On differentiation, duration and financial crises:

- *An empirical analysis of the role played by product differentiation and the "rate of survival" to the patterns of Swedish import emerged from the recent financial crisis* -

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Abstract

Since the availability of disaggregated data, researchers have empirically shown that the extent of product differentiation and the intensive margin of trade matters for explaining patterns of international trade. Recently, there seems to be an emerging interest in studying the potential impact of financial crises on international trade dynamics. Utilizing Rauch´s production scheme (1999) and Besedeš and Prusa (2006a) innovative construction to the intensive margin of trade, the work at hand investigates whether the type of good and the duration (survival rate) of trade relationships facilitate differing trade patterns resulted from the recent financial crisis. Results indicate that these two aspects have an unequivocal influence on the mechanisms through which a financial crisis might impact import relations. Most importantly, whereas import of differentiated goods has been more negatively impacted by the crisis, higher survival rates seem to hamper the reduction in import values during the crisis; which also found to be more significant for Swedish traders of differentiated goods.

Key words: *international trade, product differentiation, intensive margin, survival rate, financial crises.*

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Introduction

The current global financial crisis has been described as the worst since the great crisis of the 1930. According to the Swedish Riksbank, it has been the worst one impacting Sweden in modern times (October Report 2009). Evidently, Swedish traders have been influenced profoundly; where both import and export have declined substantially (see Appendix A). Apparently, there have been only a few serious attempts to address the impact of financial crisis on the patterns of international trade. This work aims at shedding more light on the mechanisms through which a financial crisis might impact import relations.

Utilizing Rauch´s production scheme (1999) and Besedeš and Prusa (2006a) innovative construction to the intensive margin of trade, the work at hand investigates which type of imported good, as it is classified by Rauch (1999), has been impacted most severely by the current financial crisis, and whether the duration of import relationships, as it is formulated by Besedeš and Prusa (2006a), facilitate a hampering impact on the reduction in import resulted from the crisis.

The purpose is twofold. Firstly, the purpose is to assess the general influence (i.e. the main effects) of the good type and trade duration on the observed import reduction for Sweden during the initial phases of the financial crisis. And secondly, to explore the interactive effect of these two constructs on import relations during the crisis. That is, whether the importance of trade duration for the survival of the import relationships at the beginning and short term range of the financial crisis, differs between the two product categories. In order to do that, it is prudent to first explore whether the duration of trading relations, irrespective of its factual length, is more important for trade in differentiated products than for homogeneous.

Aside from its empirical value this study can also be seen as a robustness study for some of the underlying assumptions behind the importance of the product type and the duration of trade relations to the patterns of international trade. Not only does this paper shed light on the mechanisms through which a financial crisis influence international trade but it also contributes to the bulk of empirical work and literature concerning product differentiation. In all probability, this paper also contributes to the emerging discourse surrounding the intensive and extensive margins of trade in an innovative and integrating set; where the nexus of international trade, financial crisis and product differentiation are studied against the importance of duration to import relations.

Using a balanced panel on Swedish import, at the 3-digit SITC disaggregated product level from Sweden´s thirty largest import sources (see appendix A), an augmented gravity model was devised as a tool for assessing several specified hypotheses. This was further

supplemented by a panel regression method taking into account the time and space dimensions of the panel data at hand. The estimated period ranges from the first quarter of 2004 to the second quarter of 2009, and is assumed adequate in capturing the general trend before the crisis, using it as a benchmark, in order to investigate the short term effects of the crisis on Swedish importers.

Next, a relevant theoretical platform, from which the research premise is motivated and formulated, is built in *three steps*, each corresponding to a relevant theoretical "leg" within international trade. This is followed by a short review of the evidence and implications from the current financial crisis. Again, against this theoretical platform and empirical evidence, several research questions and more specific hypotheses are formulated and motivated, and the empirical approach for testing these is given in detail. Finally, several statistical issues are addressed and the analysis of the obtained results is sealed by a concluding discussion and suggestions for prospective research.

Product differentiation and international trade – Step I

The late 1970s saw a radical shift in perspectives regarding the standard, new classical view of international trade theory. The seminal work of Krugman (1979), and later of Helpman and Krugman (1985), has been so influential that the prominent bulk of studies on international trade, such as inter and intra industry trade, the home market effect and imperfect competition, all involve the implicit assumption that trade in homogeneous and differentiated goods display distinctive and different patterns (Besedeš and Prusa, 2006b, p.339). Indeed, the notions of imperfect competition, increasing returns to scale and the love for variety clearly emphasize the importance of considering the concept of product differentiation in trade theories.

Theoretical Overview

An important set of theories has been dedicated to the distinction between horizontal and vertical product differentiation and the implication for international trade and the welfare of nations thereof. In brief, horizontal product differentiation is a key ingredient of models assuming that trade liberalization generates welfare gains through the expansion of product varieties available to consumers (Krugman, 1979, 1981). On the other hand, models focused on the notion of vertical product differentiation claim that richer economies will produce and export higher quality products, with potentially significant consequences for welfare (Flam and Helpman, 1987; Hummels and Klenow, 2005). Both these constructs of product differentiation have been embraced by a new generation of trade models with heterogeneous firms (Melitz, 2003; Chaney, 2008), with several important implications for positive and normative aspects of international trade theory (Bastos and Silva 2010, p.1).

Rauch product classification scheme

From an empirical perspective, the product categorization scheme introduced by Rauch (1999) represents an important milestone for taking the concept of product differentiation and applying it to the data. Briefly, using disaggregated data on the SITC 4-digit product classification, Rauch (1999) divides internationally traded commodities into three groups: homogeneous products, those traded on an organized exchange (e.g., oil, steel, wheat), reference price products, those not traded on organized exchanges but nevertheless possessing some kind of benchmark price (e.g. chemicals with reference prices listed in industry guides), and all other commodities, classified as differentiated products (e.g., branded products such as apparel). All in all, the possession of a reference price distinguishes between two main groups; homogeneous (reference price related) and differentiated products.

Rauch (1999, p.7) motivates his product scheme based on the conventional wisdom that the heterogeneity of manufactures along the dimensions of both characteristics and quality limits the scope for prices to convey all the necessary information, as opposed to primary commodities. Therefore, he argues, connections between buyers and sellers of differentiated products are made through a costly search process that terminates when a 'reservation match' is achieved; rather than international commodity arbitrage through organized exchanges. In connection, he argues that these search costs constitute the greatest barrier to trade for differentiated products and that these move together with "proximity" measures (1999, p.8).

Empirical findings

Ever since Rauch introduced his product scheme, researchers begun to focus more explicitly on how trade in homogeneous and differentiated products differs. Currently, there seems to be a wide consensus that differentiated products do differ from homogeneous goods in many important respects of international trade. Besedeš and Prusa (2006b) summarize some of the most important emerging empirical facts. Apparently, differentiated products display a greater importance for physical and non-physical proximity (distance, language, culture) as well as higher investment specific costs and search barriers to trade (Rauch 1999); the home market effect is also of greater importance (Feenstra et al., 2001); lower price elasticities and hence lesser rates of substitution (Broda and Weinstein 2004, 2006); a lower border effect (Evans, 2003); higher markups (Feenstra and Hanson, 2004); less frequent use of the US dollar as the main currency for trade (Goldberg and Tille, 2005); and a stronger effect of communication costs (Fink et al., 2005).

Utilizing Rauch and Watson´s (2003) matching model, Besedeš and Prusa (2006b) themselves found that differentiated products are further characterized by smaller initial purchases, transaction values and longer trade relationships. In later works differentiated products were

found to be associated with greater evasion to import tariffs (Javorcik and Narciso, 2008). Importantly, some studies have further assessed the extent to which Rauch's classification is well suited for capturing the degree of product differentiation. For example, a recent publication has showed direct evidence that Rauch´s classification is indeed well suited for capturing quality differentiation (Bastos and Silva 2010).

The extensive and intensive margins of international trade – Step II

The recent availability of disaggregated data has also facilitated an increasing interest among researchers to explore the role of intensive and extensive margins of international trade; with respect to formation of and changes in trade patterns. A conventional definition of the extensive margin relates it to the breadth of international trade, capturing the number of trade partners a country has, while the intensive margin is related to the depth of international trade, capturing the value of trade. Theoretically, studies of extensive and intensive margins have been motivated by a variety of trade models for a variety of reasons; some of which offering different answers to similar issues (Besedeš and Prusa, 2006a, p.5).

Theoretical & Empirical Overview

The extensive margin is mainly emphasized by monopolistically competitive models following Krugman (1981), where larger economies are predicted to export a greater variety of goods proportional to their size advantage. On the other hand, the intensive margin is emphasized by models of national differentiation (Armington 1969), where larger economies are predicted to export greater value and volume, but not a greater variety of goods. Empirically, a number of papers examined the role of extensive and intensive margins for the growth of trade and welfare implications thereof. All in all, while some argue for the role of the extensive margin to the growth of exports; others emphasize instead the importance of the intensive margin for the growth of world trade (Besedeš and Prusa 2006a).

The survival dimension of the intensive margin

In a recent and innovative contribution by Besedeš and Prusa (2006a) the role of intensive and extensive margins is further explored. Instead of defining the intensive margin as the volume of trade involving existing trade partners, they define it to capture the intensity of existing trade relationship. That is, how long it is maintained, its survival or duration, and its ability to grow or deepen. Consequently, they decompose the intensive margin into two components: survival and deepening. Interestingly, they showed that developed countries significantly overtrump developing ones in their survival dimension of the intensive margin performance; where the latter would have gained substantially by having the former´s margins. They concluded that a key element for achieving higher aggregate export growth is longer relationships (i.e., higher survival rates) and hence higher intensive margins.

Survival & Product differentiation

In a related parallel work, Besedeš and Prusa (2006b) investigate the role of product differentiation on the intensive margin of US import as it is embodied by the survival dimension (i.e., trade duration); using data on import relationships at a disaggregated-product level. Building on Rauch and Watson´s (2003) matching model, Besedeš and Prusa (2006b) show that the duration data fits well, in that it can explain the prevalence of short and small valued relationships. As was already discussed, they found that, ceteris paribus, differentiated goods tend to project higher survival rates; hence, to be traded in longer relationships than homogeneous goods.

Additionally, they found that trade relationships involving homogeneous goods consistently start with considerably larger transactions than those involving differentiated goods; which then were taken to indicate that transactions involving differentiated goods tend to involve smaller values than homogeneous goods overall (Besedeš and Prusa 2006b, p.340). Furthermore, they show that the initial purchasing transaction size has a persistent, long term, effect on duration, where larger initial transactions shift up the survival function throughout the entire horizon (Besedeš and Prusa 2006a, p.340). Interestingly, this double effect could actually balance the dissimilarities on duration of US import trading relations between the two product categories. If anything, their results provide strong support for the notion that product type matters for the duration of trade and further that there is much to be learned from product level analysis on the importance of trade duration to the patterns of international trade.

Financial crises and international trade – Step III

Theories and empirical works on the nexus of international trade and financial crises are scarce. Evidently, the impact of a financial crisis on international trade is a relatively unexplored field (Cheng and Ma 2005, van Bergeijk 2009); surely when it comes to the studying and literature of product differentiation. Typically, the effects of crises on trade have been considered obvious and traditional; although the empirical findings are largely inconclusive, at least regarding the effect on exports (van Bergeijk 2009, p. 6). Instead, economists have tended to look at the reverse, i.e. the effect of trade on financial crises. Motivations have usually concerned trade imbalances role, and that trade is considered to be an important factor in the contagion process; where a significant and positive link has been established between the value of trade among the countries involved and the contagion dynamics (Kaminsky and Reinhard 2000).

The effects of financial crises – after all

In the few theories and empirical works that do exist, financial crises are usually divided into two types of categories, banking crises and currency crises (Cheng and Ma 2005, Thomas 2009). According to the theory, in a currency crisis import may decrease, mainly because of a loss in income and a devaluation of the currency, while export may rise because of a decline in domestic demand and a weakening of the domestic currency. In a banking crisis, on the other hand, the financial system collapses which may have a recessive effect and further decrease both import and export (Cheng and Ma 2005, page 275). Yet, there is still some theoretical ambiguity as to whether and how financial crises may be taken to affect export; while import is usually expected to decrease during and after a financial crisis (van Bergeijk 2009, p. 6). Furthermore, the notion of time to crisis seems important. That is, the ex ante and ex post market dynamics following the crisis, and the length of those.

Empirically, there has been mainly contradicting and insignificant results regarding the effects of different financial crises on export, whereas the results reported on the effects on import has been typically less contradicting and in line with theory. For example, Cheng and Ma (2005) show that a currency crisis, both in the long and in the short term, usually leads to a drop in import but has an ambiguous effect on export. A banking crisis on the other hand, has shown to imply a negative effect on imports while export is impacted positively over the short run but negatively in the long run (Cheng and Ma 2005). Studying the impact of several macroeconomic variables during recessions worldwide, Claessens et al. (2008) further show insignificant results for export. Nevertheless, when a recession was associated with a credit crunch, both export and import were showen to be negative; but where the coefficient of import was seven times larger in magnitude (ibid, p. 66).

Recent contributions

In a recent contribution, Thomas (2009) focuses on the effect of financial crises on trade through the mechanisms of capital flow. He argues that trade credits often tend to collapse during a banking crisis; where the net private capital flow works as a proxy to that (ibid, p. 3). Assumingly, trade credits are easy to cut during a crisis due to their short term duration and limited reputational risks (ibid, p. 2). Furthermore, he shows that a banking crisis typically leads to an immediate higher reduction in imports than exports; 2 % Vs 1.3 % (ibid, p. 4 and 5). He concludes that trade finance has a noteworthy role in explaining trade developments during crises.

According to Van Bergeijk (2009), in times of financial crises, policy makers generally tend to opt for an export lead recovery strategy, where an influx of resources is channeled to exporting sectors in order to ensure a sufficient amount of hard currency and that exporters are further able to meet international debt obligations. However, policy makers may be less

inclined to come to the aid of importing firms (ibid, p. 7). The question is whether this prospective regularity does not have the potential to evolve into a negative equilibrium at the face of a decline in world demand; where everyone wants to export but no one wants to buy.

According to Van Bergeijk (2009), "import is the key to understanding financial crises", and he is of the opinion that a financial crisis should be most visible and unambiguous in the development of volume of imports which is perceived to enable a more valid deduction of arguments and conclusions regarding the stated research questions and hypotheses below. Based on these recent insights, it was decided to confine the discussion to the case of import, which further seems to be impacted more severely than the export sector following the recent crisis in Sweden (as far as the estimated study period of this work is concerned).

Recent evidence - The financial crisis of 2008-2009

According to the World Bank, WTO and OECD, world trade is projected to decrease by 9.7 to 16 % following the recent global financial crisis, Van Bergeijk (2009). Apparently, both global and domestic demand seems to have declined significantly; with implications for the Swedish import and export sectors thereof. The Swedish Riksbank has recently described the current (domestic) crisis as the worst seen in modern time (October Report 2009). Indeed, both the Swedish export and import sectors fell by about 22 % during the first 6 months of 2009 (Kommerskollegium, July Report) as compared to the same period of 2008 and are expected to decrease by 12 % in total, in 2009 (Riksbank, December follow-up); where the impact on import has been expected to be slightly greater.

An important contributing supply and demand factor refers to a significant lift in uncertainty and a drop in perceived trust between agents across (world and domestic) markets (e.g., banks). For example, one of the immediate implications of the increase in uncertainty and drop in trust within the financial system has been restricted access to credit; both in Sweden and throughout the world. Companies (and individuals), regardless of their financial position and industry affiliation, have faced increasing difficulties securing (trade) finance (Riksbank's February report, 2009).

Seemingly, the consequences for the Swedish economy have been lower bilateral trade volumes, lowered investments, increasing unemployment and bankruptcies (Riksbank's October report, 2009). According to the Riksbank, Swedish GDP has decreased more and faster than that of the US and the Euro area (about 4.5% decrease during 2009); assumingly, since Sweden is a small open economy that is highly dependent on trade. Moreover, the Swedish crown (SEK) has depreciated throughout the crisis as compared to the US dollar and

the Euro; as investors have escaped small economies and currencies during the crisis (Riksbank's July report, 2009). This seems to have further disfavored Swedish importers.

From the third quarter of 2009, financial markets have started showing signs of stabilization and have continued to do so throughout the year (Riksbank, December follow-up). The American, EU's and Sweden's GDP has stopped falling during the second quarter of 2009 and demand seems to have stabilized thereafter; although still at relatively low levels. Furthermore, investors seem to be more inclined to risk and the TED-spread, a signal of insecurity in the market, is back at the level before the bankruptcy of Lehman Brothers. Nevertheless, unemployment in Sweden is still projected to reach 10.3 % in 2010, as it lags GDP by about a year. Investments are projected to further decrease during 2010, from 20% reduction in 2009; mainly due to low utilization levels at the moment.

Research premise - Hypotheses

Evidently, the crisis of 2008-2009 has resulted in several pitfalls for Swedish importers. The reduction in trust and trade finances by (domestic) banks, along with a general increase in uncertainty and the resulted downturn in domestic demand, seem to be the most prominent difficulties behind the reduction in import values. Seemingly, these problems are of great importance during the short period where the course of action is still very ambiguous and unclear. In order to elicit any differences in import reduction pertaining to the two types of products and the duration of trade relations, prevailed differences between the two product types must be introduced into the analysis. As it emerges, there are counterintuitive arguments as to how the crisis could be taken to affect import of the two product categories differently.

The importance of the product type

Following Rauch´s (1999) arguments that search costs are the greatest barrier to trade for differentiated products and that these move together with physical and non-physical proximity (e.g., distance respective, language and colonial ties), the recent crisis might be expected to impact the formation of trade relations in differentiated products more negatively. The intuition is that the already embedded uncertainty in trading with differentiated goods will be exacerbated and lead to higher search costs than usual during the crisis as a result of a general increase in risk and uncertainty and an overall decrease in trust; and the resulted limitation on trade finances thereof. Homogeneous on the other hand, enjoy higher transparency and less uncertainty; partially through organized exchanges and trade agencies, but also due to their nature as standardized basic necessary products, which may be perceived as "safer" to trade.

