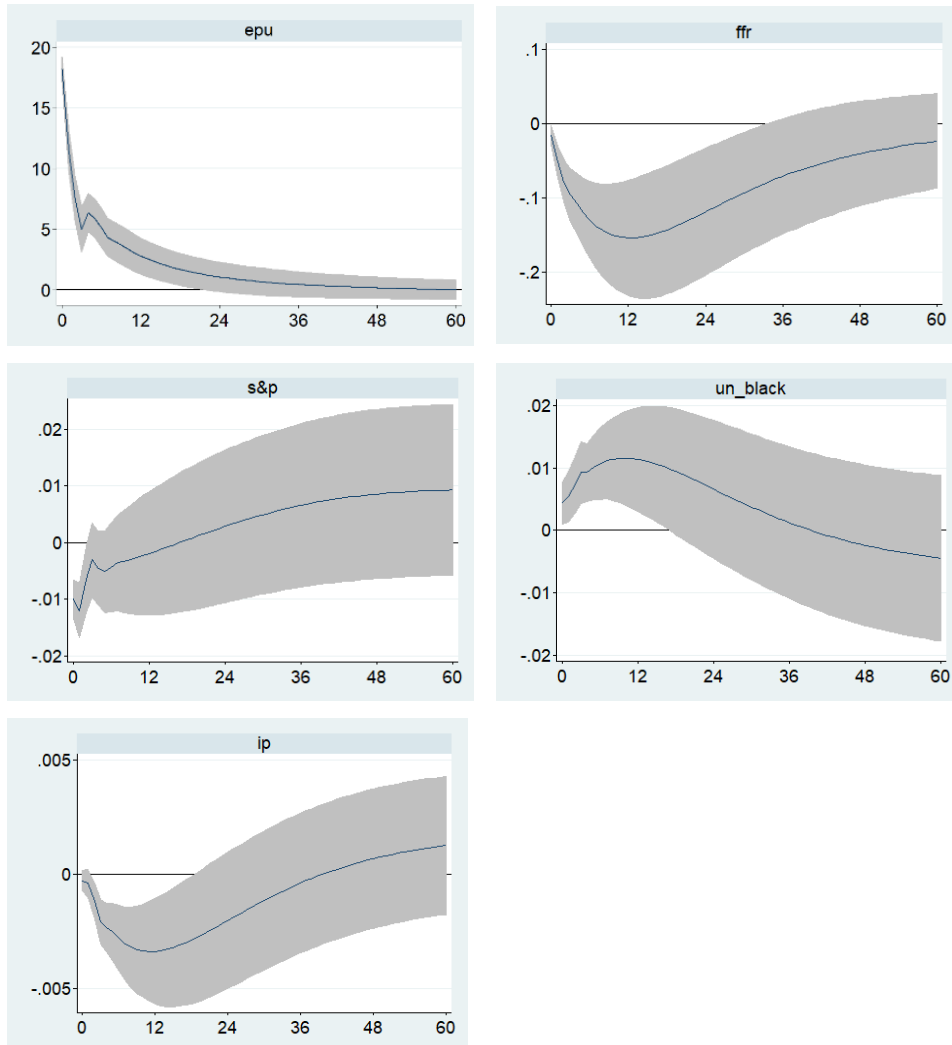
Note: A 90% confidence level is used.

Figure 5 shows that a positive unit (one standard error) economic policy uncertainty shock leads to a decrease in the S&P 500, the effective federal funds rate and industrial

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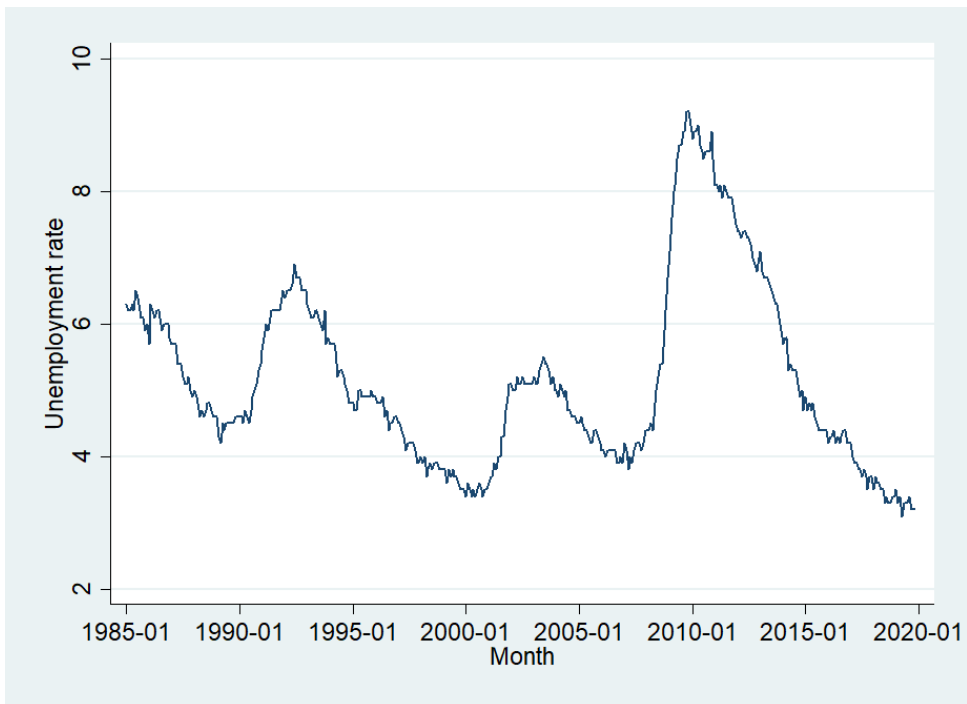United States on Unemployment of Black and White Americans: Pre-pandemic
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production. As can be seen, the decrease in the S&P500, the effective federal funds rate
and industrial production is statistically significant. Figure 5 also shows that a positive
unit (one standard error) economic policy uncertainty shock leads to an increase in the
unemployment rate for black Americans. As can be seen, the increase in the
unemployment rate for black Americans is statistically significant a year and a half after
the orthogonalized shock.

