

Stockholm School of Economics

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Bachelor Thesis in Economics

The Impact of Business Related Institutions on Offshoring

A Firm-level Study of Swedish Offshoring 1997-2005

Abstract: This paper examines the effect of institutional quality on offshoring decisions for Swedish firms. The analysis focuses on institutional variables that are directly related to the business environment including regulation on trade, business and financial markets as well as corruption. The paper also examines if the impact of institutions differ depending on the size and R&D-intensity of the offshoring firm as well as the distance to the offshoring country. Taking stance from the gravity model of trade the result of the study shows that inferior institutions have a negative impact on both the choice of country as well as the volume of offshoring. Results also suggests that large firms tends to avoid corrupt countries when offshoring while firms with high R&D expenditures are shown to be discouraged by price instabilities. The study does not provide any evidence that distance to the offshoring country influence the effect of institutions. The negative impact provide further argument for the importance of institutions for economic development and that institutional reform is essential for emerging economies that seeks to attract foreign firms.

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1 Introduction

The question of why some economies prosper while others stagnate has occupied economists for centuries. Sources of economic performance are important and have significant implications for designing effective economic policy. One school of thought that has extended the analysis of economic growth in recent years is the concept of institutions introduced by Nobel Prize laureate Douglass North among others (North, 1970). The core question of this work is that why growth generating activities, such as investment and technological development, seems to take place in some economies while this behavior is extremely rare in others (North, 1991). The answer, according to North, is that economies have different sets of institutions. There is no widely accepted definition of institutions and different theoretical approaches have emerged. A broader definition that cuts across most views is formulated by North (1991):

"Institutions are the humanly devised constraints that structure political, economic and social interaction."

The essence of institutions is that they shape incentives together with economic thrust. Based on these two aspects individuals form their behavior in economic activity (North, 1991). Since different economies provide different sets of institutions different economic behavior will occur. In countries with good institutions that effectively complement economic thrust the interests of the individual and the society as a whole is aligned. In such economies the individual has an incentive to accumulate capital, invest and refrain from taking advantage of other individuals (North, 1991).

Even though the theoretical and empirical debate of institutions has been intensive recent years the concept of institutions has mainly focused on economic growth (Furubotn, 2000). Institutions, however, is a concept that is applicable in many other contexts of economic performance. In the present study the discussion of institutions will be extended to the effect on firm behavior and how institutions influence the choice of country when offshoring.

Offshoring is the process in which firms locate business processes to external companies outside national borders. This phenomenon has been heavily influenced by the ongoing globalization and integration of economies. As barriers of trade decline and economies become more interconnected new possibilities of international trade and investment arise (Tingvall, forthcoming). Along with trade liberalization, technological progress and improved communication possibilities have further facilitated this process. This development has dramatically reshaped the prerequisites for offshoring and broadened the scope of business processes that are possible to offshore. (Grossman and Rossi-Hansberg, 2006).

The rise of offshoring has received great attention in public and academic debate in recent years where critics has argued that offshoring will threaten jobs in developed economies as production shifts to low wage countries (Hira and Hira, 2008). A more positive voice was raised by author Thomas Friedman on the new economic integration and globalization as a mean of fighting poverty (Friedman, 2007). Friedman claims that the world has become flat, economically speaking, where jobs and resources can move freely. Other voices has expressed that the notion of a flat world is exaggerated and that there still exists significant barriers towards offshoring (Leamer, 2007). This debate raises the question to

what degree the world is flat and how large the barriers against offshoring really are? As tariff rates decrease and technological change makes trading less constrained other trade barriers come into light (Tingvall, forthcoming). In the present study it will be argued that institutions are one of the more subtle barriers of trade that has a constraining effect on offshoring and gains relatively higher importance as more explicit barriers to trade simultaneously decline. For example, excessive price controls on important inputs, unstable financial markets or a politically dependent central bank all constitutes various risks of conducting business in a foreign country (Anghel, 2004). Corruption is another important factor since it poses a threat of hold up when finalizing contracts or maintaining intellectual property (Tingvall, forthcoming). These risks have all the potential of offsetting the benefits of offshoring. With the exception of Tingvall's (forthcoming) study on corruption and offshoring earlier studies have failed to bring in impact of institutions into the analysis.

Though institutional effects on offshoring have been fairly unexplored several studies have investigated the relationship between institutions and so called foreign direct investments (FDI). FDI occurs when firms locate production abroad but maintain ownership of the operations and thus shares many similarities to offshoring. Countries with better institutions such as protection of property rights and favorable business policies have been shown attract FDI regardless of other control variables (Anghel, 2004). Other studies are also pointing in the same direction, see for example Bénassy-Quér et al (2007) and, Ali and MacDonald (2008). The effect of corruption has also been acknowledged within the literature where it have been shown do have a deterring effect on FDI, see for e.g. Wei and Smarzynska (1999) and Hakkala et al (2008).

Looking at this literature there seems to be strong evidence for institutional determinates for firms locating production abroad when maintaining ownership. The aim of the present study is to take the first steps in taking a closer look on central institutional determinants of offshoring. Both factors that determine selection of location of offshoring, and given a specific location, also what determines its volume will be investigated. More specifically the focus will be on institutional aspects concerning the business and financial environment. In order to investigate this question bilateral trade flows of goods directed towards Sweden from the rest of the world is used based on a data set of Swedish firm level data. To isolate other factors influencing bilateral trade flows the gravity model is used as the main analytical.

The paper is organized as follows: Section 2 covers a broader background to the offshoring phenomena including definitions, measurement and types of offshoring. Section 3 presents a literature overview of the concept of institutions as well as the previous literature on its theoretical implications for offshoring. Thereafter section 4 describes the theory behind the gravity model and provides a specification of the empirical model along with some econometric considerations. Section 5 presents the empirical data and section 6 includes a basic data description. Section 7 presents the results and is followed by a conclusion and summary in section 8.

2 Offshoring

2.1 Definitions, types and measurement

The debate about offshoring has been lively during recent years where the labor market and loss of jobs have been one of the topics that have taken the center stage (Becker et al, 2010). However, since jobs can be moved across borders in different manners some confusion of concepts has arisen. Thus, clarifications and consistent definitions have to be made in order to get concepts straight as well as separate out activities that do not count as offshoring.

Ekholm (2006) presents four ways of sourcing business processes by dividing the organization of production into two major decisions presented in a two by two matrix. The first decision concerns the organization of production meaning if the firm should produce a good or a service by itself or to buy it from an external company. The second decision concerns the location of the production; that is, if the production is going to be carried out in the home country or abroad. If the firm decides to use an external company, this is called outsourcing and if the firm decides to locate production abroad it is called offshoring according to present terminology (Ekholm, 2006). When a firm decides to both outsource a business process abroad to an external firm it is called outsourced offshoring which is simply referred to as offshoring in the present study. The alternative is to only outsource and maintain ownership within the firm which is referred to as FDI, as mentioned above.

Table 1. Forms of sourcing production

Localization/Organization	<i>Domestically</i>	<i>Abroad</i>
<i>Internal</i>	Insourcing	FDI
<i>External</i>	Outsourcing	Outsourced offshoring

The literature also encloses a variety of sub-concepts to pinpoint the nature of the offshored outsourcing. Two commonly used concepts are frequently used to highlight the skill intensity of the offshored jobs first, *business process outsourcing* (BPO); second, *knowledge process outsourcing* (KPO). BPO comprises jobs within manufacturing and simpler services such as basic support functions. On the other hand KPO involves skill intensive employments such as accounting and software engineering (Sen and Shiel, 2006). Nearshoring is another term that distinguishes between offshoring to neighboring countries from situations where offshorers seek faraway suppliers since these two forms of offshoring carry different costs and risks (Shamis et al, 2005). Offshoring can thus be defined in various ways depending on what type of trade is of interest. Here a broader definition is applied that includes all skill levels and distances where offshoring is measured as imports of intermediate inputs. This definition has been frequently used in earlier research since full information on the activities of offshoring firms on a firm level is very difficult to obtain, see for e.g. (Tingvall

forthcoming), (Hakkala et al, 2008). An alternative method would be to study aggregate trade flows. However, such measures contain too much noise and overlooks decisions on the firm level (Hakkala et al, 2008). By utilizing trade statistics on the firm level this study is able isolate the effect of firm behavior in a more efficient way where other factors that influences trade flows can be excluded.

It is important to note that the definition used in this study excludes imported services. The motive for this exclusion is that previous studies have showed that institutions affect trade in services differently from trade in goods (Karpaty and Tingvall, forthcoming). The main reason for this is that trade in goods as opposed to services poses different risks for firms to engage in. In addition, the tradability of services differs greatly which complicates its relationship to institutions. Easily tradable services have been shown to be marginally affected by institutions while less tradable services are more affected (Karpaty and Tingvall, forthcoming). Including goods and services simultaneously would thus risk to generate misleading results that hides certain institutional effects.

2.2 Driving forces

The patterns of world trade have changed dramatically over recent decades. There are not only trade volumes that have risen dramatically but also the very nature of trade. Perhaps the most striking feature of this process is the ability for firms to trade intermediate goods and services. This has fundamentally altered the way production is organized (Grossman and Rossi-Hansberg, 2006).

Throughout the era of industrialization growth was driven by specialization in the production process through division of labor. However, more complex ways of organizing production posed the problem of coordination as division of labor required proximity since costs of transmitting information and shipping goods were substantial. Therefore the main driver of economic efficiency was agglomeration through geographic concentration which paved the way for market expansion of labor, goods and capital. As a result international trade was constrained to complete goods (Grossman and Rossi-Hansberg, 2006). With recent decades of revolutionary progress in communication and informational technologies transaction costs have been significantly lowered. This has reduced the need for geographical concentration in many areas and opened the possibility of geographically disintegrate production into a global supply chain. As a result international trade has been extended to also include intermediary goods along with complete goods since a specialized supply chain does not require proximity to the same extent (Grossman and Rossi-Hansberg, 2006).

Tempest (1996) brings a very revealing example of the global supply chain when describing the manufacturing process of Barbie dolls. In this process the initial design of the doll is carried out in Mattel's headquarter in El Segundo, California. The plastic pellets of which the body is made of is made from oil refined in Taiwan. The nylon hair is produced in Japan and the cotton cloth is

manufactured in China. The paper cardboard for packaging and the moulds for the doll is made in the US. Final assembly is carried out in Indonesia and Malaysia. After that the dolls are shipped back to the US for quality testing in California which also market and sell the dolls there at the local market and around the whole globe as well.