Although important in its own right, the implication of search costs is only one dimension through which the crisis could be taken to affect the trade in differentiated and homogeneous

goods differently. According to Goldberg et al. (2005), differentiated products usually involve less frequent use of the US dollar as the main currency for trade. As discussed, one of the observed consequences from the recent crisis has been a steady depreciation of the Swedish crown vis-à-vis foreign currencies, and among those the US dollar; which despite its depreciation against some foreign currencies it has nevertheless appreciated against the crown throughout the period of the crisis.

This double effect could indicate that Swedish importers of differentiated products could be impacted more negatively than importers of homogeneous products. More specifically, since contracts for differentiated products are, more often than homogeneous, specified in the foreign home currencies, the depreciation of the Swedish crown has diminished the purchasing power of Swedish importers more than what could be the case in case Swedish importers had secured their purchasing of imported goods with the US dollar; as importers of homogeneous goods. It seems as if Swedish importers of differentiated goods have not internalized the appreciation of the US dollar against the crown and further foregone the function of the US dollar as a trust restoration mechanism during the crisis.

Additionally, Feenstra and Hanson (2004) argue that differentiated products usually enjoy higher markups than homogeneous. Since the crisis is further assumed to reduce real aggregated income (e.g., through unemployment) and hence overall demand, and under the assumption that prices are relatively rigid downward, it is possible that the net effect will be to the detriment of differentiated imports. Another important empirical observation found differentiated products to be associated with greater evasion to import tariffs (Javorcik and Narciso, 2008); mainly due to the difficulties associated with assessing their quality and price. Using product-level data Javorcik et al. (2008) show that the trade gap, defined as the discrepancy between the value of exports reported and the value of imports reported is positively related to the level of tariff, and that the responsiveness of the trade gap to the tariff level is greater for differentiated products than for homogenous goods. Ceteris paribus, the risk of protectionism resulting from the crisis could then imply a greater negative impact on trade relations involved differentiated products.

The arguments above all point towards a relatively higher reduction in import of differentiated products, resulted from the recent economic crisis. Nevertheless, there are several counter arguments to the supposition that the crisis will tend to impact differentiated products more negatively than homogeneous ones. These focus almost exclusively on existing rather than prospective trade relationships. According to Rauch and Watson (1999), when deciding how to interact, partners also consider the chance that they will eventually terminate their

relationship, and that the value of termination depends on how easily other matches can be made and on the information available about prospective new partners.

Consequently, since search costs, investment specific and sunk costs (e.g., training costs) are usually higher for differentiated products (Besedeš and Prusa 2006b, p.340), which may still affect the establishment of new trade relations more negatively due to the crisis, it could nevertheless be taken to imply that existing trade relations will tend to be more robust for differentiated products. That is, the exact presence of information problems, higher search costs, higher sunk costs and relationship specific investments, all associated with differentiated products, might prevent traders from breaking their relations since breaking those might be very costly, especially in times when risk and uncertainty are high; to reestablish later on or to find new trading partners.

Furthermore, as noted by Besedeš and Prusa (2006b, p.340), differentiated products are usually characterized by smaller initial purchases, and longer trade relationships, all of which could facilitate a hampered impact of the crisis on differentiated products than homogeneous ones (see later for more detailed arguments). Additionally, the lower price elasticities, and hence lesser rates of substitution, for differentiated products (Broda et al. 2004, 2006), might be taken to indicate that traders will be less prone to break their relationships than traders with homogeneous. Thus, ceteris paribus, according to these arguments the reduction in import will be relatively lower for differentiated than homogeneous.

As it is emerged, there is ambiguity through which mechanisms, and by which magnitude, the crisis will affect import relations of the two product categories differently. Apparently, there may be significant differences in reaction to the crisis by traders of the two products; but that is also dependent upon the nature and phase of the relationship. Before considering more specific cases aiming at further eliciting the mechanisms through which the crisis might be taken to affect the import of the two product types differently, it will be prudent to start by asking whether, *ceteris paribus*, the crisis affects import of the two product types differently.

H1: The relative reduction in import resulted from the crisis does not differ between the two product categories (two sided).

The importance of surviving

According to Besedeš and Prusa (2006a, p.2) a key element for achieving a higher aggregate export growth is longer relationships (i.e., higher survival rates). They conclude that unless relationships are long lasting, high growth will have a short term effect (ibid, p.7). Of course, since export of a country is the import of another, one might expect longer duration, irrespective of product type, to be associated with great importance (e.g., trust, stability) to the

importing country as well. Indeed, Besedeš and Prusa (2006b) found that duration can explain the prevalence of short and small valued relationships of US import. Furthermore, they argued that longer import trade relationships have higher probabilities to be maintained (ibid, p.354).

The intuition that higher duration is important in hampering the import reduction throughout the crisis is straightforward and naturally follows the findings by Besedeš and Prusa (2006a). Accordingly, entering new agreements or replacing existing ones, is a costly activity, which will tend to be aggravated under times of great uncertainty and higher risks. Furthermore, longer duration might also imply that larger investment specific costs have been incurred and that these are largely sunk (e.g., search and training costs). Hence traders will be more patient in breaking up their relations as duration increases. Moreover, enduring relationships might be very valuable as traders have learned about one another from past interaction. The resulted trust and lower perceived risk are highly important not least in times of crisis. Hence, they might be willing to assume certain concessions during the crisis in order to preserve their trading relation; that they otherwise would not.

Of course some of the arguments above may strongly depend on the product category. However, in order to explore the importance of trade duration on the reduction of import between the two products during the crisis, it should first be explored whether the survival rate, irrespective of product type, has the expected positive, and hampering ("holding back") effect on import throughout the crisis.

H2: Higher survival rates do not hamper the reduction of import throughout the period of the recent credit crisis (one sided)

The importance of surviving to the product type

Ceteris paribus, relationships involving homogeneous goods tend to be quite fragile (Besedeš and Prusa 2006b, p.340). Intuitively, search costs and specific investments are low and buyers most often purchase their products at the lowest price that rules the day. Furthermore, homogeneous products are fairly standardized across suppliers. Consequently, trade relationships for these products might be less costly and less important to maintain, as relationship-specific factors may not matter and source country may be irrelevant (i.e., traders will be more likely, to be willing, to switch to an alternative supplier). Building on Rauch and Watson´s (2003) intuition regarding the importance of trade duration for trading relationships, Besedeš and Prusa (2006b, p.345) found that, ceteris paribus, differentiated goods, indeed, tend to project higher survival rates than homogeneous.

Nevertheless, Rauch and Watson (2003) argue that, all else equal, (1) relationships starting with large orders will tend to have longer durations while (2) a decrease in investment costs increases the probability that a relationship starts large and (3) a decrease in search costs increases the likelihood the buyer will opt to switch to a new supplier. These three assumptions were all asserted by Besedeš and Prusa (2006b, p.341), though they somewhat ignore a more detailed treatment of these assumptions on their empirical findings. Ceteris paribus, while the first and second arguments indicate higher duration for homogeneous products the third argument speaks against it, to the favor of differentiated. Consequently, the important question is whether duration, irrespective of its factual length, is more important for trading import values of differentiated products. The factual length is at best an indicator for the importance of the trading relationship.

Extrapolating these insights to the importance of the survival rate in generating higher values of import, one could assume that the higher uncertainty and specific costs associated with differentiated products, makes the duration of the existing relation to be a very important factor for increasing engagement in the relationship, *irrespective of the factual length of the relationship*. This is further supported by the observation that trade relations for differentiated products usually start with smaller initial purchases (Besedeš and Prusa 2006b, p.340); which clearly emphasize the importance of uncertainty, trust and learning; all important for traders in differentiated products. Hence, in order to assess the importance of duration it is judicious to ask whether higher survival rates are *relatively* more important in generating higher import values for importers of differentiated products than for homogeneous ones.

H3: The importance of higher survival rates on import values is not higher for differentiated products (one sided)

Projecting these insights to the importance of the survival rate in hampering the reduction in import following the recent crisis it is argued that, ceteris paribus, longer trade relations will have a more prominent hampering effect on the reduction of import values for importers of differentiated products. Assumingly, terminating a good match can be very costly once the crisis is over and the costly search for new traders begins. That is, the existence of higher search and investment specific costs, associated with differentiated products will make traders in those more reluctant to end or contract down their relations, in comparison to traders in homogeneous; absent organized exchanges and price and quality transparency, longer relations imply less risk and uncertainty so valuable in uncertain times.

H4: The importance of higher survival rates on import values is not higher for differentiated products throughout the period of the crisis (one sided)

Empirical approach

Following previous research an augmented gravidity model is adopted as a departure point for testing all the aforementioned specified hypotheses. The data at hand is a balanced panel of imports from Sweden´s (currently) largest 30 import countries from the first quarter of 2004 to the second quarter of 2009. The data set is balanced since the set of countries and product categories are the same across the research period. Besides the original adopted gravity model, a panel regression procedure is further employed; where both time and country fixed effects are accounted for. As a final robustness check, a fixed effects specification with both time and country will be further explored.

The Gravity Model

The Gravity Model is the most celebrated and commonly used model for explaining trade flows between two countries (Rauch 1999, Lawless 2008). The gravity relationship dates at least as far back as 1954 to Isard (Lawless 2008, p. 4) and has the following original form:

$$F_{ij} = GM_iM_jD^{\alpha},$$

Where F_{ij} is either import from country *i* to country *j* or export from country *i* to country *j*. G is a constant, M_i, M_j are the economic masses of the two countries and D is the distance between them. Hence, the magnitude of trade between two countries depends on the supply conditions in the source country, the demand conditions in the host country and the distance between them. An advantage of the gravity model, or an enriched gravity model that is typically used, besides its simplicity, is the very high explanatory power of the model (Bussière et al, 2005).

At least two theoretical foundations can be given to the model: the monopolistic competition model and the Armington–Heckscher–Ohlin–Vanek model, as it is named by Harrigan (Rauch 2005 p. 11, refers to Harrigan 1994). Rauch himself derives a similar equation (without distance) simply by assuming that every country consumes its own output and that of every other country in proportion to its share of world demand (Rauch 1999, p. 11). The basic model is usually enriched by several other variables that are thought to stimulate or hinder trade. The model is then called an augmented gravity model. There are a vast number of variables that have been added, but according to Bussière et al. (2005) four variables are typically added in a multiplicative manner; common language, common border, colonial ties and free trade agreements.

For the study at hand, an OLS procedure is applied to a log linear augmented gravity model. Swedish GDP, foreign GDP and Distance (see later), all theoretically appealing and proven

empirically successful, are included. Upon those the augmented model at hand takes several other variables into account. Apart from the research variables of survival rate, a dummy for the product category, and a dummy variable for the crisis; all essential in testing the specified hypotheses, it was decided to include the most theoretically and empirically appealing control variables; in order to best elicit the entrenched mechanism through which the crisis may be taken to impact Swedish import traders. Of the four variables that are frequently added, common language, common borders, and free trade agreements, are addressed directly. The common language and common border dummy for Sweden coincides as the constructed dummy variable is taking the value 1 for Denmark, Norway and Finland and 0 for all other countries. Furthermore, the fourth variable, colonial ties, is also reflected in this variable as well (Baltic countries excluded); and hence no separate variable for this was created.

Additionally, an important trade cost variable; measuring the length of time in days it takes for all the customs procedures to be completed, is included and in line with Lawless (2008). Moreover, the "openness" of a country, its integration in the world economy, is believed to be important, as well as the existence of a strong free trade agreement, FTA_j. Finally, several interaction variables, between the research variables of product, crisis and survival, are created in order to test the specified hypotheses. In the data section a closer description and motivation for all of the original recorded variables is given.
The final augmented gravity model in its logarithmic form looks as follows:

$$\ln Import_{ijt} = \ln \beta_0 + \beta_1 \ln GDP_t + \beta_2 \ln GDP_{jt} + \beta_3 \ln Distance_j + \beta_4 \ln Openness_{jt} +$$
$$+\beta_5 ln\ time\_to\_export + \beta_6 crisis_t + \beta_7\ product_i + \beta_8 Survival_{ijt} +$$
$$\beta_9 language(adjacency)_j + \beta_{10} FTA_j + \beta_{11} Prod/crisis_{it} + \beta_{12} Prod/survival_{ijt} +$$
$$\beta_{13} Survival/crisis_{ijt} + \beta_{14} Survival/Prod/crisis_{ijt} + \varepsilon_{ijt}.$$

Where GDP_t is Swedish GDP, GDP_{jt} is foreign GDP. The four interaction variables between product, time and survival rate, will be introduced stepwise in accordance with the outline described in the results part (see below).

Panel Data Regression - Time Fixed effects and Country Fixed effects

Despite its simplicity, the gravity specification may distort the true picture of the relationship between the dependent and the rest of the explanatory variables, since it does not account for both the time and space dimensions of the panel data set. More specifically, the panel data at hand has the between-countries information on import of 262 product categories among countries for any given time period, and further the within-country information for the same 262 products for any given country across the different time periods. The same is valid for the

effects of time periods. That is, the between-time information refers to information on the 262 products across time periods for any given country while the within-time refers to information on the 262 products from the same time period across the different countries. This information is not accounted for when running the OLS gravity model.

By allowing for this within- and between- information across time and countries, simultaneously or separately, a panel regression procedure such as the fixed effects modeling procedure can convey important information and further adjust the standard errors of variables and thereby correct for potential heteroscedasticity and serial autocorrelation; thus adjust the substantive analysis of results. Hence, to get a better insight into the analysis and in order to provide a robustness for the obtained results from the adopted OLS gravity model, and further to deal with encountered statistical (and theoretical) challenges (i.e., suspected, minor, problems of serial correlation and/or miss specification; see later), fixed effects specifications were further introduced into the analysis; or specifically, the least-squares dummy variable procedure (LSDV). By creating a dummy variable for every time period and/or country, one controls for country and/or time specific case effects in a standard multiple regression. Of course, the underlying assumption behind the employed fixed effects procedure is that the unobserved effects; although they differ between countries and/or time periods, are constant across the 262 product categories.

That the fixed effects procedure may be more realistic is clearly supported by both Gujarati (2003) and Wooldridge (2002). According to Gujarati (ibid, p.637) it is often wise to use a fixed effects specification when working with panel data; partially since leaving out the time and country fixed effects might lead to distorted estimates. Apparently, it would be naïve to assume that there is no country heterogeneity and that the intercept should not vary over time. Nevertheless, by not employing a panel regression procedure the researcher can still use the gravidity specification as it is originally formulated; where fundamental variables such as distance and Swedish GDP are included; which would have to be precluded otherwise, because of perfect multicollinearity with the fixed effects dummies for country and time respectively. Evidently, Rauch (1999) used an augmented gravity model without any fixed effects specification.

Indeed, the literature describes both advantages and disadvantages with both procedures. Starting with an augmented OLS gravity model the analysis continues to present both time fixed effects and a country fixed effects specifications. Again, while the time fixed effects specification corrects for seasonality and macroeconomic events (e.g., political), the country fixed effects dummy procedure corrects the intercept for heterogeneity between the different

countries. As a further and final robustness test a fixed effect model that control for both time and country will be specified as well.

The time fixed effects model in its logarithmic form looks as follows:

$$\ln Import_{ijt} = \ln \beta_0 + \beta_1 \ln GDP_{jt} + \beta_2 \ln Distance_j + \beta_3 \ln Openness_{jt} + \beta_4 lntime\_to\_export + \beta_5 product_i + \beta_6 Survival + \beta_7 language(adjacency)_j + \beta_8 FTA + \beta_{10} Prod/survival_{ijt} + X_{it} + Y_{ijt} + Z_{ijt} + FE_t + \varepsilon_{ijt}.$$

Where FE_t is the set of time dummies introduced, and X, Y and Z stands for the three sets of interaction terms product/time, survival/time and product/survival/time, respectively (63 interactions in total).

The country fixed effects model in its logarithmic form looks as follows:

$$\ln Import_{ijt} = l\,n\,\beta_0 + \beta_1 \ln GDP_t + \beta_2 \ln GDP_{jt} + \beta_3 \ln Openness_{jt} + \beta_4 time\_to\_export + \beta_5 crisis_t + \beta_6 product_i + \beta_7 Survival_j + \beta_8 language(adjacency)_j + \beta_9 FTA + \beta_{10} Prod/crisis_{it} + \beta_{11} Prod/survival_{ijt} + \beta_{12} Survival/crisis_{ijt} + \beta_{13} Survival/Prod/crisis_{ijt} + FE_j + \varepsilon_{ijt}.$$

Where FE_j stands for the set of country dummies introduced.

Both the country and time fixed effects model in its logarithmic form looks as follows:

$$\ln Import_{ijt} = \ln \beta_0 + \beta_1 \ln GDP_{jt} + \beta_2 \ln Openness_{jt} + \beta_3 \text{time\_to\_export} + \beta_4 product_i + \beta_5 Survival_j + \beta_6 language(adjacency)_j + \beta_7 FTA + \beta_8 Prod/survival_{ijt} + X_{it} + Y_{ijt} + Z_{ijt} + FE_j + FE_t + \varepsilon_{ijt}.$$

Again, X, Y and Z stands for the three sets of interaction terms product/time, survival/time and product/survival/time, respectively (63 interactions in total).

Approaching the data

With what follows, a brief discussion is provided on the source and procedure taken for each of the included variables in the regression models. All in all, there is one dependent variable and 10 explanatory variables; upon which several multiplicative terms were further created to assess the posed research hypotheses. All explanatory variables, explanatory to Sweden's import trade relationships, are in line with conventional economic theory and previous research. The research period ranges from the first quarter of 2004 to the second quarter of 2009; no complete data for the third and fourth quarters of 2009 could be retrieved with respect to the dependent and other core variables. Starting from the first quarter of 2004 is

assumed to be sufficient in order to capture the general trend before the crisis and to investigate the short term effects of the crisis on Swedish traders of imported goods thereafter.