4.2 The impact of economic policy uncertainty on unemployment of white Americans

Figure 6 shows the unemployment rate for white Americans from January 1985 to
November 2019.

Figure 6: Unemployment rate for white Americans from January 1985 to November
2019

Source: Federal Reserve Bank of St. Louis (2021c).

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Figure 6 shows that the unemployment rate for white Americans was the highest in October and November 2009 (9.2%) and the lowest in April 2019 (3.1%).

Figure 7 shows the orthogonalized impulse response graphs in the second case.

Figure 7: The orthogonalized impulse response graphs in the second case
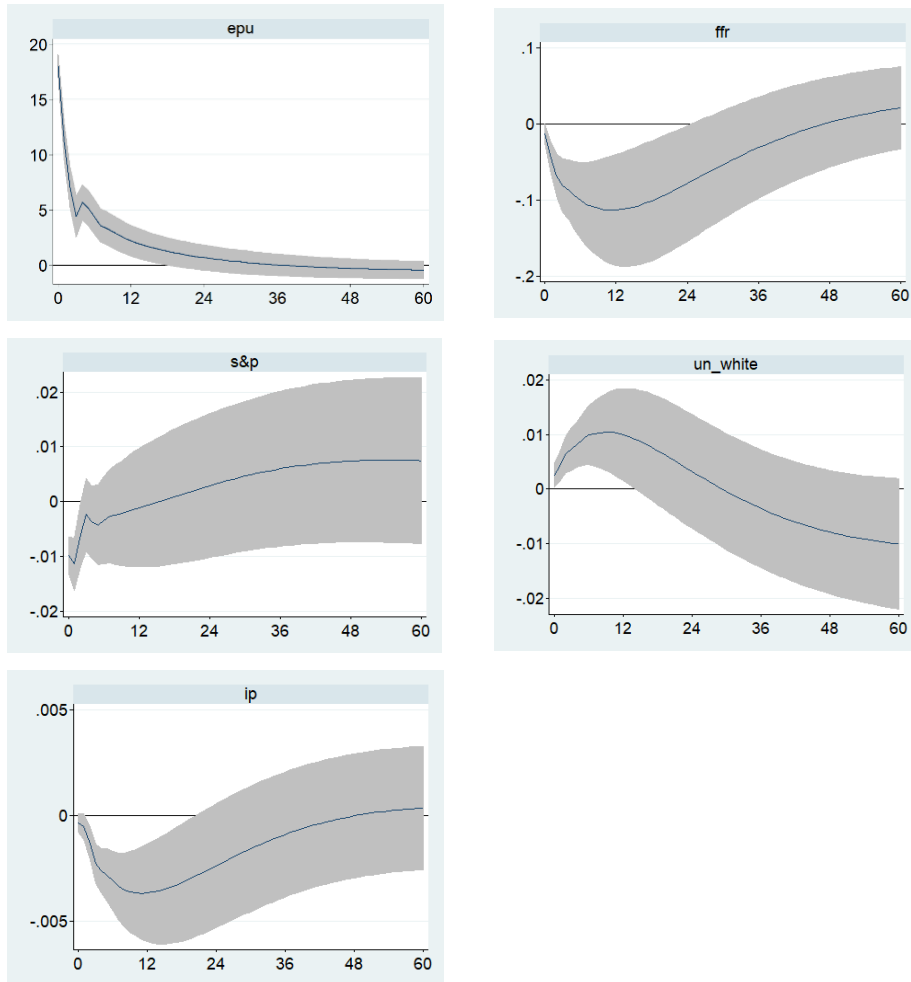
Note: A 90% confidence level is used.

