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**EMPIRICAL INVESTIGATION ON THE IMPACT OF JUDICIAL PERFORMANCE
ON INTRA-EUROPEAN TRADE FLOWS**

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Chapter 1

Effectiveness of Judicial Institutions and Economic Activities: A 20-Year Review of Empirical Studies

Abstract This 20-year review focuses on the empirical analyses that evaluate the causal link between well-functioning judiciaries and multiple economic activities. The evidence available in a variety of academic works, supports for the existence of such a link. Specifically, the present review aims to provide scholars in Institutional economics with a general overview of state of the art, both as regards the key findings of the existing literature, the empirical approaches and the indicators of judicial performance to prefer in assessing the impact of the judicial system's effectiveness on economic outcomes. Also, this Chapter emphasizes the importance of the Institutional analysis for the gravity model-based studies in the International trade research field.

1. Background and Rationale

In the last 20 years, many studies in Institutional economics have emphasized the complementarity of the *de jure* and *de facto* institutions, which are meant to unveil if the set of legal rules is implemented in a way that makes the institutional environment effective (Hodgson, 2006; Voigt, 2013, Marciano et al., 2019). The idea that property rights and legal enforcement are essential for the wealth of nations was introduced in the 18th century by Adam Smith's works¹. Furthermore, received new life during the 19th and most of the 20th centuries, since various schools of thought came to agree that secure property rights and effective contract enforcement are fundamental prerequisites of market economies (Scully, 1998; Acemoglu and Johnson, 2001; Glaeser et al., 2004; Rodrik et al., 2004; Hodgson, 2018).

The main emphasis of scholars in Institutional economics is on the pivotal role played by well-functioning judicial systems in fostering economic growth, as institutions are responsible for the concrete enforcement of the legal framework. Indeed, in a context of uncertainty and incomplete contracts, a high performative judiciary cuts down transaction costs and opportunistic behaviors by acting as a deterrent against economic agents' deviations from previously signed contracts (Marciano et al., 2019).

¹ Smith, A. (1763), Lectures on Justice, Police, Revenue and Arms, Clarendon Press (1896) and Smith, A. (1776), An Inquiry into the Nature and Causes of the Wealth of Nations, London: Methuen

The present literature review focuses on a fundamental corner of the broader ‘institution and economic performance’ literature: the impact of judicial performance on multiple economic outcomes. Far from the scope of providing a comprehensive survey of the empirical studies on the topic, this Chapter concentrates on those academic works which, in the last two decades, have most underlined the importance of efficient courts in ensuring the effectiveness of a legal framework oriented to facilitate the economic activities.

The primary studies analyzed in this literature review have been searched in four academic bibliographic databases (EconLit, ReseachGate, Jstor and Springer Link) and a major working papers repository (RePEc), with also extensive use of Google Scholar. These searches were gradually narrowed according to two inclusion/exclusion criteria: the specific use of judicial performance indicators – with the exclusion of those studies that employ different contract enforcement measures or just the rule of law indices – and the reliability of the datasets’ structure and estimation techniques used in the empirical analysis.

This paper aims to provide scholars in Institutional economics and Trade theory with a general overview of state of the art, both as regards the key findings of the existing literature and the empirical approaches and indicators of judicial performance to prefer in the analysis of the impact of judicial system’s effectiveness on economic outcomes. To the very best knowledge of the author, a systematic assessment of the research on the topic has not yet been conducted; hence the present analysis attempts to fill this void². The present Chapter proceeds as follows: Section 2 sketches a descriptive synthesis of the analyzed studies. Section 3 outlines the key findings of these empirical works, starting with those concentrating on the effect of the courts’ performance on the development of financial and credit markets (subsection 3.1), firms’ size, performance and dynamics (subsection 3.2), and the availability and cost of credit (subsection 3.3), ending with the smallest portion of items that estimate the causal relationship between the judiciaries’ functioning and the loan payment delay (subsection 3.4), the sectoral specialization (subsection 3.5), competition in markets (subsection 3.6) and export trade flows (subsection 3.7). Section 4 specifically focuses on the judicial performance indicators employed in the literature, and Section 5 delineates the empirical approaches. Finally, conclusions and implications are drawn in Section 6.

2. Descriptive Synthesis of the Literature

This review analyzes 22 studies in the field of modern Institutional economics, which move from the basic assumption that well-functioning judiciaries are a crucial determinant of the economic performance, as they contribute to implementing two important prerequisites of the market economy. Indeed, the effectiveness of the legal environment ensures both the security of property rights and the good enforcement of contracts. Therefore, an effective legal system incentivizes agents to invest by protecting their returns, and to enter into economic transactions by dissuading opportunistic behaviors and reducing transaction costs (Giupponi et al., 2013).

² For a systematic review of the literature on the relationship between - the broader concept of -contract enforcement and investment, see Aboal et al. (2014).

Table 1 presents the primary studies organized according to the year of publication, authors, the objective of the analysis, the structure of the datasets, dependent variables, explanatory variables – among which, those related to judicial performance are listed first – and the employed estimation techniques.

The analyzed studies have been published mostly in refereed reviews (15 studies) and in working paper series or as conference presentations (7), in the period 2000-2020. All are available in English. While the majority of the analyses focus on the causal relationship between the judicial efficiency and the development of financial and credit markets (7 studies), the availability and cost of credit (5), and the firms' size, performance and dynamics (5), some evidence is also provided for the sectoral specialization (2), competition in markets (1) and loan repayment delay (2).

In this review, seven studies use the same measure of judicial performance, the majority of which are among the most recently published. These analyses assess the judiciary's functioning using the trial length, that is, the estimated time to resolve a dispute through courts. Three of these studies add other indicators to the judiciaries' speed. More specifically, Djankov et al. (2008) account also for the kind and cost of debt enforcement procedure, Chemin (2009) considers the violation of a precedent by the same or another High Court and Giacomelli and Menon (2013) employ, in addition to the estimated length of civil, labour and criminal cases, the litigation rate (that is the number of new proceedings over the total population).

Instead, four studies – three published after 2015 – concentrate on the judicial backlog accumulation by using the clearance rate, which measures whether a court keeps up with its incoming caseload as a proxy of courts' performance. Among these studies, Ippoliti et al. (2015) also account for the technical efficiency of national judiciaries and per capita public expenditure for judges' salaries.

Furthermore, Visaria (2007) assesses the judiciary by means of the pending cases, judges per capita, and various indicators for the debt recovery tribunals. Laeven and Majnoni (2003) employ indices for the enforcement of property rights by courts related to the degree of property protection and the rule of law.

A couple of empirical works rely on the agents' confidence in the contract's enforcement by courts. The two earliest studies analyzed in this paper employ measures of judicial functioning based solely on a survey. Lambert-Mogiliasky et al. (2007) proxy the judicial quality using the average rate of approvals by appellate courts. While Laeven and Woodruff (2007) score the perceived quality and impartiality of judges, resources, and contract legislation's adequacy, resolutions' enforcement, and the efficiency of public ministry and public registry of real estate property.

Finally, Acemoglu and Johnson (2005) and Qian and Strahan (2007) adopt the index of judicial procedure formalism constructed by Djankov et al. (2003) that measures the regulation of legal proceedings for the collection of a bounded check. Nunn (2007) estimates the impact of the judicial system by using the highest number of indicators, which are the courts' perceived independence, number of procedures, litigation costs, and the trial length.

Table 1. Empirical studies on the causal relationship between the judicial performance and economic activities

Year	Authors	Objective	Dataset	Dependent variable	Explanatory variables	Estimation techniques
2001	Cristini, Moya and Powell	Investigation on how variations in the effectiveness of the legal system across different provinces affect the development of credit markets	Panel data, 24 Argentina provinces, 1992-1997	Credit to the private sector as a percentage of GDP, loans in arrears as a percentage of the total credit to the private sector	Indices of the effectiveness of provincial judicial systems (index based on a survey on banks on legal costs, obstacles to judicial effectiveness and delays from court vacancy), public provincial banks, unemployment rate, the interest rate on interbank loans, participation of regional banks in the respective jurisdictions	OLS
2001	Cabral and Pinheiro	Analysis of the impact of the judiciary's contract enforcement on the credit market size	Panel data, 22 states of Brazil, 1990-1996	The ratio of total, rural and non-rural credit to GDP	Judicial inefficiency (index based on a survey: cost, slowness, unfairness) GDP per capita, the share of agricultural activities in GDP	OLS
2002	Johnson, McMillan and Woodruff	Investigation on how market players' confidence in courts' efficiency and firms' relational contracting affect transaction costs related to contracting with new partners and market activity in transition economies (from a planned economy to market)	Cross-section, data for 1,460 firms in Poland, Slovakia, Romania, Russia, and Ukraine, between 7 and 207 workers (survey)	Trade credit offered to customers	Sets of variables measuring the effect of courts (confidence in courts' contracts enforcement and used courts in recent disputes), bilateral relational contracting, trade associations, business networks, social networks and	Probit, Tobit regressions with fixed-effects
2003	Laeven and Majnoni	Investigation on the effect of judicial efficiency on the cost of bank credit (interest rate spreads across countries)	Data for 106 countries at an aggregate level and 32 countries at the level of individual banks, 2000	Interest rate spread (difference between the avg. lending rate and the avg. deposit rate)	Indices of efficiency and enforcement of property rights by the judiciary (degree of property protection, the rule of law), inflation rate, enforcement of liquidity requirements, restrictions on banks to engage into non-bank financial activities, restrictions on entry into banking, the share of state ownership in the banking system, the ratio of deposits of the largest banks to the total, degree of freedom in banking, the existence of a public credit register, the fraction of dollarization	OLS and IV (using legal origin as an instrumental variable)

Table 1. — (continued)

Year	Authors	Objective	Dataset	Dependent variable	Explanatory variables	Estimation techniques
2004	Fabrizio and Padula	Analysis of the causal relationship between the judicial enforcement of loan contracts and the allocation of credit to households	Cross-section, data for households' credit and debt from a Bank of Italy's survey (1989-1995-1998), total of 23,556 observations	Credit market participation (household's application for a loan/mortgage), credit rationing (household is credit constrained), households' debt	Legal enforcement of credit contracts (ratio of the backlog of pending trials to incoming trials in each district), age of household head, labor household income, collateral assets (by household), years of schooling, family size, retirement and unemployment, marital status, city size, GDP per capita	Model of household credit market with secured debt contracts (where the judicial system affects the cost incurred by banks to repossess the collateral), Probit
2005	Acemoglu and Johnson	Study on the importance of property rights and contracting institutions for the long-run economic growth, investment, and financial development of a country	Cross-section, data for 71 former European colonies: 25 with a common-law English legal origin and 46 with a civil law French legal origin	GDP per capita, the ratio of investment to GDP, credit to the private sector, and stock market capitalization as a percentage of GDP	Contracting institutions (index of legal formalism, the overall procedural complexity of resolving a case involving nonpayment of commercial debt, the number of distinct procedures involved in the same process), property rights institutions (constraint on executive, protection against expropriation, Heritage Foundation's private property index), other controls	OLS and IV (using the legal origin as an instrumental variable)
2005	Bianco, Jappelli and Pagano	Analysis of the effects of judicial enforcement on credit markets	Panel data, credit market data for 95 Italian provinces, and indicators of efficiency for 27 judicial districts, 1984-1998	The ratio of loans to GDP, credit rationing, spread between the lending rate and the T-bill rate, the ratio of values of non-performing loans to total loans	Length of trials, stock of pending trials, Herfindahl index, real GDP	Model of opportunistic debtors and inefficient courts, OLS, Fixed-Effect estimator
2006	Visaria	Investigation of the micro-level link between judicial quality and loan repayment delinquency	Cross-section, the total number of loans taken by 1831 Indian firms, sanctioned before and after (size of loans) Debt Recovery Tribunals act date (June 24 th , 1993)	Time taken to pay the invoices, size of the sanction-interest rate on the disbursement, the existence of a DRT	Cases pending, judges per capita, indicators for DRT, year-age of sanction, firm's assets, project type, loan currency and state of project location, borrower's industry, cash flow, GDP, credit per capita, growth rate, State-government indicators	Difference-in-difference strategy based on two sources of variation (the monetary threshold for claims to be eligible and staggered introduction of tribunals across Indian states), cross-sectional OLS, Probit, Fixed-Effect estimator

Table 1. – (continued)

Year	Authors	Objective	Dataset	Dependent variable	Explanatory variables	Estimation techniques
2007	Lambert-Mogiliansky, Sonin and Zhuravskaya	Analysis of the causal relationship between the efficiency of the regional judiciary and the performance of firms that reorganized following a bankruptcy law	Cross-section, data for Russian firms that started reorganization procedures in 1998	Change in sales, labour productivity, and product variety	Judicial quality (avg. rate of approvals by appellate courts), re-organization, regional governors' political popularity, leverage ratio, current liquidity, cost per unit of output, labour productivity growth, official employment, gross regional product per capita	Model of household credit market with secured debt contracts (where the judicial system affects the cost incurred by banks to repossess the collateral), Probit
2007	Laeven and Woodruff	Investigation on how judicial efficiency affects the distribution of firm size and ownership (proprietorships and corporations)	Panel data, Mexican states and the US, 25 two-digit sectors in 1998	Firm size (weighted avg. firm size in a specific industry-state and share of small firms in employment)	Judicial efficiency (score: perceived quality and impartiality of judges, adequacy of resources and contract legislation, resolutions' enforcement, public ministry and public registry of real estate property efficiency), costs of regulation, generalized trust, market size, incorporation intensity, financial development, foreign firms, years of schooling, per capita income	OLS and IV (using the legal origin as an instrumental variable)
2007	Num	Analysis of the impact of judicial efficiency on sectoral specialization (production of goods for which inputs require relationship-specific investments)	Data for 145 countries and 222 industries, 1997	Total exports from a country to all other countries in the world in a specific industry	Legal quality (index: judiciary's independence), the rule of law (agents' confidence), number of procedures, litigation cost, estimated length of legal procedures, legal origin, private credit to GDP, trade openness, contract, capital and skill intensity in each industry, value-added, intra-industry trade, TFP growth, Herfindahl index, GDP per capita, capital endowment, human capital endowment	Model of opportunistic debtors and inefficient courts, OLS, Fixed-Effect estimator
2007	Qian and Strahan	Examination on how legal protection of creditors and the enforcement of contracts by courts shape the ownership of bank loans as well as the price and non-price terms of these contracts	Cross-section, data for bank loans originated in 1994 through the middle of 2003 made to large borrowers located in almost 60 countries	Number of lenders, share owned by government or domestic banks, secured lending, loan maturity, drawn all-in spread (BPS over LIBOR), loan size	Legal formalism (index: substantive and procedural statutory intervention in judicial cases), property rights (index of judiciary's freedom), corruption, legal origin, re-organization procedure, creditor rights (index), GDP per capita, banks' claims on the private sector as a share of GDP, change in GDP	Difference-in-difference strategy based on two sources of variation (the monetary threshold for claims to be eligible and staggered introduction of tribunals across Indian states), cross-sectional OLS, Probit, Fixed-Effect estimator

Table 1. – (continued)

Year	Authors	Objective	Dataset	Dependent variable	Explanatory variables	Estimation techniques
2008	Djankov, Hart, McLiesh and Shleifer	Analysis on how judicial efficiency affects the development of financial and credit markets	Cross-section, data for 84 countries, GDP averaged over 1999-2003	Private credit as a share of GDP	The efficiency of contract enforcement (days to resolve a payment dispute through courts), the efficiency of the debt enforcement procedure (a measure which accounts for the kind of procedure, estimated time and cost), the origin of the bankruptcy laws, the strength of creditor rights, presence of credit information systems, GDP, GDP per capita growth, inflation	OLS
2009	Chemin	Examination of the impact of judicial speed on credit markets, agricultural development, and manufacturing performance	Panel data, 18 biggest states in India, 1971-1996	Real per capita agricultural bank finance, state's per capita registered and unregistered manufacturing domestic product, per capita state trade, hotel and restaurant domestic product, urban headcount (index)	Expected duration of a case in High Court, exp. duration interacted with the proportion of households owning no land, violation of a precedent by the same-another High Court, election year, dismissed appeals, Exp. Org. of State, Panchayats	OLS and IV with fixed-effects
2010	Fabbri	Investigation of the effect of judicial efficiency on the size of firms and the cost of bank financing	Panel data, 1,700 Spanish firms, 1990-1998	The interest rate on the stock of bank debt (avg.), size of the firm (stock of capital)	Length of trials (avg., days), firm age, listed firms, asset intangibility (R&D), Herfindahl index, GDP, households' savings	OLS with fixed-effects
2013	Giacomelli and Menon	Analysis of the causal relationship between judicial efficiency and firm size across municipalities, exploiting spatial discontinuities in tribunals' jurisdiction for identification	Data for Italian municipalities located along a jurisdiction border, 2008	Avg. plant size, number of plants over population, employment over population, avg. plant turnover, turnover growth	Estimated length of civil, labour and criminal cases, litigation rate (number of new cases over total population), population, the share of foreigners, bank branches, the share of graduates, level of crime and local tax rate	OLS

Table 1. – (continued)