Import – the dependent variable

The panel data on the dependent variable, $Import_{ijt}$,is in thousands of SEK from Sweden's 30 largest import countries. It is recorded on a monthly basis and was retrieved from Statistics Sweden (SCB). The disaggregated data is on the three digit classification level (3-SITC) and encompasses 262 product categories. This is the lowest, yet most comprehensive SITC classification provided by SCB. The monthly figures were compounded to a quarterly basis, which was perceived as low enough to capture the effects of the crisis and further correcting for seasonality. Furthermore, since data on most other variables is recorded on a yearly basis, it is expected to find less incongruence between the weighted average of the yearly data and the import data. Given the logarithmic forms of the employed models, the value of this variable must not equal zero, as it then will be undefined. Excluding the zero observations would probably lead to a selection bias and renders the survival rate variable useless (constantly equal to one). Consequently, the approach taken by Eichengreen et al. (1995) and Co et al. (2004) is employed. That is, the value of one is added to all import values. Then for a zero trade value ln (1 + trade) = 0, while for large values of trade, $\ln(1 + \text{trade}) \approx \ln(\text{trade})$, and the constant elasticity relationship is preserved.

Product classification

Due to several ambiguities at the three- and four-digit level, Rauch (1999) created both 'conservative' and 'liberal' product classifications (ibid, p.15); with the further intention of studying differences at the three digit classification as well. Overall, the former minimizing the number of three- and four-digit commodities that are classified as either homogeneous or reference priced while the latter maximizing those numbers (ibid). Hence, since homogeneous and reference goods were taken as one group (homogeneous), the liberal approach was employed to allow for larger variation between the two groups of differentiated and homogeneous commodities; which increases the validity of the tests. Besides differences between the two classifications were considered marginal; which did not seem to distort the results.

Nevertheless, since Rauch´s classification is constructed on the four digit classification (Complete classification was retrieved from Haveman's website), own discretion had to be used when the first explanatory dummy variable, $Product_i$ (1 if differentiated, 0 otherwise) was created. The problem was that each product category in the three digit level is equal to several sub categories at the four digit level, and since these sub categories were not always

unified within their group on whether the good is homogeneous, differentiated or a reference good, a choice had to be made on what type of good the three digit category would be defined as. Fortunately, in almost all cases the choice was simple since both classifications were more or less the same; i.e., the three digit level contained categories of the four digit level with the same classification. Nevertheless, in some cases where the sub categories were not unified, the dominant classification with respect to the number of sub categories and their importance/value was chosen (e.g., if the four digit level on salt products only contains the categories cocking salt and bathing salt the choice is obvious).

Finally, regarding the practice of combining homogeneous and reference goods to one group, it is worth mentioning that theoretically, both homogeneous and reference priced commodities possess an indicated price (see discussion above) and, practically, there were very few reference classifications at the four digit level; none of which dominates when classifying the product category at the three digit level. All in all, the expected sign is negative since in absolute values Sweden imports more homogeneous goods than differentiated (Appendix A).

Crisis

The bankruptcy of Lehman Brothers, on September 15, 2008, at the end of the third quarter, is said to be the triggering factor of the contemporaneous global financial crisis. The US, Euro area and the TCW countries (a weighted average of Sweden's most important trade partners) went into a recession right before or during the third quarter of 2008. However, the drastic worldwide GDP drop started at the end of 2008. Because of this ambiguity, it was decided to create two crisis dummies (for structural change), one starting at the third quarter and one starting at the fourth quarter of 2008; and where the last will is used as a robustness check. The dummy takes the value 1 for the last four and three periods, respectively. Naturally, the expected the sign of these dummies is negative.

Survival rate

The survival rate variable, $Survival_{ijt}$, measures the relative fraction of the periods trade has taken place for a specific product and country and is calculated as follows: the number of periods trade has taken place at the 3 digit product disaggregation level divided by the total number of periods. The survival rate for the study period is based on the actual survival rate between 2000 and 2004 (i.e., this is the time basis used for the continual survival rate between 2004 and the second quarter of 2009). It is based on the Kaplan Meier estimator (Kaplan & Meier 1958) used by Besedeš and Prusa (2006). The expected sign is positive; the longer one has been trading with a certain company, trust increases and uncertainty decreases, which, all

else equal, should lead to the importer buying larger quantities. The variable is *not* in a natural logarithm as it takes the values of zero to one.

GDP and PGDP

Aggregate GDP, $GDP_{t,}$ GDP_{jt}, refer to Swedish and foreign country GDP respectively and it is based on a purchasing-power-parity (PPP) valuation of country GDP in current international dollar. This GDP measure is one of few GDP measures that includes Taiwan; one of Sweden's thirty most important import countries. The data for each of the thirty countries plus Sweden comes from the World Data Bank. Since data collected is on a yearly basis, a weighted average method was called for in order to retrieve quarterly measures. Furthermore, for the two last quarters in the data set (first two quarters of 2009) an estimated GDP measure was employed; estimated by the World Bank. For Sweden the GDP for these quarters was estimated independently and in accordance with the Riksbank's estimations of Swedish GDP (6.2 % deduction for the first quarter as compared to the fourth quarter of 2008 and nothing for the second, Swedish Riksbank, December follow-up). It is expected that these two variables will have a positive coefficient in compliance with the gravity model – trade volume between two countries is proportional to the product of their economic masses. The variables are in natural logarithm.

Distance

The variable $Distance_j$ is defined as the distance in kilometers between Stockholm and foreign countries' capitals; treated as the economic centers of each country. The values are calculated using the great circular method, from the capitals' longitude and latitude coordinates; using CIA World Fact Book (2009). That distance has a negative impact on trade between two countries is one of the most robust results in economics (Lawless, 2008) and the effect has actually been increasing over the last 50 years ("*The Distance Puzzle"*, Disdier & Head, 2008). Distance is said to impede both flows of information and products, increases upfront search costs and transportation costs (Rauch, 1999). In compliance with the gravity model a negative coefficient is expected – trade volume between two countries is inversely proportional to the geographical distance between them. The variable is a natural logarithm.

Trade costs – foreign time to export

Trade costs were collected from the Doing Business Survey, made by the World Bank Group (see references). They provide information about the average length of time (days) it takes for all the customs procedures to be completed, the cost of import/export as measured by all the fees associated with customs clearance and the number of documents that has to be filled out to import/export a container. Time to export for the 30 countries was chosen as the only trade

costs variable. This was used by Lawless (2008), along with the other two trade costs. Nevertheless, the time to export is a variable cost as opposed to the other two and hence the one that provides the most uncertainty for companies looking to export to Sweden. The importance of this variable has been further proven by Hummels (2001). The expected sign of is obviously negative; the longer time it takes at one's own border, the less one exports. The variable is in a natural logarithmic form.

FTA and language – proximity measures

The Free trade agreement dummy variable, FTA_{jt}, was based on a EU membership along with Norway and Switzerland; countries with extensive free trade agreements with the EU covering most goods (European Commission). Hence, in case the country has an FTA with Sweden it takes the value of one and zero otherwise. The language dummy, $Language_j$, is equal to 1 for Norway, Denmark and Finland, as Danish and Norwegian are very similar to Swedish and since Swedish is pervasive in Finland; one of two official languages. This variable can also be interpreted as an adjacency variable, as Sweden shares borders with these countries. As argued by Rauch (2005, p. 12), the distance between, for instance, Chicago and Mexico City, and Chicago and London, though similar, do not give the correct estimate of the physical separation between the US and Mexico compared to the US and the UK. Obviously, a positive coefficient is expected for both these dummies; sharing a trade agreement and a language/border lowers communication and transportation costs.

Openness

A common measure of $Openness_{jt}$, (i.e., the general integration of a country in the world economy) is calculated as the ratio of total trade to GDP (van Bergeijk 2009, p. 10). Yearly Data was collected from the world data bank for the years 2004-2008. A weighted average was used for this period where 5 % are deducted from all openness values in the first quarter of 2009 as compared to the fourth quarter of 2008 and another 5 % for the second quarter of 2009. This is in Accordance to van Bergeijk (2009, p. 5) who in turn refers to the World data bank, the OECD and the WTO who estimate a decrease of world trade in 2009 by 9.7 % to 16 %. Likely, the decrease will be largest in the first two quarters. The variable demonstrates a country's overall propensity for external trade and since countries tend to trade more with partners that are highly integrated in the world economy (Head and Ries, 1998) it is expected to project a positive coefficient. The variable is introduced in its natural logarithmic form.

Discussion & Other variables

Other variables appearing in the literature, and not commented on above, are infrastructure, corruptness, area (proxy for transportation cost) and population density (indicator of internal geography). And there are many more, of course. Nevertheless, these are not in the original model, nor do they seem to be very common in the literature. Furthermore, it is believed that the effects of the variables mentioned above, though theoretically justified, will be picked up by the other included variables (infrastructure and corruptness by GDP, for instance). All data sources are considered reliable and in line with conventional use by researchers (e.g., world data bank and SCB). Hence, it is considered improbable that measurement errors are serious enough to have important effects on the obtained results.

Statistical issues

The implied research procedure of creating multiplicative terms for assessing the research hypotheses on a panel data set, along with the chosen empirical approach, imposed several statistical challenges; partially related to the time and cross-sectional dimensions of the data set, and partially to high multicollinearity. For all specified models the assumptions of normality, multicollinearity, heteroscedasticity and autocorrelation were tested and addressed. Overall, using the usual plots and the (large-sample) Jaque-Bera test for normality, the assumption of normality distribution has been rejected for all specified models; as it is usually the case. The problem seems to be more of kurtosis related. For all specifications skewness has ranged between - 0.339 to - 0.394 while kurtosis has ranged between the values of 1.115 and 1.229. The positive kurtosis indicates too few cases in the tails. However, based on asymptotic distribution theory, the relatively big sample size of 172,920 observations allows for all working assumptions and procedures thereof (for all tests, see Appendix B).

Sensitivity analysis – the gravity pooled OLS specifications

The relative big sample size seems to have secured the absence of strong multicollinearity with no largely inflated standard errors. Nevertheless, the introduction of interaction terms into the regression led to moderate levels of multicollinearity in the final specified model. Hence, for reasons of parsimony, robustness and escalating multicollinearity, the interaction terms were introduced subsequently into the regression. Although simple correlations around 0.5 are found among some of the explanatory variables, none of the coefficients have projected VIF values in excess of 10, or a tolerance value (1/VIF) below 0.1; which are of course more lenient cutoff levels. Overall, it is safe to conclude that no severe multicollinearity is presented in the gravity pooled OLS specifications.

Additionally, the assumption on homoscedasticity was tested both by graphical examinations of the usual scatter plots and by using the celebrated Breusch-Pagan-Godfrey large sample

test of homoscedasticity (see Appendix B). From examination of the scatter plots there were observed small to moderate violations. Indeed, the null hypothesis, based on the generalized residuals, from the Breusch-Pagan-Godfrey test is rejected; and hence homoscedasticity cannot be assumed. Therefore, the White heteroscedasticity-robust standard errors and significance levels are calculated and reported (see Appendix B). Without altering the values of the OLS coefficients the White standard errors are considered superior to regular OLS standard errors since in case heteroscedasticity is presented, it corrects for it, while if it is not, no error has been made (Gujarati 2003, p.418).

Dealing with multicollinearity and heteroscedasticity, the only emerging issue seems to be related to the time and/or space dimension of the panel data set. That is, when the results from the gravity OLS regressions were studied, and conventional criteria were applied and satisfied (e.g., significance, expected signs R squared, etc.), the only drawback was the inability to satisfy the assumption of no-autocorrelation. More specifically, the Durbin-Watson (*d*) value, of about 1.6, rejected the assumption of no positive autocorrelation when taking the critical bounds into account; it seemed as if minor positive autocorrelation was presented in the data. However, as a rule of thumb, a *d* value between 1.5 and 2.5 is usually said to indicate the independence of observations. Hence, the relatively high *d* value of 1.6 could still be taken to indicate that the idiosyncratic errors are serially uncorrelated (at the first order). Of course this could still points toward small specification errors. Obviously, the (highly restricted) assumption that the slopes and intercepts for all countries and time periods are the same cannot be taken for granted.

Sensitivity analysis – fixed effects specifications

Hence, in order to provide a robustness for the obtained results from the gravity specification, and further to try and correct for the suspected (minor) problem of (positive) serial correlation and/or miss specification, the least-squares dummy variable procedure (LSDV) was introduced. On the whole, using this fixed effects modeling procedure conveys valuable information; the results seem to be fairly robust in comparison to the gravity model and in line with theory across most specifications (see analysis). Although it precluded the important inclusion of some theoretically motivated explanatory variables it still provides some interesting insights into the analysis. Nevertheless, the fixed effect approach seems to change very little the observed minor positive autocorrelation and heteroscedasticity.

Regarding the suspected problem of positive autocorrelation, all *d*-values are slightly higher, as compared to the gravity specification, and still in excess of 1.6. This could be taken as if no major specification error exists in the original gravity model but rather a minor serial correlation; which is tolerable and expected in a time series analysis. Additionally, although

the null-hypothesis on positive autocorrelation is still rejected when using the critical bounds, the idiosyncratic errors could still be assumed as serially uncorrelated due to the relatively high *d*-values. Moreover, the null hypothesis of no homoscedastic error terms is rejected, although diagrammatically it seems to be somewhat alleviated in comparison to the gravity model. Nevertheless, White-corrected standard errors and significance levels are calculated and reported for all specifications.

Lastly, the introduction of many interaction terms along with the research procedure, seem to constitute an escalating problem pertaining to multicollinearity. Hence, for reasons of parsimony, robustness and escalating multicollinearity, the interaction terms were introduced subsequently into the regression. For the time fixed effect procedure the problem is much more moderate. Principally, multicollinearity was extremely high whenever country fixed effects were included; as many of the included control variables are country-specific (e.g., GDP, FTA, etc.). Hence, for the country fixed effects, and country and time fixed effects, procedures both a specification that includes these variables and one that excludes them are reported. Yet, when excluded, distorted coefficients and suspected miss-specification emerged instead. Hence, the results from these two procedures should be viewed as questionable and interpretation should be made with great caution, while the results from the former, time fixed effect procedure, should be viewed as rather unproblematic.

Further remarks – fixed effects, first differencing or random effects

As mentioned, by reverting to fixed effects specifications some theoretically important variables had to be excluded. For specifications involving time fixed effects components, Swedish GDP had to be left out due to perfect multicollinearity between the time variables. On the other hand, for specifications involving country fixed effects components, variables that are country-specific, such as distance and host country GDP, had to be excluded because of the same reason. Distance and host country GDP are both included in the original gravity model, so it is a significant drawback. Nevertheless, the procedure still provides some profound insights to the analysis.

It is worth mentioning that the choice between the LSDV fixed effects procedure and first difference procedure was not simple as there were clear advantages (and disadvantages) for both methods. However, as far as the idiosyncratic errors are assumed as (relatively) serially uncorrelated, the fixed effects procedure is considered more efficient than first differencing; which is in line with Wooldridge arguments (2002, p.447), who stressed that the fixed effects model is almost always stated with serially uncorrelated error terms, which lead researchers to favor the fixed effect estimators. Furthermore, although eliminating the unobserved effects, "first" differencing also greatly reduces the variation in the explanatory variables (ibid,

p.448). Last but not least, since the cross sectional dimensions/units of product and country are not considered as random drawing, the fixed effect procedure was favored to a random effect one; which is in line with Gujarati arguments (2003, p.650).

Analysis & Results – OLS gravity model

Table 1 presents the results for the OLS gravity model(s). While specification 1 only presents the results for the first and second null hypotheses, each subsequent specification introduces an additional interaction term, equivalent to a subsequent hypothesis, up to the final specified model (3), where all hypotheses are tested simultaneously. Model 4 presents the robustness equivalent final specification, taking the structural break to occur a quarter later; all relevant interaction terms for this model are based on the new crisis dummy. For all specifications the White-corrected standard errors and significance levels are reported (see Appendix C).

Table 1: Gravity OLS (Pooled)

	(I)	(II)	(III)	(IV)
Swedish GDP	.66974****	.65735****	.65739****	.58586****
	(.09904)	(.09866)	(.09866)	(.09208)
Foreign GDP	.71463****	.72581****	.72581****	.72618****
	(.00796)	(.00794)	(.00794)	(.00793)
Distance	- .50355****	- .52523****	- .52522****	- .52547****
	(.01259)	(.01255)	(.01255)	(.01255)
Language (1= Scandinavian)	.97405****	.98343****	.98344****	.98362****
	(.02344)	(.02340)	(.02340)	(.02340)
FTA (1= EU)	.41961****	.40487****	.40486****	.40481****
	(.02125)	(.02122)	(.02122)	(.02122)
Time	- .21059 ****	- .21283****	- .21283****	- .21285****
	(.01250)	(.01247)	(.01247)	(.01247)
Openness	.80429****	.81756****	.81756****	.81836****
	(.01721)	(.01709)	(.01709)	(.01709)
Survival	8.23648****	8.55155****	8.55340****	8.55874****
	(.01440)	(.01527)	(.01543)	(.01512)
Product type (1= Differentiated)	- .27847****	.34952****	.35311****	.34910****
	(.01605)	(.01679)	(.01680)	(.01641)
Crisis (1= period of 07/08 - 06/09)	- .07484****	- .07756****	-.06963***	
	(.02914)	(.02944)	(.03116)	
Crisis (1= period of 10/08 - 06/09)				-.04472**
				(.03468)
Product / Crisis	- .07419***	- .06346**	- .08404***	- .08242**
	(.03925)	(.03916)	(.04239)	(.04819)
Survival / Crisis	.04611**	.04779**	.03729*	.00824
	(.03151)	(.03175)	(.03501)	(.03970)
Product / Survival		- 1.22337****	- 1.23034****	- 1.22906****
		(.02877)	(.03138)	(.03067)
Product / Survival / Crisis			.03933	.04137
			(.07818)	(.08822)
Constant	- 36.73046****	-36.82611****	-36.82860****	-34.95367****
	(2.59756)	(2.58746)	(2.58745)	(2.41441)
F	37416.608****	34926.529****	32431.644****	32429.893****
Durbin	1.613	1.623	1.623	1.622
R^2	.722	.724	.724	.724
R^2 - Adjusted	.722	.724	.724	.724
Observations	172 920	172 920	172 920	172 920

Note: **** WP<0.01, *** WP<0.05, ** WP<0.1, * WP<0.2; are White p-values. White-Standard Errors in parentheses. GDP, Distance, Time, Openness and Import_ijt, are all taken in a natural logarithmic form. Dependent Variable: Import_ijt.