Mattel and other companies can benefit from the comparative advantage of each country in the global production process where each plant only carries individual tasks. International trade has moved from being trade in goods to become a complex network of trade in tasks where it is possible to separate tasks in time and space. In the world of global task trade firms can single out business processes which requires different skill levels and locate them where production is most efficient. Companies can thereby take advantage of factor costs and expertise around the globe throughout the entire supply chain (Grossman and Rossi-Hansberg, 2006). This phenomenon has been described as an extension of the utilization of comparative advantage originally formulated by David Ricardo (1821). The main difference today is that firms can relocate investments that yield the highest return at each stage of the production process (Jahns et al, 2006).

The driving forces that have facilitated this process are complex and occur on different levels. In this section these dynamics are explained on two levels, the macro level which includes large scale changes and the micro level which captures the effect within the individual firm. The driving forces at the macro level are divided into four broad categories 1) economic; 2) political-legal; 3) social-demographic; and 4) technological.

2.2.1 Driving forces at the macro level

1) Economic driving forces

The economic driving forces are twofold. The first driving force is factor price differences, including for example wage differentials which make firms able to access inputs at a lower cost. However, offshoring is also important in order to gain resources, for example certain knowledge that is not easily transmittable. Somewhat surprisingly the resource aspect is often neglected even though most offshoring activities occur between developed economies where factor prices are very similar (Jahns et al, 2006). Roodhofs and Warlop (1999) also point out that the increasing role of financial markets as resource allocators as opposed to firms itself has forced companies to focus on core value adding activities. This means that companies have to focus on business activities where they possess a comparative advantage which affects make or buy-decisions towards outsourcing rather than in-house production.

2) Political-legal driving forces

Another aspect is increased openness in the world and that more economies have opened for international trade. The fall of the Soviet bloc, China's introduction of a partial market economy and general developments in countries like India and Brazil has added billions of people into the global labor market creating a new opportunities for global specialization (Spencer, 2005). Also efforts to liberalize trade in many economies by reducing barriers of trade such as tariffs, non-tariff-barriers, and quotas have played a great role in this. In addition the emergence of trade unions such NAFTA, ASEAN or the different treaties within the EU has been important to intertwine economies (Jahns et al, 2006). Increased possibilities to locate production to new economies have also created a strategic incentive for firms to exploit legal conditions. In this process firms are able to move production to obtain more favorable regulations on labor, taxes and competition (Hitt et al, 2002).

3) Socio-demographic forces

Socio-demographic forces are primarily connected to the globalization of the world labor market in emerging economies. The emerging economies have not only added to the supply of labor but also changed the socio-demographic composition of the global labor force. This new segment of people represents a young, motivated and increasingly educated share of the global workforce which has good prerequisites to compete for global jobs (Jahns et al, 2006).

4) Technological driving forces

Technological forces that have driven the rise of offshoring activities are primarily developments within telecommunication and transportation during recent years. In particular the internet and the mobile phone but also improved transportation infrastructure is essential features in this development. As a result, geographic boundaries become a less important factor when deciding where to locate operations. These developments have both diminished obstacles of relocating production but also made it less costly to transport physical components (Jahns et al, 2006).

2.2.2 Driving forces at the micro level

To obtain a complete picture of the dynamics of offshoring the perspective of the individual firm also has to be applied. This is important since the macro factors affect how individual firm operate at the micro level. Three main channels have been identified in which the macro driving forces affect offshoring at the firm level; 1) transaction costs, 2) resources, and 3) markets..

1) Transaction costs

Transaction costs are the essential feature of the make-or-buy decision of the firm. Transaction costs can be divided into the costs that occurs before a contract is closed (ex ante) and after (ex post). The ex-ante costs involve for example costs for finding a suitable supplier while ex-post costs involve

costs of monitoring the supplier (Williamson, 1979). One of the crucial factors that influence these costs is asset specificity. Asset specificity is the degree to which the good or service is specific to the buyer. High asset specificity calls for a hierarchical contract (in-house production) while low asset specificity makes market transactional arrangements more suitable (outsourced production) (Williamson, 1979). Several factors have decreased the asset specificity and thus strengthened the buy-incentives. For example, production is more independent from specific geographical locations. Thus greater amount of inputs are available in offshore countries. Also site specificity is less bound to specific locations as transport and infrastructure improves. The human asset specificity also decreases since more people joins the global labor force with higher educations and thereby improved language skills which further decreases barriers of trade through the market (e.g. in India) (Jahns et al, 2006).

Transactions costs are also reduced due to a stricter alignment of legal systems which reduces uncertainty when trading abroad. This goes especially for developing countries such as India and China. Improved legal systems in many offshoring countries provide better protection and possibilities to disclose confidential information is better. This contributes to decreased costs of both information and coordination of trade. Thus the environmental forces have reduced specificity and lowered transaction costs and thus improved prerequisites for offshoring (Jahns et al, 2006).

Other theories; 2) Resources and 3) Markets

There also exist other explanations that put more focus on the strategic behavior of firms. Morstead and Blount (2003) argues for example that offshoring often make firms obtain a greater variety of resources compared to onshoring (i.e. develop the resources within the firm). Grant (1991) argues similarly that offshoring can act as “filling gaps” that compensates for organizational deficits that the firm cannot deal with by using its own resources. Another strategic aspect is that previous supplier markets can become important customer markets instead (Hoskisson et al, 1999). In this sense offshoring can act as a gateway to new markets or restructuring markets as the firm gains networks and knowledge in offshore locations.

To sum up, the underlying factors to the growth of offshoring is to be found in the rise of global supply chain as the need for proximity decreases. The development has been facilitated by several developments on the macro level; economic, political-legal, socio-demographic, and technological. These developments have improved firms’ abilities to operate abroad through markets to a much larger extent as an alternative to in-house production. Partly because transaction costs and asset specificity decreases but also through strategic incentives.

3 Institutions

3.1 Background and theory

As offshoring increases and economies become vertically integrated as more explicit constraints of global trade are reduced, subtle barriers of trade come into light. Here the field of institutions has a potential to generate a more complete analysis of underlying barriers of trade and offshoring.

Institutions have emerged as one of the central schools of explaining long-term economic performance along with the neoclassical and geographical theory of growth (Gwartney et al, 2006). Neoclassical theory focuses on the mobilization of human and physical capital into production along with technological progress, see Solow (1956), Romer (1986) and Lucas (1988). The geographical (or locational) school, on the other hand, argues that temperate climates and access to markets carries a strong explanatory power in achieving economic progress, see Sachs (2001) and Gallup et al (1998). The essential argument is that tropical climates affect productivity negatively since it drains the energy-level of workers along with tropical disease which disable the workforce (Gwartney et al, 2006). In contrast to these two schools of thought, institutionalists instead emphasize the importance of the institutional environment, see for e.g. North (1991), Hall and Jones (1999) and Barro (1996).

As mentioned in the introduction, institutions are the humanly devised constraints that structure political, economic and social interaction. North (1991) emphasizes that institutions constrain certain behavior through both informal and formal institutions. Informal institutional constraints comprise of sanctions, taboos, customs and traditions among others while formal institutions are formal rules such as constitutions, laws and property rights. The essence of institutional constraints is that it creates order and reduces uncertainty in exchange by narrowing the set of choices along with the standard constraints of economics. Both economic and institutional constraints provide a certain incentive structure of economic activity that determines transactions and production costs in an open economy. However, such a brief description fails to capture the underlying theory of the role of institutions in an economy.

To better understand the need for economic constraints, North (1991), explains the function of institutions in a game theoretical framework. North claims that wealth-maximizing individuals usually seek to cooperate with other agents in a repetitive game manner if they possess complete information about the player's past performance and if the total number of players are small. However, in the setting of a finite game where the numbers of players are large and information about the players is limited, cooperation is difficult to obtain. In such a game, productive economic activity is hindered by uncertainty since collecting necessary information is costly and time consuming. By limiting the set of choices through constraining rules, institutions facilitate economic cooperation between players and reduce costs of economic activity. That is, institutions facilitate economic cooperation but to different degrees and thereby determine the long run economic growth on an aggregate level. Institutions are

thereby a solution of complex problems of organizing production in a competitive framework and thus impact production- and transaction costs. Furthermore, institutions manage opportunistic behavior in general and in the context of transaction specific investments as well as the ability for individuals to process information efficiently (Williamson 1979). Institutions can hence be seen as the factor that enables capital accumulation, investment and technological development since institutions tackle the problem of market imperfections due to limited information (Gwartney et al, 2006).

3.2 How institutions affect offshoring

Institutions affect the prerequisites of offshoring through transaction costs and production costs which, in turn affect the profitability of the offshoring firm. Moving production outside the home country to an external firm entails a risk premium since it is not possible to formulate complete contracts about how to carry out their commitment as stated in the contract. North (1991) argues that the risk premium, which affects transaction costs, is determined by the degree of contract enforceability, i.e. the protection of property rights and the likelihood of defection of the other party. However, the risk premium also affects production costs since poor institutions limit production to interpersonal exchanges. Thus poor institutions prohibit more complex and efficient ways of organizing production (North, 1991).

Weak institutions also affect costs by raising costs for monitoring and control of production. A common feature of countries that suffers from weak institutions is widespread corruption. Bribing government officials and uncertainty of receiving certain permits or public services along with delay in production also entails severe costs (Hakkala et al, 2008). Tingvall (forthcoming) shows that corruption has a deterring effect on offshoring and that it decreases the propensity for firms to choose countries with high levels of corruption.

The regulatory qualities also affect the institutional environment and have thus important implications for a decision to offshore to a certain country. For instance, business regulations affect the abilities for foreign companies to operate and invest in a specific country (Massini et al, 2010). Tariffs and regulation on trade also influence the possibilities for firms to offshore along with regulations on labor and financial markets which affect the availability of inputs (Massini et al, 2010). In addition to these challenges, offshoring involves macro-related risks such as inflation and general currency risks (Massini et al, 2010).

Even though recent decades have shown an unprecedented increase in offshoring, trade statistics still show that the major increase is due to increases in trade flows between countries that already traded extensively (Becker et al, 2010). Despite the fact the Soviet bloc, China and India have opened their borders for investment and trade, offshoring is mostly concentrated among developed countries. In

Sweden, trade with advanced countries constitutes a clear majority even when it comes to intermediary goods. Despite the fact that the share of low-income country trade is increasing these statistics indicates that there still exists underlying obstacles for offshoring (Ekholm, 2006). Nunn (2007) has shown that countries where firms have a greater ability to enforce legal contracts also have a comparative advantage in businesses that require relationship specific investments. Dunning (2009) argues that recent developments in the global economy also has affected firms perception of locational advantages. Instead of focusing on traditional locational advantages such as labor costs or availability of natural resources factors such as knowledge-based assets and infrastructure has gained increasingly more importance. These emerging locational advantages, Dunning points out, are hence influenced by institutions to a much greater extent.