Figure 7 shows that a positive unit (one standard error) economic policy uncertainty shock leads to a decrease in the S&P 500, the effective federal funds rate and industrial

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production. As can be seen, the decrease in the S&P500, the effective federal funds rate and industrial production is statistically significant. Figure 7 also shows that a positive unit (one standard error) economic policy uncertainty shock leads to an increase in the unemployment rate for black Americans. As can be seen, the increase in the unemployment rate for black Americans is statistically significant less than a year and a half after the orthogonalized shock. Our evidence shows that the impact of the economic policy uncertainty shock on unemployment rate for black Americans is slightly faster and greater than the impact of the economic policy uncertainty shock on unemployment rate for white Americans, which is in line with our expectations.

4 Discussion

Our findings provide insights into whether and how economic policy uncertainty in the United States affects unemployment of black and white Americans. We found that economic policy uncertainty in the United States adversely affects the labour market for members of both racial groups, however, the impact is slightly greater and faster in the case of unemployment of black Americans. This means that black American workers are slightly less resistant to an economic policy uncertainty shock in the United States.

5 Conclusion

Unemployment of black Americans is a big issue for politicians and policymakers in the United States. The COVID-19 pandemic/recession has sparked a debate on racial discrimination of black American workers in the US labour market. This paper therefore asks, among other things, whether economic policy uncertainty in the United States affects unemployment of black and white Americans differently. Our evidence shows that this is actually the case.

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Figure A.1 shows the average unemployment rate for white Americans in 2019 by state.

Figure A.1: The average unemployment rate for white Americans by state, 2019
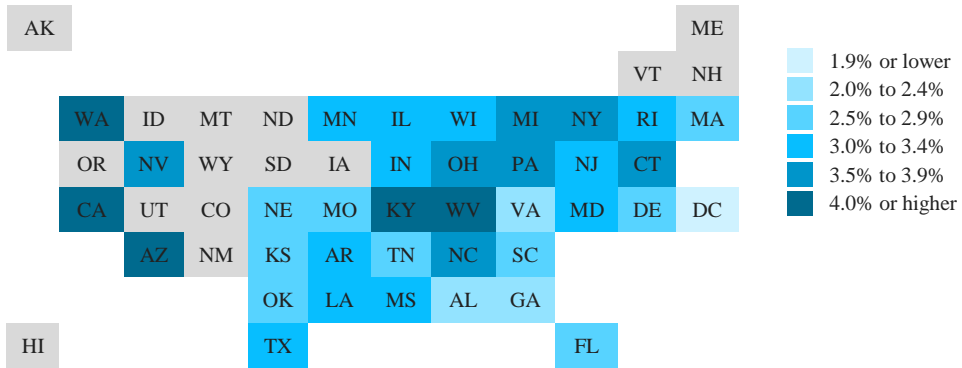
Notes: See Figure 1.
Source: U.S. Bureau of Labor Statistics (2020).

In 2019, the average unemployment rate for white Americans was the highest in Arizona and West Virginia (4.6%) and lowest in District of Columbia (1.9%). In 2019, the average unemployment rate for white Americans was 4.0% or higher in five states, namely Arizona, California, Kentucky, Washington and West Virginia.

Figure A.2 shows the average unemployment rate for black Americans in 2008 and 2009 by state.