Although high multicollinearity prevailed in the final model(s) (highest VIF value of 7.05 for the crisis variable in model 3), there are no signs of severe multicollinearity. For the first two specifications multicollinearity does not seem to impose any problem, also under stringent

cut-off levels. Furthermore, as observed, the main effects of all basic variables, *throughout the four specifications*, have the correct expected sign, are highly significant, and are of a reasonable, and similar, magnitude; and where the rate of survival has a monumental impact on the value of import. In the following, the results from each model are analyzed separately with respect to the research variables and hypotheses presented and further in comparison to preceding specifications.

As expected, the first specification affirms a structural change in the data set around the crisis period; which is highly robust in comparison to following specifications. Ceteris paribus, the import value of a product, irrespective of its type, is down by 0.07%, on average, as compared to the benchmark period of before the crisis (01/04 to 06/08). Moreover, the dummy variable for the product type shows that, ceteris paribus, on average, a differentiated product is imported to a 0.28% lower value than homogeneous. Additionally, the survival rate variable projects a very large magnitude where, all else equal, a one percentage unit increase in the rate of survival, on average, will lead to an 8.2% increase in imports irrespective of the product type; which is highly robust across the following specifications as well.

Regarding the first two hypotheses, the first specification clearly shows that, ceteris paribus, the import value of differentiated products has decreased by 0.074%, on average, more than the import of homogeneous products, during the specified crisis period. This is highly significant ($p < .01$) and *rejects the first null hypothesis (H1)*. Furthermore, the duration of a trading relation has a hampering impact on import, irrespective of the product type, during the crisis. Ceteris paribus, for every one percentage unit increase in the rate of survival an import relationship has, during the crisis period, the imported value of the good is increased by 0.04%, on average. Hence, *the second null hypothesis (H2) is also rejected* ($p < .1$).

In the second specification, the coefficient for the introduced interaction term is highly statistically significant, but has the unexpected negative sign ($p < .1$). Accordingly, the rate of survival is more important in explaining the import of homogeneous products. This peculiarity is robust throughout the rest of the specifications (see later for detailed analysis). Consequently, *the third null hypothesis (H3) is not rejected*. Additionally, introducing the multiplicative effect between product and survival rate into the regression has a controlling-mediating impact on the main effects of the product variable. The coefficient for the product dummy is now positive and highly significant ($p< .01$), which implies that, ceteris paribus, the import value of an imported differentiated product is larger by 0.35%, on average, than a homogeneous one. All in all, in comparison to the first specification the results from the second specification are robust for the first two null hypotheses and for all other variables.

Column 3 presents the final specified model, whereby the introduced interaction term (product/survival/crisis), assessing the final fourth hypothesis, is included. The sign of the coefficient is positive, and in line with the a priori expectation that the importance of the survival rate in hampering the reduction in import following the recent crisis is higher for Swedish importers of differentiated goods than homogeneous. Nevertheless, the coefficient is not significant at any specified level. Consequently, *the fourth null hypothesis (H4) is not rejected.* Overall, the results for all other variables and relevant hypotheses thereof are similar to the results from the first two specifications, indicating that the findings are robust. Again, by introducing the multiplicative effect between product and survival rate into the regression has a controlling-mediating impact on the main effects of the product variable; where the coefficient for the product dummy is still positive, highly significant ($p < .01$) and has almost the exact same magnitude.

Regarding the three first hypotheses, the import value of differentiated products has, ceteris paribus, decreased by 0.08%, on average, more than the import of homogeneous products during the specified crisis period, which is highly significant ($p < .01$) and still *rejects the first null hypothesis (H1)*. Yet, the importance of surviving during the crisis (survival/crisis) is now not significant at the usual acceptable cut off levels of $p < .1$ (but instead $p<.2$); although, the coefficient still has the expected sign. As far as this lenient cut-off level is accepted, *the second hypothesis (H2) is still rejected*; ceteris paribus, for every one percentage unit increase in the rate of survival an import relationship has, during the crisis period, the imported value of the good is increased by 0.0374%, on average. Furthermore, and still unexpected, the rate of survival seems to be more important in explaining the import of homogeneous products; the *third null hypothesis (H3) is still not rejected.*

Seemingly, there are number of reasons that could explain this unexpected peculiarity, which strongly goes against the insights raised by Besedeš et al. (2006b). On the one hand, since the survival rate for this work has been calculated on a relatively low disaggregate product level (3-SITC) it might fail to capture (or even distort) the true multiplicative relation between the rate of survival and the type of the product on the value of Swedish import. On the other hand, Sweden is not the US and due to its market and geographical situation, Swedish importers of homogeneous goods might be more concerned with updating their trading relations even when organized exchanges do prevail. This is supported by a noteworthy observation from an ex ante analysis of the data. Apparently, distance has a negative impact on imported values of differentiated products, all else equal. This confirms Rauch´s (1999) insights, and Feenstra's (et al., 2001) empirical contribution, that differentiated goods are tended to be traded closer to the home country and vice versa. This effect could be taken to indicate that the high skilled Swedish market, surrounded by well developed markets, implying increasing costs on

Swedish importers of homogeneous products; as those are traded over longer distances. This is important since transaction costs, although thought to be higher for differentiated products, tend to increase with distance irrespectively (Rauch 1999). Trading over longer periods certainly alleviate some of these costs. Moreover, since homogeneous enjoy higher transparency overall the magnitude of this potentiality might be large and the relation stable.

Finally, assessing the research supposition about the structural break in the data, the fourth specification presents the robustness results for the equivalent final specification of model 3, where the dummy for the crisis is now assumed to capture a structural break to occur, approximately, with the fall of Lehman Brothers. On the whole, the results are highly robust; there are only minimal changes in magnitude for most variables, while all variables project the expected signs. Nonetheless, the crisis variable is not significant at the highest levels any more, and its coefficient has a lower magnitude as compared with the equivalent crisis dummy from the first three specifications. Moreover, the coefficient for the interaction variable, between survival and crisis, is now much lower in magnitude and does not even survive the very low cut-off level of $p < .2$. Overall, since the F-value, d-value and the level of significance are all slightly higher in the final third specification, it is considered a somewhat better model; better in capturing the structural break in the data set than its equivalent.

Analysis & Results – Time fixed effects

Table 2 presents the results for the time fixed effects model. Swedish GDP was the only time invariant variable that had to be excluded from the model, as compared to the gravity one. The research procedure further implied the creation of 21 time dummies; each corresponding to a subsequent quarter in the data set; where the omitted category stands for the first quarter in the set. In order to assess the posed research questions and hypotheses the variables of product and survival, and their interaction, were entered in a multiplicative manner with each of the dummies created for time; creating three set of interaction terms respectively (21 in each set). Since this implies multiple variables connected to each of the posed hypotheses (except for the third hypothesis), results are specified as related and supportive; while interpretation mainly focuses on the general effects rather than the magnitude of coefficients.

Furthermore, with the purpose of alleviating the inspection and structure of the table, only the last four interaction terms, seen as the "crisis" related variables, from each series of interaction terms are reported. This is also valid for the reported last four "crisis" dummies; corresponding to the crisis period from the gravity specification. Nevertheless, in order to better understand the ex ante dynamism of the crisis, the analysis takes the entire set of interaction terms (and dummies) into consideration. For all specifications, the White-corrected standard errors and significance levels are reported (see Appendix C).

Table 2: Time Fixed Effects

	(I)	(II)	(III)	(IV)
Forigen GDP	.72770****	.72689****	.72690****	.72691****
	(.00334)	(.00334)	(.00334)	(.00334)
Distance	- .51969****	- .51771****	- .51768****	- .51766****
	(.00532)	(.00533)	(.00533)	(.00533)
Language (1= Scandinavian)	.98862****	.98794****	.98798****	.98808****
	(.00981)	(.00981)	(.00981)	(.00981)
FTA (1= EU Membership +)	.42209****	.42657****	.42666****	.42664****
	(.00903)	(.00905)	(.00905)	(.00905)
Time	- .21213****	- .21306****	- .21301****	- .21296****
	(.00533)	(.00533)	(.00533)	(.00533)
Openess	.81995 ****	.81730 ****	.81730 ****	.81734 ****
	(.00746)	(.00746)	(.00746)	(.00746)
Survival	8.55656****	8.32511****	8.32033****	8.333580****
	(.00784)	(.02973)	(.02944)	(.03399)
Product type (1= Differentiated)	.39934****	.33679****	.32228****	.35201****
	(.02838)	(.00963)	(.02985)	(.04427)
Product / Survival	- 1.22249****	- 1.22273****	- 1.22258****	- 1.28007****
	(.01426)	(.01426)	(.01426)	(.06558)
Crisis 1 (1= period of 07/08 - 09/08)	- .04072***	- .31561****	- .29924****	- .28323****
	(.01818)	(.03140)	(.03631)	(.04093)
Crisis 2 (1= period of 10/08 - 12/09)	- .02830**	- .29519****	- .29628****	- .27460****
	(.01818)	(.03143)	(.03635)	(.04098)
Crisis 3 (1= period of 01/09 - 03/09)	- .11655****	- .30692****	- .29386****	- .28403****
	(.01817)	(.03145)	(.03637)	(.04100)
Crisis 4 (1= period of 04/09 - 06/09)	- .09195****	- .21819****	- .21776****	- .19293****
	(.01816)	(.03148)	(.03640)	(.04104)
Product / Crisis 1	- .14699****		- .03615*	- .07728*
	(.03867)		(.04092)	(.06361)
Product / Crisis 2	- .11207****		.00269	- .05314*
	(.03867)		(.04093)	(.06367)
Product / Crisis 3	- .10542****		- .02868	- .05376*
	(.03867)		(.04093)	(.06371)
Product / Crisis 4	- .14441****		- .08925***	- .15322****
	(.03867)		(.04094)	(.06376)
Survival / Crisis 1		.35500****	.34266****	.32137****
		(.03934)	(.04163)	(.04860)
Survival / Crisis 2		.35439****	.35515****	.32637****
		(.03938)	(.04168)	(.04865)
Survival / Crisis 3		.24498****	.23510****	.22199****
		(.03940)	(.04170)	(.04868)
Survival / Crisis 4		.19748****	.16697****	.13406****
		(.03943)	(.04173)	(.04872)
Product / Survival / Crisis 1				.26923****
				(.09404)
Product / Survival / Crisis 2				.10795*
				(.09417)
Product / Survival / Crisis 3				.04935
				(.09423)
Product / Survival / Crisis 4				.12336**
				(.09430)
Constant	- 19.47750****	- 19.28735****	- 19.28158****	- 19.29411****
	(.10391)	(.10524)	(.10595)	(.10675)
F	8907.983****	8915.347****	6314.718****	4888.622****
Durbin	1.623	1.623	1.623	1.623
R^2	.724	.725	.725	.725
R^2 - Adjusted	,724	,724	,724	,724
Observations	172 920	172 920	172 920	172 920

Note: **** WP<0.01, *** WP<0.05, ** WP<0.1, * WP<0.2; are White p-values. White-Standard Errors in parentheses. GDP, Distance, Time, Openness and Import_ijt, are all taken in a natural logarithmic form. Dependent Variable: Import_ijt.

Again, due to reasons of parsimony, robustness control and escalating multicollinearity with each subsequent introduction of a series of interaction terms, the final model is presented in a step-wise manner. Generally, all VIF values, in all the specifications below, fall under the chosen (though lenient) critical cut-off level of 10, except for the product and survival variables. Due to the research procedure it is of no surprise that these are displaying high

levels of multicollinearity when standing alone. Overall, multicollinearity does not seem to impose severe problems, even though the product and survival variables project VIF values that exceed the level of 30; as in the final specified model (57.655 and 32.702 respectively).

Regarding the introduction of the time fixed effect dummies, a perpetuate pattern emerges throughout the four specifications. Generally, the time dummies coefficients are negative and highly significant, implying, all else equal, a decreased import values as compared to the bench mark quarter. Nevertheless, the reported coefficients for the "crisis" dummies display an increasing magnitude in comparison to previous dummies; especially notable is the increase in magnitude as compared to the last eight quarters before the specified crisis period. In addition to that, the magnitude of the coefficients increases substantially when introducing the controlling multiplicative effect between the survival rate and the time variables into the regression. Principally, from the second specification and onward, the coefficients of the crisis dummies project, everything else equal, a fall of 0.2% to 0.3% as compared to the bench mark category.

While the first specification presents the *related* results for the first null hypotheses, the second specification present the *related* results for the second null hypothesis. The third specification tests for the two hypotheses simultaneously, while the fourth specification presents the final model; including the related *results* for the fourth null hypothesis. The results from each specification are further analyzed in comparison to preceding specifications. On the whole, the "main effects" coefficients for the control and research variables (i.e. including the constructed research variables of survival and product) all display the expected signs, are highly significant and similar in magnitude to the gravity model specifications, *throughout the four specifications;* which is also valid for the product/survival variable assessing the, "non-rejected", third null hypothesis (for motivation see the preceding section). Once more, the rate of survival has a monumental impact on the value of import, where ceteris paribus, on average, a one percentage unit increase in the rate of survival, leads to an 8.3% – 8.5% increase in imports, irrespective of the product type.

Assessed in isolation, the first specification portrays an interesting emerging pattern regarding the joint effect between the product variable and the time dummies. Apparently, while all 21 coefficients are negative, it is only about a year and a half prior to the crisis period (i.e., starts at 01/07) that the relation starts to be statistically significant (i.e., it is mainly the last 10 quarters/dummies that generate statistically significant coefficients). The four reported "product/crisis" coefficients clearly show an increase in magnitude, and significance, as compared to the previous quarters; all four are negative and highly significant ($p < .01$). That is, ceteris paribus, it seems as if the import value of differentiated products has decreased

more than homogeneous during the period of the crisis as compared to previous quarters. It seems as if Swedish importers of differentiated products have started reducing their purchasing more than importers of homogeneous, already one year before the crisis, and that this relative reduction culminates during the crisis. Although the results are robust and well in line with the results from the gravity model, they are not as robust as in the following specifications.

In the second specification the second null hypothesis is tested separately. Interestingly, when assessing the multiplicative effect of the survival rate with the time variables, another interesting pattern emerges. Clearly, whereas most of the 21 coefficients are positive and highly significant (with exception to the first four quarters of the data set), their magnitude is increasing substantially from about two years before the crisis period (i.e., from about 09/2006), and then decline during the last two quarters. One plausible interpretation is that, the duration of a trading relation becomes more and more important as traders started feeling concerns for the future, while the reduction in demand during the crisis along with increasing uncertainty is so strong that the importance of duration is moderated; although still positive and highly significant. The results are highly robust throughout the additional two specifications, including the final specified model (4); and further support the obtained results from the gravity model.

Testing for the first two null hypotheses simultaneously, the third specification affirms the importance of "surviving" during the crisis; yet, it gives differing results with respect to the joint effect between the product and time variables, studied separately in the first two specifications. Surprisingly, most of the 21 coefficients in the set are now positive though insignificant. Nevertheless, three of the reported "product/crisis" coefficients are negative, and where the last one is also highly significant. Interestingly, it is during the last six quarters in the set that some of the coefficients start displaying negative and statistical significant patterns. On the whole, the results in the third specification are considered robust and well in line with the first and second specifications.

The fourth specification introduces the final specified model. To that end, 21 additional interaction terms are introduced; aiming to shed light on the fourth null hypothesis. Results portray an interesting emerging pattern regarding the joint effect between product, survival and the time variables. Apparently, it is only about a year and a half prior to the crisis period (i.e., from 01/07) that the relation starts to be statistically significant and positive; indicating towards the importance of surviving for differentiated products over the short, ex ante and ex post, periods of the crisis. Among the four reported "product/survival/crisis" coefficients, the first and the fourth are statistically significant under the usual cut-off levels ($p < .1$); while the

second is significant at the lenient cut-off level ($p < .2$). However, all the four coefficients are positive. If anything these results seem to support the research supposition about a positive relation between the rate of survival and differentiated products in times of great risk and uncertainty; an analysis (and result) that could not be performed (retrieved) by using the OLS procedure.

Overall, the final model produces highly robust results as compared to previous specifications and the results obtained from the gravity procedure. The "main effects" coefficients for the single standing variables (i.e. including survival and product), all display the expected signs, highly significant, and highly similar in magnitude to the gravity model. Patterns are also highly similar for the survival/crisis and product/survival variables; assessing the second and third null hypotheses respectively. Regarding the joint effect between the product and time variables, assessing the first null hypotheses, the emerging pattern, although somewhat inconclusive, could still be taken to support the results from the final gravity model. All the reported "product/crisis" coefficients are negative, though significant at the very lenient cutoff level of $p<.2$; while the last one is still highly significant.

Seemingly, there is enough evidence to conclude that the reduction in import values during the crisis is, ceteris paribus, higher for differentiated products, while higher survival rates, irrespective of the product type, have a hampering impact on the reduction of import values, during the period of the crisis, as compared to the benchmark category. Furthermore, the results seem to support the research supposition that, ceteris paribus, the rate of survival, during times of increasing uncertainty, is more important for traders of differentiated products. On the whole, the results seem to support the inclination to reject the first, second and fourth null hypotheses.