3.3 Problems of measuring institutions and the effect on offshoring

Though the concept of institutions and its link to offshoring is interesting, it also involves some problematic aspects. (La Porta et al, 2008) shows that different institutional measures are highly correlated causing methodological problems due to co-linearity. As a consequence it difficulties occur when trying to isolate institutional aspects that are the root of economic performance and offshoring in this case. However, countries' institutional performance have been shown to be constant regardless of what institutional measures are used which shows that institutions plays a crucial role even though the most important institutions are difficult to track down, see for e.g. Bénassy-Quér et al (2007), Ali and MacDonald (2008) and Gwartney et al (2006).

Another methodological problem is the difficulty in measuring institutional quality which is an issue that has been heavily debated. Chang (2010) claims that the indexes which rely in qualitative measures are at best very insecure and often heavily biased since most of the indexes are constructed by organizations that are lean towards free-market and Anglo-American institutions. Therefore such indexes overstate the quality of western style institutions and understate other institutional arrangements. In addition to this, Chang (2010) also argues that most surveys are based on answers on businessmen and experts whom were trained in the US which spurs on the biasedness towards the western view of efficient institutions. These claims are important to acknowledge but difficult to verify.

Many indexes are also composites created through aggregate measures that merge different indicators of institutional quality. Chang (2010) argues that it does not makes theoretical sense to add minor measures in to aggregate indexes since the construction of such measures often become arbitrary. In addition this Chang (2010) claims that many measures of institutional quality muddles incompatible variables by including both measures of institutional form (such as democracy, independent judiciary etc.) with institutional function (such as rule of law, respect for private property, government

effectiveness etc.). An additional critique to qualitative indexes is their propensity to rather reflect the general state of business rather than institutional quality (Rodrik, 2009). Rodrik (2009) argue that the reassessment of the institutional development in Southeast Asia after the Asian crisis in 1997 as an example of when good institutions rather reflect a booming economy.

An issue of concern that also comes up when studying institutions and economic performance is the endogeneity of institutions and the causality between institutions and economic outcomes. It is not solely institutions that affect economic performance but also the opposite, economic performance that affect institutions. Such causality can invoke serious problems in estimation due to the simultaneity bias (Anghel, 2004). Chang (2005) argues that economic development can affect institutional change through three main channels. First, greater wealth through economic growth may intensify demand for better institutions. Second, greater wealth makes high-quality more affordable. Third, economic progress creates new agents that demands new institutions.

Chang (2002) also notes that today's advanced western countries acquired most institutions after economic development rather than before. This includes democracy, modern bureaucracy, intellectual property rights, limited liability, bankruptcy law, banking the central bank, securities regulation. However, critique can be directed to this view since today's developing countries are dependent on developed countries through trade and investment etcetera. This requires better institutions which make the debate of whether institutions or economic development were driving forces in the wealth creation of the western world somewhat irrelevant. For example literature on FDI shows that institutions are important for attracting international capital but also that such investments also have a greater effect on aggregate growth in countries with more developed institutions (Gwartney et al, 2006).

In this paper however the issue of endogeneity is not very pressing since the focus lie on Swedish firms' offshoring activity which is not very likely to have a significant impact on the institutional quality of a certain country. Therefore offshoring, as opposed to economic development, could quite safely be regarded as an exogenous variable. Thus, the critique of causality, which is important to acknowledge, is not very applicable to the present study.

The validity of institutional measures, however, is an issue to have to be dealt with. In order to tackle these problems the variables used in the study has been chosen carefully in accordance with the critique directed by Chang (2010). First, the variables used are based on different methods from questionnaires to instrumentally based indexes developed by the Fraser Institute (1997-2005) and the Heritage Foundation (1997-2005). Thus the study does not fully rely on measures of a single methodology, but rather a mix drawn from variables with different strengths and weaknesses. For examples questionnaires might be biased towards western institutions but involves less uncertainty since it is based on actual questions rather than a composite of a wide range of proxy measures.

Another important aspect to note is that several variables are used simultaneously in the study where each variable describes a narrower set of country characteristics. This makes the somewhat dubious task of weighing different economic aspects into a single index value made less uncertain. For example, measures of price stability and trade regulations are used instead of broader measures of general economic freedom which is more difficult to estimate. The institutional variables are also focusing on the business environment since the interest of the study is firm choices. Variables capturing factors such as human rights or level of democracy are thus excluded since they do not carry a clear, straight forward connection to firm's propensity to explain the choice of country when offshoring. Thus, utilizing a range of measures defined at a narrower basis closely related to business environment is better prerequisites to give a more complete picture of what factors that attract offshoring. A complete description of variables used is found in section 5.

In sum the issues of measuring institutions and how indexes are created are important to take into consideration. However, many studies have been using very different institutional measures and a large diversity of methods, despite that they have made the same conclusions based on their results, namely the importance stable of institutions. Regardless of the historical aspects of institutions and their effect on economic development on today's industrialized world, developing countries need to attract foreign trade and investment that in turn require better institutions. However, the issue of tracking down the core institutional determinants of economic development remains as well as the problem of causality. This study accomplishes to circumvent the latter issue and seriously tries to solve the first through the choice of institutional variables.

3.4 Hypotheses

Based on theory and empirical results of earlier research presented above three hypotheses are formulated:

- 1) Inferior institutions have a deterrent effect on offshoring, both on the choice of country and the volume of offshoring.
- 2) The institutional effect on offshoring differs across firms since certain characteristics affect prerequisites to deal inferior institutions. In this study firm size and R&D-intensity are examined.
- 3) The distance to the offshoring target impacts the effect of institutions.

By testing these hypotheses a first step is taken in extending the knowledge base of the institutional effect on offshoring and complements previous research on similar activities such as FDI. The study is also among the first of its kind since it is based on firm level data which few previous studies have been able to do. The contributions to the field are thus significant and can shed new light on the effects of institutions.

4 Models

4.1 The Gravity model

The gravity model is the underlying framework to analyze the flow of inputs to the Swedish firm in the data set. This framework has emerged as one of the main models to analyze trade flows and has been used in papers similar to this when studying FDI, see for example De Mello-Sampayo (2007), De Mello-Sampayo (2009) and Hejazi (2009). The gravity model originates from the theories of Isaac Newton of gravity between two bodies also known as Newtons law of gravity transferred into an economic context. Newtons law states that the attractive force between two bodies i and j is determined by their mass M and distance between them D along with a gravitational constant G , such as $F_{ij} = G (M_i M_j / D_{ij}^2)$ (Helpman et al, 2008).

Tinbergen (1962) was among the first to apply the concept of gravity in an econometric context. By suggesting that the “economic gravity”, i.e. the imports (M) from country i to j , is determined by the joint economic size of the two economies ($Y_i Y_j$) and their distance in between d_{ij} . Illustrated below:

$$M_{ij} = T(r) \frac{Y_i Y_j}{d_{ij}^{-\varepsilon}}$$

In this specification the gravitational constant is replaced by a proportionality constant $T(r)$. When applying the model, economic size is primarily determined by GDP and distance is measured by the proximity of the country’s economic centers. In this paper the proportionality constant comprises of the institutional quality of the country exporting to Sweden. The purpose of using the gravity model is simply to isolate the effect of institutional quality from other economic aspects that also influence trade flows.

Recent papers have however provided evidence that shows some weaknesses of the model. For example the model does not include the effect of relative prices which is an important factor for trade and which have been shown to generate omitted variable bias (Anderson and van Wincoop, 2003). Anderson & van Wincoop (2003) have suggested that this issue can be overcome by replacing $T(r)$ with a so called multilateral trade resistance term (MRT) which is allowed to vary. The multilateral trade resistance is a term that takes into account not just bilateral trade resistance to a specific country but the trade resistance to all other countries. The intuition is that bilateral trade relations are not solely affected by trade resistance between the two countries but also the trade resistance to other trading partners of a country (Adam and Cobham, 2007).

Another aspect that is not controlled for in the original gravity model is firm heterogeneity and the fact that trading with foreign countries requires a fixed sunk costs. This implies that all firms do not have the same prerequisites for international trading and thus also offshoring (Melitz, 2003). Melitz (2003) shows that a firm needs to cross a certain level of productivity in order to afford international trade. Not controlling for firm productivity will thus generate a selection bias.

In sum, the recent research that reveal shortcomings of the gravity model also provide methods to tackle the problems. Both factor price differences and trade resistance as well as firm heterogeneity shows to be problems that quite easily can be avoided by extending the model. Thus the gravity model retains its validity for trade analysis. In the light of this it is here concluded that the gravity model is a suitable analytical tool to use in the context of the present study.

4.2 Specification of basic model

In order to investigate if and how institutions impact offshoring of Swedish firms based on the modified gravity model the following log-linear model is formulated:

$$\ln(\text{offshoring}_{ij}) = \beta_0 + \beta_1 \text{institutions} + \beta_2 \ln(x_i) + \beta_3 \ln(x_j) + \beta_4 \Omega + d_r + \gamma_t + \varepsilon_{ij}$$

The dependent variable offshoring stands for imports of input goods to country i from country j . The institutional variable consists of several measures of the quality of the business and financial environment in the exporting country. x_i includes a set of firm specific variables of the offshoring firm which includes sales volume, productivity and a dummy variable if the firm is an MNE. These are all important determinates of offshoring and thus helps to discern other factors that might influence a firm's propensity to offshore. The MNE dummy also helps to distinguish whether imports are outsourced offshoring or FDI. x_j , on the other hand, includes a set of country specific variables including GDP in accordance with the original gravity model and population to obtain factor productivity. Trade resistance is captured by Ω which includes distance and tariffs. d_r is a regional dummy that captures country fixed effects, γ_t is a period dummy and ε_{ij} is the error term.

4.3 Other econometric issues

Beyond the shortcomings of the original model and its modifications the study also encounters two additional econometric difficulties which have to be dealt with. The first problem includes the great number of observations that take a zero value in the data set. The second issue involves country fixed effects that are not included in the basic specification that might influence the dependent variable and this lead to omitted variable bias. In the next section these problems are described in more detail along with methods to deal with them.