Year	Authors	Objective	Dataset	Dependent variable	Explanatory variables	Estimation techniques
2015	Peev	Investigation of the impact of the access to external finance, governance (government effectiveness, the rule of law, regulatory quality, control of corruption), and economic liberalization on firm growth in European transition countries	Panel data, listed and unlisted firms in 10 European transition countries, 1996-2011	Sales growth, assets growth	Country governance (government effectiveness, regulatory quality, agents' confidence in the quality of contract enforcement, property rights, police and courts, control of corruption), country finance (domestic credit to private sector, ratio of non-performing loans to total loans, asset share of foreign-owned banks, real interest rate in the US) and economic liberalization (business, trade, monetary, investment and financial freedom)	IV with fixed-effects
2015	Ippoliti, Melcarne and Ramello	Investigation on the effect of judicial efficiency on the expectations about the reliability of the legal framework, as a relevant determinant of entrepreneurship	Data for 38 European countries, 2010	Enforcing contract – distance to frontiers (index)	Technical efficiency of national judiciaries, clearance rate, per capita public expenditure for judges' gross salaries, civil liberties (index), GDP per capita, years of schooling, life expectancy, population, legal origin	OLS, Truncated Regressions
2017	García-Posada, Martínez-Matute and Mora-Sanguinetti	Examination of the impact of regional variations in the loan contract enforcement in periods of sustained growth and recession on the credit market performance	Panel data, stock of credit granted to Spanish firms, 2001-2012	The ratio of total credit to GDP, the ratio of non-performing loans to total credit	Clearance rate (declaratory or execution judgments), crisis interaction, the weight of manufacturing, construction, and services, lawyers per capita, population	Fixed-Effect estimator
2017	Amirapu	Investigation of the effect of judicial efficiency on industries' reliance on contracts (transactions involving relationship-specific investments)	Cross-section, data for India's formal manufacturing sector over the period 1998/9-2007/8	The annualized growth rate of gross value, added, fixed capital, number of employees, and number of factories	District court efficiency (fraction of cases resolved within one year), contract intensity (industry-level measure of relationship-specificity), net state domestic product per capita, literacy rate, paved roads normalized to population, corruption (score), trust in people, people fair	OLS with fixed-effects

Table 1. – (continued)

Year	Authors	Objective	Dataset	Dependent variable	Explanatory variables	Estimation techniques
2020	Melcarne and Ramello	Analysis of the link between judicial efficiency in resolving liquidation bankruptcies and firms' (entry and exit) dynamics	Panel data, bankruptcy delays in 165 Italian provinces, 2005-2011	Firms' entry and exit rate (incorporated, collective and individual firms)	Bankruptcy delay (avg. years to solve a case), judicial delay, unemployment rate, income per capita, bank branches, lawyers, added value, production value, debts, construction and service sectors (firms), bankruptcy reform	OLS with fixed-effects
2020	Schiantarelli, Stacchini and Strahan	Examination on the effect of legal enforcement and weak bank balance sheets on borrowers' debt repayment incentives	Panel data, 2,6 million Italian firms' loan-level observations, 2008-2013	Loan repayment delay	Efficiency of justice (length of property execution proceedings), Bank characteristics (assets, liquidity, capitalization, stable sources of funding, losses from sovereign bonds holding), loan quality and lending relationship (share of borrowing, exposures),	OLS, IV with fixed-effects

Generally, a large portion of the studies, notably some of those that are most recently published, are based on a panel data structure. Others employ cross-section analyses with varying degrees of ingenuity and competence in choosing indicators and variables. The estimation techniques preference is given to the Ordinary Least Squares (OLS) and Instrumental Variables (IV, mainly using the legal origin as an instrumental variable) with fixed-effects or the Fixed-Effect estimator, but some authors use Probit and Tobit estimations, the Random-Effect estimator, or construct theoretical models.

3. Summary of Findings

The key findings of the 22 analyzed studies in Institutional economics are summarized in the following subsections and [Figure 1](#), starting with those empirical works that concentrate on the impact of the judicial system on the development of financial and credit markets, firms' size, performance and dynamics, and the availability and cost of credit. These are the main economic activities on which the literature in the present review is focused.

The section also reports the most significant conclusions of the smallest portion of items that estimate the causal relationship between the courts' performance and the loan payment delay, sectoral specialization, competition in markets, and export trade flows.

Figure 1. **Judicial Performance Impact on Economic Activities**



3.1 Development of Financial and Credit Markets

The analyzed studies mainly focus on the positive impact of well-functioning judicial systems on financial and credit markets development. Conversely, these analyses demonstrate that weak contract enforcement has a detrimental effect on markets' dynamics and economic growth. Cristini et al. (2001) explore how variations in the legal system's effectiveness across the 24 Argentine provinces have conditioned the development of credit markets. Their results show that provinces with low judicial efficiency have less credit available to borrowers and banks' non-performing loans are higher; thus, improvements in courts' performance would increase the availability of credit. Cabral and Pinheiro (2001) analyze the effect of the judiciary's contract enforcement on the Brazilian credit

market size, providing evidence that judicial inefficiency negatively impacts the volume of both rural and non-rural credits.

Acemoglu and Johnson (2005) focus on former European colonies and find that property rights institutions, which protect citizens against the expropriation risk, affect the long-run economic growth, investment, and financial development, while contracting institutions – proxied by an index of legal formalism, the overall procedural complexity of resolving a case involving nonpayment of commercial debt and the number of distinct procedures involved in the same process – matter for the form of financial intermediation.

In the same theoretical framework, Djankov et al. (2008) demonstrate that reductions in the time needed to recover a debt stimulate the development of the debt markets. Chemin (2009) measures the effect of the Indian length of proceedings on credit markets, agricultural development and manufacturing performance and shows that the judiciary's inefficiency affects the weaker sections of the country and the overall economy. More specifically, this author finds that farmers have less access to credit markets, which negatively impact on the agricultural development, and that contract-intensive sectors, such as registered manufacturing, are weakened by courts' delays.

Ippoliti et al. (2015), by using two different indicators of judicial efficiency, the clearance rate and the technical efficiency, concentrate on the relationship between national courts' performances and expectations about the reliability of the legal framework, as a crucial component stimulating entrepreneurial action. Their results underline the role played by judicial efficiency in reducing endogenous uncertainty in markets. García-Posada et al. (2017) analyze how differences in the availability of credit and the evolution of non-performing loans ratios in the Spanish economy may be justified by variations in the loan contract enforcement during periods of sustained growth and recession and show that an increase in the clearance rate of executions have a positive impact on the ratio of total credit to GDP.

3.2 Firms' Size, Performance, and Dynamics

Six studies in this review explore the link between judicial efficiency and firms' size, performance, and dynamics, providing empirical evidence of the importance of well-functioning courts for a business-friendly environment. As Lambert-Mogiliansky et al. (2007), who study the impact of the judicial efficiency in bankruptcy proceedings following the enactment of a bankruptcy reform in Russia and estimate that poor judicial efficiency is associated with a higher incidence of reorganizations. In fact, in regions with low courts' performance, firms that have re-organized according to the law had lower growth in sales, product variety, and labour productivity compared to firms not subject to bankruptcy proceedings. Conversely, in regions with high judicial efficiency, firms in re-organization outperformed firms not involved in bankruptcy proceedings.

Laeven and Woodruff (2007) examine the extent to which the distribution of firm size in Mexico is related to the legal system's effectiveness. These authors find that states with more efficient judiciaries have larger firms. In addition, the impact of the courts' performance is more significant in sectors dominated by proprietorships since a better legal system fosters the investments of firms' owners by diminishing the idiosyncratic risk they face. Giacomelli and Menon (2013) also investigate

the effect of the judiciaries on firm size, focusing on Italian municipalities and exploiting spatial discontinuities in courts' jurisdiction for identification. Their results show that the average firm size would significantly increase by halving the trial length.

Peev (2015) analyzes the determinants of firm growth in ten European transition countries by using, among others, indicators of governance that account for government effectiveness, regulatory quality, agents' confidence in the quality of contract enforcement, property rights, police and courts and control of corruption. This author empirically demonstrates that the countries which benefit the most from the economic liberalization's positive impact on firm growth are those with higher indicators of country governance.

Finally, Melcarne and Ramello's study (2020) explores the effect of the time needed to conclude a bankruptcy procedure on firms' entry and exit rates in Italy. Their results show that bankruptcy delay has a negative and significant impact on the entry and exit rates of partnerships of multiple entrepreneurs who share their liability. Indeed, quicker judicial resolutions reduce the indirect costs that a bankrupt firm must undergo, allowing an easier reallocation of assets towards more efficient destinations.

3.3 Availability and Cost of Credit

In the last twenty years, literature in Institutional economics has emphasized the significant effect of judicial efficiency on the availability and cost of credit, finding robust evidence of this causal relationship. Laeven and Majnoni (2003) investigate the impact of courts' performance on banks' lending spreads for a cross-section of 106 countries at an aggregate level and 32 countries at the level of individual banks and show that contract enforcement, in addition to inflation, is the key determinant of interest rate differences. Therefore, these authors suggest that judicial reforms aimed at enhancing the enforcement of legal contracts are essential to reducing the financial intermediation cost for firms and households.

Fabbri and Padula (2004) study the link between the degree of the legal enforcement of loan contracts and the allocation of credit to Italian households, using a model of household credit market with secured debt contracts where the working of the judiciary affects the cost incurred by banks to repossess the collateral, showing that the functioning of courts impacts on the probability of being credit-constrained and the equilibrium amount of debt. They empirically support these predictions and document that an increase in the backlog of pending proceedings is positively associated with the household probability of being turned down from the credit and is negatively related to the availability of credit, with a stronger effect for poorer than wealthier households.

Bianco et al. (2005) concentrate on the cost of enforcing contracts as a key determinant of market performance. These authors, by building a model of opportunistic debtors and inefficient courts, using panel data on Italian provinces and cross-country evidence, demonstrate both that improvements in judicial efficiency decrease credit rationing and increase lending and credit is less widely available in provinces with longer trials or more significant judicial backlogs. Qian and Strahan (2007) examine how legal formalism and origin, creditor rights, property rights, and financial development affect the design of price and non-price terms of bank loans in 60 countries. Their results

show that private contracts reflect differences in both the enforcement of contracts and the legal protection of creditors. Indeed, loans made to borrowers in countries where under default procedures, creditors can seize collateral are more likely to have lower interest rates, longer maturity, and to be secured.

Fabbri's study (2010) focuses on the effect of law enforcement on the cost of credit and the size of firms, empirically demonstrating that in the judicial districts with a higher length of trials, bank financing is more costly and firms are smaller. This analysis shows that stronger enforcement of creditors' rights enhances credit conditions and individual capital accumulation. Also, the quality of legal enforcement is positively related to individual savings.

3.4 Loan Repayment Delay

The present subsection aims at underlining the link between judicial efficiency and borrowers' repayment incentives and delinquency by analyzing two empirical contributions on this topic.

First, Visaria (2006) employs a loan-level data set from a large Indian bank to assess the effect of debt recovery tribunals' establishment – which accelerate banks' recovery of non-performing loans – on delinquency in loan repayment and finds that legal reform and improvements in the enforcement of loan contracts can reduce borrowers' delinquency, leading banks to provide cheaper credit.

Second, Schiantarelli et al. (2020) concentrate on Italian firms' delayed payment to banks weakened by past loan losses. Specifically, they estimate that weak balance sheets combined with ineffective legal enforcement erode borrower repayment incentives. These authors use court-level data to build an enforcement measure for creditors based on the length of proceedings regarding the execution of property across Italy, and they estimate that payment delays are higher when lenders are weak and legal enforcement is poor, even for the lowest risk borrowers.

3.5 Sectoral Specialization

This review also focuses on those empirical works investigating whether a country's ability to enforce written contracts is an important determinant of comparative advantage. Such as Nunn's study (2007) that combines a variable measuring, for each considered good, the proportion of its intermediate inputs that require relationship-specific investments with data on trade flows and judicial efficiency. The analysis suggests that countries with well-working judiciaries specialize in producing goods for which relation-specific investments are essential and that courts' performance indicators have a more explanatory capacity of the pattern of trade than skilled labour and physical capital combined together.

Similarly, Amirapu (2017) investigates the link between the functioning of formal judicial institutions and transactions involving relationship-specific investments by using variation across industries in their reliance on contracts along with differences across Indian states in the length of the trials. This author shows that the interaction is highly predictive of future growth in the Indian formal manufacturing sector.

3.6 Competition in Markets

The impact of the legal system's effectiveness on the competition in markets is explored by Johnson et al. (2002). They offer evidence for the post-communist countries of the positive effect of well-functioning courts on the level of trust in new relationships between firms and customers. Workable judiciaries also encourage entrepreneurs to try out new suppliers and, more generally, new interactions to start and develop by reducing barriers to entry.

3.7 Export Trade Flows

As mentioned above, several analyses in the Institutional economics' field have investigated the causal relationship between judicial performance and multiple economic activities; however, the impact of the effectiveness of the judicial system on the export flows' levels in bilateral trade has not yet been specifically explored. Therefore, Chapter 2 makes an effort to measure the causal impact of the efficiency of contract enforcement by national judiciaries on inbound trade levels. Chapter 2 employs estimation techniques generally used in the Institutional economics' empirical analyses that are Pooled OLS with fixed-effects and Fixed-Effect estimator, providing empirical evidence that a well-functioning justice system - in terms of quicker commercial disputes' resolution, a higher clearance rate, and businesses' perceived independence - improves the country's trade exchanges and consequently fosters its economic growth.

Furthermore, as regards the existing Trade theory gravity-model based studies, in contrast to the several academic studies investigating the effect of specific trade costs, only a small number of research examine the role of institutions in shaping up international trade³, and none of this focus specifically on the impact of well-functioning judiciaries.

Indeed, Trade theory keeps concentrating its attention on the nature of competition in international markets, endowments, technology, and preferences as the most relevant determinants of trade. However, as institutions determine costs that impact the profitability and feasibility of economic activity (North, 1990), the effectiveness of the institutional environment inevitably affects trade's magnitude and direction (Lee et al., 2007). Therefore, the Institutional analysis is essential to identify the causal factors of actual, rather than potential, international trade. It follows that the investigation also needs to be extended to the concrete functioning of the judicial systems which could

³ Such as Lee and Ranjan (2007), who create a gravity model where individuals consume two classes of goods and estimate that the contract enforcement – proxied with several indicators capturing different aspects of institutional quality – affects the volume of trade in both. Also using a gravity equation, Francois et al. (2007) employ a panel of bilateral trade to explore the influence of infrastructure and institutional quality, supporting with the empirical evidence that the export performance depends on access to well-developed transport and communication infrastructure as well as on a market-friendly legal and institutional environment. The causal relationship between the quality of the regulatory environment and the volume of trade is also investigated by Iwanow et al. (2007), with a particular focus on Africa's international competitiveness. These authors augment the gravity model with trade facilitation, regulatory quality and infrastructure indicators and point out how reforms in these fields are important in facilitating export growth for developing countries.

unveil if the set of legal rules is implemented to make the institutional environment effective (Hodgson, 2006; Voigt, 2013; Marciano et al., 2019).

Thus, Chapter 3, by exploring whether the countries' judicial performance affects the volume of bilateral trade - and hence augmenting the gravity equation with indicators of the efficiency, accessibility, and perceived independence of the national judiciaries - tries to shift the international Trade theory's attention on the Institutional analysis.

4. Assessing Judicial Performance

Once the importance of judicial institutions for economic activities has been made clear by the findings of the 22 analyzed studies in the previous section, it becomes necessary to shed some light on the indicators generally employed to assess their functioning. The judicial systems' performance comprises various dimensions, including the fairness of adjudications and courts' independence. Generally, institutional economists, prefer quantitative measures, emphasizing the 'production' of justice, in terms of the trials speed and the number of resolved cases (Marciano et al., 2019). The strength of the judicial performance indicators – or their 'validity' – is variable across these studies.

In the present literature review, seven empirical analyses consider the disposition time indicator as the most appropriate measure to assess the impact of judicial institutions. This simply metric estimates the time needed, in days or years, to solve a case through courts. The length of proceedings indicator has the merit of being extremely intuitive and of providing economic agents with valuable information capable of influencing their investment choices. Indeed, proceedings involve costs, which are positively associated with judicial delay. More specifically, these are the indirect costs linked to the waste of energy or investment opportunities or related to a longer-lasting uncertainty about the outcome of the dispute.

The European Commission for the Efficiency of Justice provides a standardized way to compute the disposition time indicator (CEPEJ, 2014). Given the number of pending, incoming and solved cases in a judicial organization i and in a period t , the judicial delay (JD) can be calculated as follows:

$$JD_{i,t} = \frac{\text{pending}_{i,t-1} + \text{pending}_{i,t}}{\text{incoming}_{i,t} + \text{solved}_{i,t}} \quad (1)$$

Another quantitative indicator of judicial effectiveness often used by institutional economists to evaluate judicial performance is the clearance rate (CR), which measures whether a court is keeping up with its incoming caseload and is employed in four analyzed studies. The rate of resolving cases can be seen as the result of the interaction between demand for and supply of justice (Giupponi et al., 2013), and it is computed as the ratio of solved to incoming cases (CEPEJ, 2014):

$$CR_{i,t} = \frac{\text{solved}_{i,t}}{\text{incoming}_{i,t}}$$

When the clearance rate is equal to 1, it means the judicial system can resolve as many cases as those come in; conversely, a rate of resolving cases minor than 1 implies the inability to fully handle incoming proceedings, thus accumulating over time an increasing backlog. This indicator can provide the policymakers with helpful information in order to implement actionable reforms where necessary⁴.