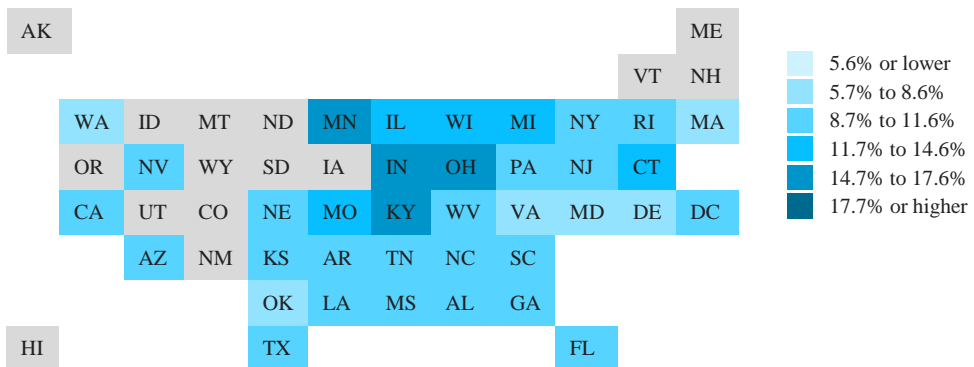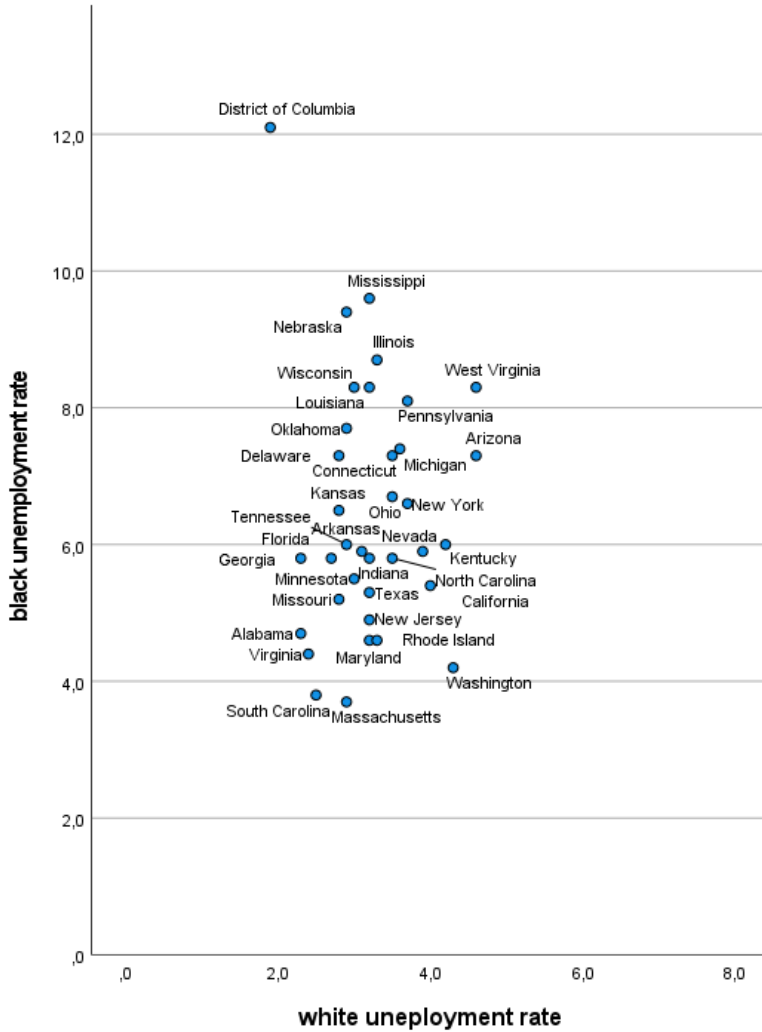**Figure A.2:** The average unemployment rate for black Americans by state, 2008 and 2009

2008

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2009

AK										ME
									VT	NH
WA	ID	MT	ND	MN	IL	WI	MI	NY	RI	MA
OR	NV	WY	SD	IA	IN	OH	PA	NJ	CT	
CA	UT	CO	NE	MO	KY	WV	VA	MD	DE	DC
	AZ	NM	KS	AR	TN	NC	SC			
			OK	LA	MS	AL	GA			
HI			TX				FL			

Notes: See Figure 1.
Source: U.S. Bureau of Labor Statistics (2009, 2010).

During the Great Recession in the United States, the average unemployment rate for black Americans rose the most in Wisconsin (11 pp), while it fell the most in Nebraska (–2 pp). In 2009, the average unemployment rate for black Americans was the highest in Wisconsin (23.8%) and lowest in West Virginia (8.9%).

To analyse the grouping of states by black and white unemployment rates, we also used two-step cluster analysis. This procedure determines the appropriate number of groups (clusters) in the first step and divides the observations into clusters in the second step using a non-hierarchical clustering procedure (Hair et al, 2014). Tkaczynski (2017) explains the stages that need to be performed in order to efficiently carry out this clustering technique. The author also discusses several recent segmentation studies that use this method and points out the limitations of this approach.

Statistical analysis was performed using the SPSS statistical package. The Euclidean distance measure was used, in combination with Schwarz's Bayesian Criterion (BIC) as the clustering criterion. The number of clusters was determined automatically, with the maximum number of clusters set at 15. The two-step cluster analysis resulted in a single-cluster solution. As can be seen from the scatter plot of black unemployment versus white unemployment (Figure A.3), there is only one cluster with an outlier, the District of Columbia.

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Figure A.3:   Scatterplot of black unemployment rate vs. white unemployment rate by
states, 2019 annual averages

Source: U.S. Bureau of Labor Statistics (2020).

Consumer Behaviour of Recession-hit Black Americans in the Pre-pandemic Digital World

MITJA BRÜNEC, TOSJA KOBLER JOVANOVIČ, DOMEN MALC & DEJAN ROMIH

Abstract Black Americans were disproportionately hard hit by the Great Recession and the Covid-19 epidemic/recession. This paper analyses the consumer behaviour of recession-hit black Americans in the pre-pandemic digital world. It shows that the consumer behaviour of black Americans is changing due to digitalization and that the recession is affecting them similarly to other consumers.