Analysis & Results - Country fixed effects and combined country and time fixed effects

Table 3 presents the results for both the country fixed effects (specifications 1 and 2) and the combined country and time fixed effects models (specifications 3 and 4). For the latter the research procedure implied the creation of 29 country dummies, controlling for country heterogeneity; each corresponding to a single country in the data set; where the omitted benchmark category stands for Belgium. For the combined procedure, 21 time dummies were created, along with 29 country dummies, whereby each subsequent quarter dummy was entered in a multiplicative form together with each of the research variables of product and survival, and the interaction of those; creating a total of three interaction sets, aiming to assess the posed hypotheses.

Table 3: Country Fixed Effects (I) and (II), and Country and Time Fixed effects (III) and (IV)

	(I)	(II)	(III)	(IV)
Foreign GDP		.91634****		.12160****
		(.04771)		(.06374)
Swedish GDP	2.19283****	1.09705****		
	(.09605)	(.07411)		
Language (1= Scandinavian)		.79925****		1.07232****
		(.08081)		(.09252)
FTA (1= EU Membership +)		-.12769****		-.10084****
		(.02489)		(.02800)
Time to export		.15376****		.14495****
		(.02012)		(.02026)
Openess		.12571****		.06788 ***
		(.03209)		(.03381)
Survival	8.51490****	8.51382****	8.39641****	8.36100****
	(.01570)	(.00863)	(.03393)	(.03432)
Product type (1= Differentiated)	.35557****	.35578****	.37578****	.36507****
	(.01661)	(.02838)	(.04427)	(.04429)
Product / Survival	- 1.26472****	- 1.26601****	- 1.29019****	- 1.29219****
	(.03141)	(.01575)	(.06559)	(.06561)
Crisis (1= period of 07/08 - 06/09)	-.10548****	-.08399****		
	(03066)	(.01668)		
Crisis 1 (1= period of 07/08 - 09/08)			.17750****	- .14712****
			(.04080)	(.04595)
Crisis 2(1= period of 10/08 - 12/09)			.18385****	- .12459****
			(.04098)	(.04570)
Crisis 3 (1= period of 01/09 - 03/09)			.12888****	- .15921****
			(.04088)	(.04530)
Crisis 4 (1= period of 04/09 - 06/09)			.18576****	- .09933****
			(.04091)	(.04528)
Product / Crisis	- .08643***	- .08191****		
	(.04183)	(.03925)		
Product / Crisis 1			- .10145**	- .08832*
			(.06361)	(.06363)
Product / Crisis 2			- .07447	- .06558
			(.06368)	(.06369)
Product / Crisis 3			- .07568	- .07019
			(.06371)	(.06372)
Product / Crisis 4			- .17496****	- .17043****
			(.06375)	(.06378)
Survival / Crisis	.02541	.02698**		
	(.03444)	(.03151)		
Survival / Crisis 1			.20396****	.25923****
			(.04858)	(.04902)
Survival / Crisis 2			.23376****	.27285****
			(.04863)	(.04897)
Survival / Crisis 3			.11373****	.14587****
			(.04866)	(.04897)
Survival / Crisis 4			.02480	.05703*
			(.04870)	(.04901)
Product / Survival / Crisis	.03726	.04455*		
	(.07796)	(.02522)		
Product / Survival / Crisis 1			.2410***	.24692****
			(.09404)	(.09406)
Product / Survival / Crisis 2			.08876*	.09757*
			(.09418)	(.09420)
Product / Survival / Crisis 3			.01918	.03169
			(.09423)	(.09425)
Product / Survival / Crisis 4			.09351*	.10628*
			(.09429)	(.09432)
Constant	- 57.63643****	- 53.86869****	.26988****	- 33.64217****
	(2.53981)	(1.24865)	(.03150)	(1.71045)
F	12655.754****	11155.529****	4041.280****	3876.594****
Durbin	1.659	1.660	1.660	1.661
R^2	.730	.730	.730	.731
R^2 - Adjusted	,730	,730	,730	,731
Observations	172 920	172 920	172 920	172 920

Note: **** WP<0.01, *** WP<0.05, ** WP<0.1, * WP<0.2; are White p-values. White-Standard Errors in parentheses. GDP, Distance, Time, Openness and Import_ijt, are all taken in a natural logarithmic form. Dependent Variable: Import_ijt.

Country fixed effects - specifications 1 & 2

With the purpose of alleviating the inspection and structure of the table, the country dummies are not included in the table. Moreover, the practice from the preceding time fixed effects analysis is followed as well, as in the last two specifications. For all specifications, the White-corrected standard errors and significance levels are reported (for the retrieved tests see Appendix C). Otherwise, the research procedure follows that of the time fixed effects procedure where interpretation of the results should be taken cautiously, as related and supportive, with emphasis on the general effects rather than magnitude of coefficients. Reminiscently, distance is automatically excluded from all specifications as it perfectly correlates with the country dummies; while Swedish GDP is further excluded from the last two specifications, as it perfectly correlates with the time dummies.

In addition to that, for the first and third specifications, country specific variables (e.g., FTA) are precluded but included in the second and fourth final specified models. The reason for this practice mainly pertains to extremely high multicollinearity between the country dummies and the country specific variables included in the final models (VIF values in excess of 100); which may lead to imprecise estimates and statistically insignificant coefficients. When excluded, multicollinearity, although present, did not seem to impose any serious problem (i.e., variables passed stringent cut-off levels). Yet, other problems (miss-specifications) emerged instead. Hence, for reasons of robustness-controlling and comparison it was decided to run specifications without these variables. Again, due to these statistical difficulties the results from the following procedures should be taken with great caution.

A quick glance at the table tells that the first and second specifications show fairly similar results for the mutually included variables. The only major difference regards to the *significance level* of the interaction variables of survival/crisis and product/survival/crisis, assessing the second and fourth null hypotheses respectively. When theoretically motivated country specific variables were excluded, as in the first specification, the significance levels of these interaction terms and to a certain extent also the product/crisis variable, fall down in comparison to the second and fully specified model; which could indicate a slight miss-specification.

Nevertheless, when those were included, as in the final second specification, the time to export and FTA variables (country specific), project the unexpected signs. Likely, the country dummies, of which all but three of them are significant ($p<0.01$, see appendix C), pick up several of the effects on these two country specific variables, which resulted in the unexpected sign for these two variables. However, this could also be the result of the existing extremely high multicollinearity. Even so, the constructed research variables of product, survival and

crisis all project the expected signs, highly significant and generally similar in magnitude for both specifications.

The survival rate variable is, again, of a very large magnitude. All else equal, a one percentage unit increase in the survival rate will lead to, on average, an 8.5% increase in imports according to both specifications. The crisis variable in both specifications is rather similar where ceteris paribus, on average, import is 0.1% respective 0.08% less during the period of the crisis as compared to the bench mark category; a small but significant effect, of which some is picked up by the other variables (i.e. GDP and interaction variables). The product variable is further positive, highly significant and similar in magnitude for both specifications, where ceteris paribus, on average, the import value of an imported differentiated product is larger by 0.35%, on average, than a homogeneous one. Again, it is noteworthy to mention that this variable is actually negative prior to the inclusion of the survival/product term, which has a controlling mediating impact; as was shown previously.

Regarding the first null-hypothesis, the coefficient for the product/crisis variable is negative and significant in both specifications ($p<0.05$ and $p<0.01$, respectively). Ceteris paribus, on average, differentiated goods were imported to a 0.081% respective 0.086% less value as compared to homogeneous goods during the crisis. Hence, the *first hypothesis is rejected,* which is well in line with the preceding findings. Regarding the second null-hypothesis, the coefficient for the survival/crisis variable is positive for both specifications though only significant at an acceptable level for the final second specification ($p<0.1$). Accordingly, a one percentage unit increase in the survival rate during the crisis, ceteris paribus, increases imports on average by 0.027%. Although the robustness of this result is questionable, the assumed specification error in the first specification gives higher validity to the final specified model; despite presented problems of multicollinearity. Therefore, at least as far as the final model is concerned, the *second null hypothesis is rejected*. That is, the survival rate once again seems to exercise a hampering effect on the reduction of imports due to the crisis, which further supports the preceding findings from the gravity and time fixed effects models.

Regarding the third null-hypothesis, the coefficient for the survival/product variable is negative and highly significant for in both specifications ($p<0.01$). On the basis of this, *the third null hypothesis is not rejected*, which is a surprising persistent result retained from all the preceding finding. As discussed in the previous section, there are a number of sound reasons that may explain this peculiarity (see p.28). Nevertheless, when multiplying this interaction term with the dummy for crisis, resulting in the product/survival/crisis variable, the coefficient sign turns positive. Ceteris paribus, during the crisis, a one percentage unit increase in the survival rate, on average, will lead to 0.037% respective 0.044% higher

increase in imports for differentiated goods relative to homogeneous goods. Yet, the coefficient is only significant at the very lenient cut-off levels ($p<0.2$) and only for the final specified model. As far as this lenient cut-off level is accepted, and the first specification is deemed as miss-specified, *the fourth null-hypothesis* is rejected with a lot of doubt.

On the whole, the findings from the country fixed effects model are fairly similar to the findings from the basic gravity and the time fixed effects models. Again, a surprising result is that the survival rate is more important for homogeneous goods than differentiated. But when the crisis hit, the interaction term became positive, indicating that the extreme increase in uncertainty during the crisis made importers of differentiated goods more reluctant to end their trade relations, in line with the theoretical discussion. Standing on its own, the first, second and four hypotheses; though with restraint, are rejected which fairly supports the results from the gravity and time fixed effects procedures.

Country and time fixed effects models – specification 3 and 4

Preceding patterns reemerged in the following final robustness procedure. Compared to the time fixed effects procedure similar emerging patterns with respect to the set of time dummies and the additional three set of interaction terms is observed in the final, fourth, model specification. Compared to the country fixed effects procedure a suspected problem of miss-specification arises when precluding the country-specific variables from the model, as in the third specification, while multicollinearity arises instead when those are included, as in the final, fourth, specification.

Regarding the third specification, the coefficients for the crisis dummies are unexpectedly positive and significant. And since none of the original gravity model variables are included, one may suspect that this is a specification error due to omitted variables. However, when the country specific variables are included problems pertaining to high multicollinearity arise instead; where FTA and time to export show the same counterintuitive results. Aside from these peculiarities, the results from the two specifications are highly similar. Hence, in order to avoid excessive repetition of arguments, and due to the suspected miss-specification, the following analysis will exclusively focus on the results obtained from the fourth and final model specification; and only with respect to the posed hypotheses.

Regarding the first null hypothesis, the reported product/crisis interaction variables are all negative and of similar significance and magnitude. Again, it seems that differentiated goods, all else equal, were hit harder by the crisis than homogeneous goods. The last coefficient, corresponds to the last quarter in the data set, projects that ceteris paribus, during this quarter alone, differentiated products are imported, on average, 0.17% less than homogeneous goods

as compared to the benchmark (first) quarter of the data set; which is highly statistically significant ($p<0.01$). Of the other interaction terms, only the third quarter of 2008 is significant though at the very lenient cut-off level ($p<0.2$). This uneven distribution of significance makes it difficult to conclude other than saying that evidence might be supportive to a rejection of, *rather than reject, the first null hypothesis*.

Regarding the second null hypothesis, the reported survival/crisis coefficients are all positive, and three out of the four coefficients are highly significant ($p<0.01$). The effect, however, is larger for the first two quarters of the crisis and diminishes rapidly in the third and last quarter, and finally becomes insignificant, indicating that the importance of the survival rate, though significant and rather large in the beginning of the crisis, diminishes as the crisis continues. It seems as if there is enough evidence to support *the rejection of the second null hypothesis*. Regarding the third null hypothesis, the survival/product variable is, once again, negative, highly significant ($p<0.01$) and of similar magnitude to all previous specifications, indicating that, ceteris paribus, the survival rate is more important in explaining the import values of homogeneous goods. Again, *the third null-hypothesis is not rejected*.

Regarding the final fourth null hypothesis, the reported product/survival/crisis coefficients are all positive, though the distribution of significance among the reported variables is not coherent. Nevertheless, while the second and last terms are significant at the very lenient cut-off level ($p<0.2$), the first term is highly significant ($p<0.01$). Bearing the difficulties of deduction in mind there seems to be a fair amount of evidence supporting the research supposition that the survival rate during the crisis was more important for differentiated goods than homogeneous goods. Once again, it makes it difficult to conclude other than saying that evidence *support (a rejection) rather than reject the fourth null hypothesis.* In conclusion, the final robustness procedure, though suffering from multicollinearity, shows very similar results to the other three models (i.e., gravity, time and country fixed effects). All in all there is support for the rejection of the second null-hypotheses and a milder support for the rejection of the first and fourth null-hypothesis 4. Again, the third null-hypothesis is not rejected.

Concluding discussion

Utilizing Rauch´s production scheme (1999) and Besedeš and Prusa (2006a) innovative construction to the intensive margin of trade, the work at hand investigates whether the type of imported good and the duration of Swedish import relationships facilitate differing trade patterns resulted from the recent financial crisis. In all probability, this is an unexplored research procedure. The emerging results contribute to the literature and empirical bulk of facts related to the nexus of international trade and product differentiation; intensive margin respective financial crises. Results indicate that both the product type and the survival rate

have an unequivocal influence on the mechanisms through which a financial crisis might impact import relations; and thus also enhance policy makers´ understanding of international trade and current account projections under times of financial uncertainty.

Indeed, most of the retrieved results are in accordance with prior expectations and in line with theory. Whereas the results from the four different modeling procedures slightly differ from one another, most of the emerged patterns are perpetuated from model to model. The fixed effects procedures shed more light into the analysis and constituted a subsequent robustness platform for assessing the standard gravity model. On the whole, the obtained results from the simple pooled gravity model seemed robust throughout, although some of the mechanisms behind some of the posed hypotheses are better captured within the fixed effect procedures. Nevertheless, the gravity coefficients, almost exclusively, show the expected signs and are of a significant magnitude, and further accompanied by a very large R^2 value; underlying the importance of these variables and the high-explanatory power of the gravity model. Generally, this is also valid for the rest of the explanatory variables entered, including the constructed research variables; and the relevant interaction terms thereof.

Regarding the first research premise, it appears as if the reduction in import values following the recent crisis, ceteris paribus, relatively impact Swedish traders of differentiated goods more than homogeneous ones. According to the gravity model the first null hypothesis is rejected which is reasonably supported throughout the fixed effects model procedures. As discussed, the effect of the crisis on imported values with respect to the product category was expected to be ambiguous, as there were arguments, based on theory and empirical observations, for both a larger respective lower negative impact on importers of differentiated goods, in comparison to homogeneous ones.

Evidently, it seems as if a weakening crown and a more pervasive use of foreign currency when buying the goods, along with larger transaction costs associated and the general decline in real income, had a dominant negative effect on Swedish importers of differentiated goods, in comparison to homogeneous ones. As discussed, one might expect, given the assumed larger search and investment specific costs associated with differentiated goods, that Swedish importers of these goods may be more reluctant to break their trading relations with their suppliers, as they wish to maintain a healthy relationship with their foreign counterparts. Nevertheless, this possible "positive" effect was not strong enough to affect the results.

Concerning the second research premise, the rate of survival does seem to have a significant hampering effect on the reduction of imports during the crisis, irrespective of the product type. According to the gravity model the second null hypothesis is rejected which is strongly supported by the analysis of the fixed effects models. Ceteris paribus, the longer a trading

relation lasts the more reluctant Swedish importers seem to be towards breaking their trading relations; although the magnitude of this effect seems to be moderated along with increasing uncertainty and as demand declines. This confirms the importance of the survival rate as an empirical construct and further supports the results obtained by Besedeš and Prusa (2006a), though in another context. Here, the importance of duration as a hampering factor in an otherwise booming uncertain environment is underlined; and where the relative, rather than the factual, length of the relation in question is regarded in comparison

Nevertheless, results run counter to the insights provided by Besedeš and Prusa (2006b). As argued, the search and investment specific costs associated with differentiated goods, should lead to the survival rate being more important for differentiated goods. Surprisingly, the rate of survival, ceteris paribus, seemed to be of greater importance for homogeneous rather than differentiated goods. In accordance with the final gravity model specification the third null hypothesis is not rejected which is highly persistent and strongly supported by the analysis of the fixed effects procedures. In the analysis section several arguments were voiced with the purpose of explaining this apparent counterintuitive result. Briefly, while the research procedure and data at hands may provide some clarifications, the context in which this paper is built against (i.e. to the particular case of Sweden) may offer some other sound explanations. Lastly, the role of distance, based on Rauch´s insights (1999) was underlined as an explanatory factor in this context (see p.28).

Expectedly, however, when the joint effect between the rate of survival and the product type was examined against the backdrop of the financial crisis, the importance of survival turned to favor differentiated goods instead; which is in line with the ex ante reasoning and supports the supposition of higher transaction costs for differentiated products and a larger reluctance to end trade relations thereof. Nevertheless, according to the final gravity model specification the fourth null hypothesis could not be rejected. However, the analysis and results from the fixed effects procedures were important in eliciting the multiplicative relation between the survival rate and the product category during the crisis. Importantly, in all specifications the relevant coefficient is consistently positive, where some statistically significant patterns were observed. Yet, although the results could be taken to indicate that the ex ante reasoning may very well be valid, on the whole, it does not seem to be sufficient in rejecting the fourth null-hypothesis. This could be assessed in a prospective study.

In conclusion, it is important to bear in mind that the paper at hand takes Sweden as its departure point; which is a relatively small open economy. Undoubtedly, the import sectors of different countries are impacted differently under (different) times of crisis; hence to the importance of the product type and rate of survival and the resulted mechanisms thereof.

Without a doubt, a more contextualize perspective into the analysis is required, before deducing the results to the general case. Furthermore, since the paper at hand only investigates the effects of the crisis until June 30th 2009, while the crisis is still impeding, it would be of great interest to lengthen the time horizon with the purpose of better understanding the hypothesized relations. Moreover, a more detailed disaggregated product-level data, say on the SITC-4 level, will most definitely contribute to the accuracy and validity of the analysis. All in all, extrapolating the findings above to the general case will have to be complemented with additional case studies and theoretical contributions.