The length of trials and the clearance rate measures are often used as substitutes in the empirical analyses to assess the impact of the judicial system's effectiveness on economic activities; however, it should be noted that these two indicators are not necessarily related to each other. Indeed, it is widely agreed and quite intuitive to assume that an excessive time needed to resolve cases can raise fears of accumulating backlogs, but the excessive trial length is motivated by reasons that may differ from those explaining the clearance rate's level, such as the lack of alternative dispute resolution systems, the scarcity of resources invested at the state level in the judicial sector or the insufficient use of telematic and e-justice tools. At the same time, a high rate of resolving cases can be associated with obstacles to access to justice, including, for example, high costs of the claim. Litigation costs are often used as an indicator of accessibility, for example, by Nunn (2007). Therefore, these measures, by providing different and valuable information, are susceptible to be jointly estimated in empirical studies⁵.

Marciano et al. (2019) see a limitation in both the disposition time indicator and the clearance rate of not explicitly considering the inputs used. These authors underlie that the two measures do not allow, from a microeconomics perspective, to grasp whether the resources are efficiently employed. They find that these concerns can be overcome by estimating technical efficiency scores (TE), a more complex indicator used in one analyzed study: Ippoliti et al. (2015). The TE indicates the ability of a judicial unit to maximize the number of proceedings disposed with given endowments, such as physical ones and the number of judges. Efficiency scores range from 0 to 1 and are estimated as the radial distance of each unit from a deterministic production frontier of ideal efficiency⁶.

Once the most used quantitative measures to assess judicial performance have been examined, attention shifts to those empirical studies that employ indicators with a qualitative connotation. Indeed, the major criticism often made by lawyers to scholars in Institutional analysis moves from the emphasis on the production of justice in terms of trial speed and number of solved cases. Lawyers tend to consider this kind of indicators as very rough measures, unable to provide information on how the law is actually enforced (Marciano et al., 2019). For their part, economists have tried to capture the quality of judges' work in practice by constructing indicators of reliability, independence, and agents' confidence in the judicial system, mainly based on surveys that are by their very nature exposed to human bias. Such as, Laeven and Woodruff (2007), who score the perceived quality and

⁴ For the use of the disposition time indicator from the companies' perspective and the clearance rate from a policymakers' perspective to assess the impact of judicial performance on trade flows, see Chapter 2.

⁵ For jointly using these indicators in a panel-gravity model analysis, see Chapter 3.

⁶ Interpretation of these scores, in an output-oriented specification with given inputs, can work as follows: if a judicial unit has a TE = 0.3, it can resolve 30% of the cases that an otherwise ideally efficient unit would resolve.

impartiality of judges, and Nunn (2007), employing, among others, a courts' perceived independence index.

A particular approach that stands out from the others is followed by Lambert-Mogiliansky et al. (2007), who attempt to assess the judicial quality by using a quantitative measure, that is, the average rate of approvals by appellate courts as an – probably questionable – indicator of the correctness of the decisions taken by tribunals at first instance.

Furthermore, two studies in this review, Acemoglu and Johnson (2005) and Qian and Strahan (2007) evaluate the judicial system by means of the indices of procedural formalism, firstly proposed by Djankov et al. (2003), which are constructed from a survey of lawyers assessing the legal procedures for the collection of a bounded check, in terms of number, timing, and existence of alternative mechanisms of resolution. These indices might be criticized since they provide estimates for judicial performance's dimensions that can be more properly evaluated through quantitative data than opinions.

Anyway, the difficulties associated with the construction of qualitative measures should not dissuade economists from using them together with quantitative indicators in evaluating judiciaries' functioning. This might be considered as a more comprehensive and reliable approach to capture the multi-faceted nature of the judicial performance.

5. Empirical Approaches

As regards the estimation techniques, Table 1 shows that the most recent analyzed studies in Institutional economics employ panel data and give preference to Ordinary Least Squares (OLS) regressions with fixed-effects or the Fixed-Effect estimator, which accounts for the variations within identities, and control for the effect of time-invariant variables with time-invariant effects. Also, seven empirical works address endogeneity issues by employing instrumental variables (IV) estimations – the usual strategy for causal inferences – and using the legal origin as an instrumental variable.

A further generally used approach to evaluate the impact of the effectiveness of the judicial system on economic outcomes is the construction of theoretical models. Such as, Fabbri and Padula (2004) who build a model of the household credit market with secured debt contracts, where the judiciary's functioning affects the cost incurred by banks to repossess the collateral. Bianco et al. (2005) construct a model of opportunistic debtors and inefficient courts. Improvements in judicial efficiency should decrease credit rationing and increase lending. They support these predictions using panel data on Italian provinces and cross-country evidence.

Finally, another estimation methodology employed in this research field is the difference-in-difference strategy, adopted by Visaria (2006) and Lambert-Mogiliansky et al. (2007). The first author uses two sources of variation: the monetary threshold for claims to be eligible and the staggered introduction of tribunals across states. The latter empirical work is based on a difference-in-difference strategy to estimate the effect of the quality of the judicial system on restructuring firms under bankruptcy procedures and the effect of political popularity of regional governors.

All analyzed studies have performed robustness tests either by introducing new control variables in the regressions, by using different methods of estimation or analyzing different data samples. Melcarne and Ramello (2020) perform a specific and useful check to address reverse causality concerns: these authors estimate the basic equation for collective firms lagging the bankruptcy delay regressor by one year.

6. Conclusions and Implications

This 20-year literature review has underlined the pivotal role of well-functioning judiciaries in ensuring the effectiveness of a legal framework oriented to facilitate economic activities. The 22 analyzed studies in modern Institutional economics move from the basic assumption that a high courts' performance is a crucial determinant of the economic outcomes, as judicial institutions contribute to implementing two important prerequisites of the market economy. Indeed, the effectiveness of the legal environment ensures both the security of property rights and the good enforcement of contracts. Thus, an effective legal system incentivizes agents to invest by protecting their returns and to enter into economic transactions by dissuading opportunistic behaviors and reducing transaction costs (Giupponi et al., 2013).

These studies support with robust empirical evidence that the functioning of enforcing institutions affects the development of financial and credit markets (Cristini et al., 2001; Cabral and Pinheiro, 2001; Acemoglu and Johnson, 2005; Djankov et al., 2008; Chemin, 2009; Ippoliti et al., 2015; Garcia-Posada et al., 2017), firms' size, performance and dynamics (Lambert-Mogiliansky et al., 2007; Laeven and Woodruff, 2007; Giacomelli and Menon, 2013; Peev, 2015; Melcarne and Ramello, 2020), availability and cost of credit (Laeven and Majnoni, 2003; Fabbri and Padula, 2004; Bianco et al., 2005; Qian and Strahan, 2007; Fabbri, 2010), loan repayment delay and borrowers' delinquency (Visaria, 2006; Schiantarelli et al., 2020), sectoral specialization and transactions involving relationship-specific investments (Nunn, 2007; Amirapu, 2017), competition in markets (Johnson et al., 2002) and export flows (see Chapter 2; Chapter 3).

More specifically, the present paper aimed to provide scholars in Institutional economics with a general overview of state of the art in the assessment of the impact of the judicial system's effectiveness on multiple economic activities, as regards the key findings of the existing literature, the empirical approaches and indicators of judicial performance to prefer in this research field. Also, the literature review leaves room for further research in the Trade theory context shifted on the importance of institutions: although the effectiveness of the institutional environment affects trade magnitude and direction, the bulk of the existing gravity model-based literature on international trade keeps not concentrating on the institutional analysis. As institutions determine costs that impact the feasibility and profitability of the economic activities, focusing on institutional details is important to identify the determinants of the actual, rather than potential, volume of trade (North, 1990). It follows that the investigation on the causal factors of international trade flows needs also to be extended on

the concrete functioning of the judiciary, which could unveil if the legal system is enforced in a way that makes the institutional environment effective⁷.

⁷ For a panel-gravity model approach analyzing the effect of the judicial performance on intra-European export flows, see Chapter 3.

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Chapter 2

Judicial Performance and intra-European Export Trade Flows

Abstract The present paper explores the link between judicial performance and international trade flows, focusing on intra-European exports. Relying on previous works dealing with the impact of the legal system's enforcement on economic activities, this study stresses the idea that the judicial efficiency and the importing country's perceived independence may affect its inbound trade flows.

More specifically, the results from the empirical analysis demonstrate that a faster resolution of proceedings, a higher clearance rate and a better businesses' perception of a European country's judiciary increase the exported value of goods and services by foreign companies to that country. Conversely, an ineffective legal environment appears to discourage international trade and does not allow interested economies to fully exploit its positive effects on economic development.

1. Introduction

The importance for the wealth of nations of property rights and legal enforcement has been emphasized since the 18th century, as confirmed by Adam Smith's work¹. During the 19th and most of the 20th centuries, this concept received new life and various schools of thought came to agree that secure property rights and effective contract enforcement are crucial to foster economic and trade development (Scully, 1988; Acemoglu et al., 2001; Glaeser et al., 2004; Rodrik et al., 2004; Hodgson, 2018). Nowadays is widely shared in the literature of modern institutional economics the need not to limit the investigation to *de jure* institutions but to extend it to *de facto* institutions, which are meant to unveil if the set of legal rules is implemented in a way that makes the institutional environment effective (Hodgson, 2006; Voigt, 2013; Marciano et al., 2019).

It follows that improving the effectiveness of justice systems is essential for respecting the rule of law. Indeed, an independent and efficient judiciary allows the very existence of the rule of law, the practical application of the law and the mutual trust needed to develop a business-friendly environment. Therefore, in a context of uncertainty and incomplete contracts, a well-functioning judicial system is concretely able to cut down transaction costs and opportunistic behavior by acting as a deterrent against economic agents' deviations from previously signed contracts (Marciano et al., 2019).

¹ Smith, A. (1763), Lectures on Justice, Police, Revenue and Arms, Clarendon Press (1896) and Smith, A. (1776), An Inquiry into the Nature and Causes of the Wealth of Nations, London: Methuen.

The present study explores explicitly whether the actual functioning of a country's judicial system affects its international trade flows and, consequently, its outward orientation and economic growth.

The paper proceeds as follows: Section 2 sketches the theoretical framework linking judicial performance and economic activity. Section 3 focuses on the role of international trade in fostering economic development. Section 4 delineates the regulatory profiles of trade exchanges between European countries. Section 5, in subsections 5.2 and 5.3, outlines the hypothesis investigated more precisely and describes the dataset and the empirical strategy. Subsection 5.3 presents and discusses the results. Finally, conclusions are drawn in Section 6.

2. Judicial Performance and Economic Activities

In the last twenty years, a vast literature has focused on the link between the regulatory regimes and economic growth (La Porta et al., 1998; Djankov et al., 2002; Alesina et al., 2005; Acemoglu and Johnson, 2005; Peev, 2015), providing growing evidence of the pivotal role played by efficient courts in ensuring the effectiveness of a legal framework oriented to facilitate economic activity. Hence, most literature has underlined the relationship between assessing the national judicial performance and the perceived reliability of the domestic enforcing contracts' system (Ippoliti et al., 2015). Such as Jappelli et al. (2005), who focus on the cost of enforcing contracts as a key determinant of market performance. The authors empirically demonstrate this point about the credit market by building a model of opportunistic debtors and inefficient courts. Improvements in judicial efficiency should decrease credit rationing and increase lending. They support these predictions using panel data on Italian provinces and cross-country evidence, finding that credit is less widely available in provinces with longer trials or more significant judicial backlogs.

Arellano et al. (2007) construct a theoretical model to understand how the degree of the national contract enforcement affects firms financing decisions through a comparative study on firms' financing patterns in the United Kingdom and Ecuador. These authors observe that UK's more vigorous contract enforcement translates into a more extensive set of available loans, as it acts as a subsidy on borrowing. It thus enables small firms – which are mostly affected by the scarcity of wide loans because of their low firm value - to issue more debt².

The causal relationship between the speed of judiciaries and economic growth is also explored by Chemin (2009), who measures the effect of the Indian length of proceedings on credit markets, agricultural development and manufacturing performance. Other empirical analyses have further confirmed that a well-functioning justice system positively affects economic activities, such as Melcarne and Ramello's study (2020) related to the impact of the time needed to conclude a bankruptcy procedure, in a specific court and year, on firms' entry and exit rates in Italy. Their results show that bankruptcy delay has a negative and significant impact on the entry and exit rates of partnerships of multiple entrepreneurs who share their liability. Indeed, quicker judicial resolutions reduce the indirect costs that a bankrupt firm must bear, allowing an easier reallocation of assets towards more efficient destinations.

² Conversely, the weaker Ecuadorian enforcement operates like a tax on borrowing.

In the same theoretical framework, Schiantarelli et al. (2020) concentrate on Italian firms' delayed payment to banks weakened by past loan losses. Specifically, they estimate that weak bank balance sheets combined with ineffective legal enforcement erode borrowers' debt repayment incentives. These authors use court-level data to build an enforcement measure for creditors based on the length of proceedings regarding the execution of property across Italy, and they estimate that payment delays are higher when lenders are weak and legal enforcement is poor, even for the lowest risk borrowers.

The present paper tries to further extend the understanding of this various evidence³ by investigating the existence of a relationship between the national judiciary's performance and its international trade flows levels or, more precisely, whether the efficiency and the perceived independence of a European country's judicial system can affect the foreign firms' willingness to export goods and services to that country.

3. Trade, Economy, and Institutions

The role of trade in fostering economic growth has been emphasized since the works by Grossman and Helpman (1990), Romer (1990) and Young (1991), which had the merit of stimulating a large body of academic studies, most of that supported with empirical evidence a positive impact, in the long-run, of trade openness on growth (Frankel et al., 1999; Dollar et al., 2004; Freund et al., 2008; Chang et al., 2009)⁴. This conclusion - widely agreed by scholars, at least with regard to developed countries - finds its reasons in the access to goods and services provided by trade openness and in its contribution in achieving efficiency in the resources' allocation, as well as in improving total factor productivity through the spread of knowledge and technology (Rivera-Batiz et al., 1991; Barro et al., 1997; Keho, 2017).

Far from the scope of providing a survey of the literature on the topic, what is important to underline, for the present paper, is that trade, as one of the several catalysts of growth and productivity, produces its positive effect depending on its weight in economic activity (Singh, 2010).

In this perspective, intuition – confirmed by empirical analysis (Rodrik, 2000; Rauch and Trindade., 2002; Anderson and Marcouiller, 2002; Anderson and Young, 2006) – suggests that the imperfect enforcement of contracts constitutes a limitation for trade. To give an example, Anderson and Marcouiller (2002) demonstrate that by using a structural model of import demand in which insecurity is considered a hidden tax on trade, corruption and imperfect enforcement dramatically constrain the Latin American countries' international trade as much as tariffs do. Thus, countries should undertake reforms compatible with internal institutional capabilities not to fail to capture gains from international trade. Gains that those improvements in contract enforcement would precisely stimulate.

³ For a more comprehensive literature review, see Chapter 1.

⁴ Other studies argue to the contrary (Vlastou, 2010; Ulasan, 2015; Polat et al., 2015; Musila et al., 2015). These different conclusions could derive from econometric strategies, the proxy variable used for trade openness and the heterogeneity – in technological and institutional development and trade policy - of the economies included in the sample of countries, which violets the cross-sectional homogeneity assumption of most analyses that employ panel data regression approach (Keho, 2017).

The present study makes an effort to measure the causal impact of the efficiency of contract enforcement by national judiciaries on inbound trade levels, assuming that a well-functioning justice system - in terms of quicker commercial disputes' resolution and higher perceived independence - improves the country's trade levels and consequently foster its economic growth.

As mentioned above, several analyses have been conducted on the relationship between judicial performance and multiple economic activities; however, the link between the former and the export trade flows has not yet been empirically explored. Therefore, the present paper aims to fill this gap and provides helpful information to policy-makers that might encourage judicial reforms where appropriate.

4. Regulatory Framework

Due to the homogeneity of the legal framework and commercial policy that applies between countries, the present analysis focuses on intra-European trade flows. Indeed, the European Union is the typical example of a customs union. That entails, on the one hand, the prohibition of imposing between the Member States both customs duties and quantitative restrictions on imports as well as any charges or measures having equivalent effect, and on the other, the application of a common tariff in their relations with third countries⁵. Therefore, European goods⁶ and services are free to circulate between the Member States, within an area without internal frontiers⁷. Conversely, goods from third countries exported to the European customs territory and intended to be definitively placed on the EU market are subject to import duties. Hence, this analysis considers only the trade flows between European countries and does not account for the effects of any tariffs or restrictive measures.

The jurisdiction, recognition and enforcement of judgments in commercial matters are governed, in relations between the Member States, by the Regulation (EU) No. 1215/2012 of the European Parliament and of the Council of 12 December 2012, which is by its very nature directly applicable in each EU country and prevails over any incompatible national rule. This Regulation entered into force on 1 January 2015, replacing the Council Regulation (EC) No. 44/2001 of 22 December 2000, which, however, for what interests in this paper, provides similar provisions⁸.