4.3.1 Zeros and selection

The data used for this study is composed into firm-country pairs meaning that for each Swedish firm flow of inputs from all countries are measured. Thus, most of the observations contain zero trade since most firms only offshore operations to a few countries. In this dataset almost 97 % of the observations record no trade. The gravity model has previously been defined in a log-normal specification, however since the logarithm of zero is undefined leads to omission of all zero-trade observations. The problem with this is that it is not random where the zero-trade flows occur and all zeros cannot be treated as equal (Tingvall, forthcoming). Take for example a Swedish high-tech firm that is deciding an offshoring partner where the choice is between a supplier in Germany and a supplier in France. Let's say that the firm chooses the German partner which lead to a zero-trade flow with France for that specific firm. However, France, the second best choice, is now treated as all other countries that the firm does not trade with, i.e. for example Haiti that were nowhere near a contract with the Swedish firm. Since the zero trade flows are not random, omitting them due to the log-normal specification gives biased results. The log-normal specification is therefore not suitable to study trade-flows on the firm-level (Tingvall, forthcoming).

Helpman et al (2008) suggests that the problem of zero-trade flows can be overcome by estimating the gravity model through a Heckman specification. In the Heckman estimation the decision to offshore is divided up into two sub choices. First, the firm chooses whether to offshore or not and to which country. Second, given that a firm has chosen a country, the firm chooses the volume of offshoring. The first decision is estimated in a Probit model where the probability for the firm to choose a certain country is estimated. In this way one can separate zeros where trade would have been more likely to occur from cases where trade flows is less likely to occur. Taking the example of the Swedish high-tech firm, we can separate the zero trade flow of France from the zero trade flow of Haiti. Since all zero trade flows hides a certain probability of being targeted the probability model manage to extract information about selection that otherwise would have been omitted in the original log-normal gravity model. Thus the problem of a selection bias through the zero trade flows is circumvented.

When estimating the selection part of the model it is suggested to include additional exclusion restrictions to obtain reliable estimates. The reason behind the additional restrictions is to include variables that specifically affect the choice to trade abroad (Bernard and Jensen 2004). In the present study export intensity of the firm is included since exporting firms already have to operate in foreign countries and thus are more likely to offshore (Tingvall, forthcoming). Along with export intensity, skill intensity of the firm as measured by the share of workers with tertiary education will be utilized. Skill intensity has earlier been shown to be a stable and prominent predictor of firm propensity to offshore (Bernard and Jensen, 2004).

4.3.2 Fixed effects

Another issue of concern is fixed effects. Fixed effects are time-invariant variables that is not observed in the estimated model but that still might affect the dependent variable. There may for example be trade-agreements between certain countries or other aspects that are fixed over time that will affect trade flows. If this would be the case the model suffers from omitted variable bias (Wooldridge, 2008).

One way to tackle this problem would be estimate a fixed effect model to control for all unobserved heterogeneity. The problem with this is that it only leaves us with the variation over time where time-invariant variables are not possible to estimate (Wooldridge, 2008). The fixed effect would for example eliminate the distance variable of the gravity model and also most of the institutional variables as well.

An alternative way overcome the problem of unobserved heterogeneity would be to include a dummy variable for each country in the data set. However, by doing so the model includes a massive number of coefficients that makes the model unstable and over flexible. In addition to this it has been shown that this method of controlling for country specific fixed effects is inefficient since the effects of the dummies tend to dominate other variables (Benedictis and Vicarelli, 2009). Instead 22 regional dummies are included to manage country fixed effects without entering a too large amount of variables.

Unfortunately problems arise since it cannot be known if the regional dummies are able to capture unobserved heterogeneity in a satisfying manner. Plümper and Troeger (2007) propose a method to solve this issue by using a so called Fixed Effect Variance Decomposition (FEVD) estimator. The FEVD estimator makes it possible to obtain the benefits of the normal fixed effect model without eliminating the variation of time-invariant or nearly time-invariant variables. This method has gained a fairly large spread and been applied in a wide range of papers examining international trade and investments, see for example Chen, Kokko & Tingvall (2011), Tingvall (forthcoming) and Davies et al (2008). The FEVD model works in three fairly simple stages. First, an ordinary fixed effect model is estimated. In the second step the unit effect is broken down into two components, one that is explained by time-invariant or rarely changing variables and one error term. In the third stage the model is re-estimated with the time-invariant variables and the error term by pooled OLS that takes the unexplained unit effect into consideration. By comparing coefficients with and without FEVD estimators the efficiency of the regional dummies can be observed (Plümper and Troeger, 2007). If the FEVD estimators differs from the ordinary Heckman estimators it can be concluded that the regional dummies do not capture country specific effects. Thus the problem of unobserved heterogeneity is not solved using by regional dummies.

The reason for not relying solely on the FEVD estimator is due some recent critique that has been directed towards this method. Greene (forthcoming) claims that the gains of FEVD model are illusory and that it does not solve the underlying problems of fixed effects. The main critique is that FEVD model only turns a normal fixed effect model into a random fixed effect model where the time-invariant variables are estimated incorrectly. This critique has however been argued to be misdirected in an ambitious paper by Plümper and Troeger (forthcoming). Thus, no definite consensus exists on the validity of FEVD estimators. To conclude the issue of unobserved heterogeneity and fixed effects, both the method of using regional dummies and FEVD estimators carry some problematic aspects. However, if the original Heckman model containing regional dummies and the FEVD model produce similar results it indicates that the estimations are correct.

5 Data

The study is based on data covering imported intermediate inputs of Swedish firms between 1997 and 2005 divided up on the national origin of the supplier. The firm data is thereafter matched with data covering information of institutional characteristics of each exporting country. The firm data includes register-based sets of data gathered from Statistics Sweden which contains financial and labor market statistics. The financial statistics provide information such as industry sector, number of employees, wages, net profits, balance sheet total and R&D-intensity while the labor market statistics covers information on educational level and demographics. Data on firm's imports includes all firms with a total import value above 2.2 million SEK. Thus firms that do not reach this point and are present in the financial statistics will record zero trade flow. Firms also receive a sector classification according to SNI92 (Statistics Sweden). Imported goods are classified in six broader categories according to MIG (Major Industrial Grouping): durable consumption goods, non-durable consumption goods, investment goods, energy goods, other intermediary goods. In this study imported intermediate and consumption inputs are used as proxies for offshoring.

The institutional variables used in the study are directly related to the business environment since the paper examines offshoring choices on the firm level. Thus, frequently used measures such as level of democracy or human rights are not used since these measures have no direct connection to the conditions for foreign to trade with a certain country. The institutional variables are index measures that indicate the difficulties for firms to operate with respect to regulations and taxation of trade and business as well as efficiency of bureaucracy and corruption. In addition to this, indicators of financial markets are included since they indicate the availability of input capital and stability of input prices in the country. The indexes are constructed by the Heritage Foundation and the Fraser Institute. All indexes are harmonized to be fully comparable and ranges from 0-10 where 0 corresponds to the

lowest possible institution quality and 10 respectively highest institutional quality except Fiscal freedom where 0 corresponds to the highest possible institution quality and 10 respectively lowest institutional quality. A closer description of all institutional variables is presented below:

Freedom to trade internationally (Fraser Institute)

The Freedom to trade internationally index is a broad measure of how well-integrated the country is with the global economy. The index takes several aspects into account such as taxes on international trade, regulatory trade barriers, actual size of trade sector compared to expected size, difference between official exchange rate and black market rate and international capital market controls. An index value of zero corresponds to ‘increasing tax rate on international trade’, ‘slow import or export process’, ‘small trade sectors relative to the population and geographic size’, ‘exchange rate controls are present and a black-market exists’, and ‘restrictions on the freedom of citizens to engage in capital market exchange with foreigners’. While an index value of ten corresponds to ‘no specific taxes on international trade’, ‘swift import or export process’, ‘large trade sectors relative to the population and geographic size’, ‘no black-market exchange rate’, and ‘no restrictions on the freedom of citizens to engage in capital market exchange with foreigners’.

Business freedom (Heritage Foundation)

The Business freedom index captures the quality of the business climate and difficulties that business owners meet. The index is based on ten equally weighted components that affect the business environment: 1) Number of procedures it takes to start a business, 2) Number of days it takes to start a business, 3) The costs of starting a business as a share of income per capita, 4) The minimum capital it requires to start a business as a share of income per capita, 5) Number of procedures it takes to acquire necessary licenses, 6) Number of days it requires to acquire necessary licenses, 7) The cost of obtaining necessary licenses as a share of income per capita, 8) Number of years it takes to close a business, 9) The cost to close a business as a share of the estate value and 10) The recovery rate when closing a business.

Fiscal freedom (Heritage Foundation)

The fiscal freedom index is a measure of general tax pressure in a country. The index comprises of three equally weighted measures: 1) Top tax rate on individual income, 2) Top tax rate on corporate income and 3) Total tax revenue as a percentage of GDP. Since the measure is defined from high to

low as opposed to the other indexes signs are shifted. Hence, a negative sign implies that better institutional quality with regard to fiscal freedom increases offshoring.

Investment freedom (Heritage Foundation)

The investment freedom index examines each country's policies toward foreign investment, as well as its policies toward capital flows internally, in order to determine its overall investment climate. Since outsourced offshoring do not require any specific investment it does not affect this activity directly. However, it has important implications for a firm's choice between FDI and outsourced offshoring. A limited investment freedom has therefore the potential to be positive for outsourced offshoring since it restricts FDI.

Trade freedom (Heritage Foundation)

The trade freedom index is based on two factors: 1) The trade-weighted average tariff rate and 2) Non-tariff barriers. Non-tariff barriers are indirect barriers of trade such as licenses, quotas or other forms of legislation that restrict imports. It is important to note that trade freedom does not affect the flow of inputs that are exported to the same extent as the inputs that are imported. However, limited trade freedom becomes a severe problem for offshoring if the exports are processed input goods. If that is the case imperfect trade freedom risks to create severe disturbances in the supply chain.

Freedom from corruption (Heritage Foundation)

This index is based on Transparency International's investigations on the spread of corruption in the public sector. It is a subjective measure based on questioners that focus on the misuse of public power for private benefit such as bribery. It includes both political corruption and administrative corruption. The results are primarily based on the answers of business people, risk analysts and the general public. It is important to highlight that the time series data has to be viewed with some caution since it changes over time, not only affected by changes in the level of corruption but also changes in measurement. Changes in measurement include variation in the composition of respondents, formulation of questions and changes in methodologies. Moreover, the index is based on a three-year moving average which in turn implies that changes in the level of corruption only affect the score gradually over time.