Suggestions for prospective research

Clearly, some of the theoretical and empirical applications raised in this paper are new; and hence further research can be extended as far as the researcher´s imagination is concerned. For example, one could look at whether the importance of the survival rate moves together with distance and how this is being influenced during times of crisis and great uncertainty. Indeed, there are many more thinkable related topics that researchers could assume in order to construct stronger theoretical foundations about the patterns of international trade and current account projections in general, and during times of financial crisis in particular; which in itself could be of great interest to policy makers.

Building on Rauch´s insights, it will be of interest to further explore if distance/proximity affirms the importance of search costs and investment specific relations for differentiated products during times of (financial) uncertainty. To the context of the work at hand, it would certainly be motivating to investigate whether the relative reduction in import due to a crisis differs between the two product categories as distance increases. According to Rauch (1999), closer proximity is more important for differentiated products than homogeneous due to decreasing search costs and lower specific investments. Thus, the higher associated search costs and the further drop in trust and available credit along with an increasing uncertainty might affect (prospective) trading agreements between traders of differentiated goods more negatively (to establish and maintain) than homogeneous as distance is increasing The underlying assumption is that the crisis shifts the search cost function upwards along with increasing distance. Nevertheless, the opposite could be thought to exist as well. The countervailing argument is that, ceteris paribus, since search, investment and sunk costs are usually higher for differentiated products, traders will be less prone to break existing relations (good matches) as distance is increasing while they might do so for products traded over shorter proximity; as this naturally implies decreasing search costs. Thus, this potential "positive" search costs effect might actually strengthen existing trade relations and hamper

the reduction in import throughout a financial crisis, and that this will tend to be positively related to distance. Clearly, there is much more to be learned.

Last but not least, the role of the extensive margin of trade and its behavior during the current crisis may be of great interest to researchers aiming to explore the effect of the current and prospective financial crises on the patterns of international trade; along the role of the intensive margin as it is brought up by the work at hands. Evidently, though it may be the fault of too aggregated data, the number of relations from its peak, prior to the crisis, to its bottom, after the crisis was officially recognized, has not declined in a corresponding way to the value of imports. Approximately, 98% of the number of existing relationships during the bottom also existed prior to the crisis, while only 73.5% of the value is imported in a corresponding comparison (See Appendix A). Indeed, just another interesting aspect to investigate.

Reference list

Armington, Paul, 1969, "A Theory of Demand for Products Distinguished by Place of Production", *International Monetary Fund Staff Papers*, 16 (1969), 159-78.

Broda, C., and Weinstein, D.E., (2006), "Globalization and the Gains from Variety," *NBER Working Papers* 10314.

Besedeš T. , and Prusa, T.J. (2006a), " The Role of Extensive and Intensive Margins and Export Growth", Louisiana State University, Rutgers University.

Besedeš, T., Prusa, T.J., (2006b), "Product differentiation and duration of US import trade", *Journal of International Economics* 70 (2006) 339–358.

Bastos, P., and Silva, J. (2010), "Identifying vertically differentiated products", *Economic letters* (2010).

Bussière, M., Fidrmuc, J., Schnatz, B. (2005), "Trade integration of eastern and central European countries", *ECB Working papers* No. 545.

CIA World Fact Book (2009), "Geographic coordinates". Available [online]: https://www.cia.gov/library/publications/the-world-factbook/fields/2057.html [2010-01-10].

Claessens, S., Kose. A.M., Terrones, M.E. (2008), "What Happens During Recessions, Crunches and Busts?", IMF.

Chaney, T. (2008), "Distorted Gravity: The Intensive and Extensive Margins of International Trade", *American Economic Review* 2008, 98:4, 1707–1721.

Cheng, L, Ma, Z. (2005), "The Effects of Financial Crises on International Trade", (p. 253 - 286), National Bureau of Economic Research, Volume Title: International Trade in East Asia, NBER-East Asia Seminar on Economics, Volume 14, *University of Chicago Press*.

Co, C. Y., Euzent, P. and Martin T. (2004), "The Export Effect of Immigration into the USA". *Applied Economics* 36(6), 573–583.

Disdier, A., Head, K (2004)" The Puzzling Persistence of the Distance Effect on Bilateral Trade", *development studies working papers* No. 186.

Eichengreen, B. and Irwin, D. (1995), "Trade Blocs, Currency Blocks and the Reorientation of World Trade in the 1930s". *Journal of International Economics* 38, pp. 1–24.

European Commission, http://ec.europa.eu/trade/creating-opportunities/bilateral-relations/countries/norway/, http://ec.europa.eu/external_relations/switzerland/index_en.htm .

Feenstra, R.H., Hanson, G.H., 2004, "Ownership and Control in Outsourcing to China: Estimating the Property-Rights Theory of the Firm", *NBER Working Paper* No. 10198

Flam and Helpman, 1987, Industrial policy under monopolistic competition, Journal of International Economics, vol. 22, pp 79-102

Flam, H. (2006), "Euro effects on the intensive and extensive margins of trade", Stockholm University.

Goldberg and Tille, 2005, "Vehicle currency use of international trade", Federal Reserve Bank of New York; National Bureau of Economic Research (NBER), Graduate Institute, Geneva, *FRB of New York Staff Report* No. 200.

Great circle distance method: The formula is rather complicated, and it was calculated using the web page http://www.fcc.gov/mb/audio/bickel/distance.html, and double checked with Google Earth. For a closer look at the formula see http://en.wikipedia.org/wiki/Great-circle_distance .

Gujarati, D.N., "Basic Econometrics", McGraw-Hill, fourth edition 2003, pp. 148-149, 411-412, 439-440, 636-655.

Head, K. and Ries, J. (1998), "Immigration and Trade Creation: Econometric Evidence from Canada", *Canadian Journal of Economics* 31(1), pp. 47–62.

Helpman, E., Krugman. P. R, (1985) - Market Structure and Foreign Trade Increasing Returns, Imperfect Competition, and the International Economy, Massachusetts Institute of technology.

Hummels, David (2001). "Time as a Trade Barrier", Purdue University.

Hummels and Klenow, 2005, The Variety and Quality of a Nation's Exports." *American Economic Review*, 95(3): 704–723.

Javorcik and Narciso, 2008 "Differentiated Products and Evasion of Import Tariffs"
CEPR Discussion Paper No. DP6804.

Kaminsky G.L., Reinhard, C.M. (2000), " On crises, contagion and confusion", *Journal of International Economics* 51 (1), (2000) pp. 145–168.

Kaplan, E.L. & Meier, P. (1958). "Nonparametric estimation from incomplete observations". *Journal of the American Statistical Association* 53, pp. 457–481.

Kommerskollegium, July Report, available [online]:
http://www.kommers.se/templates/PressMeddelande____5582.aspx, [2010-01-10].
Krugman, P. R. (1979), "increasing returns, monopolistic competition and international trade", *Journal of international economics* 9 (1979) 469-479.

Krugman, P.R., (1981), "Intra-industry specialization and the gains from trade", *Journal of Political Economy* 89, pp. 959–73.

Lawless, M. (2008), "Deconstructing Gravity: Trade Costs and Extensive and Intensive Margins", Central Bank of Ireland.

Melitz, M.J. (2003), "The impact of trade on intra-industry reallocations and aggregate industry productivity", *Econometrica*, vol. 71No. 6 (p. 1695-1715).

Product classification collected at Jon Haveman's website, http://www.macalester.edu/research/economics/page/haveman/trade.resources/tradedata.html, [2010-01-10].

Rauch, J.E. (1995), "Networks versus markets in international trade", *Journal of International Economics* 48 (1999) 7–35.

Rauch, J.E. (2001), "Business in social networks in international trade", *Journal of Economic Literature*, vol. 39, No. 4 (Dec., 2001), pp. 1177-1203.

Rauch, J.E, and Watson, J. , (2003), "Starting Small in an Unfamiliar Environment", *NBER Working Papers* 7053.

SCB (2009), *Statistics Sweden*. Available [online]: http://www.ssd.scb.se/databaser/makro/Produkt.asp?produktid=HA0201&lang=1 [2010-01-10].

Serlenga, L., and Y. Shin (2004), "Gravity Models of the Intra-EU Trade: Application of the Hausman-Taylor Estimation in Heterogeneous Panels with Common Time-Specific Factors", *ESE Discussion Paper* 105, University of Edinbugh, School of Economics, University of Edinburgh.

The doing business survey, made by the World Bank Group, Available online: http://www.doingbusiness.org/MethodologySurveys/, [2010-01-10].

The Swedish central bank's reports between October 2008 – December 2009. Available [online]: http://www.riksbank.se/templates/YearList.aspx?id=10532, [2010-01-10].

Thomas, A. (2009), "Financial crises and emerging market trade", IMF staff position note.

Van Bergeijk, P.A.G, (2009), "Some economic historic perspectives on the 2009 world trade collapse", *ISS Working paper* No. 476.

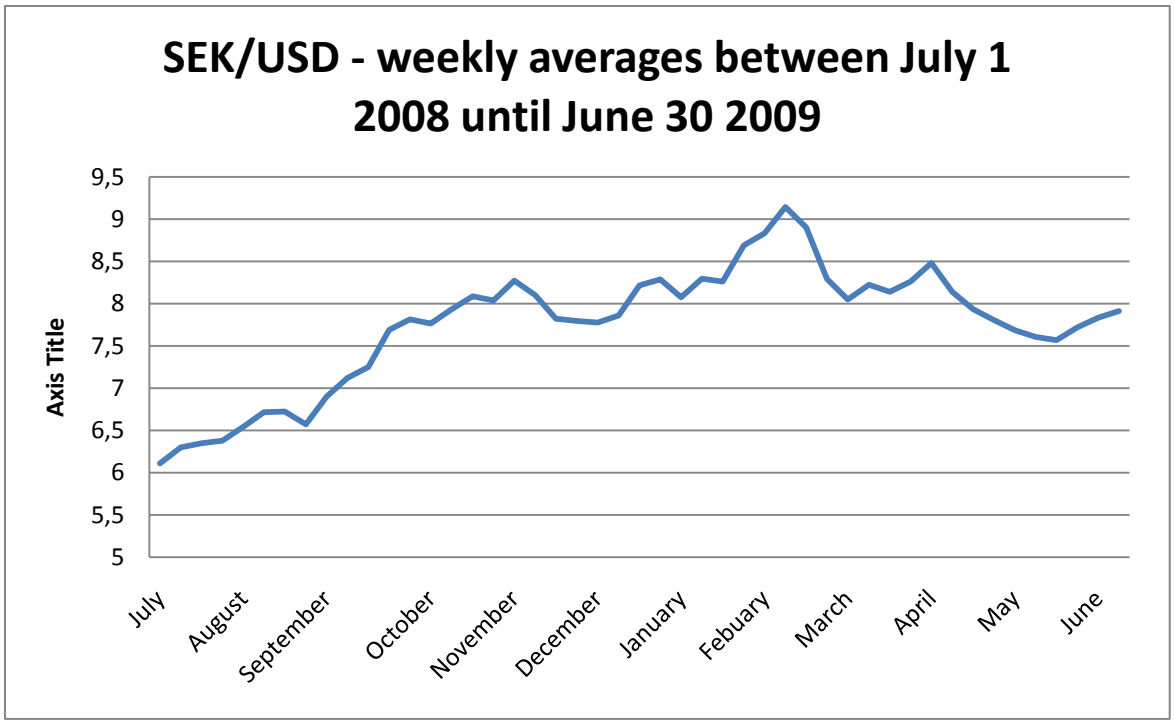
Wooldridge, J. (2002). "Introductory Econometrics: A Modern Approach", South-Western College Pub, second edition, pp. 440-450.

Appendix A – Tables and diagrams

Table: Countries

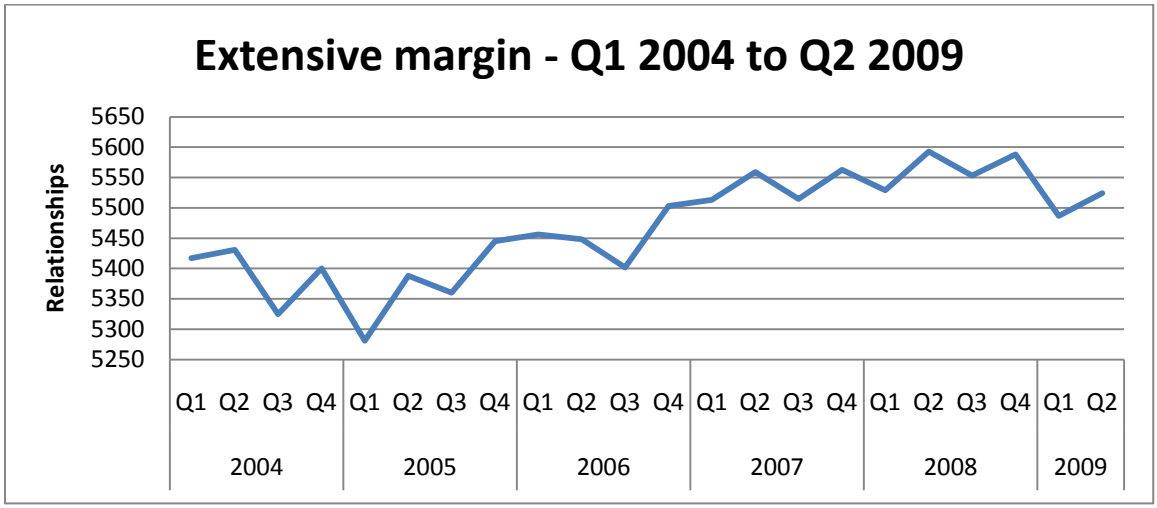
Austria	Germany	Korean Republic	Slovakia
Belgium	Great Britain	Latvia	Switzerland
China	Hong Kong	Lithuania	Taiwan
Czech Republic	Hungary	Netherlands	Thailand
Denmark	India	Norway	Turkey
Estinia	Ireland	Poland	USA
Finland	Italy	Russia	
France	Japan	Spain	

Exchange rate

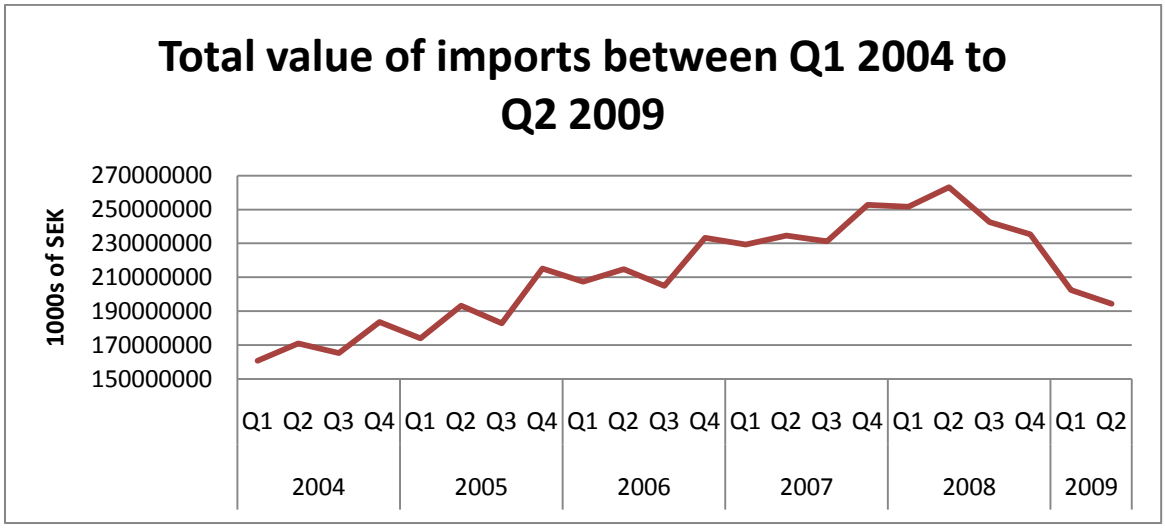


Source: Sweden's Riksbank

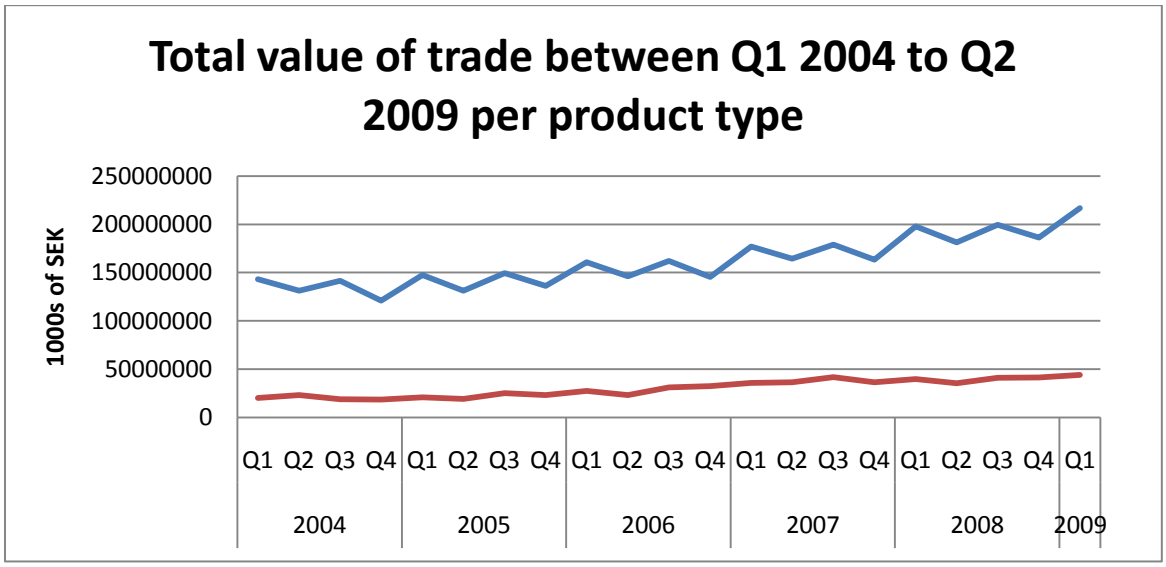
Total trade diagrams



Source: Sweden Statistics (SCB)



Source: Sweden Statistics (SCB)



Source: Sweden Statistics (SCB)

Appendix B– Statistical tests and results

The Breusch-Pagan-Godfrey test

Indicating whether a homoscedastic variance exists in the regression employed, the test was performed in the following way:

First, the k-variable regression model was assumed, $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_{ki} + u_i$ Then the error term variance $\sigma_i^2 = \alpha_1 + \alpha_2 Z_{2i} + ... + \alpha_m Z_{mi}$, was taken as a linear function of the nonstocastic variables Z's; some or all of the X's can serve as Z's. In the table below, where the results from this analysis are presented, all explanatory variables in the specifications above serve as Z's.