Under Article 7 of the Reg. (EU) No. 1215/2012, jurisdiction in contractual disputes between counterparties domiciled in different Member States is attributed to the courts for the place of performance of the obligation in question. This shall be the place in an EU country where, under the contract, the goods were delivered or should have been delivered in the case of sale of goods, or the services were provided or should have been provided in the case of the provision of services.

The attribution of jurisdiction by the Regulation to the courts of the obligation's place of performance explains why the present paper concentrates on intra-European trade flows relating to exports. It also attempts to estimate how much these export flows are affected by the destination countries' judicial performance.

⁵ See articles 26 and 28 of the Treaty on the Functioning of the European Union.

⁶ The European goods that originate in the Member States or come from third countries are in free circulation in the EU area.

⁷ That is the so-called internal market.

⁸ The clarification is due as this analysis estimates the impact of judicial performance on trade flows between 2014 and 2018.

However, Article 25 of the Regulation allows the parties to agree in writing and *ex-ante* that a court or the courts of a Member State have jurisdiction to settle any disputes that have arisen or may arise in connection with a particular contractual relationship. Then that court or those courts shall have jurisdiction unless the agreement is null and void as to its substantive validity under that Member State’s law.

Nonetheless, this study assumes that the exporting party is unwilling to incur the transaction costs related to the necessary bargaining with the trade partner to obtain such a shift of jurisdiction. Furthermore, the exporting company’s affixing of this clause might result in the loss of profit opportunities, as the potential buyer decides to turn to a different seller who does not ask for the same disadvantageous contractual condition. Also, according to Article 19 of the Reg. (EU) No. 1215/2012, if the importing party is a person, the consumer, who has concluded the contract for a purpose that can be regarded as being outside his trade or profession, the jurisdiction is susceptible of displacement only with an agreement which is entered into after the dispute has arisen. As logic suggests, this *ex-post* arrangement would be even more difficult for the exporting party to achieve.

5. Empirical Analysis

5.1 Data

The present empirical analysis covers the period between 2014 and 2018⁹, focusing for each year on the 28 judicial systems of the Member States of the European Union¹⁰. When a commercial dispute arises between an exporter from a European country and its importing partner domiciled in another Member State, as mentioned above, under Article 7 of Reg. (EU) No. 1215/2012, the procedure is carried out by the court that has territorial jurisdiction in the country of performance of the obligation in question.

Thus, assessing the judiciary’s efficiency of the importing EU State could affect foreign exporters’ decision to sell goods or services to that country. The multi-faceted nature of judicial performance is captured in terms of the efficiency of the justice system by two indicators, which are the Length of proceedings¹¹ and the Rate of resolving cases¹². The first one indicates the estimated time needed to resolve litigious civil and commercial cases (in days) in court in a specific year/country, meaning the court’s time to decide for the first instance. This ‘disposition time’ indicator is computed as the number of unresolved cases divided by the number of resolved cases at the end of a year multiplied by 365 days, that is:

$$\text{Length of proceedings} = \frac{\text{Pending cases at the end of a period}}{\text{Resolved cases in a period}} \times 365$$

⁹ It is precluded to further extend the time under study due to yearly data availability relating to judicial performance indicators.

¹⁰ The United Kingdom is included as it left the European Union on 31 January 2020 and all EU rules continued to apply to the UK until 31 December 2020.

¹¹ Unavailable data for Bulgaria, Ireland and the UK. Data for Belgium are referred exclusively to 2015 and for Cyprus to 2014.

¹² Unavailability of data for Bulgaria, Ireland and the UK.

Instead, the second is the clearance rate, which is calculated as the ratio of the number of commercial and civil resolved cases to incoming commercial and civil cases in a specific year/country. It measures whether a court is keeping up with its incoming caseload:

$$\text{Rate of resolving cases} = \frac{\text{Resolved cases in a period}}{\text{Incoming cases in a period}} \times 100$$

When the clearance rate is about 100% or higher, it means the judicial system can resolve at least as many cases as those come in; conversely, a clearance rate below 100% indicates that the courts resolve fewer cases than the number of incoming cases.

Besides, to evaluate judicial independence, this study uses the survey-based WEF¹³ indicator on businesses' perception, which associates higher values with a better perception¹⁴. It is assumed that the Perceived independence operates as an index of the competitiveness - or as a more robust/weaker warranty of reliability for foreign companies - of a national judicial system and, indirectly, of that country's ability to achieve sustained prosperity and growth levels.

These three indicators of judicial performance are the variables of interest in the present analysis.

Data on the annual export trade flows of each Member State to each other European country are taken from the Trade by partner country and activity dataset provided by Eurostat, which reports the value¹⁵ (thousand euro) exported by companies trading in all NACE¹⁶ activities. Thus, it is possible to extract 708 trade flows for the period 2014-2018, that correspond to 3540 observations on an annual basis¹⁷.

Some variables – related to the importing Member State in a specific year - are used as controls to account for other time-varying factors. Concerning the countries' transport infrastructure development, which is vital to the well-functioning of economic activities as it ensures the distribution of goods and the provision of services, the present study controls for the Railway Transport. This variable indicates the length of railway lines (in km) normalized to the land area (in km²) of each

¹³ World Economic Forum.

¹⁴ The WEF indicator is based on survey answers to the question: 'In your country, how independent is the judicial system from influences of the government, individuals, or companies? [1 = not independent at all; 7 = entirely independent]'. Responses to the survey come from a representative sample of businesses economy's main sectors: manufacturing industry, non-manufacturing industry, agriculture and services in all the concerned States. For example, the 2017 edition captured the views of 14,375 business executives in over 148 economies between February and June 2017. By following the WEF's data editing process, a total of 12,775 responses from 133 economies were retained. The survey is conducted in various ways, including telephone interviews or face-to-face, online surveys and mailed paper forms.

¹⁵ The value of traded goods is calculated at the national frontier on an FOB basis.

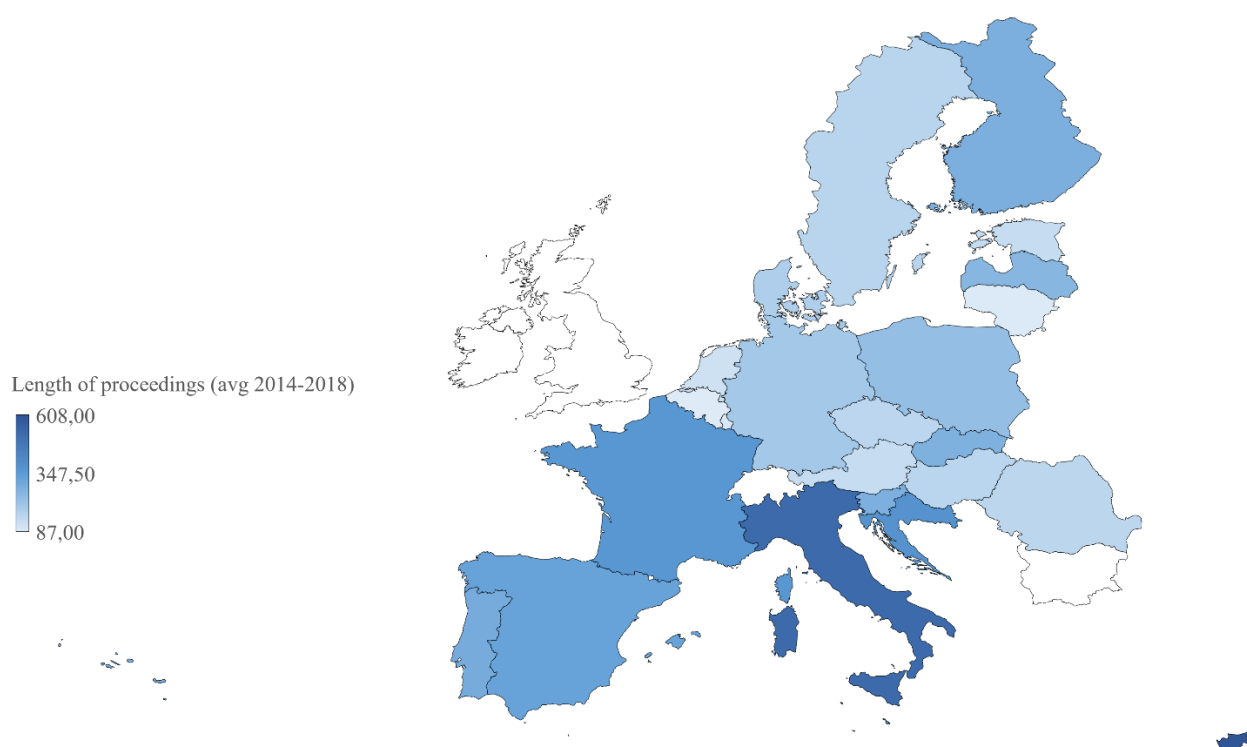
¹⁶ The Statistical classification of economic activities in the European Community (NACE). NACE is mandatory within the European Statistical System. This study refers to the NACE Rev. 2 version, adopted at the end of 2006.

¹⁷ There are missing data for 48 trade flows, referring mainly to exports from Belgium, Cyprus and Croatia.

country¹⁸. Furthermore, this paper accounts for the Real GDP per capita - calculated as the ratio of real GDP to the average population of a specific year - to control the general economic situation within a national judiciary. The Real GDP per capita represents an inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a year and is also used as a proxy for the development of a country's material living standards. Finally, by measuring the number of people having their usual residence in a country on 1 January of the respective year, the Population indicator accounts for the breadth and then the heterogeneity of potential buyers in a State. Consequently, it might be positively associated with the opportunities of selling. These variables are expected to affect the exporter's selling decision of goods or services to a specific country; however, since this is an exploratory analysis, there is the awareness that the same ones do not have a decision-making process's total explanatory capacity. Indeed, as known, there are other factors involved. [Table 1](#) reports a description of all variables.

As emerges from [Table 2](#) and [Figures 1-2-3](#), the values of the indicators of judicial efficiency and perceived independence tend to vary considerably across the European Union since, despite the integration process, significant economic and institutional differences still exist between the Member States. Indeed, while the mean value of the Length of proceedings corresponds to less than a year, some European countries' courts take almost two years to resolve a dispute in the first instance.

Figure 1 Length of proceedings (avg 2014-2018)



¹⁸ Eurostat provides datasets on the total length of railway lines and the total surface area of land in the country.

Figure 2 Rate of resolving cases (avg 2014-2018)

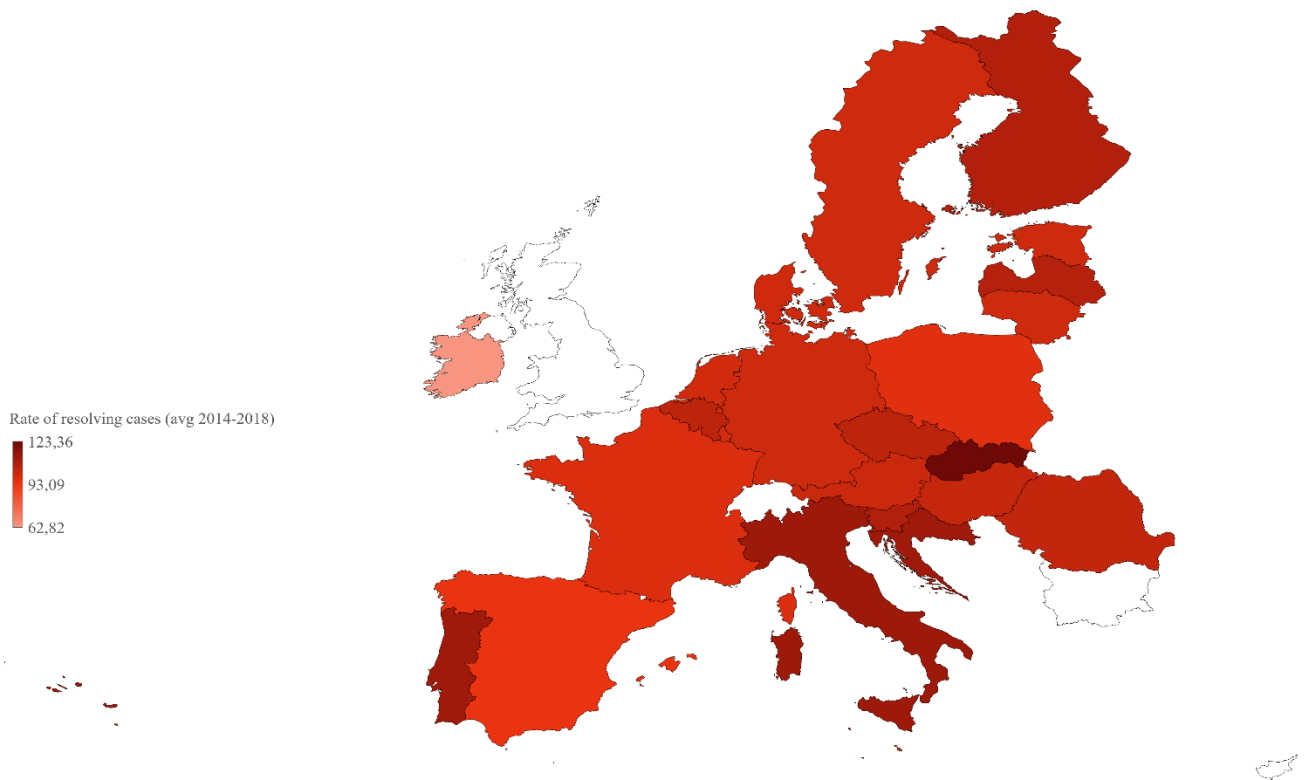


Figure 3 Perceived independence (avg 2014-2018)

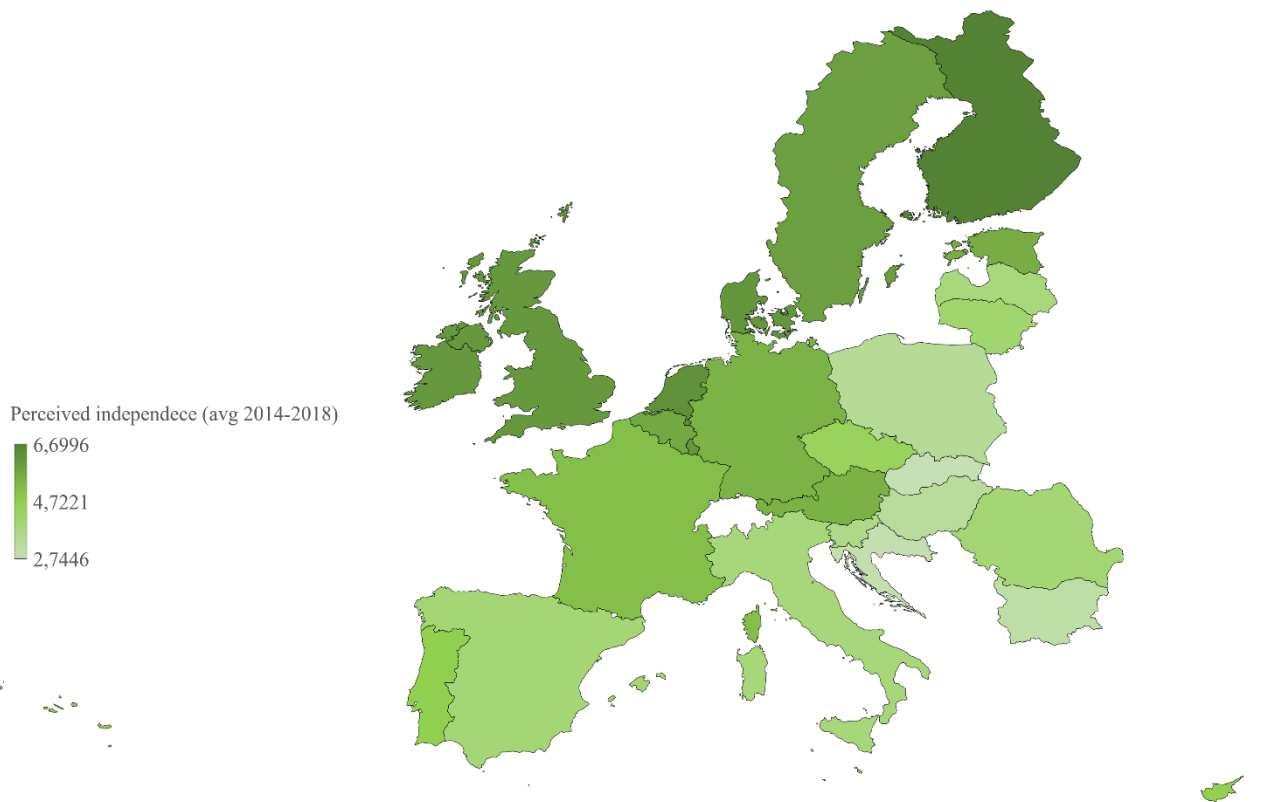


Table 1 Variables description

Variable	Description	Source	Unit
<i>Dependent variable</i>			
Exported value	Value of traded goods/services by companies	Eurostat	From MS to MS
<i>Variables of interest</i>			
Length of proceedings	Time needed to resolve cases	CEPEJ	Judicial country system
Rate of resolving cases	Clearance rate	CEPEJ	Judicial country system
Perceived independence	Businesses' perception of judicial independence	WEF	Judicial country system
<i>Controls</i>			
Railway transport	Railway length normalized to the land area surface	Eurostat	Country
Real GDP per capita	The ratio of real GDP to the average population	Eurostat	Country
Population	The resident population in a country on 1 January	Eurostat	Country

Table 2 Descriptive statistics – all variables

Variable	Mean	Std. dev.	Min.	Max.	<i>N</i>
Exported Value	3,709,303	9,802,176	163.46	91,706,460.94	3,540
Length of proceedings	250.732	133.722	84	610	2,953
Rate of resolving cases	102.349	11.559	56	133	3,165
Perceived independence	4.701	1.206	2.38	6.818	3,540
Railway transport	0.053	0.028	0.017	0.121	3,175
Real GDP per capita	25,967.92	16,209.1	5,530	83,470	3,540
Population	1.85	2.32	429,424	82,792.351	3,540

Also in the perspective of the Rate of resolving cases indicator, there are judicial systems that only reach about 60% - such as Ireland – and hence accumulate over time an increasing backlog.