Ključne besede: • black American • black consumer • black English • Black Twitter • consumer behaviour • pre-pandemic digital world • recession

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1   Introduction

There is a growing interest among marketers in the consumer behaviour of recession-hit black Americans who represent the third largest ethnic group in the United States with over 44 million people or an estimate of 13,4 % of all US residents as per 2019 US Census. The long and often troublesome history of this group of Americans shows itself in basic demographics as black Americans are less educated, less likely to own a home or a vehicle, more likely to live with their parent(s) and earn significantly less per household compared to the rest of the population (Breman, 2020). Recent studies have shown that black Americans were also disproportionately hard hit by the Great Recession and the COVID-19 epidemic/recession. More than one third are employed in the service industry (Breman, 2020), which faced the harshest reality of COVID-19 epidemic restrictions. During that time, many black Americans felt the hardship and were lured by low prices. This paper analyses the consumer behaviour of recession-hit black Americans in the pre-pandemic digital world. Digital technology is reshaping the black American community. It provides new ways of searching for information about products and services, new paths to purchase and consume them, as well as a unique opportunity to interact with brands and other consumers and sharing their experiences with world-wide audience. The effects that digital media have are not limited only to consumer behaviour online (i.e., environment-integral effects) but also to consumer behaviour in other, unrelated environments (i.e., environment-incidental effects) (Stephen, 2016). As it appears, black American community embraced this new, digital way of brand-consumer interaction. This is partly because many of its members are digital natives – born and raised alongside rapid digital expansion. Their world is all digital. As a result, companies must adapt to the all-digital world to compete for black American customers. They must provide a digital shopping experience for black American digital shoppers. After all, digital shopping is the new black.

The rest of this paper is divided into four sections. Section 2 analyses the consumer behaviour of black Americans in the pre-pandemic digital world, Section 3 analyses the consumer behaviour of recession-hit black Americans in the pre-pandemic digital world, Section 4 analyses the use of black English in marketing and Section 5 concludes this paper.

2   Consumer behaviour of black Americans in the pre-pandemic digital world

The digital age has brought new technology and marketers have taken advantage of the new opportunities to communicate and interact with respective target groups. The new technology has changed consumer behaviour, which is driven by digital developments. There is a new layer to information gathering and exchange, and while in the past the salespeople were the true experts on store's offerings, today it is not unusual to assume that a consumer has more information on what is available. Additionally, digital

developments provided a whole new meaning to consumer engagement and as consumers tend to be more proactive and expect a greater level of personalization in all marketing activities (product and service design, distribution options, pricing, and communication), they will reward the brands that give them such opportunities. Finally, if in the past consumers used to go to a store to find out about a product and make a purchase, with the new technology, consumers can make their purchases online, with nothing but a few simple clicks.

Consequently, the digital age has also spurred buying power in the Black community. This is because black Americans are notorious for their love of digital devices and actively embrace new technologies. Black Americans, for example, are 37 % more likely to be the first among their peers to try new technology products compared to the general population. They are also 43 % more likely to own many gadgets, such as mobile phones, tablets, computers, etc. (The Nielsen Company [Nielsen], 2019). In fact, black Americans own more gadgets in their households than the entire US population. These devices include smartphones, tablets, gaming consoles, wireless headphones, smart TV, Internet-to-TV streaming devices, smart speakers, smartwatches, and virtual reality head-mounted devices (Nielsen, 2018). According to Nielsen, 96 % of black Americans own a smartphone. What is even more amazing is that they make up 23 % of the total market for US mobile sales while only accounting for 14 % of the total population (Nielsen, 2019). This is probably because 54 % of the black American population has lived their entire lives in the digital age (Cavill, 2019).

Black Americans also outperform the general population in other areas of digital technology. They use various types of technology more frequently, from video, messaging websites and apps, voice assistants, and podcasting to gaming and online grocery shopping.

Nielsen (2019) shows fragmentation across media and time spent via traditional and emerging technologies. Its shows that radio has the highest weekly reach among black Americans at 92 %, followed by total TV usage and Live and Time-Shifted TV at 91 % and 89 %, respectively (Nielsen, 2019). It is followed by App/Web on a smartphone at 81 %. In all these categories, the black population outperforms the overall population. Interestingly, Internet on a computer is below average at 46 %. Video on a computer has an even lower percentage at 21 %. In all these categories, the overall population outperforms the black population. This means that the black population spends much more time listening to the radio, watching television, and using their smartphones. These three types of media therefore seem to be the most reliable channels for reaching black consumers.

Video streaming is very important to the black community. It is their primary source of entertainment and cultural connection. Black Americans spend much more time per week in front of the television than the general population. They spend 50 hours and 38

minutes per week in front of the TV, compared to 39 hours and 6 minutes of the total population (Nielsen, 2019). This is quite a significant difference. Furthermore, the black population streams video across all devices, not just television. Streaming devices via Internet (TV) top the list, with 83 % of black Americans using them at least once a week, compared to 74 % of the overall population. Video streaming via smartphones, smart TVs, and computers is also popular among black Americans at 78 %, compared to 64 %, 76 %, and 63 %, respectively, for the overall population (Nielsen, 2018). This could also coincide with the rise of TV content (movies, series) that predominantly feature black people as the main characters. Black Americans strive for more content that they can relate to, and the American TV series Empire is just that. More content that caters to the black population means more people streaming videos. In addition, black viewers can also increase the rating and popularity of the content, and black American-created content seems to have a profound effect on the mainstream. Namely, they attract a large number of non-black viewers (Nielsen, 2018).