Regulation on credit, labor and business (Fraser Institute)

This index captures how business related regulations affect the business environment. It investigates market regulations on credit, labor and business. A value of zero corresponds to: low percentage of deposits held in privately owned banks; high foreign bank license denial rate; private sector's share of credit is close to the base-year-minimum; deposit and lending rates is fixed by the government and real rates is persistently negative; high impact of minimum wage; widespread use of price controls throughout various sectors of the economy; starting a new business is generally complicated. A score of ten corresponds to: high percentage of deposits held in privately owned banks; low foreign bank license denial rate; private sector's share of credit is close to the base-year-maximum; interest rates is determined primarily by market forces and the real rates is positive; low impact of minimum wage; no price controls or marketing boards; starting a new business is generally easy. In sum this index measures the ease or difficulty of doing business in country as a consequence of the regulatory environment.

Access to sound money (Fraser Institute)

The access to sound money index is a financial measure that indicates the monetary stability of the country. The index gives of the health of financial markets and the availability of capital. It consists of three equally weighted indicators: 1) Standard inflation variability in the last five years, 2) Recent inflation rate and 3) Freedom to own foreign currency bank accounts domestically and abroad. Here the lowest score corresponds to: high annual money growth; high variation in the annual rate of inflation; high inflation rate; restricted foreign currency bank accounts and the highest possible score corresponds to: low annual money growth; low or no variation in the annual rate of inflation; low inflation rate; foreign currency bank accounts are permissible without restrictions. The index generally captures price stability and ability to for foreign actors to transfer foreign capital to the country.

Financial freedom (Heritage Foundation)

The financial freedom factor measures the relative openness of each country's banking and financial system. It captures the extent of government regulation on financial services, the extent of state intervention in banks and other financial services, the difficulty of opening and operating financial services firms for domestic and foreign individuals and government influence on the allocation of credit. In other words, a high index on this measure means that a country has a transparent financial system, free from government regulation where foreign and domestic firms can operate without any obstacles due to the financial market.

Monetary freedom (Heritage Foundation)

The index of monetary freedom comprises of two components; 1) Weighted average inflation and 2) Price controls. The weighted average inflation rate for the three most recent years serves as the primary input into an equation that generates the base score for monetary freedom. The extent of price controls is then assessed as a penalty of up to 20 percent subtracted from the base score based on the average inflation rate.

Taken together, the above described indexes give a good view of institutional aspects of the business and financial climate that might influence the choices of an offshoring firm.

6 Data description

Before carrying out the analysis some description of the data is presented. This includes a description of Swedish offshoring firms and their trade patterns. In addition to this the institutional variables are tested for correlation. The reason for this is that they all capture similar aspects of the business environment that the offshoring firms operate in. As a consequence the institutional variables might be heavily correlated and thus suffer from multicollinearity (Wooldridge, 2008).

Starting off with the firm data, it reveals that offshorers are generally large firms and often multinational enterprises. The offshoring firms also show to be skill intensive and tend to have fairly low productivity which is somewhat surprising. The trade patterns show that the majority of the offshoring are targeted within Europe and especially Western Europe which holds 75 % of the total value of imported inputs. Europe as a whole holds approximately 85 %. At the same time distant and poor countries show the lowest volume of offshoring.

Turning to the issue of correlation, it is important to note that multicollinearity does not generate biased estimates but risks to eliminate significance of individual predictors that are heavily correlated (Wooldridge, 2008). When dealing with this issue it is not possible to state a definite level under which multicollinearity is not a problem, however the problem diminishes as number of observations increases (Wooldridge, 2008). Since the data does not show any extreme correlations between any pair of institutional variables and the number of observations are high the issue of collinearity does not seem to be a very pressing issue here, see *table 2*. Nevertheless multicollinearity cannot fully be rejected as a problem and thus it have to be taken into consideration when analyzing the results.

Table 2. Correlation between institutional variables

Variable	Fr tr in	Bus fr	Fisc fr	Inv fr	Tr fr	Corr	Reg	Acc m	Fin fr	Mo fr
Freedom to trade internationally	1.00									
Business freedom	0.47	1.00								
Fiscal freedom	-0.10	0.01	1.00							
Investment freedom	0.67	0.44	-0.08	1.00						
Trade freedom	0.60	0.37	0.02	0.41	1.00					
Corruption	0.66	0.67	-0.27	0.49	0.47	1.00				
Regulation on credit, labor and business	0.62	0.61	0.04	0.49	0.44	0.74	1.00			
Access to sound money	0.68	0.40	-0.05	0.55	0.43	0.61	0.63	1.00		
Financial freedom	0.58	0.53	-0.01	0.63	0.40	0.55	0.67	0.61	1.00	
Monetary freedom	0.39	0.42	-0.09	0.30	0.18	0.48	0.49	0.74	0.39	1.00

7 Analysis

In the following section the main analyses are carried out. First the institutional variables are tested in a basic Heckman model to see if institutions affect choice and volume of offshoring. Second the FEVD-extension is applied to the Heckman model to further control for any country fixed effects that the regional dummies in the original model might fail to capture.

The basic analysis is then extended by an analysis of how firm characteristics influence the institutional effect on offshoring. The reason for such an extension is to test if the effect of institutions differs across different types of firms. By studying certain firm characteristics a more complete understanding of the institutional effect on offshoring can be reached. Two firm characteristics are tested, R&D-intensity and firms size which will be described in more detail in section 6.2.3 and 6.2.4.

In a second extension of the analysis the effect of distance to the offshoring country is tested. The theoretical implications of nearshoring are described closer in section 6.2.5.

7.1 Basic Heckman model

In the basic Heckman model firms' choice of offshoring country and the volume is examined. The Heckman model thereby comprises of two models, one target model that corresponds to volume and one selection model that corresponds to choice of a country. Thus, the Heckman model produces two estimators for each variable, one for the effect on choice of country (in the selection model) and one for the effect on the volume of the offshoring (in the target model).

Since the study comprises of several institutional measures a number of regressions with different specifications will be run in order to find out which institutional measures are significant in different constellations. In order to qualify as a significant variable, it has to show significant results when regressed as the only institutional variable as well as when regressed simultaneously with other institutional variables. First all institutional variables are included individually in ten separate regressions (1.1). Then two regressions are run where all business variables and then financial variables are tested simultaneously (1.2). This is done to see whether effects of the institutional variables are persistent when run together with other variables. In a third step all institutional variables are regressed simultaneously to further test the persistence of the variables (1.3). Results are presented in *table 3*.

Table 3.

Variable	Heckman 1.1		Heckman 1.2		Heckman 1.3	
	Selection	Target	Selection	Target	Selection	Target
Freedom to trade internationally	0.141 (0.006)*	0.544 (0.000)*	0.132 (0.002)***	0.271 (0.000)***	0.108 (0.015)**	0.227 (0.000)***
Business freedom	0.010 (0.585)	0.028 '(0.667)	-0.001 (0.981)	0.015 (0.722)	-0.006 (0.786)	0.715 (0.019)**
Fiscal freedom	0.046 (0.277)	-0.212 (0.045)**	0.064 (0.108)	-0.216 (0.012)**	0.055 (0.131)	-0.202 (0.001)***
Investment freedom	0.018 (0.373)	0.162 (0.001)***	-0.018 (0.381)	0.116 (0.001)***	-0.013 (0.524)	0.140 (0.000)***
Trade freedom	-0.008 (0.805)	0.036 (0.685)	-0.038 (0.147)	-0.048 (0.353)	0.030 (0.244)	-0.092 (0.055)*
Corruption	0.169 (0.000)***	0.331 (0.002)***	0.151 (0.000)***	0.242 (0.010)***	0.137 (0.000)***	0.217 (0.006)***
Regulation on credit, labor and business	0.147 (0.004)***	-0.037 (0.761)	0.121 (0.018)**	-0.052 (0.639)	0.032 (0.442)	0.020 (0.770)
Access to sound money	0.086 (0.000)***	0.325 (0.000)***	0.024 (0.334)	0.380 (0.000)***	-0.007 (0.749)	0.176 (0.002)***
Financial freedom	0.024 (0.215)	-0.045 (0.414)	-0.007 (0.716)	-0.033 (0.553)	-0.001 (0.971)	-0.105 (0.008)***
Monetary freedom	0.102 (0.000)***	0.308 (0.001)***	0.067 (0.025)**	-0.117 (0.225)	0.054 (0.050)**	-0.465 (0.442)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included. 1.1 includes individually regressed variables (ten regressions in total), 1.2 includes regressed by group (two regressions in total), 1.3 includes all variables (one regression in total). See appendix A, B and C for full tables including control variables.

Based on the previous regressions three additional models are tested. In the first regression variables that are not individually significant in either the target model or the selection model are excluded (2.1). In the second regression variables that are not significant when all variables were run simultaneously in the target or selection model are excluded. Finally, in the third regression all variables that were not significant in all previous regressions are excluded leaving six variables left: freedom to trade internationally, fiscal freedom, investment freedom, corruption, access to sound money and monetary freedom. Results are presented in *table 4*. These data show what variables that affect offshoring with satisfying significance levels when regressed individually as well as simultaneously with other variables.

Table 4.

Regression Variable	Heckman 2.1		Heckman 2.2		Heckman 2.3	
	Selection	Target	Selection	Target	Selection	Target
Freedom to trade internationally	0.091 (0.044)**	0.206 (0.001)***	0.109 (0.011)**	0.228 (0.000)***	0.093 (0.036)**	0.200 (0.002)***
Business freedom			-0.006 (0.791)	0.071 (0.020)**		
Fiscal freedom	0.051 (0.185)	-0.220 (0.000)***	0.058 (0.112)	-0.200 (0.001)***	0.055 (0.166)	-0.231 (0.008)***
Investment freedom	-0.016 (0.451)	0.112 (0.000)***	-0.015 (0.456)	0.139 (0.000)***	-0.016 (0.450)	0.117 (0.000)***
Trade freedom			-0.028 (0.289)	-0.091 (0.057)*		
Corruption	0.140 (0.000)***	0.261 (0.005)***	0.143 (0.000)***	0.221 (0.006)***	0.144 (0.000)***	0.235 (0.011)**
Regulation on credit, labor and business	0.026 (0.551)	-0.156 (0.030)**				
Access to sound money	-0.009 (0.623)	0.104 (0.070)*	-0.005 (0.820)	0.177 (0.001)***	-0.005 (0.761)	0.061 (0.266)
Financial freedom			0.004 (0.801)	-0.102 (0.002)***		
Monetary freedom	0.061 (0.029)**	0.006 (0.930)	0.054 (0.051)*	-0.047 (0.426)	0.060 (0.030)**	0.033 (0.600)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included.