In 2018, the Member States' highest clearance rates were reported in Hungary (116%) and the Slovak Republic (131%). Lithuania had a Rate of resolving cases of 104% and one of the lowest disposition time indicators of 84 days. Countries with favorable clearance rates and slow proceedings – such as Italy with a clearance rate of 103% and a length of 527 days - are fighting backlog but struggle with timeliness in this kind of circumstances. In the same last year observed, judiciaries of Poland and Spain accumulated backlog, but the time needed to resolve litigious cases is still within the acceptable range. The disposition time indicator is higher in France, Greece and Malta, raising fears of further

accumulation of backlog. Justice systems that are facing such challenges should then introduce some actionable measures.

Over the period 2014-2018, most judiciaries demonstrated an overall improvement in the Rate of resolving cases. Individually, this indicator has mainly fluctuated over time; indeed, neither Member State achieved a constant incline in its clearance rate, but Austria and Italy kept their results equal to or above 100% throughout the period observed. Moreover, the Slovak Republic's judiciary made the most considerable improvements. Various internal and external reasons might justify low rates of resolving cases; however, if these values are significantly deficient or report a decreasing trend - as in the case of Greece and Ireland – become problematic since accumulating backlog generates increases in the time needed to resolve disputes (CEPEJ, 2020).

Instead, the judiciaries perceived as less independent by businesses between 2014 and 2018 are Croatia, Hungary and the Slovak Republic. Conversely, courts and judges of Finland, the Netherlands and Sweden are considered the most reliable ones.

The highest exported values in the five years are associated with the trade flows from the Netherlands to Germany, particularly in 2018, the latter being one of the Member States with the fastest resolution of disputes in civil and commercial matters, as well as higher clearance rate and businesses' perceived independence. On the contrary, the lowest values are observed in the export flow from Malta to Latvia, which implements a judicial performance utterly opposite to that of Germany, the largest importer-exporter of the European Union.

5.2 Identification Strategy

This paper presents an empirical strategy to assess the impact of the judicial performance of the importing European country on the inbound export trade flows levels, which follows a twofold subjective perspective. Concerning the judicial efficiency indicator, the basic assumption is that the policy-maker might be interested in observing the clearance rate. At the same time, companies might take the Length of proceedings into greater consideration.

As mentioned above, the increase in the Rate of resolving cases has, by its nature, a prodromal effect on the disposition time; therefore, it is logical to expect that the national policy-maker concentrate more on the first, from an anticipatory perspective that looks at the problem's indicator rather than to the result. In fact, for the profile of interest in this study, it is assumed that the policy-maker has or should have concerns about the ineffectiveness of the country's judicial system associated with the consequent inability to take advantage of the opportunities for economic growth deriving from international trade.

Otherwise, foreign companies may not be interested in analyzing an index that highlights the possible negative consequences of the loss of judicial efficiency in the importing countries. What companies might focus on when choosing an importing partner is, more concretely, the current length of proceedings in the Member State of performance of the obligation - whose courts have jurisdiction under the Reg. (EU) No. 1215/2012. Indeed, the onset of a possible commercial dispute involves costs to be incurred, which are generally positively associated with the duration of the procedure. These are, more specifically, the 'indirect' costs linked to the more significant waste of energy that a slower procedure requires or to a longer-lasting uncertainty about the outcome of the dispute or again, in the

event of contractual breach by the buyer, to the eventual loss of trade/investment opportunities, due to the temporary lack of resources in the time needed by the procedure to conclude¹⁹.

Consequently, from the foreign companies' perspective, it is possible to hypothesize the overall effect of the Length of proceedings of the importing country on their exported value to that country to be negative, while from the policy-maker's point of view, a positive association is expected between the national clearance rate and the in-entry export trade flows.

Instead, the judicial Perceived independence indicator is considered as a variable of interest in both perspectives, since for the national policy-maker, it represents an index of its judiciary's competitiveness on an international level, whereas, for foreign companies, the impartiality of the judges and the fairness of the court procedures translate into a warranty of the importing country's justice system reliability against the risk of a completely unpredictable judicial outcome. Therefore, a positive impact of the businesses' perception of the national judicial independence on the considered flows is expected.

Hence, this study follows a cross-country approach, which considers intra-European export flows of goods and services only, due to the uniformity of the EU regulatory framework on the jurisdiction in commercial matters and the absence of frontiers, tariffs and restrictive measures in trade between the Member States. As mentioned above, the Length of proceedings, the Rate of resolving cases and the Perceived independence tend to vary substantially across the European Union, according to the heterogeneous judicial organization and the different complexity of the legal systems that still characterize the EU countries. The present analysis uses the Railway transport, Real GDP per capita, and Population variables - above described - as controls to capture the differences in the socio-economic and infrastructural environment of each importing Member State. The Exported value, the Real GDP per capita and the Population indicators are transformed into natural logarithm because of their right-skewed distributions.

Moreover, this study exploits the panel structure of the collected data and adopts a double fixed-effect strategy²⁰. Accordingly, both year dummies and exporting country dummies are introduced in the first econometric model, that is a pooled OLS regression. The formers are meant to capture shocks affecting the intra-European trade, while fixed effects for the exporting Member States (all trade flows from a country) are introduced to account for all other determinants of countries' exports levels that are not expected to change in five-years.

Therefore, the pooled OLS baseline models are the following:

(1)

Companies' perspective

$$EVL_{i,t} = \beta LP_{i,t} + \gamma PI_{i,t} + X'_{i,t}\theta + \sigma_i + \alpha_t + u_{i,t}$$

(2)

Policy-maker's perspective

$$EVL_{i,t} = \vartheta RC_{i,t} + \tau PI_{i,t} + X'_{i,t}\theta + \sigma_i + \alpha_t + u_{i,t}$$

¹⁹ This analysis does not consider 'direct' costs (and monetized), such as legal expenses and court fees, due to the unavailability of annually updated data relating to European countries.

²⁰ In the context of institutional analysis, fixed-effect empirical approaches are those preferred by most recent studies to assess the impact of judicial performance on economic activities, as discussed in Chapter 1.

where $EVL_{i,t}$ is the natural logarithm of the exported value in all NACE activities by a Member State to another Member State in year t , σ_i are the exporting countries fixed effects (all trade flows from a MS), α_t year fixed effects and $u_{i,t}$ the stochastic error term. LP (Length of proceedings), RC (Rate of resolving cases) and PI (Perceived independence) are the variables of interest. Negative values of β s and positive values of γ s, ϑ s and τ s are expected. X is a vector of controls accounting for factors that might change over time. Standard errors are clustered at the export flow level (from MS to MS) to account for autocorrelation and heteroskedasticity.

The second econometric model uses the Within (fixed effect) estimator, which accounts for the within-Member State variations in the exported value to each European country. Accordingly, this analysis adopts the following instrumental variable specifications:

(3)

Companies' perspective

$$EVL_{i,t} = \eta LP_{i,t} + \zeta PI_{i,t} + X'_{i,t}\theta + \varphi_i + u_{i,t}$$

(4)

Policy-maker's perspective

$$EVL_{i,t} = \xi RC_{i,t} + \nu PI_{i,t} + X'_{i,t}\theta + \varphi_i + u_{i,t}$$

where φ_i are the fixed effects for export flows from a Member State to another Member State, and, also in these regressions, negative values of η s and positive values of ζ s, ξ s and ν s are expected. Standard errors are robust to heteroskedasticity.

5.3 Results and Discussion

Tables 3 and 3.1 report the results of this analysis for all the considered variables. The empirical evidence seems to support the insight that the Length of proceedings, the Rate of resolving cases and the Perceived independence of the importing country's judiciary affect the intra-European trade levels. More specifically, from the companies' perspective, the variable which estimates the time needed to resolve litigious cases in commercial and civil matters (in days) has, as expected, a negative and statistically significant coefficient at the .01 level in both the pooled OLS (1) and the within fixed-effect estimator (3). Conversely, a positive coefficient is associated with the businesses' perception of judicial independence, which is statistically significant (at the .1 level) in the latter regression (3).

While from the policy-maker's perspective, the estimated coefficients of the variables of interest are all positive in both (2) and (4), consistently with the arguments above. They are also statistically significant at the .01 level, except for the clearance rate's coefficient in the pooled OLS (2), statistically significant at the .05 level.

Regarding the control variables used in all models, they appear to have (as was reasonable to expect) a positive effect on the Exported value, and their estimated coefficients are statistically significant in most cases. Indeed, a wealthier economy, a more extensive railway transport system and a higher number - and therefore greater heterogeneity - of potential buyers are factors that positively affect the inbound international trade flows levels.

Table 3 Impact of judicial performance on intra-EU export trade flows – All NACE activities

VARIABLES	(1) Pooled OLS	(2) Pooled OLS
Length of proceedings	-0.00150*** (0.000390)	
Rate of resolving cases		0.00662** (0.00299)
Perceived independence	0.0413 (0.0675)	0.199*** (0.0585)
Railway transport	5.204*** (1.460)	8.626*** (1.282)
Real GDP per capita	0.384*** (0.136)	0.138*** (0.05197)
Population	0.945*** (0.0371)	0.910*** (0.0333)
Year (FE)	Yes	Yes
Country (FE)	Yes	Yes
Observations	2,785	2,910
R-squared	0.799	0.795

NOTE: Ordinary Least Squares Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. Standard errors (in parentheses) are clustered at the export flow level to account for autocorrelation and heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3.1 Impact of judicial performance on intra-EU export trade flows – All NACE activities

VARIABLES	(3) FE	(4) FE
Length of proceedings	-0.00119*** (0.000134)	
Rate of resolving cases		0.00700*** (0.000851)
Perceived independence	0.0381** (0.0200)	0.0900*** (0.0192)
Railway transport	-4.610 (3.772)	-6.342 (3.661)
Real GDP per capita	1.012*** (0.120)	0.979*** (0.116)
Population	0.996** (0.524)	0.847** (0.535)
Observations	2,785	2,910
Number of Trade flows from MS to MS	557	582
R-squared within	0.145	0.110
R-squared between	0.243	0.207
R-squared overall	0.242	0.206
Breusch-Pagan test for RE (Prb>chibar2)	0.000	0.000
Sargan-Hansen test (p-value)	0.021	0.000

NOTE: Fixed Effect Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. Standard errors (in parentheses) are robust to heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The independent variables collectively explain in both (1) and (2) about 80% of the variance in the Exported value. Concerning models (3) and (4), the Breusch and Pagan Lagrangian multiplier test for random effects and the Sargan-Hansen test of overidentifying restrictions (fixed vs. random effects) are performed. Their outcomes indicate that the random/fixed models should be preferred over the pooled OLS and the within fixed effect estimator over the random estimator.

As regards the foreign companies' perspective, this analysis estimates that for every additional day of the length of the proceedings before the courts of the importing country, the value they export (in thousand euros) to that country decreases on average by about 0.15% in (1) or, similarly, about 0.12% in (3). This means that the implementation of robust reforms of the judicial system that reduce the time needed to resolve commercial and civil disputes by 100 days might lead to a substantial increase in the value of European exports to a Member State, i.e., by about 15% in (1) or 12% in (3). At the same time, the improvement of 1 score of the businesses' perception of judicial independence, on average, increases the exported value by about 3.9% in (3).

Regarding the policy-maker's perspective, the results of the empirical analysis show that for every 1% increase in the clearance rate of the importing European country, the value of the inbound export flows increases (on average) by about 0.66% in (2) or about 0.7% in (4). Thus, a rate of resolving cases higher than 10%, achieved thanks to the implementation of legal system reforms which allow courts to conclude a greater number of procedures in a year, would encourage an increase in the value of these external flows of 6.6%, in (2), or 7%, according to the model (4). This value also appears to increase by approximately 22%, on average, in (2) or about 9.4% in (4), for every additional score of the businesses' perception of judicial independence.

These results were subjected to some checks to assess their robustness. First, the present empirical analysis accounts for autocorrelation and heteroskedasticity using standard errors clustered at the export flow level (from MS to MS). A concern might deal with multicollinearity, which in this case should not be an issue. Indeed, as emerges from Table 7 in Appendix B, the considered variables are not severely correlated to each other²¹.

Moreover, the empirical evidence of each model seems only very slightly affected by the robustness test No.1, which estimates equations (1), (2), (3) and (4) lagging all the independent variables by one year²², as shown by Tables 4 and 4.1 in Appendix A. In this case, therefore, the hypothesis is tested that the value exported from one MS to another MS is perhaps associated with the levels of judicial performance as well as socio-economic and infrastructural development reported by the importing country in the respective previous year.

In order to further strengthen the robustness of these estimates, two other tests are performed for all empirical models. These robustness tests consider as the dependent variable, respectively, the exported value from MS to MS in NACE activities B-E²³ and G²⁴. As emerges from Tables 5, 5.1, 6 and 6.1 in Appendix A, the positive effects of the Rate of resolving cases and Perceived independence

²¹ The estimated variance-inflation factor (VIF) is on average 2.55 in (1) and 1.83 in (2), hence below the value of 5, the threshold that is usually adopted as a rule-of-thumb for detecting multicollinearity problems.

²² Independent variable_{t-1}.

²³ Industry (except construction).

²⁴ Wholesale and retail trade; repair of motor vehicles and motorcycles.

of the importing country on the value of inbound international trade flows, as well as the negative impact of the Length of proceedings, are confirmed again by these empirical sub-analyzes.

6. Concluding Remarks

International trade may be considered a key determinant of national economic development, at least to the extent that it provides access to goods and services, contributes to achieving efficiency in resources allocation and improves total factor productivity through the spread of knowledge and technology. Thus, if intended as one of the several catalysts of growth and productivity, trade exchanges produce a positive effect depending on their weight in the economic activity. Since previous works have highlighted how the concrete enforcement of the legal system impacts the economic environment, the present paper has attempted to estimate the effect of the functioning of the national judiciaries on countries' external trade flows. This analysis has focused on intra-European exports due to the homogeneity of the legal framework and commercial policy between the Member States. In this scenario, the territorial jurisdiction for resolving disputes on the sale of goods or provision of services is attributed to the courts for the country of performance of the obligation.

The present study has stressed that longer proceedings, lower clearance rate and a worse businesses' perception of judicial independence of a country's justice system should determine an increase in the 'indirect' costs that companies might undergo when exporting goods or services to that country. Accordingly, a negative effect of the length of proceedings and a positive effect of both the rate of resolving cases and the perceived independence on inbound trade flows have been hypothesized.

This analysis employs data on judicial performance from the 28 European States and data on the exported value in NACE activities from one MS to another MS to test the research hypothesis. A two-fold subjective perspective has been adopted, which assumes that the national policy-maker is more interested in the clearance rate, while the foreign companies look at the disposition time indicator. The results appear consistent with expectations and suggest that judiciaries' efficiency and perceived independence might impact the international trade levels. In this sense, one potential speculation is that an ineffective legal environment discourages international trade and does not allow the interested economies to exploit its positive effects fully. National policy-makers should then evaluate this understanding of the empirical evidence and introduce actionable reforms, where appropriate, aimed at enhancing the domestic justice system's functioning.

The present exploratory analysis leaves room for further research, for instance, to assess whether this causal relationship is also observable within a single country, or rather if the performance of a provincial/regional judicial district may affect international flows towards the same territory on which its courts have jurisdiction. Also, these results might stimulate scholars in International economics in taking the judicial performance, and the Institutional analysis in general, into greater consideration. Therefore, Chapter 3, tries to shift the international Trade theory's attention on the Institutional analysis, by exploring whether the countries' judicial performance affects the volume of bilateral trade and hence augmenting the gravity equation with indicators of the efficiency, accessibility, and perceived independence of the national judiciaries.