Apps have become omnipresent in the digital age. They are especially popular among black Americans. They use a variety of apps, from social media and online shopping to streaming music and video. More importantly, they also co-create apps that are specifically tailored to the needs of the black community. This is because black Americans feel they are not represented well enough in the media and their needs are different from the general population. One way of looking into these kinds of differences is offered by VALS™ framework. This survey separates consumers into eight distinct types based on primary motivation and resources. Primary motivations include ideals (consumers are guided by knowledge and principles), achievement (consumers who look for products and services that demonstrate success), and self-expression (consumers who desire social or physical activity, variety, and risk). Resources, on the other, hand exceed the obvious income criterion, and include energy, self-confidence, novelty seeking, impulsiveness, vanity, etc. Combining the two dimensions forms eight types of consumers as shown in Figure 1.

Figure 1: VALS™ Framework types
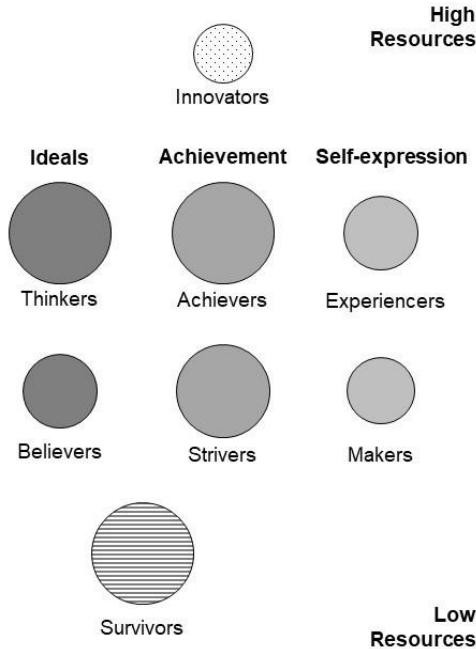
Source: Strategic Business Insights (2021).

Research by Strategic Business Insights (Breman, 2020) shows that there are some considerable differences in distribution of VALS types in black American group compared to white Americans. Only low proportions of black Americans are in upper-resource groups (except for experiencers), while the majority lies in low resource groups (believers, strivers). Experiencers as a consumer group are among other things early adopters, are sensation seeking, see themselves as very sociable, spontaneous, and have a heightened sense of visual stimulation. Believers, believe in dichotomy between right and wrong, want friendly communities, watch TV to find an escape, have strong me-too fashion attitudes. Lastly, strivers have revolving unemployment, use video and video games as a form of fantasy, are fun loving, imitative, are the centre of low-status street culture and wear their wealth. Having apps that are specifically designed by and for the black population incorporates these characteristics and therefore allows black Americans to better connect with their culture and support others in the community. Such examples include apps, such as Official Black Wall Street and I Am Black Business, which contain information about black American-owned businesses. Through

these apps, they can also support black-owned businesses with their purchasing power (Nielsen, 2019). Another example is Squire Technologies, a fast-growing small business management platform. What started as an app to help black Americans find a good barber has evolved into a platform that is changing the landscape of the barbering experience (Nielsen, 2019). The app has processed $100 million since its inception.

Apps have also spawned social platforms and with that, the ability for the black community to express themselves. These social platforms are often used as mobile apps. Social networks are one of the places where black Americans leave feedback and recommendations on products (Nielsen, 2019). They are also one of the places where businesses can reach out to the black community and tap into the buying power of black Americans. The most popular are Facebook (66 %), Instagram (55 %), Pinterest (34 %), Twitter (37 %), and Snapchat (33 %) (Nielsen, 2019). Surprisingly, Facebook is used less by Black Americans over the age of 18 compared to the general population. The two social networks that are significantly more popular are Instagram and Twitter. The latter stands out especially with the rise of "Black Twitter". This term "refers to a particular collective of black identities and voices on Twitter taking part in collective, culturally specific jokes and dialogues that affect the community" (Wheeler, 2019). It is a platform for black Americans to express themselves, their culture, their concerns, etc. (Nielsen, 2018). Some of the topics raised by black twitter in 2020, spurred the expansion of movements such as black lives matter and blackout day, where the latter was "aimed at highlighting how the black dollar powers the larger U.S. economy and how the America would be a very different place if Black consumers did not participate" (Bridges, 2020). All in all, Twitter established itself as a very influential pathway, especially since celebrities have such a huge impact on the buying decisions of black Americans. These celebrities can promote their own products or products of certain brands on social media. For this reason, platforms, such as Instagram and Twitter, especially "Black Twitter", can be a great opportunity for companies to reach the black community.

Gaming is another important component in the life of the black community. The black American population is relatively young, so gaming provides a great opportunity for marketers to connect with young black American gamers. The gaming industry is strong in the United States, with gaming revenue of $36 billion in 2017 (Nielsen, 2018). However, there is a lack of diversity in gaming content. Most games are aimed at the general population, although there is much room for improvement. Although more and more games offer characterization of game characters, such as skin, hair, and facial features, these are minor elements. What is important is the content, the story that drives the gaming experience. This is something games lack when it comes to black culture. However, some developers are trying to bring in content that includes all demographics, such as Culture Shock Games and Dim Bulb Games with their projects We Are Chicago and Where the Water Tastes Like Wine (Nielsen, 2018).