The third model that only includes stable significant variables (2.3) is referred to as the narrow model. This model exclusively includes the institutional variables that best seem to explain both selection and volume of offshoring. Based on the narrow model four additional regressions are run were variables that have shown some significance by themselves are included, these are: business freedom (3.1), trade freedom (3.2), regulation on credit (3.3), labor and business and financial freedom (3.4). The purpose of carrying out these regressions is primarily to test the stability of the narrow set of institutions but also to see whether dismissed institutional variables produce significant results in this specification. Results of these regressions are presented in *table 5*.

Table 5.

Regression Variable	3.1		3.2		3.3		3.4	
	Selection	Target	Selection	Target	Selection	Target	Selection	Target
Freedom to trade internationally	0.093 (0.037)**	0.201 (0.002)***	0.110 (0.008)***	0.220 (0.001)***	0.091 (0.044)**	0.206 (0.001)***	0.093 (0.036)**	0.185 (0.002)***
Business freedom	-0.009 (0.711)	0.011 (0.786)						
Fiscal freedom	0.055 (0.163)	-0.228 (0.007)***	0.060 (0.120)	-0.224 (0.012)**	0.051 (0.185)	-0.22 (0.005)***	0.053 (0.166)	-0.230 (0.000)***
Investment freedom	-0.014 (0.489)	0.114 (0.001)***	-0.015 (0.480)	0.119 (0.000)***	-0.016 (0.451)	0.112 (0.000)***	-0.018 (0.395)	0.147 (0.000)***
Trade freedom			-0.030 (0.277)	-0.042 (0.422)				
Corruption	0.146 (0.000)***	0.234 (0.013)**	0.142 (0.000)***	0.230 (0.012)**	0.140 (0.000)***	0.261 (0.005)***	0.144 (0.000)***	0.241 (0.004)***
Regulation on credit, labor and business					0.026 (0.551)	-0.156 (0.030)**		
Access to sound money	-0.008 (0.683)	0.063 (0.237)	-0.001 (0.959)	0.067 (0.243)	-0.009 (0.623)	0.105 (0.070)*	-0.008 (0.683)	0.128 (0.018)**
Financial freedom							0.005 (0.764)	-0.081 (0.013)**
Monetary freedom	0.063 (0.023)**	0.030 (0.607)	0.052 (0.064)*	0.022 (0.772)	0.061 (0.029)**	0.006 (0.930)	0.061 (0.030)**	-0.001 (0.988)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included.

The first and perhaps most important conclusion from the model is that institutional variables have a significant effect on both the propensity for a firm to choose a specific offshoring target but also the volume of offshoring. Most significant estimators also have a positive sign which is expected since this implies that better institutions generate more offshoring.¹ When comparing the results between the target model and the selection model it seems that offshoring volume depends on relatively larger number of institutional variables compared to initiating a supplier contract. Only freedom to trade internationally and corruption shows significant effects on both volume and selection. In addition to these variables monetary freedom produces stable significant estimators in the selection model. In the target model freedom to trade internationally, fiscal freedom, investment freedom and access to sound money shows the most pronounced levels of significance. Occasionally other variables show significant results but to a far less extent compared to these variables.

When comparing beta-values the general picture is that institutions have a relatively larger impact on volume than selection. The variables with the largest coefficients are freedom to trade internationally, fiscal freedom and corruption. Focusing on the narrow model including the most stable predictors of offshoring the coefficient of freedom to trade internationally is approximately 0.2 in the target model (see *table 3, regression 1.3*). The interpretation of this number is that an increase in the index by 1 point in freedom to trade internationally index generates an estimated 20 % increase in offshoring volume. For corruption the corresponding number is 0.24 and 0.23 for fiscal freedom. The coefficient for freedom to trade internationally in the selection model is 0.24. This means that an increase in the index by 1 point increases the probability of a firm choosing a country by 24 %.

In sum, the results show that institutions have a significant effect on offshoring for firm choice and volume. Freedom to trade internationally and corruption is perhaps most interesting since they show a stable effect in both the selection model and the target model. Along with these factors, fiscal freedom, investment freedom, trade freedom, access to sound money and monetary freedom seem to play a key role when firms decide upon offshoring.

7.2 FEVD Heckman Model

In order to manage problematic aspects of country heterogeneity with regional dummies the Heckman model is extended by applying a Fixed Effect Variance Decomposition (FEVD) estimator. In the FEVD setting two regressions are run, first with the narrow set of institutional variables and then a regression that includes all institutional variables.

¹ Since fiscal freedom is defined from high to low a negative sign is expected for this particular variable.

Comparing results when running the narrow set of institutional variables the standard Heckman model and FEVD-Heckman model shows similar results with regard to both significance levels and beta values, see *table 6*. The only difference is that access to sound money and monetary freedom becomes significant in the target model in the FEVD specification. Same similarities also occur when including all institutional variables. This shows evidently that the regional dummies in the standard Heckman specification capture most of the country specific fixed effects. It also strengthens the case for the validity of the FEVD estimator. A general difference between the basic Heckman model and the FEVD-Heckman model are the significance levels which increases quite substantially when applying the FEVD extension. However, with the background of the critique that recently have been directed towards this method, significance levels have to be interpreted cautiously.

Table 6.

Regression Variable	Heckman FEVD 4.1		Heckman FEVD 4.2	
	Selection	Target	Selection	Target
Freedom to trade internationally	0.094 (0.032)**	0.107 (0.028)**	0.109 (0.013)**	0.184 (0.000)***
Business freedom			-0.007 (0.774)	0.129 (0.000)***
Fiscal freedom	0.053 (0.180)	-0.197 (0.000)***	0.054 (0.139)	-0.171 (0.000)***
Investment freedom	-0.017 (0.428)	0.143 (0.000)***	-0.014 (0.502)	0.122 (0.000)***
Trade freedom			-0.036 (0.238)	-0.095 (0.001)***
Corruption	0.144 (0.000)***	0.283 (0.000)***	0.136 (0.000)***	0.271 (0.000)***
Regulation on credit, labor and business			0.032 (0.442)	-0.033 (0.520)
Access to sound money	-0.006 (0.748)	0.071 (0.052)*	-0.008 (0.718)	0.268 (0.000)***
Financial freedom			0.000 (0.987)	-0.081 (0.000)***
Monetary freedom	0.061 (0.028)**	0.176 (0.000)**	0.055 (0.045)**	-0.002 (0.974)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included.

7.3 Effect of R&D-intensity

To get a deeper understanding of the effects of institutions on offshoring firm characteristics is tested. Such an analysis can generate a more diversified picture of the effect of institutions since firms might act differently in the same institutional environment. First the effect of R&D-intensity is tested.

The R&D-intensity of offshoring firms has been described as an important feature when deciding where to locate production. High R&D costs often indicates a more complex production process, larger relation specific investments and greater vulnerability of losing intellectual property (Mol, 2005). Therefore R&D-intensive firms might be more likely to choose countries with better institutions. Another possibility is that such firms might prefer FDI instead of offshored outsourcing since FDI leaves firms with more control. To test the effect of R&D intensity a measure is created where R&D expenditure is divided by total revenues for every firm. The analysis gives by hand which industries that have the most and least R&D-intensive firms. Then two regressions are run with the firms of the most and the least R&D-intensive industries including the narrow set of institutional variables.

The result of these regressions are somewhat mixed, see *table 7*. Overall fewer variables reach a satisfying significance level compared with the basic Heckman regression including all firms. In the target model firms within the least R&D-intensive industries do not show significant results for any institutional variable compared to the high R&D-intensive industries which shows significant results for investment freedom, corruption and access to sound money. The results seem to confirm the hypothesis that less R&D-intensive branches are more insensitive to institutional factors to some extent. The access to sound money-variable is especially interesting since it is not significant in the original Heckman model and shows a substantial positive coefficient of 0.445 for R&D-intensive industries. Regarding the selection model results are not as clear cut. The least R&D-intensive branches show more significant results both compared to the most R&D-intensive branches as well as the original Heckman model which contradicts the hypothesis of R&D-intensive firms as more sensitive to the institutional environment.

Table 7.

Regression Variable	Heckman Low R&D-intensity		Heckman High R&D-intensity	
	Selection	Target	Selection	Target
Freedom to trade internationally	0.130 (0.044)**	0.137 (0.954)	0.033 (0.579)	0.034 (0.803)
Fiscal freedom	0.129 (0.002)***	-0.298 (0.923)	0.103 (0.143)	0.044 (0.634)
Investment freedom	-0.068 (0.015)**	0.133 (0.918)	0.007 (0.795)	0.115 (0.068)*
Corruption	0.117 (0.020)**	0.317 (0.637)	0.128 (0.000)***	0.191 (0.085)*
Access to sound money	-0.027 (0.0327)	-0.088 (0.517)	0.032 (0.229)	0.445 (0.000)***
Monetary freedom	0.012 (0.776)	-0.060 (0.955)	0.072 (0.025)**	0.129 (0.223)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included.

7.4 Effect of firm size

Firm size is another important aspect that influence the possibilities of offshoring for certain firms. As mentioned above firm needs to cross a certain size to be able to afford the fixed costs that is needed to move production abroad (Melitz, 2003). Size might also be a factor that affects a firm's prerequisite to deal with an inferior institutional environment. Large firms have more resources and might not be as vulnerable for complicated regulations or a rigid bureaucracy (Baldwin and Okubo, 2011). However, greater resources also make it easier for firms to shift offshoring location since such a process also involves large fixed costs. In addition to greater resources larger firms also tend to have a larger network of suppliers which further facilitate reallocations of contacts (Baldwin and Okubo, 2011). Therefore effects may move in either direction. Large firms might put up with worse institutions or move production to countries with better institutions.

To examine this number of employees is used as a measure of firm size. Two groups of firms are created, large firms with more than 603 employees which represent the top ten percent of the sample and small firms with less than 57 employees which represent the bottom ten percent. Finally the regression with the narrow set of institutional variables is run. The results show that differences are fairly few depending on size in the selection model, see *table 8*. Both the set of the large and small firms shows very similar results compared to the original Heckman model. In the target model the similarities are somewhat weaker. One result that stands out in the context of vulnerability to a weak institutional environment is the effect of corruption. It shows that corruption only has a significant

effect on large companies and that the effect is significantly larger compared the original Heckman model. To further test this effect a similar regression is run for very large firms with over 10 000 employees. This regression shows an even larger effect of corruption on offshoring volume. This does not confirm the idea that larger firms have more resources to deal with corruption and inefficient bureaucracy but rather the hypothesis of relocation.