Appendix A: Robustness checks

Table 4 Robustness check No.1 – Lagged independent variables – All NACE activities

VARIABLES	(1) Pooled OLS	(2) Pooled OLS
Length of proceedings	-0.000952** (0.000387)	
Rate of resolving cases		0.00419 (0.00295)
Perceived independence	0.0944 (0.0672)	0.194*** (0.0584)
Railway transport	6.591*** (1.463)	9.006*** (1.278)
Real GDP per capita	0.320** (0.132)	0.149 (0.120)
Population	0.924*** (0.0362)	0.904*** (0.0329)
Year (FE)	Yes	Yes
Country (FE)	Yes	Yes
Observations	2,228	2,328
R-squared	0.799	0.796

NOTE: Ordinary Least Squares Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. All the independent variables are lagged once. Standard errors (in parentheses) are clustered at the export flow level to account for autocorrelation and heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4.1 Robustness check No.1 – Lagged independent variables – All NACE activities

VARIABLES	(3) FE	(4) FE
Length of proceedings	-0.00143*** (0.000144)	
Rate of resolving cases		0.00869*** (0.00126)
Perceived independence	0.100*** (0.0204)	0.169*** (0.0219)
Railway transport	-3.202 (3.299)	-7.874 (3.384)
Real GDP per capita	1.087*** (0.136)	0.884*** (0.142)
Population	-0.931 (0.497)	-1.373 (0.535)
Observations	2,228	2,328
Number of Trade flows from MS to MS	557	582
R-squared within	0.146	0.091
R-squared between	0.107	0.169
R-squared overall	0.105	0.167
Breusch-Pagan test for RE (Prb>chibar2)	0.000	0.000
Sargan-Hansen test (p-value)	0.000	0.000

NOTE: Fixed Effect Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. All the independent variables are lagged once. Standard errors (in parentheses) are robust to heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5 Robustness check No. 2 – Industry (except construction) – NACE activities B-E

VARIABLES	(1) Pooled OLS	(2) Pooled OLS
Length of proceedings	-0.00171*** (0.000376)	
Rate of resolving cases		0.00934*** (0.00285)
Perceived independence	0.0104 (0.0659)	0.195*** (0.0569)
Railway transport	4.504*** (1.503)	8.386*** (1.311)
Real GDP per capita	0.530*** (0.134)	0.248** (0.118)
Population	0.992*** (0.0367)	0.954*** (0.0324)
Year (FE)	Yes	Yes
Country (FE)	Yes	Yes
Observations	2,770	2,900
R-squared	0.819	0.817

NOTE: Ordinary Least Squares Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. Standard errors (in parentheses) are clustered at the export flow level to account for autocorrelation and heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5.1 Robustness check No. 2 – Industry (except construction) – NACE activities B-E

VARIABLES	(3) FE	(4) FE
Length of proceedings	-0.00124*** (0.000122)	
Rate of resolving cases		0.00919*** (0.000836)
Perceived independence	0.0790*** (0.0208)	0.119*** (0.0201)
Railway transport	6.985* (4.083)	5.942 (4.055)
Real GDP per capita	0.236* (0.126)	0.506*** (0.108)
Population	-1.903 (0.468)	-1.179 (0.453)
Observations	2,770	2,900
Number of Trade flows from MS to MS	554	580
R-squared within	0.141	0.133
R-squared between	0.199	0.167
R-squared overall	0.197	0.165
Breusch-Pagan test for RE (Prb>chibar2)	0.000	0.000
Sargan-Hansen test (p-value)	0.000	0.001

NOTE: Fixed Effect Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. Standard errors (in parentheses) are robust to heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6 Robustness check No. 3 – Wholesale and retail trade; repair of motor vehicles and motorcycles – NACE activities G

VARIABLES	(1) Pooled OLS	(2) Pooled OLS
Length of proceedings	-0.00157*** (0.000505)	
Rate of resolving cases		0.00855** (0.00429)
Perceived independence	0.00655 (0.0846)	0.174** (0.0719)
Railway transport	5.468*** (1.841)	9.139*** (1.653)
Real GDP per capita	0.150 (0.161)	-0.113 (0.142)
Population	0.831*** (0.0447)	0.797*** (0.0397)
Year (FE)	Yes	Yes
Country (FE)	Yes	Yes
Observations	2,655	2,770
R-squared	0.692	0.688

NOTE: Ordinary Least Squares Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. Standard errors (in parentheses) are clustered at the export flow level to account for autocorrelation and heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6.1 Robustness check No. 3 – Wholesale and retail trade; repair of motor vehicles and motorcycles – NACE activities G

VARIABLES	(3) FE	(4) FE
Length of proceedings	-0.00213*** (0.000173)	
Rate of resolving cases		0.0164*** (0.00127)
Perceived independence	0.0993*** (0.0256)	0.153*** (0.0263)
Railway transport	2.259 (6.191)	1.851 (6.549)
Real GDP per capita	-0.789 (0.162)	0.0966 (0.172)
Population	-3.415 (0.473)	-1.005 (0.508)
Observations	2,655	2,770
Number of Trade flows from MS to MS	531	554
R-squared within	0.201	0.161
R-squared between	0.182	0.163
R-squared overall	0.178	0.157
Breusch-Pagan test for RE (Prb>chibar2)	0.000	0.000
Sargan-Hansen test (p-value)	0.000	0.025

NOTE: Fixed Effect Estimates. A constant is included in each model but not shown in the table. The dependent variable, the Real GDP per capita and the Population, are in logs. Standard errors (in parentheses) are robust to heteroskedasticity. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix B: Additional table

Table 7 Cross-correlation matrix

Variables	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(a) Exported value	1.000						
(b) Length of proceedings	-0.050 (0.006)	1.000					
(c) Rate of resolving cases	-0.012 (0.496)	0.092 (0.000)	1.000				
(d) Perceived independence	0.130 (0.000)	-0.374 (0.000)	-0.357 (0.000)	1.000			
(e) Railway transport	0.187 (0.000)	-0.315 (0.000)	0.145 (0.000)	0.010 (0.569)	1.000		
(f) Real GDP per capita	0.163 (0.000)	-0.127 (0.000)	-0.322 (0.000)	0.798 (0.000)	0.200 (0.000)	1.000	
(g) Population	0.511 (0.000)	0.123 (0.000)	-0.017 (0.348)	0.009 (0.601)	0.129 (0.000)	0.043 (0.010)	1.000

NOTE: *p* values in parentheses. Variables (a), (f) and (g) are in logs.

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Chapter 3

The Effect of Judicial Performance on European Trade: A Panel-Gravity Model Approach

Abstract This paper employs a panel-gravity model approach to analyze the effect of judicial performance on intra-European bilateral flows. Moving from the assumption that the effectiveness of the institutional environment affects trade magnitude and direction, this study augments the gravity specification with control variables that account for the freight system development and efficiency, business regulatory quality and technological innovation, as well as indicators of the importing countries' judicial performance.

More specifically, it is verified that a well-functioning judicial system - in terms of efficiency, accessibility and businesses' perceived independence - encourages bilateral exchanges. Conversely, the ineffective enforcement of the legal system, by affecting the transaction costs that foreign companies might undergo when trading in goods and services with partner countries, negatively impacts on the export flows' levels.

1. Introduction

Since its introduction in the 1960s by Timbergen (1962) and Linneman (1966), the gravity model has been widely used in the literature on international trade due to its considerable explanatory power and empirical robustness. Indeed, in the last two decades, numerous studies have employed the gravity specification for analyzing bilateral flows and attempting to explain trade policy implications¹.

Given that the research community has already extensively investigated the positive impact of Free Trade Agreements on international trade flows, as confirmed by the large body of gravity model-based studies, the present paper does not concentrate the attention on the effects of trade barriers. The application of the gravity specification is therefore restricted to the exports between member countries of a customs union - the European Union - in which goods and services are free to circulate within an area without internal frontiers².

The objective of the present analysis is then to assess the impact of a different key determinant of exports, the judicial performance, that has not yet been estimated specifically by means of the gravity

¹ See Karlaftis et al. (2010) for a 10-years review of empirical studies (from 2000 to 2010).

² Thus, this study does not account for the effects of any tariffs or restrictive measures.

empirical approach. The main hypothesis in this paper is based on the assumption that, in a context of uncertainty and incomplete contracts, a well-functioning judicial system plays a pivotal role in encouraging economic activity, as emerges from a significant number of academic studies (among others, La Porta et al., 1998; Djankov et al., 2002; Alesina et al., 2005; Acemoglu and Johnson, 2005; Peev, 2015) since it acts as a deterrent against economic agents' deviations from previously signed contracts (Marciano et al., 2019). The present analysis tries to further extend this understanding of the empirical evidence by investigating with the gravity specification the relationship between the judiciary's efficiency, accessibility and perceived independence and the international trade flows levels. This empirical approach then differs from that presented in Chapter 2, which employ the typical estimation techniques used in the Institutional economics literature, as discussed in Chapter 1, to assess the impact of the effectiveness of judicial systems on intra-European trade flows.

The paper proceeds as follows: Section 2 sketches the theoretical framework, underlining the significant impact of institutions on international trade. Section 3 defines the judicial performance and the regulatory profiles of intra-European bilateral trade. Section 4 describes the dataset and variables employed in the gravity model. Subsection 4.1 focuses explicitly on the judicial performance indices. Section 5, in subsections 5.1 and 5.2, outlines the hypothesis investigated more precisely and explains the empirical strategy and estimation methodology. Subsection 5.3 presents and discusses the results. Finally, conclusions are drawn in Section 6.

2. Trade Costs and Institutions

The bulk of the existing gravity model-based literature has focused on how trade flows are shaped by specific types of trade costs. For instance, Bougheas et al. (1999) have examined the role of infrastructure in bilateral exchanges through its influence on transport costs, providing empirical evidence of the positive relationship between the level of infrastructure and the volume of trade. Mann et al. (2004) estimate the effect of trade facilitation on trade flows, considering four aspects: ports, customs, regulations and service sectors of telecommunications and financial intermediation (important for all types of trade). Their results suggest that improvements in these facilitation measures increase imports and exports for a country and the world.

Also, Marquez-Ramos et al. (2010) focus on the impact of technological innovation on sectorial exports, using the technological achievement index (TAI). These authors demonstrate the existence of a positive non-linear relationship as the effect of improved technological innovation varies according to the technological achievement in countries.

In contrast to the several academic contributions investigating the effect of specific trade costs on international trade, only a small number of research examine the impact of institutions, such as Lee and Ranjan' study (2007) which employs a gravity model where individuals consume two classes of goods and verifies that the contract enforcement affects the volume of trade in both. The contract enforcement is proxied with several indicators capturing different aspects of institutional quality that are related to the capacity of the state to implement sound policies, the respect of citizens and the state for the rules that govern their interactions, the repudiation of contracts by governments, the expropriation risk, the

corruption, and the degree of law enforcement. The authors find that reliable institutions are essential in shaping up international trade between countries.

Also employing a gravity equation, Francois et al. (2007) use a panel of data on bilateral trade to explore the influence of infrastructure and institutional quality, supporting with the empirical evidence that the export performance - and the propensity to take part in the trading system at all - depends on the access to well-developed transport and communications infrastructure as well as on a market-friendly legal and institutional orientation.

The causal relationship between the quality of the regulatory environment and the volume of trade is also investigated by Iwanow et al. (2007), with a particular focus on Africa's international competitiveness. These authors augment the gravity model with trade facilitation, regulatory quality and infrastructure indicators and point out how reforms in these fields are essential in facilitating export growth for developing countries.

Despite this empirical evidence, Trade theory keeps concentrating on the nature of competition in international markets, endowments, technology, and preferences as the most relevant determinants of trade. However, as institutions determine costs that impact on the profitability and feasibility of economic activity (North, 1990), the effectiveness of the institutional environment inevitably affects trade's magnitude and direction (Lee et al., 2007). Therefore, the institutional analysis is essential to identify the causal factors of the actual, rather than potential, international trade. It follows that the investigation also needs to be extended to the concrete functioning of the judicial systems, which could unveil if the set of legal rules is implemented in a way that makes the institutional environment effective (Hodgson, 2006; Voigt, 2013; Marciano et al., 2019).

The present paper, by exploring whether the countries' judicial performance affects the levels of bilateral trade - and hence augmenting the gravity equation with indicators of the efficiency, accessibility, and perceived independence of the national judiciaries - tries to shift the international trade theory's attention on the institutional analysis.

3. Defining Judicial Performance and Regulatory Framework

The performance of judicial systems comprises various dimensions. Here, the focus is on the trial length, the clearance rate, the cost of the claim and the businesses' perceived independence. The reason for concentrating on these dimensions is that timeliness, accessibility to the service and predictability of disputes' outcomes are essential properties for a judiciary that sustains the proper functioning of markets. The effectiveness of the judicial system is a crucial determinant of economic performance, as emphasized by a large body of institutional analysis' empirical evidence, since it contributes to the efficient production and distribution of goods and services by guaranteeing the security of property rights and the enforcement of contracts (Giupponi et al., 2013).

Although several studies investigate the effect of judicial performance on multiple economic activities, the link between the former and international trade has not yet been empirically explored in depth. Therefore, the present paper aims to fill this gap and provide helpful information to the policymakers, that might encourage judicial reforms where appropriate.

Length of proceedings and judiciary's independence are pivotal to ensure the certainty of rules and the achievement of justice. This prevents firms from the risk associated with an unpredictable decision and lets them make better investment choices when trading with partner countries. The time needed to resolve cases and the clearance rate are then used in this study as proxies for judicial efficiency, as well as in most of the literature on the impact of judicial performance on economic outcomes (among others, Chemin, 2009; Melcarne and Ramello, 2020; Schiantarelli et al., 2020). Moreover, accessibility is proxied by the cost of a claim (% of claim value), which must be adequately low to avoid exclusion from the service.

A further reason for using these dimensions (length of proceedings, rate of resolving cases, cost of claim and businesses' perception of judicial independence) is that they are susceptible to quantitative measurement – although in different metrics - and thus lend themselves to cross-country comparisons as well as to being indexed and made compatible with each other for the empirical applications.

As regards the regulatory framework, the jurisdiction and the recognition and enforcement of commercial judgments are governed, in relations between the Member countries, by the Regulation (EU) No. 1215/2012 of the European Parliament and of the Council of 12 December 2012, which is by its very nature directly applicable in each EU State and prevails over any incompatible national rule. This Regulation entered into force on 1 January 2015, replacing the Council Regulation (EC) No. 44/2001 of 22 December 2000, which, however, for what interests in this paper, provides similar provisions³.

Under Article 7 of the Reg. (EU) No. 1215/2012, jurisdiction in contractual disputes between counterparties domiciled in different Member States is attributed to the courts for the place of performance of the obligation. This shall be the place in an EU country where, under the contract, the goods were delivered or should have been delivered in the case of sale of goods, or the services were provided or should have been provided in the case of the provision of services. Therefore, the present analysis, which attempts to estimate the impact of judicial performance on intra-European export flows, focuses exclusively on the destination countries' judiciaries.

However, Article 25 of the Regulation allows the parties to agree in writing and *ex-ante* that a court or the courts of a European state have jurisdiction to settle any disputes that have arisen or may arise related to a specific contractual relationship. Then that court or those courts shall have jurisdiction unless the agreement is null and void as to its substantive validity under that Member country's law.

Nonetheless, this study assumes that the exporting party is unwilling to incur the transaction costs related to the necessary bargaining with the trade partner to obtain such a shift of jurisdiction⁴.

³ The clarification is due as this analysis estimates the impact of judicial performance on trade flows between 2014 and 2018.

⁴ It should also be noted that according to Article 19 of the Reg. (EU) No. 1215/2012 if the importing party is a person, the consumer, who has concluded the contract for a purpose that can be regarded as being outside his trade or profession, the jurisdiction is susceptible of displacement only with an agreement which is entered into after the dispute has arisen. As logic suggests, this *ex-post* arrangement would be even more difficult for the exporting party to achieve.

4. Data, Sources and Variables

This paper aims to assess the impact of the behind-the-border trade costs on export flows, with specific regard to the European economies' judicial performance. The study covers the period between 2014 and 2018⁵, focusing for each year on the 28 EU Member States' reciprocal exports trade flows in all NACE rev. 2 activities⁶. The resulting dataset from Eurostat contains 3,540 observations on an annual basis. Moreover, the present analysis extracts data from various sources to construct institutional yearly based indicators, used as controls, for infrastructure-logistics performance, business regulatory quality and technology achievement for all countries in the sample. A description of all variables and indices can be found in [Table 1](#).

Table 1. Variables and indices description. Sources of data

Variable	Description	Source
<i>Dependent variable</i>		
EXP _{ijt} : Export from <i>i</i> to <i>j</i> in year <i>t</i>	Value in MEUR of traded goods/services in all NACE activities by companies from EU MS (28) to EU MS	Eurostat (2014 -2018)
<i>Variables of interest</i>		
JPI _a _j : Importer's judicial performance (a) (index)	Judicial performance variable I, simple average of <i>LP_j</i> and <i>CC_j</i> indices	Author's calculations
<i>LP_j</i> : Importer's length of proceedings (index)	Time (days) needed to resolve cases variable	CEPEJ (2014-2018), author's calculations
<i>CC_j</i> : Importer's cost of claim (index)	Cost of claim (% of claim value) variable	Doing Business (2014-2018), author's calculations
JPI _b _j : Importer's judicial performance (b) (index)	Judicial performance variable II, simple average of <i>RC_j</i> e <i>PI_j</i> indices	Author's calculations
<i>RC_j</i> : Importer's rate of resolving cases (index)	Clearance rate (%) variable	CEPEJ (2014-2018), author's calculations
<i>PI_j</i> : Importer's perceived independence (index)	Businesses' perception of judicial independence (survey) variable	CEPEJ (2014-2018), author's calculations

⁵ This study is constrained to five years because of the CEPEJ's data availability for judicial performance.

⁶ The United Kingdom is included as it left the European Union on 31 January 2020.