Regardless of the digital platform, black Americans' embrace of technology impacts their shopping behaviours, from information and content search, to how they use their devices to shop and purchase products, and their interaction with brands. Black Americans have significant purchasing power in the United States and their buying power is increasing as shown in Table 1.

Table 1: Buying power of black Americans

	Share of US population (2019)	Share of buying power (2019)	Buying power (US$) (2019)	Increase in buying power (2010–2019)
White	76.2%	81.7%	13.2 trillion	39.5%
Black	**13.4%**	**8.9%**	**1.4 trillion**	**48.1%**
Asian	6.3%	7.1%	1.2 trillion	89.5%
Latinx	18.6%	10.7%	1.7 trillion	69.1%
American Indian	1.3%	0.8%	126.8 billion	51.8%
Multiracial	2.8%	1.6%	253.9 billion	73.6%

Source: Humphreys (2019).

This growth is facilitated by increasing education levels and the number of black-owned companies (Humphreys, 2019), while the digital age has additionally enabled the black community to become more prominent in the marketplace. Consequently, black Americans are also co-designing apps that are tailored to their needs. Moreover, they represent a great potential for companies and brands to tap into the buying power of the black community and capitalize on the untapped potential.

3   The consumer behaviour of recession-hit black Americans in the pre-pandemic digital world

The Great Recession was tough on all Americans, but it hit black Americans the hardest. They were the most economically and financially vulnerable segment of the population anyway. Even today, they have not fully recovered. Pre-recession data also shows that black Americans lay behind other groups when it comes to income. The average black family earned $55,265 in 2007, just 64 % of an average white family. The poorest black American families had it even harder, earning only 43 % of a white family's earnings (Adejumo, 2019). In addition, more than 20 % of black Americans earned less than $15,000 a year in 2008 and were also significantly more likely to be unemployed. For example, during the Great Recession, unemployment for all Americans peaked at 10 %, while it exceeded 16 % for black Americans (Adejumo, 2019).

Recessions usually cause consumers to become poorer or feel poorer. They also become more cautious when it comes to spending (Quelch, 2008). This means reduced spending and fewer purchases overall. Hampson and McGoldrick (2013) provided even more in-depth description of shopping adaptations during recessions. Their research showed that consumers amidst recession exhibit less impulse buying and more planning, less store loyalty and lower shopping frequency. Consumers tend to be more price conscious, they buy more store brands, and when shopping for clothes, value seeking is the way to go. Lastly, authors find that recessions discourage ethical buying and charity donations. Black Americans are no different from other groups in this regard.

Recession-hit black Americans, just like Americans in general, are more likely to defer purchases and buy things that are more likely to be necessary (Quelch, 2008). In other words, black Americans tend to prioritize things. If the latest smartphone or computer seemed like a must-have yesterday, today it is something they can do without. They also tend to look for more durable goods (Quelch, 2008). If an item tends to last longer, there is less need for a new item. This can help save money in the long run. Trusted brands are especially valued by recession-hit black Americans, who are known to be loyal consumers (Quelch, 2008). If a black American is satisfied with purchasing digital items from a particular brand, they are much more likely to return to that brand during and after a recession.

In bad times, consumers tend to look for things that evoke familiarity and tend to spend more time at home (Quelch, 2008). Black consumers value family and friendship ties. Consequently, they tend to spend much more on home entertainment, such as television and video games. The latter is especially true for the younger generation of black Americans. Both older and younger generations tend to spend much more time streaming video. As a result of the recession, people are spending less time outside shopping, eating at restaurants, and going to the movies. And, subsequently, the amount of time spent on smartphones and using various apps is also increasing.

As mentioned earlier, quality is important to recession-hit black Americans. However, the price of a product is just as important, or perhaps even more so. Recession-hit consumers are looking for best deals, best prices, and best promotions. It may be that less is being spent overall and black consumers are more careful about what they buy, but this is where smartphone apps have an advantage. We can assume that recession-hit black Americans are much more likely to use smartphones to make purchases. The reason for this is many apps available to help consumers find the best deals and best prices. This helps them save money and time.

The recent COVID-19 pandemic caused a recession. Many people, including black Americans, stayed home. The use of entertainment technology such as television, radio, streaming video, and video games skyrocketed. Many of them were forced to order food and other essential products, such as face masks and hand sanitizer, through apps.

Computer sales increased as people had to work from home and many still do. As a result of the pandemic, many people have lost their jobs or have been put on hold. Black Americans were worse off than their white counterparts even before the crisis. The latter could trigger another recession. Since black Americans have not even fully recovered from the last recession, this could mean even less spending power.