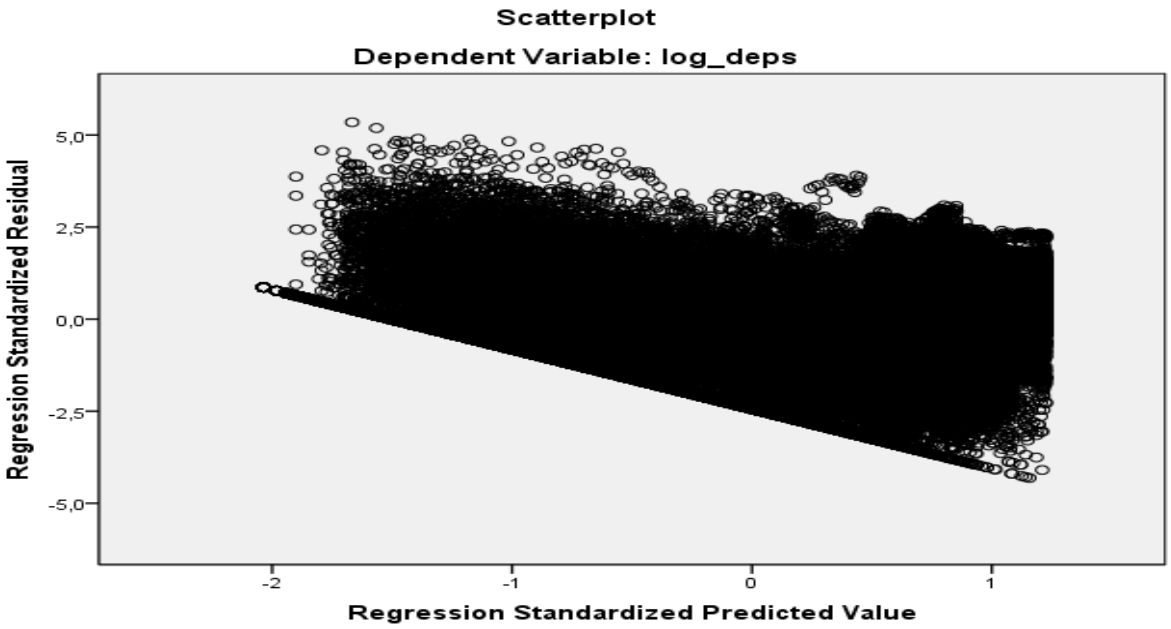
Now, assuming that $\alpha_2 = \alpha_3 = ... = \alpha_m = 0$, implies $\sigma_i^2 = \alpha_1$, which is a constant. Therefore to test whether σ_i^2 is homoscedastic one tests the hypothesis that $\alpha_2 = \alpha_3 = ... = \alpha_m = 0$. Hence, the regression $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_{ki} + u_i$ was estimated and the residuals $\hat{u}_1, \hat{u}_2 ... \hat{u}_n$ were obtained. Then, $\tilde{\sigma}^2 = \sum \hat{u}_i^2 / n$ is retrieved, with the purpose to estimate ρ_i; which was constructed by letting $\rho_i = \hat{u}_i^2 / \tilde{\sigma}^2$, i.e., each residual squared divided by $\tilde{\sigma}^2$ Following that ρ_i was regressed on the Z's: $\rho_i = \alpha_1 + \alpha_2 Z_{2i} + ... + \alpha_m Z_{mi} + \upsilon_i$, where υ_i is the residual term of this regression.

Then the ESS (Explained Sum of Squares) from the regression are obtained and $\Theta = \frac{1}{2} ESS$ is defined. In connection, if there is homoscedasticity and if sample size n increases indefinitely, then $\Theta \underset{asy}{\sim} \chi^2_{m-1}$; that is, Θ follows the chi-square distribution with (m-1) degrees of freedom, where m is the number of explanatory variables (Z's). The table below presents the results and confirms the rejection of the null hypothesis of no heteroscedasticity.

Table: Breusch-Pagan-Godfrey test

	Gravity model	Time FE	Country FE	Country and time FE
Results:	6944	7210	8647	8863
Critical value:	5,89	51,74	26,5	77,93
Heteroscedasticity:	Yes	Yes	Yes	Yes

This was supplemented by observing the usual scatter plots, which exclusively looked like the following (based on the final gravity model):



White's standard errors

White's standard errors were used to correct for the heteroscedasticity found to exist in all specifications. The White t-test and significance levels of all coefficients were estimated using the calculated standard errors, which were estimated in the following way:

Considering the simplest case:

$$Y_i = \beta_1 + \beta_2 X_i + u_i$$

The variance of the $\hat{\beta}_2$ coefficient is estimated by $\text{var}(\hat{\beta}_2) = \frac{\sum x_i^2 \sigma_i^2}{(\sum x_i^2)^2_i}$.

Since σ_i^2 is not directly observable White suggested using u_i^2, the squared residual for each i in place of σ_i^2 to estimate the variance of the $\hat{\beta}_2$ coefficient as follows:

$$\text{var}(\hat{\beta}_2) = \frac{\sum x_i^2 \hat{u}_i^2}{(\sum x_i^2)^2_i} \quad .$$

White has shown that as the sample size increases indefinitely $\text{var}(\hat{\beta}_2) = \frac{\sum x_i^2 \hat{u}_i^2}{(\sum x_i^2)^2}_i$ converges to $\text{var}(\hat{\beta}_2) = \frac{\sum x_i^2 \sigma_i^2}{(\sum x_i^2)^2}$.

The regressions run above all contain a multitude of explanatory variables and to estimate the standard errors then, the method displayed above can be generalized to the k-variable regression model:

$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + ... + \beta_k X_{ki} + u_i$. The variance of any partial regression coefficient, say $\hat{\beta}_j$ is obtained as follows: $\text{var}(\hat{\beta}_j) = \frac{\sum \hat{w}_{ij}^2 \hat{u}_i^2}{(\sum \hat{w}_{ij}^2)^2}_i$, where u_i are the residuals obtained from the original regression and w_j are the residuals obtained from an auxiliary regression of the regressor X_j on the remaining regressors in the normal k-variable regression model.

The Jarque Bera test for normality:

The Jarque Bera test, testing the assumption of normally distributed error terms, was tested by saving the unstandardized residuals from all models in order to retrieve the skewness and kurtosis coefficients; whereby these were plugged into the following equation:

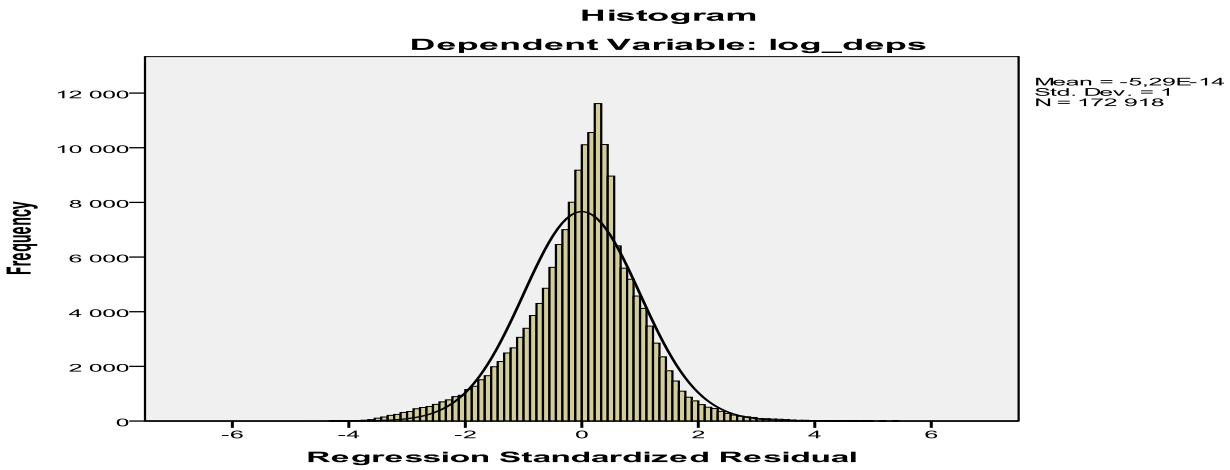
$JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right]$, where S stands for Skewness and K for Kurtosis.

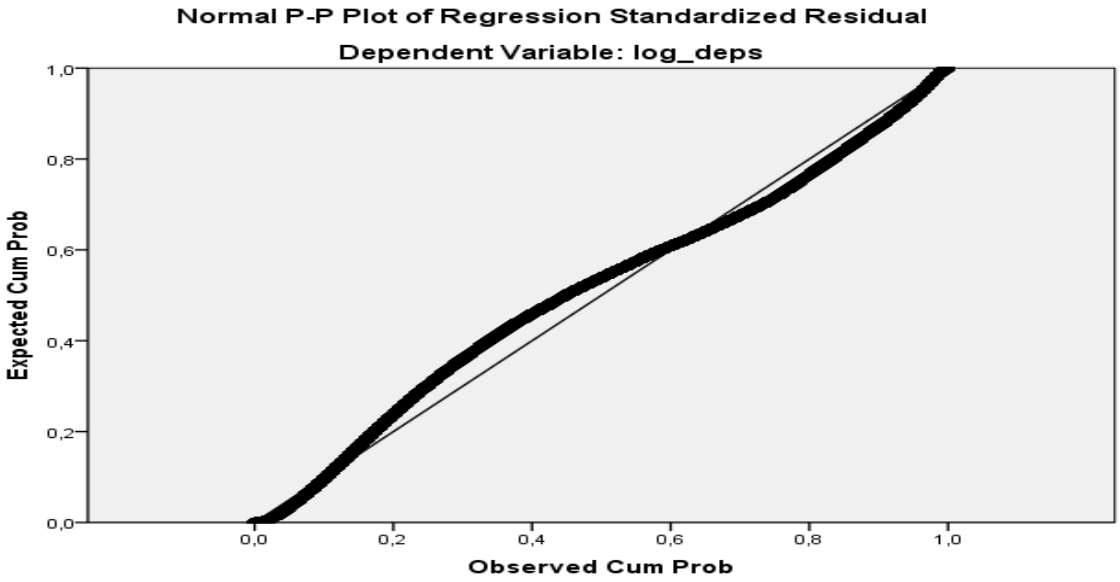
This statistic follows the chi-square distribution with two degrees of freedom. Below the results for all models (final specifications) are presented:

Table: Normality test

	Gravity model	Time FE	Country FE	Time and Country FE
Skewness:	-,394	-.359	-.341	-.339
Kurtosis:	1.115	1.161	1.223	1.229
JB:	30041	28081	26102	25910
Critical value:	0.1026	0.1026	0.1026	0.1026
Normally distr. error terms:	No	No	No	No

This was supplemented by observing the retrieved histograms and P-P plots, which exclusively looked like the following (based on the final gravity model):





Appendix C – White tests/results for all specifications

All tests were retrieved by using the syntax "White command sheet" in PAWS, created by Professor Per-Olov Edlund!

Gravity model (I)

```
------------------- White's estimated standard errors -------------------
                    b         se(b)       wse(b)           wt           wp
Constant    -36,73046      2,60078      2,59756    -14,14038       ,00000
ln_openness    ,80429       ,01709       ,01721     46,74569       ,00000
Product_type  -,27847       ,01582       ,01605    -17,34929       ,00000
Language       ,97405       ,02253       ,02344     41,55621       ,00000
FTA            ,41961       ,02047       ,02125     19,74165       ,00000
ln_distance   -,50355       ,01215       ,01259    -40,01159       ,00000
Survival      8,23648       ,01726       ,01440    572,03368       ,00000
ln_For_gdp     ,71463       ,00765       ,00796     89,78158       ,00000
ln_Swe_gdp     ,66974       ,09923       ,09904      6,76204       ,00000
ln_timetoexp  -,21059       ,01223       ,01250    -16,84326       ,00000
Crisis        -,07484       ,03399       ,02914     -2,56783       ,01023
Prod/crisis   -,07419       ,03678       ,03925     -1,89029       ,05872
Surv/crisis    ,04611       ,03792       ,03151      1,46318       ,14342

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

-------------------------------------------------------------------------
```

Gravity model (II)

```
------------------- White's estimated standard errors -------------------
                    b         se(b)       wse(b)           wt           wp
Constant    -36,82611      2,59030      2,58746    -14,23252       ,00000
ln_openness    ,81756       ,01702       ,01709     47,83668       ,00000
Product_type   ,34952       ,02301       ,01679     20,82275       ,00000
Language       ,98343       ,02244       ,02340     42,03321       ,00000
FTA            ,40487       ,02039       ,02122     19,07927       ,00000
ln_distance   -,52523       ,01211       ,01255    -41,84228       ,00000
Survival      8,55155       ,01913       ,01527    559,87962       ,00000
ln_For_gdp     ,72581       ,00762       ,00794     91,46793       ,00000
ln_Swe_gdp     ,65735       ,09883       ,09866      6,66293       ,00000
ln_timetoexp  -,21283       ,01218       ,01247    -17,06170       ,00000
Crisis        -,07756       ,03385       ,02944     -2,63471       ,00842
Prod/crisis   -,06346       ,03663       ,03916     -1,62054       ,10512
Surv/crisis    ,04779       ,03777       ,03175      1,50546       ,13221
Prod/surv     -1,22337       ,03266       ,02877    -42,52320       ,00000

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

-------------------------------------------------------------------------
```

Gravity model (III)

```
------------------- White's estimated standard errors -------------------
                    b         se(b)       wse(b)           wt           wp
Constant    -36,82860      2,59031      2,58745    -14,23353       ,00000
ln_openness    ,81756       ,01702       ,01709     47,83656       ,00000
Product_type   ,35311       ,02429       ,01680     21,01948       ,00000
Language       ,98344       ,02244       ,02340     42,03356       ,00000
FTA            ,40486       ,02039       ,02122     19,07915       ,00000
```

ln_distance	-,52522	,01211	,01255	-41,84157	,00000
Survival	8,55340	,01955	,01543	554,24460	,00000
ln_For_gdp	,72581	,00762	,00794	91,46787	,00000
ln_Swe_gdp	,65739	,09883	,09866	6,66336	,00000
ln_timetoexp	-,21283	,01218	,01247	-17,06145	,00000
Crisis	-,06963	,03798	,03116	-2,23421	,02547
Prod/crisis	-,08404	,05776	,04239	-1,98238	,04744
Surv/crisis	,03729	,04411	,03501	1,06518	,28679
Prod/surv	-1,23034	,03599	,03138	-39,21036	,00000
Prod/Sur/crisis	,03933	,08535	,07818	,50305	,61493

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

---

Gravity model (IV)

White's estimated standard errors

	b	se(b)	wse(b)	wt	wp
Constant	-34,95367	2,41237	1,05339	-33,18199	,00000
ln_openness	,81836	,01702	,00743	110,11406	,00000
Product_type	,34910	,02367	,01034	33,77609	,00000
Language	,98362	,02244	,00980	100,39476	,00000
FTA	,40481	,02039	,00890	45,46439	,00000
ln_distance	-,52547	,01211	,00529	-99,35926	,00000
Survival	8,55874	,01910	,00834	1026,37143	,00000
ln_For_gdp	,72618	,00762	,00333	218,29075	,00000
ln_Swe_gdp	,58586	,09206	,04020	14,57424	,00000
ln_timetoexp	-,21285	,01219	,00532	-40,00209	,00000
crisis	-,04472	,04221	,01843	-2,42577	,01528
Prod/cris	-,08242	,06502	,02839	-2,90286	,00370
Surv/crisis	,00824	,04966	,02169	,37996	,70398
Prod/surv	-1,22906	,03506	,01531	-80,29060	,00000
Prod/Sur/crisis	,04137	,09606	,04194	,98633	,32397

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Time fixed effects – (I)

White's estimated standard errors

	b	se(b)	wse(b)	wt	wp
Constant	-19,47750	,23788	,10391	-187,45339	,00000
Q2 2004	-,07912	,04157	,01816	-4,35745	,00001
Q3 2004	-,19306	,04157	,01816	-10,63252	,00000
Q4 2004	-,08921	,04157	,01816	-4,91322	,00000
Q1 2005	-,22450	,04156	,01816	-12,36527	,00000
Q2 2005	-,09334	,04157	,01816	-5,14111	,00000
Q3 2005	-,17428	,04156	,01815	-9,60048	,00000
Q4 2005	-,06695	,04156	,01815	-3,68751	,00023
Q1 2006	-,11058	,04157	,01816	-6,08996	,00000
Q2 2006	-,09033	,04158	,01816	-4,97352	,00000
Q3 2006	-,20062	,04159	,01817	-11,04247	,00000
Q4 2006	-,05966	,04161	,01817	-3,28267	,00103
Q1 2007	-,06794	,04162	,01818	-3,73736	,00019
Q2 2007	-,00798	,04162	,01818	-,43893	,66071
Q3 2007	-,06891	,04162	,01818	-3,79112	,00015
Q4 2007	,01516	,04161	,01818	,83423	,40415
Q1 2008	-,03666	,04162	,01818	-2,01660	,04374
Q2 2008	,04797	,04162	,01818	2,63851	,00833
Q3 2008	-,04072	,04162	,01818	-2,24024	,02508