Controls

GDP_i : Exporter's GDP	Exporter's real GDP (MEUR)	Eurostat (2014-2018)
GDP_j : Exporter's GDP	Importer's real GDP (MEUR)	Eurostat (2014-2018)
$GEODIST_{ij}$: Distance	Great circle distances between the most important cities in trading partners	CEPII
$BORDER_{ij}$: Contiguity dummy	Dummy variable = 1 if the trading partners share a common border, 0 otherwise	CEPII
$LANDL_{ij}$: Landlocked variable	Variable = 1 if one of the trading partners is landlocked, = 2 if both partners are landlocked, = 0 otherwise	World Bank
$LANG_{ij}$: Common language Dummy	Dummy variable = 1 if the trading partners have a common language, 0 otherwise	World Bank
$INFRA_{i(j)}$: Exporter's (or importer's) infrastructure and logistics performance (index)	Infrastructure and trade logistics performance variable, average of $RD_{i(j)}$ and $LPI_{i(j)}$ indices	Author's calculations
$RD_{i(j)}$: Exporter's (or importer's) rail lines spatial density	Infrastructure - rail lines length (km) normalized to the land area (km^2) - index	Eurostat (2014-2018), author's calculations
$LPI_{i(j)}$: Exporter's (or importer's) logistics performance	International trade logistics performance (score) index	World Bank (2014-2018), author's calculations
$BRI_{i(j)}$: Exporter's (or importer's) business regulatory index	Business regulatory variable, simple average of $IR_{i(j)}$, $LL_{i(j)}$ and $BE_{i(j)}$	Author's calculations
$IR_{i(j)}$: Exporter's (or importer's) insolvency regulations	Ease of resolving insolvency (score) index	Doing Business (2014-2018), author's calculations
$LL_{i(j)}$: Exporter's (or importer's) labour flexibility	Labour regulations flexibility (score) index	European Policy Information Center (2018), author's calculations
$BE_{i(j)}$: Exporter's (or importer's) index of business entry	Ease of starting a business (score) index	Doing Business (2014-2018), author's calculations
$TAI_{i(j)}$: Exporter's (or importer's) revised technology achievement index	Technology innovation variable, simple average of $CreTech_{i(j)}$ and $DiffRI_{i(j)}$	Author's calculations

<i>CreTech</i> _{i(j)} : Exporter's (or importer's) creation of technology	Technology creation index, simple average of <i>PR</i> _{i(j)} and <i>RL</i> _{i(j)}	Author's calculations
<i>PR</i> _{i(j)} : Exporter's (or importer's) patents granted to residents	Patents granted to residents (/millions people) index	World Development Indicators, World Bank (2014-2018), author's calculations
<i>RL</i> _{i(j)} : Exporter's (or importer's) receipts of royalties and license fee	Receipts of royalties and license fee (USD per person) index	World Development Indicators, World Bank (2014-2018), author's calculations
<i>DiffRI</i> _{i(j)} : Exporter's (or importer's) diffusion of recent innovations	Diffusion of recent innovations index, simple average of <i>HE</i> _{i(j)} and <i>IU</i> _{i(j)}	Author's calculations
<i>HE</i> _{i(j)} : Exporter's (or importer's) high-technology exports	High-technology exports (% of manufactured exports) index	World Development Indicators, World Bank (2014-2018), author's calculations
<i>IU</i> _{i(j)} : Exporter's (or importer's) internet users	Internet users (/1000 people) index	World Development Indicators, World Bank (2014-2018), author's calculations

The original data used to construct the judiciary's performance (JPIa and JPIb), freight system (INFRA), business regulatory (BRI) and technological innovation (TAI) variables are measured in different metrics, including days, percentages, survey results, indices, and the number of users. Therefore, to ensure compatibility between them, all indicators' subcomponents are indexed and rescaled to vary from 0 to 100. Hence, the performance of each index – meant as the single subcomponent of the JPI (a), JPI (b), INFRA, BRI and TAI variables - takes a value between 0 and 100, which is computed according to the following Equation:

$$I = \frac{(\text{actual value} - \text{observed min value})}{(\text{observed max value} - \text{observed min value})} \times 100 \quad (1)$$

The 'actual value' refers to a specific year and EU country, while the minimum and maximum values are those observed in the five years (2014, 2015, 2016, 2017, 2018) for the 28 EU Member States. The JPI (a), JPI (b), INFRA, BRI and TAI are calculated as a simple average of their dimension indices assuming that their subcomponents play a comparable role.

The present study defines the domestic infrastructure development and logistics performance as an aggregate indicator of trade facilitation related to the freight system (INFRA) built on the rail length normalized to the land area and the assessment of the logistics efficiency from the Eurostat and the World Bank databases respectively. This variable consists of the following components:

- i. Rail lines spatial density (RD) – a measure of the country’s transport infrastructure development;
- ii. Aggregated International Logistics Performance Index (LPI) – it assesses the countries’ logistics efficiency in trade⁷.

In order to account for restrictions in across-within industries factor movements, this paper uses a business regulatory variable (BRI), which consists of three subcomponents⁸:

- i. Insolvency regulations (IR) – an overall score extracted from ‘Doing Business’ dataset, computed as the simple average of the scores for the recovery rate of insolvency cases, the strength of the legal framework applicable to judicial liquidation and the reorganization proceedings;
- ii. Labour regulations flexibility (LL) – it is based on the Employment Flexibility Index which associates higher values to a higher degree of labour regulations flexibility, reflecting the values of indicators on hiring, working hours, redundancy rules and redundancy costs;
- iii. Index of business entry (BE) – this index assesses the number of all procedures, timing and cost for an entrepreneur to start and formally operate a business, as well as the paid-in minimum capital requirement⁹.

The present analysis controls also for the effect of technological innovation on exports by means of a Technology Achievement Index (TAI), originally proposed in 2002 (Desai et al., 2002), as the international trade theory emphasizes the importance of technological innovation in explaining a country’s international competitiveness and highlights the key role played by the economies’ capacity to put new ideas into practice by developing innovative processes and products (Fagerberg, 1997; Mårquez-Ramos et al., 2010; Fotov et al. 2013, Burinskiene, 2013; Kunze, 2016).

The TAI focuses on assessing the country’s technological performance based on its capability in creating and using technology. More specifically, the TAI computed and used in this study has two dimensions and each of them is specified by two sub-indicators, all extracted from the World Bank’s World Development Indicators database¹⁰. The two dimensions and the corresponding sub-indicators are summarized in [Table 2](#).

⁷ The LPI ranks countries on six dimensions of trade, including infrastructure quality and timeliness of shipments, and builds profiles of their logistics friendliness. The components analyzed in the international LPI, which takes a score from 1=low to 5=high, are the following: Customs, Infrastructure, Ease of arranging shipments, Quality of logistics services, Tracking and tracing, Timeliness. The data used in the ranking comes from a survey of logistics professionals who are asked questions about the foreign countries in which they operate. This index uses standard statistical techniques to aggregate the data into a single indicator.

⁸ See also Iwanow et al. (2007), for other applications of this index.

⁹ It is an overall score for starting a business from the ‘Doing Business’ dataset.

¹⁰ See Ali et al. (2011), for a more detailed explanation of the TAI indicators.

Table 2. Technology Achievement Index (TAI)

Dimensions	Sub-Indicators
<i>Creation of technology (CreTech)</i>	<i>(PR) Patents granted to residents (/millions people):</i> stock of embedded knowledge. The indicator reflects the current level of inventive activity
	<i>(RL) Receipts of royalties and license fee (USD/person):</i> the indicator reflects the stock of successful past innovations that are still useful and hence have a market value
<i>Diffusion of Recent Innovations (DiffRIInn)</i>	<i>(HE) High-technology exports (% of manufactured exports):</i> the indicator is a yardstick for measuring the annual average growth rates in the high technology area of a country
	<i>(IU) Internet users (/1000 people):</i> diffusion of the internet is crucial for participation in global economic activities and to access information at a relatively low cost

4.1 Judicial Performance Indices

The attribution of jurisdiction in commercial disputes by the Reg. (EU) No. 1215/2012 to the courts of the obligation's place of performance explains why the present paper focuses on the destination countries' judiciaries and does not assess the exporter's judicial system, unlike the control variables, which are estimated for both trading partners as generally required by the Gravity model approach to bilateral exchanges.

The present analysis captures the multi-faceted nature of the judicial performance in terms of the efficiency, accessibility and independence of the importing EU country's judicial system by means of the two aggregated indices JPI (a) and JPI (b), that are expected to have, respectively, a negative and a positive impact on intra-European trade flows. The data used to proxy the efficiency, accessibility and independence of the national judiciaries are constructed from several measures capturing those different aspects of the judicial performance. These measures are from three sources: CEPEJ, Doing Business and the World Economic Forum.

The JPI (a) is computed as the simple average of the following two components, which are expected to be negatively related to trade:

- i. Importer's length of proceedings – it estimates the time needed to resolve litigious civil and commercial cases (in days) in court, meaning the court's time to decide for the first instance. This 'disposition time' indicator is computed as the number of unresolved cases divided by the number of resolved cases at the end of a year multiplied by 365 days, that is:

$$\text{Length of proceedings} = \frac{\text{Pending cases at the end of a period}}{\text{Resolved cases in a period}} \times 365$$

ii. Importer's cost of claim – this component reports the average attorney fees, the court and enforcement costs, as a percentage of the claim value which is assumed to be equivalent to 200% of income per capita or \$5,000, whichever is greater.

Instead, the JPI (b) is calculated as the simple average of the following two indices, which are expected to be positively associated with trade:

i. Importer's rate of resolving cases – the clearance rate measures whether a court is keeping up with its incoming caseload and is computed as the ratio of the number of commercial and civil resolved cases to incoming commercial and civil cases in a specific year/country:

$$\text{Rate of resolving cases} = \frac{\text{Resolved cases in a period}}{\text{Incoming cases in a period}} \times 100 \quad (3)$$

When this percentage is about 100% or higher, it means the judicial system can resolve at least as many cases as those come in; conversely, a clearance rate below 100% indicates that the courts resolve fewer cases than the number of incoming cases.

ii. Importer's businesses' perceived independence – it is the survey-based WEF indicator on businesses' perception of judicial independence, which associates higher values with a better perception¹¹.

These are the variables of interest in the present paper, which are estimated both for the aggregated (JPIa and JPIb) and disaggregated (LP, CC, RC and PI) dimension indices. The present study constructs the two aggregate judicial performance indicators (JPIa and JPIb) also to provide a new tool for scholars in international trade to be used in the empirical gravity model-based analyses.

It should be noted that the length of trials and the clearance rate measures are often used as substitutes in the empirical analyses to assess the impact of the judicial system's effectiveness on economic activities; however, these two indicators, as discussed in Chapter 1, are not necessarily related to each other. Indeed, it is widely agreed and quite intuitive to assume that an excessive time needed to resolve cases can raise fears of accumulating backlogs, but the high trial length is motivated by reasons that may differ from those explaining the clearance rate level, such as the lack of alternative dispute resolution systems, the scarcity of resources invested at the state level in the judicial sector or the insufficiency of telematic and e-justice tools. At the same time, a high rate of resolving cases can be associated with obstacles to the access to justice, including, for example, high costs of the claim. In this scenario, a long duration of the proceedings might coexist with a high clearance rate.

¹¹ The WEF indicator is based on survey answers to the question: 'In your country, how independent is the judicial system from influences of the government, individuals, or companies? [1 = not independent at all; 7 = entirely independent]'. Responses to the survey come from a representative sample of businesses economy's main sectors: manufacturing industry, non-manufacturing industry, agriculture and services in all the concerned States. The survey is conducted in various ways, including telephone interviews or face-to-face, online surveys and mailed paper forms.

Table 3 classifies the Member countries by the average score obtained in the period under study (2014-2018). In this ranking, Luxembourg and Belgium are the best performers in JPI (a) and the United Kingdom and Ireland in JPI (b).

However, Table 3 also shows that the leaders in JPI (b) are among the worst performers in JPI (a). The reason is that the United Kingdom and Ireland's judicial systems, while excelling in the EU area in the clearance rate and being perceived by businesses as the most independent, have highly costly access to justice (45.7% of the value of the claim) and an excessive length of the proceedings respectively.

Table 3. JPI Ranking, best-to-worst performers

Rank	JPI (a) Avg. 2014-2018	Member State	Rank	JPI (b) Avg. 2014-2018	Member State
1	3.3	Luxembourg	1	85.5	United Kingdom
2	11.6	Belgium	2	84.4	Ireland
3	14.5	Hungary	3	82.0	Finland
4	17.7	Germany	4	73.1	Netherlands
5	19.9	Lithuania	5	71.8	Denmark
6	19.9	Austria	6	71.3	Luxembourg
7	21.3	Estonia	7	69.5	Sweden
8	22.8	Slovenia	8	69.4	Belgium
9	23.2	Netherlands	9	65.3	Estonia
10	27.3	Poland	10	64.5	Austria
11	27.7	Finland	11	63.6	Germany
12	28.1	Denmark	12	62.7	Portugal
13	29.1	Romania	13	58.5	France
14	29.7	Portugal	14	55.2	Czech Republic
15	34.6	Spain	15	53.6	Italy
16	35.4	Latvia	16	52.2	Malta
17	35.7	Croatia	17	52.0	Cyprus
18	36.4	Sweden	18	49.4	Latvia
19	37.1	France	19	49.4	Romania
20	40.3	Czech Republic	20	48.9	Lithuania
21	44.5	Slovak Republic	21	47.8	Slovak Republic
22	51.9	Malta	22	47.3	Slovenia
23	54.4	Greece	23	44.6	Greece
24	58.0	Bulgaria	24	42.9	Spain
25	59.1	Cyprus	25	41.3	Croatia
26	63.4	Ireland	26	39.6	Hungary
27	66.1	Italy	27	37.0	Poland
28	74.8	United Kingdom	28	14.8	Bulgaria

On the one hand, countries with favorable rates of resolving cases and slow proceedings are fighting backlogs but struggle with timeliness and should introduce some actionable measures. On the other hand, the Member States with high costs of claim and clearance rates respond inappropriately to

the deflationary needs of litigation, not guaranteeing access to the judicial system, and should therefore adopt different solutions to the problem to avoid discriminatory issues.

Moreover, those countries that report a satisfying performance in both indicators – such as Germany, Austria, Estonia, the Netherlands and Denmark – might serve as reference models for the other Member States in shaping their own reforms of the national judicial systems, always considering the specificities of the domestic institutional contexts.

5. Empirical Analysis

5.1 Model Specification and Estimation Methodology

This study employs a panel-gravity model approach to analyze the effect of judicial performance on intra-European trade. Standard gravity models assume that the volume of trade between country i and j is positively associated with the size of the two economies as measured by GDP and negatively related to the trade costs between them. The basic gravity model can be represented in the multiplicative form as follows:

$$EXP_{ij} = \frac{\alpha \cdot GDP_i \cdot GDP_j}{GEODIST_{ij}} \quad (4)$$

where α is a constant, EXP_{ij} represents the value of trade between country i and j , GDP_i and GDP_j denote the gross domestic product of country i and j respectively, while $GEODIST_{ij}$ is the geographical distance between the trading partners.

Equation (4) can be transformed into a linear form by taking the natural log of both sides of the equation and specified as:

$$\ln EXP_{ij} = \beta_0 + \beta_1 \cdot \ln GDP_i + \beta_2 \cdot \ln GDP_j + \beta_3 \cdot \ln GEODIST_{ij} + u_{ij} \quad (5)$$

where $\ln EXP_{ij}$, $\ln GDP_i$, $\ln GDP_j$ and $\ln GEODIST_{ij}$ denote the natural logarithms of EXP_{ij} , GDP_i , GDP_j and $GEODIST_{ij}$, respectively, and u_{ij} is the error term. Variables normally used to capture trade costs include, in addition to the distance between the trading partners, whether a country is landlocked, as well as various ‘dummy’ variables that indicate whether the country pair share a common border or language.

This study’s methodology augments the standard gravity model with judiciary, policy, infrastructure-logistics and technological innovation variables that directly impact on the behind-the-border trade costs and tries to assess their relative importance in determining export performance.

Therefore, the estimated equation is transformed as follows:

$$\begin{aligned}
\ln EXP_{ijt} = & \beta_0 + \beta_1 \cdot \ln GDP_{it} + \beta_2 \cdot \ln GDP_{jt} + \beta_3 \cdot \ln GEODIST_{ij} + \beta_3 \cdot BORDER_{ij} \\
& + \beta_4 \cdot LANDL_{ij} + \beta_5 \cdot LANG_{ij} + \beta_6 \cdot JPIa_{jt} + \beta_7 \cdot JPIb_{jt} + \beta_8 \cdot INFRA_{it} \\
& + \beta_9 \cdot INFRA_{jt} + \beta_{10} \cdot BRI_{it} + \beta_{11} \cdot BRI_{jt} + \beta_{12} \cdot TAI_{it} + \beta_{13} \cdot TAI_{jt} \\
& + \alpha_i + \sigma_j + \varphi_t + u_{ijt}
\end{aligned} \tag{6}$$

where i denotes the EU exporting country, j denotes the EU importing country, t denotes a year ($t=2014, 2015, 2016, 2017, 2018$). The variables are defined as follows:

- $\ln EXP_{ijt}$ denotes the natural logarithm of the exported value in all NACE activities from EU member State i to EU MS j in year t ;
- $\ln GDP_{i(j)t}$ is the natural logarithm of the exporting (or importing) country in year t ;
- $\ln GEODIST_{ij}$ is the natural logarithm of the geographical great circle distance in kilometers between the most important cities (in terms of population) of country i and j ;
- $BORDER_{ij}$ is a dummy that indicates whether the trading partners share a common border;
- $LANDL_{ij}$ takes a value of 1 if one of the trading partners is landlocked, two if both partners are landlocked and 0 otherwise;
- $LANG_{ij}$ takes a value of 1 when countries have a common language and zero otherwise;
- $JPIa_{jt}$ and $JPIb_{jt}$ are the aggregated indices of the importing country's judicial Performance, whose coefficients are expected to have negative and positive values, respectively;
- $INFRA_{i(j)t}$ is the exporting (or importing) country's infrastructure and logistics performance index;
- $BRI_{i(j)t}$ is the exporting (or importing) Member State's quality of labour, insolvency and business regulations index;
- $TAI_{i(j)t}$ measures the technology innovation in the exporting (or importing) country;
- α_i , σ_j and φ_t is a set of exporter, importer and time fixed effects;
- finally, u_{ijt} is the error term, assumed to be normally distributed.