4   The use of black English in marketing

Consumer groups composed predominantly of black Americans outperform all other consumer groups in the US market. Having mentioned above that they are strong representatives of consumers of the digital age, it is of great importance to focus on all parts of this American subculture, which has a unique complex of behaviours, traditions, language, and values (Escalas, 1994). Since there is not enough space and time to include all cultural aspects, let us focus on language.

The development of the formal designation of the language of the black American population goes way back to the early 1980s. It was then that the differences between the various styles of language were first worked out scientifically. It went from Ebonics to Black English, to African American English and finally to African American Vernacular English (AAVE) compared to Standard English. When Ebonics acquired a pejorative meaning and was called a politically coded language, with reference to the need for further education of speakers, it was finally agreed to AAVE.

Nearly 40 years later, the field of language used in commercials for black Americans still had to touch on the history of the language name before explaining and describing the research. Luu (2020) included the brief summary of AAVE as the final version. She went even further by defending and slightly outlining the idea that it is a language with its own history, development, incorporated values, and behavioural styles. Thus, she argued, there are many cultural aspects to it. This leads to the belief that AAVE is not just a deviation from Standard English, but a language of its own.

Combine the facts that black Americans are a growing consumer group, enthusiastic about digital devices and app use, with the importance of their urge to express themselves as a cultural subgroup, and there should be a strong call to explore their kinds of expressions, phrases, and words they like to use. This could be a shortcut to connect their enthusiasm for technology and their path of digitalized shopping. Thus, closely analysing the language used in marketing could be a game changer in reaching this particular consumer group. To satisfy the notion of black Americans communicating authentically or simply responding to marketing language, the use of the AAVE could make a difference.

So, the use of language in marketing is important. AAVE is, after all, a cultural aspect that black Americans identify with and as Vicki Bolton from Burrell, an American

advertising agency that has specialized in African American consumers, states: "People
want to see themselves in messaging." (Maheshwari, 2017). However, using the
language of a minority is a double-edged sword. On one hand, using it in marketing
could prove to be an advantage. It could attract potential black consumers. If done right.
On the other hand, it could turn off black consumers if done wrong. This is because
companies have often resorted to stereotypes when trying to reach black consumers.
This began in the 1970s when the industry stopped portraying black Americans as
slaves and inferior to white Americans. Instead, companies, such as McDonald's
Corporation and The Coca-Cola Company, began to lean towards racial diversity in
their advertisements (The Atlantic, 2015). All of this to keep up with the times and
reach a wider range of consumers. Companies began to use what they believed to be the
language of black Americans by dropping the final g in words, such as makin', doin',
and dinnertimin' (The Atlantic, 2015). Other examples include the use of phrases, such
as gettin' down, have mercy, and mammy. Such attempts were perceived by many as
tone deaf. This is because companies were trying to reach black consumers without
knowing their culture and most advertising agencies were white owned, although there
were some that were black owned.

Today, these racial stereotypes are much more subtle and audiences much more vocal
about them than in the past. Businesses, therefore, must consider whether they want to
gain a significant portion of the consumer market or lose access to it altogether (The
Atlantic, 2015). Using AAVE in advertising can be dangerous without knowing the
target culture. If done incorrectly, there can be backlash and the advertiser alienates
black consumers, who have considerable power in the marketplace, from their products.
Use AAVE or other minority language correctly, and the company can benefit from
strong buyers.

5   Conclusions

Black Americans represent a growing group of what are already the largest new
consumers of new technology. For some, their entire world is all digital. Their online
and offline consumer behaviour is shaped by digital developments. They are the ones
who listen to the radio almost constantly, spend the longest time in front of TV every
day, are the first among their peers to try new technology products, own the most
gadgets in their households, use and even co-create apps, and actively participate in
many different social platforms. In addition, there are games that black Americans also
enjoy because of their relatively young population. However, to connect the dots, one
could argue that the percentage could be even higher. A much more efficient way to
reach the black community could be through content and adapted cultural factors.
Research (Breman, 2020) shows that black American consumers differ from other
ethnic groups in their primary motivations and particularly in their resources' levels.
Brands that could address such differences with appropriate marketing mix could
benefit immensely. Furthermore, black Americans crave customized products that

would allow them to express themselves fully and appropriately. Some companies (e.g., McDonald's, Coca Cola, Culture Shock Games, Official Black Wall Street) are making important strides in this direction, and we believe that others ought to follow. Further research could expand on these topics and contribute to a more thorough understanding of black American consumer markets.

During the recession, black Americans were especially affected and were paid unequally even before. They also had the highest unemployment rate as a result of the recession. Therefore, they became much more cautious about spending money, but were still considered the most loyal consumers, valuing quality and attainable prices of products. All this had a great impact on the group as a whole and kept them from being extremely active buyers.

One of the factors that could speed up the process of making them again the group of consumers that represents the fastest growing population and focused on purchasing new products could definitely be the use of the right language. It is considered as a very important part of black American culture and allows them to identify themselves. Therefore, AAVE should be used to the fullest and invite sellers to benefit from them as strong buyers.

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