Table 8.

Regression Variable	Heckman Small firms		Heckman Large firms		Heckman Large firms > 10 000	
	Selection	Target	Selection	Target	Selection	Target
Freedom to trade internationally	0.093 (0.092)*	0.355 (0.001)***	0.113 (0.001)***	0.301 (0.002)***	0.242 (0.012)**	0.123 (0.711)
Fiscal freedom	0.084 (0.093)*	-0.185 (0.046)*	0.027 (0.467)	-0.265 (0.009)***	0.051 (0.543)	-0.188 (0.518)
Investment freedom	-0.03 (0.259)	0.16 (0.001)***	-0.008 (0.649)	0.019 (0.627)	0.055 (0.194)	0.425 (0.001)***
Corruption	0.103 '(0.011)**	0.170 (0.129)	0.177 (0.000)***	0.408 (0.000)***	0.150 (0.023)**	0.528 (0.034)**
Access to sound money	0.013 (0.622)	-0.182 (0.037)**	-0.028 (0.146)	0.135 (0.055)*	-0.038 (0.475)	0.297 (0.228)
Monetary freedom	0.066 (0.063)*	-0.039 (0.671)	0.048 (0.039)**	-0.138 (0.048)**	0.073 (0.211)	-0.315 (0.213)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included.

7.5 Effect of nearshoring

In addition to firm characteristics the distance to the offshoring target might influence the effect of institutions. A recent trend within the field of global sourcing is firms seeking to locating production to less distant places. This phenomenon has become to be referred to as nearshoring (Mears, 2005). Nearshoring has not received much attention and few articles have seriously studied this topic. Nevertheless, a rising number of firms retreat from distant locations that previously have been described as offshoring paradises such as India and China (Economist, 2005). The reasons for the current backlash of distant offshoring are many but a general explanation is that many firms underestimated the difficulties of doing long distant business. Instead many European firms have shifted attention towards less distant locations such as Eastern Europe (Economist, 2005). In the light of the limited literature on the effects of nearshoring it is interesting to see if distance affects the impact of institutional quality.

Distant offshoring carries many disadvantages as opposed to nearshore locations. Large geographical distances often means great cultural differences as well as larger language barriers (Weber, 2010). Another difficulty occurs when suppliers operate different points in time due to the longitudinal distance. These problems both affect coordination as well as the supplier-buyer relationship since cultural distance often means that both parties are used to conduct business in different ways (Mears, 2005). Many firms have also experienced that distance have made them lose control overproduction due to more complex channels of communication and longer lead-times (Weber, 2010). Suppliers are furthermore fairly unknown in many distant offshore countries. China, for example, has been shown to be very difficult to operate in since the knowledge of the within differences in China were unknown to many foreign managers (Weber, 2010). Increase of wages is another aspect that diminishes factor price advantages. Not only wage levels of low-skilled workers tend to rise but the costs of talented managers increases heavily as well (Weber, 2010). In the context of institutions an hypothesis could be that cultural differences and long distances, for example, might put more pressure on institutional quality. Nearshoring might thus decrease the necessity for good institutions since it bear other advantages.

To test this effect the distance variable in the original gravity model is modulated. Five standard Heckman regressions are run, all solely based on the narrow set of institutional variables. In the first regression only the closest countries to Sweden are included, Norway, Denmark and Finland. The second regression include all countries that have an average distance from Sweden less than 2450 kilometers is included which excludes Turkey since it is the closest non-European country. Thus all European countries that have a further weighted average distance from Sweden are also excluded. In the last three regressions distant offshoring is examined by splitting up the distant countries in three different groups depending on their average weighted distance from Sweden. The first group comprises of fairly close countries with an average distance from Sweden between the 25:th and the 50:th percentile, the second group comprises of medium distant countries between the 50:th and the 75:th percentile and the third group comprises of the very distant countries with a distance beyond the 75:th percentile. The groups are then run individually in three regressions.

The results are unfortunately somewhat inconclusive and few institutional variables reach satisfying significance levels, see *table 9 and 10*. A plausible reason for this is that the variation in institutional quality is reduced through the grouping of countries. By excluding distant or close countries important information is lost which generates large standard errors. Another factor that also might reduce variation is that distant offshoring is dominated by relatively few countries, USA, Brazil, India and China. As a consequence it is not possible to draw any definite conclusions about an institutional nearshoring effect.

Table 9.

Regression Variable	Heckman Nearshoring closest		Heckman Nearshoring Europe	
	Selection	Target	Selection	Target
Freedom to trade internationally	-0.070 (0.000)***	0.277 (0.000)***	0.122 (0.087)*	0.316 (0.002)***
Fiscal freedom	-0.061 (0.011)**	-0.081 (0.007)***	0.121 (0.001)***	-0.249 (0.000)***
Investment freedom	0.064 (0.018)**	-0.238 (0.000)***	-0.037 (0.084)*	0.048 (0.354)
Corruption	0.167 (0.000)***	0.008 (0.966)	0.033 (0.573)	0.208 (0.237)
Access to sound money	-0.016 (-0.724)	0.114 (0.124)	-0.012 (0.653)	0.138 (0.111)
Monetary freedom	0.007 (0.789)	-0.091 (0.488)	-0.008 (0.835)	-0.025 (0.795)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included.

Table 10.

Regression Variable	Heckman Distant shoring (25 - 50)		Heckman Distant shoring (50 - 75)		Heckman Distant shoring (75 - 100)	
	Selection	Target	Selection	Target	Selection	Target
Freedom to trade internationally	0.003 (0.961)	0.061 (0.653)	0.152 (0.001)***	0.224 (0.010)***	-0.002 (0.983)	0.156 (0.233)
Fiscal freedom	-0.122 (0.018)**	-0.212 (0.135)	-0.092 (0.002)***	-0.104 (0.281)	0.125 (0.002)***	0.226 (0.290)
Investment freedom	0.071 (0.000)***	0.165 (0.094)*	-0.011 (0.650)	-0.057 (0.342)	-0.044 (0.013)**	-0.097 (0.199)
Corruption	0.066 (0.588)	0.323 (0.353)	-0.121 (0.246)	-0.166 (0.454)	0.146 (0.000)***	0.471 (0.000)*
Access to sound money	0.047 (0.117)	-0.089 (0.411)	-0.005 (0.845)	0.047 (0.699)	-0.04 (0.069)*	-0.038 (0.659)
Monetary freedom	-0.037 (0.560)	0.127 (0.365)	-0.048 (0.258)	-0.095 (0.337)	0.056 (0.008)***	0.124 (0.219)

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level. Control variables for firm and country characteristics, trade resistance, region and year are included.

8 Summary and conclusion

The primary aim of the present study was to examine if institutional aspects affect Swedish firms' choice of offshoring location and offshoring volume when sourcing manufacturing processes to external firms abroad. The second aim was to see whether specific firm characteristics and offshoring location affected the impact of institutional quality. This question is of high interest since offshoring is an accelerating phenomenon that has, somewhat surprisingly, gained very little attention in previous literature.

The study is based on the gravity model and is, to my knowledge one of the first of its kind that provides empirical evidence showing high quality institution both increases the propensity of firms to choose a specific country as well as the size of the offshoring investment. Freedom to trade internationally and lack of corruption where the most prominent variables showing most impact on offshoring, both with regards to selection and offshoring volume. Also fiscal freedom was shown to be important indicating that low tax levels attract offshoring firms. Furthermore, the results indicated that investment freedom attracts offshoring which contradicts the notion that better investment climate make foreign actors substitute to FDI. Lack of monetary freedom, which captures price stability and price controls, show to be major deterring factors for offshoring as well. This however rather shows to be a threshold for firms when selecting a country but does not seem to diminish offshoring volume. The variables also show to have a greater economic impact on volume of offshoring compared to the selection of country.

To further test for country specific fixed effects a Fixed Effect Variance Decomposition-extension (FEVD) was applied to the original model. These results show to conform the finding of the original Heckman model and thus adds to its credibility.

The study also examines how the effect of institutions differ across firms with different levels of R&D expenditure and size as well as how the effects depend on the distance to the offshoring country. The institutional effect depending on R&D-intensity shows to impact offshoring volume but not on choice of country. Access to sound money, which reflects inflation and control on foreign capital, stands out as an essential determinant for offshoring volume for firms within R&D-intensive branches. The effect of firm size on the other hand shows to be limited apart from corruption that seems to have a more deterrent effect on larger firms. The impact of location seems to be fairly inconclusive and does not indicate a nearshoring effect. The reason for this is not clear but might be due to the grouping of close and distant countries which eliminates variation in the institutional variables and thus generates large standard errors.

Taken together, the results show that institutions matter for offshoring which is in line with previous finding within the field of FDI (Ali and MacDonald, 2008), (Anghel, 2004), (Bénassy-Quér et al, 2007), (Spencer, 2005). Data are showing that trade regulations is an important area along with other economic freedoms such as taxes and investments. It also provides further argument for the destructiveness of corruption on business and providing incitement to act against misuse of public authority. This finding also confirms previous studies on the effect of corruption on global sourcing, (Hakkala et al, 2008), (Karpaty and Tingvall, forthcoming), (Tingvall, forthcoming). Hence the idea that corruption acts as oil in the machinery when firms conduct business is shown to be false also in the context of offshoring.

The study provides other interesting findings as well, e.g. investment freedom is shown to attract offshoring since it contradicts the idea that there is a tradeoff for countries when attracting offshoring or FDI. Reforms that diminish restrictions on the use of foreign capital can thus spur on both these activities. However, the results also show that the institutional effect on offshoring is not constant across all firms. Some industries are found to be more discouraged by inferior institutions while other have better prerequisites to pull out of countries where it is cumbersome to conduct business. Firms within R&D-intensive industries show to be very discouraged by price instability and price controls. A potential interpretation of this result is that price stability of inputs is relatively more important for R&D-intensive firms when offshoring. Large firms on the other hand show to be very reluctant to offshore to corrupt countries. This is somewhat counterintuitive since large firms should have more resources at their disposal to manage the business climate in corrupt countries. A possible explanation of this pattern is that large firms rather use their resources to relocate production to more favorable countries as opposed to using them to put up with poor institutional environments.