Equation (6) is estimated using Ordinary Least Squares (OLS) and Pseudo Poisson Maximum Likelihood (PPML) models¹² with fixed importing, exporting country and time effects to capture time trends and other unobserved countries characteristics. Standard errors are robust and clustered at the country pair level in the OLS and by $\ln GEODIST$ in PPML to account for heteroskedasticity.

¹² The PPML uses export flows in value (current MEUR) instead of the natural logarithm of exports as the dependent variable.

5.2 Dealing with Heteroskedasticity and Zero Trade Flows

Equation (6) can be estimated using the OLS approach. However, log-linearization may lead to inconsistent estimates due to the combination of heteroscedastic errors and the omission of zero trade flows¹³. Moreover, Santos-Silva and Tenreyro (2006) observe that the standard empirical estimation of the gravity model exaggerates the role of geographical proximity. Thus, to address these potential problems, the PPML method has been widely suggested in the literature as the most preferred estimator of bilateral trade (Santos-Silva and Tenreyro, 2006; Westerlund et al., 2011; Anderson et al., 2012; Anderson et al., 2018) and it is also applicable in small samples¹⁴. Therefore, the PPML model can be specified as follows:

$$\begin{aligned} \text{EXP}_{ijt} = \exp \{ & \beta_0 + \beta_1 \cdot \ln \text{GDP}_{it} + \beta_2 \cdot \ln \text{GDP}_{jt} + \beta_3 \cdot \ln \text{GEODIST}_{ij} + \beta_3 \cdot \text{BORDER}_{ij} \\ & + \beta_4 \cdot \text{LANDL}_{ij} + \beta_5 \cdot \text{LANG}_{ij} + \beta_6 \cdot \text{JPIa}_{jt} + \beta_7 \cdot \text{JPIb}_{jt} + \beta_8 \cdot \text{INFRA}_{it} \\ & + \beta_9 \cdot \text{INFRA}_{jt} + \beta_{10} \cdot \text{BRI}_{it} + \beta_{11} \cdot \text{BRI}_{jt} + \beta_{12} \cdot \text{TAI}_{it} + \beta_{13} \cdot \text{TAI}_{jt} \\ & + \alpha_i + \sigma_j + \varphi_t \} + u_{ijt} \end{aligned} \quad (7)$$

where EXP_{ijt} is the exported value (MEUR) in all NACE activities from EU member State i to EU MS j in year t , and u_{ijt} is the remainder error term. All other variables remain the same as discussed in Equation (6).

5.3 Results and Discussion

Table 4 reports the results of this analysis for all the considered variables in the panel Gravity model, using the Ordinary Least Squares (OLS) method and the robust Pseudo Poisson Maximum Likelihood (PPML). The first part of Table 4 presents the results for both the overall JPI (a) and JPI (b) and their disaggregated indices dimensions. The empirical evidence seems to support the insight that the countries' judicial performances impact on intra-European trade flows, as shown by the results reported in columns (2) and (3) – OLS approach – as well as in columns (5) and (6) – PPML method – in which the variables of interest are added. More specifically, the JPI (a) and its subcomponents, that are the Length of proceedings and Cost of claim indices, have, as expected, negative and statistically significant coefficients at the .01 level in both the OLS estimators (2) and (3) and the PPML method (5) and (6). Conversely, positive coefficients are related in the same estimations to the JPI (b) and its indices dimensions: the Rate of resolving cases index and the Businesses' perception of judicial independence index. They are also statistically significant at the .01 level, except for the Businesses' perception index coefficient in the OLS estimator (3), statistically significant at the .1 level.

This paper considers estimates from the PPML method as the most reliable due to the significant biases associated with the OLS gravity model approach discussed above, which are made evident by the variations in the results in Table 4.

¹³ As the log of zero is undefined.

¹⁴ See Santos-Silva and Tenreyro (2006) and Westerlund et al. (2011).

Table 4. The Effect of Judicial Performance on European Trade: A Panel-Gravity Model Approach

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) PPML	(5) PPML	(6) PPML
JPI (a)		-0.00334*** (0.00105)			-0.00323*** (0.00111)	
LP Index			-0.00611*** (0.000769)			-0.00371*** (0.000866)
CC Index			-0.00633*** (0.000999)			-0.00496** (0.00204)
JPI (b)		0.00912*** (0.00125)			0.00911*** (0.00132)	
RC Index			0.00350*** (0.000738)			0.00443*** (0.000791)
PI Index			0.00160* (0.000907)			0.00425*** (0.000802)
BRI Exp	0.00049 (0.00223)	0.00053 (0.00222)	0.00188 (0.00236)	0.00349** (0.00141)	0.00347** (0.00140)	0.00351** (0.00149)
BRI Imp	0.00551** (0.00230)	0.00498** (0.00219)	0.00106** (0.00226)	0.000997 (0.00112)	0.00107 (0.00114)	0.00123 (0.00128)
INFRA Exp	0.00396*** (0.00131)	0.00397*** (0.00131)	0.00378*** (0.00136)	0.00223** (0.000940)	0.00218** (0.000934)	0.00380** (0.00153)
INFRA Imp	0.000178 (0.00144)	0.000176 (0.00147)	0.00041 (0.00162)	0.00146* (0.00121)	0.00146* (0.00126)	0.000530* (0.00104)
TAI Exp	0.00590*** (0.00216)	0.00594*** (0.00216)	0.00360*** (0.00228)	0.00894*** (0.00153)	0.00893*** (0.00152)	0.0101*** (0.00191)
TAI Imp	0.000521 (0.00210)	0.000422 (0.00215)	0.00264 (0.00247)	0.00397*** (0.00131)	0.00367** (0.00155)	0.00273* (0.00153)
lnGDP Exp	0.138*** (0.118)	0.137*** (0.119)	0.271*** (0.121)	0.448*** (0.0760)	0.445*** (0.0761)	0.462*** (0.0999)
lnGDP Imp	0.260*** (0.137)	0.262*** (0.142)	0.160*** (0.181)	0.437*** (0.120)	0.445*** (0.122)	0.647*** (0.140)
lnGEODIST	-1.318*** (0.0689)	-1.318*** (0.0689)	-1.360*** (0.0747)	-0.735*** (0.0642)	-0.731*** (0.0637)	-0.758*** (0.0693)
BORDER	0.332*** (0.111)	0.332*** (0.111)	0.327*** (0.111)	0.483*** (0.0754)	0.477*** (0.0756)	0.460*** (0.0775)
LANDL	-3.851*** (0.504)	-3.846*** (0.505)	-3.318*** (0.523)	-2.208*** (0.358)	-2.222*** (0.357)	-2.186*** (0.444)
LANG	0.479*** (0.179)	0.480*** (0.179)	0.463** (0.185)	0.258* (0.142)	0.252* (0.141)	0.396*** (0.135)
Exp-Imp country, year (FE)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,540	3,540	3,540	3,540	3,540	3,540
R-squared	0.921	0.930	0.932	0.950	0.951	0.961

NOTE: The PPML uses export flows in value (current MEUR) instead of the natural logarithm of exports as the dependent variable. A constant is included in each model, but not shown in the table. Robust standard errors (in parentheses) clustered at the country-pair level in (1), (2), (3), and by lnGEODIST in (4), (5), (6). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As regards the control variables – used in all models - the results indicate that the GDP, policy quality, freight system development and efficiency, and technological innovation of both the exporter and partner country as well as the bilateral distance, common language, contiguity and whether they are landlocked, are important determinants of bilateral trade. In terms of the direction of the impact, both the OLS and PPML estimates are consistent in all the expectations. The effect of the GDP, common language and contiguity is positive and statistically significant, thus suggesting that market size, geographical and cultural proximity foster international trade.

The level of income of a country is associated with high efficiency and productivity as well as large purchasing possibilities. This, in turn, increases the overall output available for export and, from the importer's perspective, enlarges the access to goods and services.

Instead, the geographical distance and the absence of navigable routes strongly discourage trade flows between countries, as confirmed by the high, negative and statistically significant coefficients of the *lnGEODIST* and *LANDL* variables.

Finally, the indicators built to control for the trade facilitation, the quality of the business regulations and the creation and diffusion of technology – that are the *INFRA*, *BRI* and *TAI* variables – are, as expected, all positively related to intra-European exports in both the OLS and the PPML models.

The first variables of interest, the *JPI* (a) of the importing country and its disaggregated indices dimensions, have deferring effects on trade. Considering only the PPML estimates, for every additional point of the *JPI* (a), the exported value (in millions euros) to that country decreases by 0.32% in (5), or for every 1-point increase of the *LP* and *CC* indices, that value decreases by 0.37% and about 0.5% respectively in (6). This means that the implementation of robust reforms of the judicial system that reduce the time needed to resolve commercial and civil disputes and the cost of a claim with the effect of diminishing the *JPI* (a) by 10 points might lead to a substantial increase in the value of the export to a Member State, that is by about 3.2%.

As regards the second variable of interest, the results of the empirical PPML analysis show that for every additional point of the importing country's *JPI* (b), the value of the inbound export flows increase in (5) by 0.91%, or for every 1-point increase in its dimension indices - the *RC* and the *PI* - that value increases in (6) by 0.44% and 0.43% respectively. Thus, a growth of the *JPI* (b) of 10 points, achieved thanks to the adoption of measures by the importers, which allow the national courts to conclude a greater number of disputes in a year and to spread a better perception of the judiciary's independence, might be associated with an increase of the external flows' value by 9.1%.

Moreover, the independent variables collectively explain a greater percentage of the variance in the exported value in (2), (3), (5) and (6) where the judicial performance indicators are added, compared to their base gravity models (1) and (4) estimated using the OLS and PPML approach respectively. It follows that, as expected, judiciaries' efficiency, accessibility and independence effectively contribute to shaping up bilateral trade.

A test is performed for all empirical models to strengthen the robustness of these results. The empirical evidence of the OLS and PPML seems very slightly affected by the robustness check, which estimates equations (6) and (7) considering as the dependent variable the exported value from MS to MS in NACE activities B-E, that is 'Industry (except construction)'. As emerges from [Table 5](#) in Appendix,

the negative impact of the Length of proceedings and Cost of claim on the value of the intra-European export flows, as well as the positive effect of the Rate of resolving cases and the Businesses' perception of judicial independence, are confirmed also by this empirical sub-analysis, restricted to a specific goods and services category.

Indeed, focusing exclusively on the PPML estimates, for every additional point of the JPI (a), the exported value (in millions euros) decreases by 0.34% in (5), or for every 1-point increase of the LP and CC indices, that value decreases by 0.37% and 0.62% respectively in (6). Also, for every additional point of the JPI (b), the value of export flows increases by 0.85% in (5), or for every 1-point increase of the RC and PI dimension indices, the same value increases by 0.45% and 0.38% in (6).

6. Concluding remarks

Although the effectiveness of the institutional environment affects trade magnitude and direction, the bulk of the existing gravity model-based literature on international trade keeps not concentrating on the institutional analysis. Indeed, focusing on institutional details can help identify the determinants of the actual – rather than potential – volume of trade since institutions entail costs that impact on the feasibility and profitability of the economic activities (North, 1990).

It follows that the investigation on the causal factors of export flows' levels also needs to be extended on the concrete functioning of the judicial system, which could unveil if the set of legal rules is enforced in a way that makes the institutional environment effective. Therefore, this study was aimed at providing some empirical evidence on how the timeliness, accessibility and independence of the national judiciaries play a crucial role in shaping up exchanges between trading partners, in general and in a specific category of goods and services¹⁵.

Hence, the present paper has augmented the standard gravity model with infrastructure-logistics, business regulatory, technological innovation and judicial performance variables, that directly impact on the behind-the-border trade costs, using a Panel data for the European countries. As regards the variables of interest, the results from the empirical analysis show that longer proceedings, lower clearance rates, higher costs of the claim and a worse businesses' perception of judicial independence are, as expected, associated with a significant increase in trade costs that discourage bilateral exchanges.

Conversely, a well-functioning judicial system, which ensures a shorter trial length, a higher rate of resolving cases, less costly access to the service and independence, fosters exports flows, by reducing costs that companies might undergo when trading with foreign partners. In this perspective, the national policymakers should introduce actionable reforms, where appropriate, to improve the effectiveness of the legal environment.

As the performance of the judicial system varies substantially across countries, the results from the empirical analysis can provide explanations for the significance of borders – assumed by the Trade theory - in determining the exchanges' levels¹⁶. Furthermore, these results empirically support the insight

¹⁵ This analysis estimated equations (6) and (7) considering as the dependent variable the exported value from MS to MS in all NACE activities and in NACE activities B-E, that is 'Industry (except construction)'.

¹⁶ See McCallum (1995), Trefler (1995) and Lee et al. (2007).

that the institutional analysis might explain why the actual volume of trade between countries differs from the predictions of the frictionless neoclassical models, thus leaving room for further research in the Trade theory's context shifted on the non-negligible role of institutions.

Appendix

Table 5. Robustness check – Industry (except construction) – NACE activities B-E

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) PPML	(5) PPML	(6) PPML
JPI (a)		-0.00483*** (0.00125)			-0.00434*** (0.00167)	
LP Index			-0.00452*** (0.000698)			-0.00369*** (0.000948)
CC Index			-0.00745*** (0.00108)			-0.00617*** (0.001076)
JPI (b)		0.00962*** (0.00166)			0.00848*** (0.00145)	
RC Index			0.00470*** (0.00074)			0.00451*** (0.000676)
PI Index			0.0030** (0.0010)			0.00384*** (0.00079)
BRI Exp	0.000666 (0.00217)	0.000889 (0.00206)	0.00152 (0.00216)	0.00544*** (0.00170)	0.00569*** (0.00163)	0.00596*** (0.00170)
BRI Imp	0.01153*** (0.00191)	0.00938*** (0.00186)	0.00953*** (0.00205)	0.00553*** (0.00163)	0.00659*** (0.00162)	0.00739*** (0.00152)
INFRA Exp	0.00148 (0.00106)	0.001556 (0.00103)	0.00120 (0.00107)	0.000663 (0.00125)	0.000723 (0.00119)	0.000679 (0.00125)
INFRA Imp	0.00621*** (0.00108)	0.00447*** (0.00106)	0.00531*** (0.00106)	0.00133* (0.001432)	0.00118* (0.00131)	0.00211* (0.00114)
TAI Exp	0.000429 (0.00207)	0.000986 (0.00197)	0.001389 (0.00183)	0.001525 (0.00229)	0.00168 (0.00197)	0.00089 (0.0020)
TAI Imp	0.00521** (0.00243)	0.00853*** (0.00228)	0.00580*** (0.00243)	0.00345** (0.00191)	0.00352** (0.00179)	0.00069* (0.00162)
lnGDP Exp	0.219* (0.119)	0.115* (0.108)	0.320* (0.106)	0.248* (0.1588)	0.252* (0.148)	0.274* (0.158)
lnGDP Imp	0.709*** (0.127)	0.484*** (0.127)	0.546*** (0.145)	0.355*** (0.112)	0.116*** (0.116)	0.410*** (0.167)
lnGEODIST	-1.035** (0.068)	-1.034** (0.068)	-1.935*** (0.077)	-0.409*** (0.0476)	-0.407*** (0.0476)	-0.404*** (0.0485)
BORDER	1.549*** (0.135)	1.550*** (0.135)	1.543*** (0.136)	0.809*** (0.073)	0.809*** (0.073)	0.851*** (0.076)
LANDL	-5.077*** (0.495)	-1.764*** (0.374)	-2.842*** (0.593)	-3.628*** (0.687)	-2.292*** (0.402)	-3.015*** (0.697)
LANG	0.598** (0.267)	0.601** (0.267)	0.351** (0.216)	0.188* (0.191)	0.189* (0.192)	0.221* (0.181)
Exp-Imp country, year (FE)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,510	3,510	3,510	3,510	3,510	3,510
R-squared	0.863	0.865	0.870	0.886	0.887	0.891

NOTE: The PPML uses export flows in value (current MEUR) instead of the natural logarithm of exports as the dependent variable. A constant is included in each model, but not shown in the table. Robust standard errors (in parentheses) clustered at the country-pair level in (1), (2), (3), and by lnGEODIST in (4), (5), (6). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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