The overall picture is that significant gains can be achieved in attracting offshoring firms through institutional reform. Hence the conclusion of this study carries some intriguing political implications, for instance, many developing countries have been very keen to attract FDI through political and regulatory reforms. Reforms that instead focus on attracting offshoring has the potential of instead expanding domestic business that is not foreign-owned. This is important since domestic business brings economic stability and is essential for long-term growth. However, since institutions show a larger economic effect on volume compared to selection institutional reform is not only important to attract new firms but also to expand existing offshoring. Another question of interest is to which degree there exists conflicts between offshoring and FDI since investment freedom along with other economic freedoms seem to attract both activities.

Of importance to note is that research of institutional impact on growth and trade carries problematic aspects. Even though the measures of this study are selected with great care there are uncertainties whether these measures actually captures the core of institutional quality. Further uncertainties

surround the measurement of offshoring through imported inputs. On the one hand the measure opens up for firm level studies that have great advantages over studies based on aggregate measures such as trade flows. On the other hand, import is admittedly a crude proxy where there are some uncertainties whether it properly reflects the actual size of offshoring. Being one of the first studies, to my knowledge, within the field these issues are difficult to tackle. More research has to be carried out utilizing different institutional estimators and proxies for offshoring. Greater extensions of firm characteristics and country locations ought to be examined as well. For instance the institutional effect on nearshoring is still interesting though the present study fails to find any significant results. The effect of institutions is also likely to differ across industries since different kinds of trade bare different kinds of risks. Finally new insights could be gained by examining firms of other countries. National differences in organizing business or corporate culture might be affect firms differently in a given institutional environment. To sum up, much work remains within this area of research since many of today's more subtle trade barriers are fairly unknown. New insights of the dynamics of global trade and offshoring are hence still to be gained where institutions is likely to play a key role.

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Appendix

Appendix A Regression 1.1 (Institutional variables regressed individually)

	Freedom to trade internationally		Business freedom		Fiscal freedom		Investment freedom		Trade freedom	
	Selection	Target	Selection	Target	Selection	Target	Selection	Target	Selection	Target
Institutional variables	0.141 (0.006)***	0.544 (0.000)***	0.010 (0.585)	0.028 (0.667)	0.046 (0.277)	-0.212 (0.045)**	0.018 (0.373)	0.162 (0.001)***	-0.008 (0.805)	0.036 (0.685)
Control variables										
ln(distance)	-1.057 (0.000)***	-1.833 (0.000)***	-1.039 (0.000)***	-1.272 (0.000)***	-1.101 (0.000)***	-1.199 (0.000)***	-1.038 (0.000)***	-1.242 (0.000)***	-1.036 (0.000)***	-1.265 (0.000)***
MNE	0.197 (0.000)***	0.412 (0.000)***	0.197 (0.000)***	0.314 (0.000)***	0.197 (0.000)***	0.326 (0.000)***	0.197 (0.000)***	0.313 (0.000)***	0.197 (0.000)***	0.314 (0.000)***
ln(GDP)	0.484 (0.000)***	0.654 (0.000)***	0.505 (0.000)***	0.642 (0.000)***	0.537 (0.000)***	0.613 (0.000)***	0.512 (0.000)***	0.578 (0.000)***	0.520 (0.000)***	0.649 (0.000)***
ln(Firm size) [sales]	0.261 (0.000)***	0.652 (0.000)***	0.260 (0.000)***	0.539 (0.000)***	0.260 (0.000)***	0.551 (0.000)***	0.260 (0.000)***	0.539 (0.000)***	0.260 (0.000)***	0.539 (0.000)***
ln(TFP)	-0.008 (0.000)***	-0.052 (0.000)***	-0.007 (0.002)***	-0.050 (0.000)***	-0.007 (0.001)***	-0.050 (0.000)***	-0.007 (0.000)***	-0.050 (0.000)***	-0.007 (0.002)***	-0.050 (0.000)***
Tariffs	1.986 (0.000)***	-2.349 (0.008)***	1.728 (0.004)***	-4.777 (0.000)***	1.389 (0.022)**	-3.854 (0.003)***	1.678 (0.006)***	-3.892 (0.003)***	1.623 (0.007)***	-4.830 (0.000)***
ln(population)	-0.087 (0.162)	0.216 (0.020)***	-0.116 (0.103)	0.0298 (0.840)	-0.138 (0.019)**	0.036 (0.737)	-0.123 (0.042)**	0.092 (0.465)	-0.134 (0.026)**	0.0236 (0.870)
Share skill high	0.058 (0.637)		0.007 (0.957)		0.013 (0.914)		0.007 (0.958)		0.006 (0.960)	
Export ratio	0.223 (0.000)***		0.226 (0.000)***		0.226 (0.000)***		0.227 (0.000)***		0.226 (0.000)***	

Appendix B Regression 1.1 (Institutional variables regressed individually)

	Corruption		Regulation on credit, labor and business		Access to sound money		Financial freedom		Monetary freedom	
	Selection	Target	Selection	Target	Selection	Target	Selection	Target	Selection	Target
Institutional variables	0.169 (0.000)***	0.331 (0.002)***	0.147 (0.004)***	-0.037 (0.761)	0.086 (0.000)***	0.325 (0.000)***	0.024 (0.215)	-0.045 (0.414)	0.102 (0.000)***	0.308 (0.001)***
Control variables										
ln(distance)	-0.993 (0.000)***	-1.318 (0.000)***	-1.109 (0.000)***	-1.249 (0.000)***	-1.043 (0.000)***	-1.319 (0.000)***	-1.051 (0.000)***	-1.235 (0.000)***	-1.038 (0.000)***	-1.355 (0.000)***
MNE	0.198 (0.000)***	0.361 (0.000)***	0.197 (0.000)***	0.312 (0.000)***	0.197 (0.000)***	0.327 (0.000)***	0.197 (0.000)***	0.310 (0.000)***	0.198 (0.000)***	0.340 (0.000)***
ln(GDP)	0.303 (0.000)***	0.321 (0.028)**	0.468 (0.000)***	0.669 (0.000)***	0.472 (0.000)***	0.478 (0.000)***	0.508 (0.000)***	0.679 (0.000)***	0.480 (0.000)***	0.583 (0.000)***
ln(Firm size) [sales]	0.260 (0.000)***	0.592 (0.000)***	0.260 (0.000)***	0.535 (0.000)***	0.260 (0.000)***	0.561 (0.000)***	0.260 (0.000)***	0.532 (0.000)***	0.260 (0.000)***	0.571 (0.000)***
ln(TFP)	-0.007 (0.000)***	-0.052 (0.000)***	-0.007 (0.002)***	-0.050 (0.000)***	-0.007 (0.001)***	-0.050 (0.000)***	-0.007 (0.002)***	-0.049 (0.000)***	-0.007 (0.001)***	-0.051 (0.000)***
Tariffs	2.185 (0.000)***	-3.717 (0.001)***	1.694 (0.010)***	-4.879 (0.000)***	1.826 (0.002)*	-3.901 (0.003)***	1.781 (0.004)***	-5.197 (0.000)***	1.856 (0.004)***	-3.996 (0.002)***
ln(population)	0.087 (0.205)	0.427 (0.013)**	-0.068 (0.000)***	-0.010 (0.930)	-0.073 (0.239)	0.217 (0.060)*	-0.117 (0.054)*	-0.030 (0.804)	-0.084 (0.159)	0.121 (0.265)
Share skill high	0.028 (0.817)		0.005 (0.965)		0.013 (0.914)		0.005 (0.971)		0.019 (0.876)	
Export ratio	0.226 (0.000)***		0.226 (0.000)***		0.225 (0.000)***		0.226 (0.000)***		0.225 (0.000)***	

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level.

Appendix C Regression 1.2 (variables regressed by group) and 1.3 (all variables regressed)

	1.2 Business variables		1.2 Financial variables		1.3 All variables	
	Selection	Target	Selection	Target	Selection	Target
Institutional variables						
Freedom to trade internationally	0.132 (0.002)***	0.271 (0.000)***			0.108 (0.015)**	0.227 (0.000)***
Business freedom	-0.001 (0.981)	0.015 (0.722)			-0.006 (0.786)	0.715 (0.019)**
Fiscal freedom	0.064 (0.108)	-0.216 (0.012)**			0.055 (0.131)	-0.202 (0.001)***
Investment freedom	-0.018 (0.381)	0.116 (0.001)***			-0.013 (0.524)	0.140 (0.000)***
Trade freedom	-0.038 (0.147)	-0.048 (0.353)			0.030 (0.244)	-0.092 (0.055)*
Corruption	0.151 (0.000)***	0.242 (0.010)***			0.137 (0.000)***	0.217 (0.006)***
Regulation on credit, labor and business			0.121 (0.018)**	-0.052 (0.639)	0.032 (0.442)	0.020 (0.770)
Access to sound money			0.024 (0.334)	0.380 (0.000)***	-0.007 (0.749)	0.176 (0.002)***
Financial freedom			-0.007 (0.716)	-0.033 (0.553)	-0.001 (0.971)	-0.105 (0.008)***
Monetary freedom			0.067 (0.025)**	-0.117 (0.225)	0.054 (0.050)**	-0.465 (0.442)
Control variables						
ln(distance)	-1.109 (0.000)***	-1.418 (0.000)***	-1.099 (0.000)***	-1.746 (0.000)***	-1.111 (0.000)***	-1.326 (0.000)***
MNE	0.199 (0.000)***	0.410 (0.000)***	0.198 (0.000)***	0.412 (0.000)***	0.199 (0.000)***	0.405 (0.000)***
ln(GDP)	0.331 (0.000)***	0.276 (0.027)**	0.440 (0.000)***	0.621 (0.000)***	0.325 (0.000)***	0.234 (0.053)
ln(Firm size) [sales]	0.262 (0.000)***	0.650 (0.000)***	0.261 (0.000)***	0.652 (0.000)***	0.262 (0.000)***	0.645 (0.000)***
ln(TFP)	-0.008 (0.000)***	-0.052 (0.000)***	-0.008 (0.000)***	-0.052 (0.000)***	-0.008 (0.000)***	-0.051 (0.000)***
Tariffs	2.126 (0.000)***	-0.499 (0.580)	1.897 (0.002)***	-3.016 (0.030)**	2.16 (0.000)***	-0.787 (0.360)
ln(population)	0.073 (0.280)	0.539 (0.000)***	-0.034 (0.575)	0.238 (0.019)**	0.082 (0.220)	0.558 (0.000)***
Share skill high	0.054 (0.656)		0.057 (0.641)		0.052 (0.672)	
Export ratio	0.222 (0.000)***		0.222 (0.000)***		0.222 (0.000)***	

Note: Standard errors reported in parenthesis; *** significant at 1 % level, ** significant at 5 % level, * significant at 10 % level.