Q4 2008	-,02830	,04163	,01818	-1,55620	,11966
Q1 2009	-,11655	,04159	,01817	-6,41575	,00000
Q2 2009	-,09195	,04158	,01816	-5,06246	,00000
ln_openness	,81995	,01708	,00746	109,91213	,00000
Product_type	,39934	,06497	,02838	14,07281	,00000
Language	,98862	,02246	,00981	100,79239	,00000
FTA	,42209	,02068	,00903	46,73241	,00000
ln_distance	-,51969	,01219	,00532	-97,63336	,00000
Survival	8,55656	,01794	,00784	1092,01603	,00000
ln_For_gdp	,72770	,00764	,00334	217,95705	,00000
ln_timetoexp	-,21213	,01220	,00533	-39,81528	,00000
Prod/surv	-1,22249	,03265	,01426	-85,71910	,00000
Prod/time04-2	-,00559	,08853	,03867	-,14449	,88511
Prod/time04-3	-,00799	,08853	,03867	-,20653	,83638
Prod/time04-4	-,02972	,08853	,03867	-,76863	,44211
Prod/time05-1	-,01751	,08853	,03867	-,45277	,65072
Prod/time05-2	-,04772	,08853	,03867	-1,23413	,21715
PROD/TIME05-3	-,06450	,08853	,03867	-1,66793	,09533
PROD/TIME05-4	-,01539	,08853	,03867	-,39798	,69065
PROD/TIME06-1	-,00566	,08853	,03867	-,14642	,88359
PROD/TIME06-2	-,03369	,08853	,03867	-,87123	,38363
PROD/TIME06-3	-,03405	,08853	,03867	-,88061	,37853
PROD/TIME06-4	-,08367	,08853	,03867	-2,16368	,03049
PROD/TIME07-1	-,08111	,08853	,03867	-2,09754	,03595
PROD/TIME07-2	-,10497	,08853	,03867	-2,71458	,00664
PROD/TIME07-3	-,08499	,08853	,03867	-2,19793	,02796
PROD/TIME07-4	-,12309	,08853	,03867	-3,18316	,00146
PROD/TIME08-1	-,05085	,08853	,03867	-1,31499	,18851
PROD/TIME08-2	-,08412	,08853	,03867	-2,17552	,02959
PROD/TIME08-3	-,14699	,08853	,03867	-3,80119	,00014
PROD/TIME08-4	-,11207	,08853	,03867	-2,89829	,00375
PROD/TIME09-1	-,10542	,08853	,03867	-2,72616	,00641
PROD/TIME09-2	-,14441	,08854	,03867	-3,73419	,00019

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Time fixed effects – (II)

White's estimated standard errors

	b	se(b)	wse(b)	wt	wp
Constant	-19,28735	,24087	,10524	-183,26665	,00000
Q2 2004	-,09528	,07085	,03095	-3,07822	,00208
Q3 2004	-,14419	,07090	,03098	-4,65485	,00000
Q4 2004	-,13882	,07097	,03101	-4,47688	,00001
Q1 2005	-,28372	,07098	,03101	-9,14864	,00000
Q2 2005	-,20766	,07104	,03104	-6,69049	,00000
Q3 2005	-,28384	,07106	,03105	-9,14188	,00000
Q4 2005	-,23437	,07113	,03108	-7,54124	,00000
Q1 2006	-,25628	,07120	,03111	-8,23757	,00000
Q2 2006	-,28200	,07127	,03114	-9,05636	,00000
Q3 2006	-,34421	,07132	,03116	-11,04670	,00000
Q4 2006	-,35611	,07138	,03119	-11,41744	,00000
Q1 2007	-,34031	,07146	,03122	-10,89947	,00000
Q2 2007	-,24283	,07155	,03126	-7,76764	,00000
Q3 2007	-,32815	,07161	,03129	-10,48809	,00000
Q4 2007	-,30469	,07168	,03132	-9,72926	,00000
Q1 2008	-,31151	,07174	,03135	-9,93787	,00000
Q2 2008	-,26066	,07181	,03137	-8,30795	,00000
Q3 2008	-,31561	,07187	,03140	-10,05066	,00000
Q4 2008	-,29519	,07194	,03143	-9,39091	,00000
Q1 2009	-,30692	,07197	,03145	-9,75967	,00000
Q2 2009	-,25819	,07204	,03148	-8,20304	,00000

ln_openness	,81730	,01708	,00746	109,53252	,00000
Product_type	,33679	,02205	,00963	34,95552	,00000
Language	,98794	,02245	,00981	100,71394	,00000
FTA	,42657	,02070	,00905	47,15859	,00000
ln_distance	-,51771	,01219	,00533	-97,18886	,00000
Survival	8,32511	,06393	,02793	298,02875	,00000
ln_For_gdp	,72689	,00764	,00334	217,68953	,00000
ln_timetoexp	-,21306	,01220	,00533	-39,98459	,00000
Prod/surv	-1,22273	,03264	,01426	-85,74075	,00000
Surv/time04-2	,02069	,08876	,03878	,53338	,59377
Surv/time04-3	-,07574	,08886	,03883	-1,95086	,05108
Surv/time04-4	,06225	,08896	,03887	1,60141	,10929
Surv/time05-1	,08035	,08902	,03889	2,06576	,03885
Surv/time05-2	,15173	,08910	,03893	3,89742	,00010
Surv/time05-3	,13937	,08916	,03895	3,57777	,00035
Surv/time05-4	,24019	,08924	,03899	6,16037	,00000
Surv/time06-1	,21147	,08932	,03903	5,41837	,00000
Surv/time06-2	,27004	,08939	,03906	6,91385	,00000
Surv/time06-3	,19944	,08946	,03909	5,10239	,00000
Surv/time06-4	,40767	,08953	,03912	10,42199	,00000
Surv/time07-1	,37310	,08960	,03915	9,52970	,00000
Surv/time07-2	,31047	,08970	,03919	7,92129	,00000
Surv/time07-3	,35232	,08977	,03922	8,98227	,00000
Surv/time07-4	,42852	,08984	,03925	10,91645	,00000
Surv/time08-1	,38569	,08991	,03928	9,81839	,00000
Surv/time08-2	,42418	,08997	,03931	10,79030	,00000
Surv/time08-3	,35500	,09004	,03934	9,02400	,00000
Surv/time08-4	,35439	,09012	,03938	8,99982	,00000
Surv/time09-1	,24498	,09017	,03940	6,21816	,00000
Surv/time09-2	,19748	,09024	,03943	5,00859	,00000

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Time fixed effects – (III)

White's estimated standard errors

	b	se(b)	wse(b)	wt	wp
Constant	-19,28158	,24249	,10595	-181,97899	,00000
Q2 2004	-,09598	,08201	,03583	-2,67853	,00740
Q3 2004	-,12832	,08207	,03586	-3,57864	,00035
Q4 2004	-,13435	,08215	,03589	-3,74295	,00018
Q1 2005	-,28821	,08216	,03590	-8,02829	,00000
Q2 2005	-,20865	,08223	,03593	-5,80728	,00000
Q3 2005	-,27452	,08226	,03594	-7,63777	,00000
Q4 2005	-,26561	,08233	,03597	-7,38389	,00000
Q1 2006	-,28776	,08239	,03600	-7,99315	,00000
Q2 2006	-,30891	,08245	,03603	-8,57436	,00000
Q3 2006	-,35971	,08251	,03605	-9,97785	,00000
Q4 2006	-,38006	,08258	,03608	-10,53379	,00000
Q1 2007	-,36002	,08266	,03612	-9,96860	,00000
Q2 2007	-,24065	,08276	,03616	-6,65485	,00000
Q3 2007	-,34263	,08283	,03619	-9,46705	,00000
Q4 2007	-,31222	,08291	,03622	-8,61914	,00000
Q1 2008	-,34841	,08297	,03625	-9,61054	,00000
Q2 2008	-,28700	,08304	,03629	-7,90947	,00000
Q3 2008	-,29924	,08311	,03631	-8,24041	,00000
Q4 2008	-,29628	,08319	,03635	-8,15050	,00000
Q1 2009	-,29386	,08324	,03637	-8,07973	,00000
Q2 2009	-,21776	,08331	,03640	-5,98191	,00000
ln_openness	,81730	,01708	,00746	109,52414	,00000
Product_type	,32228	,06832	,02985	10,79556	,00000

Language	,98798	,02245	,00981	100,71082	,00000
FTA	,42666	,02071	,00905	47,15739	,00000
ln_distance	-,51768	,01219	,00533	-97,17058	,00000
Survival	8,32033	,06737	,02944	282,64789	,00000
ln_For_gdp	,72690	,00764	,00334	217,67755	,00000
Prod/surv	-1,22258	,03264	,01426	-85,71960	,00000
ln_timetoexp	-,21301	,01220	,00533	-39,97210	,00000
Surv/time04-2	,02119	,09392	,04104	,51642	,60556
Surv/time04-3	-,08758	,09403	,04109	-2,13174	,03303
Surv/time04-4	,05889	,09414	,04113	1,43164	,15225
Surv/time05-1	,08367	,09420	,04116	2,03279	,04208
Surv/time05-2	,15243	,09429	,04120	3,69981	,00022
Surv/time05-3	,13236	,09436	,04123	3,21048	,00133
Surv/time05-4	,26353	,09444	,04126	6,38656	,00000
Surv/time06-1	,23499	,09452	,04130	5,68980	,00000
Surv/time06-2	,29015	,09459	,04133	7,02023	,00000
Surv/time06-3	,21101	,09466	,04136	5,10149	,00000
Surv/time06-4	,42556	,09473	,04139	10,28180	,00000
Surv/time07-1	,38782	,09481	,04143	9,36145	,00000
Surv/time07-2	,30879	,09493	,04148	7,44493	,00000
Surv/time07-3	,36313	,09500	,04151	8,74812	,00000
Surv/time07-4	,43413	,09508	,04154	10,44983	,00000
Surv/time08-1	,41333	,09514	,04157	9,94265	,00000
Surv/time08-2	,44389	,09521	,04160	10,66988	,00000
Surv/time08-3	,34266	,09528	,04163	8,23044	,00000
Surv/time08-4	,35515	,09538	,04168	8,52168	,00000
Surv/time09-1	,23510	,09543	,04170	5,63804	,00000
Surv/time09-2	,16697	,09551	,04173	4,00089	,00006
Prod/time04-2	,00153	,09365	,04092	,03731	,97024
Prod/time04-3	-,03604	,09365	,04092	-,88086	,37839
Prod/time04-4	-,01014	,09365	,04092	-,24775	,80433
Prod/time05-1	,01016	,09365	,04092	,24818	,80399
Prod/time05-2	,00225	,09366	,04092	,05499	,95614
Prod/time05-3	-,02100	,09366	,04093	-,51319	,60782
Prod/time05-4	,07051	,09366	,04092	1,72302	,08489
Prod/time06-1	,07103	,09365	,04092	1,73595	,08257
Prod/time06-2	,06070	,09365	,04092	1,48348	,13795
Prod/time06-3	,03496	,09365	,04092	,85444	,39286
Prod/time06-4	,05396	,09364	,04092	1,31880	,18724
Prod/time07-1	,04437	,09364	,04092	1,08441	,27819
Prod/time07-2	-,00473	,09365	,04092	-,11561	,90796
Prod/time07-3	,03255	,09366	,04092	,79532	,42643
Prod/time07-4	,01702	,09366	,04092	,41593	,67746
Prod/time08-1	,08252	,09366	,04092	2,01659	,04374
Prod/time08-2	,05889	,09366	,04092	1,43910	,15012
Prod/time08-3	-,03615	,09366	,04092	-,88336	,37704
Prod/time08-4	,00269	,09367	,04093	,06582	,94752
Prod/time09-1	-,02868	,09367	,04093	-,70077	,48345
Prod/time09-2	-,08925	,09369	,04094	-2,18019	,02924

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Time fixed effects – (IV)

White's estimated standard errors

	b	se(b)	wse(b)	wt	wp
Constant	-19,29411	,24431	,10675	-180,73911	,00000
Q2 2004	-,10007	,09229	,04033	-2,48158	,01308
Q3 2004	-,15233	,09235	,04035	-3,77482	,00016
Q4 2004	-,15364	,09245	,04039	-3,80361	,00014
Q1 2005	-,29652	,09246	,04040	-7,33928	,00000
Q2 2005	-,18985	,09255	,04044	-4,69447	,00000
Q3 2005	-,28075	,09260	,04046	-6,93877	,00000
Q4 2005	-,27404	,09267	,04049	-6,76774	,00000
Q1 2006	-,28837	,09275	,04053	-7,11518	,00000

Q2 2006	-,30569	,09282	,04056	-7,53716	,00000
Q3 2006	-,35968	,09288	,04059	-8,86211	,00000
Q4 2006	-,35876	,09297	,04062	-8,83115	,00000
Q1 2007	-,32696	,09308	,04067	-8,03913	,00000
Q2 2007	-,18185	,09321	,04073	-4,46494	,00001
Q3 2007	-,30906	,09330	,04077	-7,58075	,00000
Q4 2007	-,29361	,09340	,04081	-7,19400	,00000
Q1 2008	-,32842	,09348	,04085	-8,04046	,00000
Q2 2008	-,23281	,09358	,04089	-5,69340	,00000
Q3 2008	-,28323	,09367	,04093	-6,92002	,00000
Q4 2008	-,27460	,09378	,04098	-6,70144	,00000
Q1 2009	-,28403	,09383	,04100	-6,92758	,00000
Q2 2009	-,19293	,09393	,04104	-4,70095	,00000
ln_openness	,81734	,01708	,00746	109,52208	,00000
Product_type	,35201	,10131	,04427	7,95151	,00000
Language	,98808	,02245	,00981	100,71427	,00000
FTA	,42664	,02071	,00905	47,15127	,00000
log_dis	-,51766	,01219	,00533	-97,15878	,00000
Survival	8,33580	,07779	,03399	245,24044	,00000
ln_For_gdp	,72691	,00764	,00334	217,66926	,00000
ln_timetoexp	-,21296	,01220	,00533	-39,96064	,00000
Prod/surv	-1,28077	,15008	,06558	-19,53048	,00000
Surv/time04-2	,02664	,10957	,04788	,55642	,57793
Surv/time04-3	-,05559	,10969	,04793	-1,15992	,24608
Surv/time04-4	,08459	,10981	,04798	1,76294	,07791
Surv/time05-1	,09475	,10988	,04801	1,97356	,04843
Surv/time05-2	,12738	,10999	,04806	2,65037	,00804
Surv/time05-3	,14066	,11007	,04810	2,92450	,00345
Surv/time05-4	,27475	,11016	,04813	5,70825	,00000
Surv/time06-1	,23578	,11025	,04818	4,89415	,00000
Surv/time06-2	,28583	,11032	,04821	5,92926	,00000
Surv/time06-3	,21094	,11041	,04824	4,37232	,00001
Surv/time06-4	,39721	,11050	,04828	8,22670	,00000
Surv/time07-1	,34385	,11061	,04833	7,11415	,00000
Surv/time07-2	,23069	,11075	,04839	4,76693	,00000
Surv/time07-3	,31855	,11086	,04844	6,57631	,00000
Surv/time07-4	,40937	,11095	,04848	8,44376	,00000
Surv/time08-1	,38677	,11103	,04851	7,97220	,00000
Surv/time08-2	,37208	,11113	,04856	7,66251	,00000
Surv/time08-3	,32137	,11122	,04860	6,61267	,00000
Surv/time08-4	,32637	,11134	,04865	6,70853	,00000
Surv/time09-1	,22199	,11141	,04868	4,56021	,00001
Surv/time09-2	,13406	,11151	,04872	2,75150	,00593
Prod/time04-2	,01210	,14343	,06267	,19309	,84689
Prod/time04-3	,02577	,14354	,06272	,41089	,68115
Prod/time04-4	,03971	,14370	,06279	,63243	,52711
Prod/time05-1	,03174	,14374	,06281	,50529	,61336
Prod/time05-2	-,04599	,14385	,06286	-,73173	,46434
PROD/TIME05-3	-,00481	,14392	,06289	-,07652	,93900
Prod/time05-4	,09251	,14407	,06295	1,46946	,14171
Prod/time06-1	,07288	,14423	,06302	1,15639	,24752
Prod/time06-2	,05268	,14437	,06308	,83516	,40363
Prod/time06-3	,03524	,14447	,06313	,55826	,57666
Prod/time06-4	-,00088	,14460	,06318	-,01400	,98883
Prod/time07-1	-,04094	,14474	,06325	-,64730	,51744
Prod/time07-2	-,15675	,14492	,06332	-2,47544	,01331
Prod/time07-3	-,05406	,14504	,06338	-,85300	,39366
Prod/time07-4	-,03086	,14518	,06344	-,48644	,62666
Prod/time08-1	,03107	,14531	,06349	,48933	,62461
Prod/time08-2	-,08120	,14545	,06355	-1,27773	,20135
Prod/time08-3	-,07728	,14557	,06361	-1,21498	,22437
Prod/time08-4	-,05314	,14572	,06367	-,83453	,40398
Prod/time09-1	-,05376	,14581	,06371	-,84390	,39873
Prod/time09-2	-,15322	,14593	,06376	-2,40296	,01626
Prod/sur/04-2	-,02054	,21247	,09284	-,22122	,82492
Prod/sur/04-3	-,12059	,21274	,09296	-1,29724	,19455
Prod/sur/04-3	-,09707	,21303	,09308	-1,04281	,29704

Prod/sur/05-1	-,04196	,21318	,09315	-,45050	,65235
Prod/sur/05-2	,09431	,21335	,09322	1,01166	,31170
Prod/sur/05-3	-,03132	,21347	,09328	-,33572	,73708
Prod/sur/05-4	-,04245	,21368	,09337	-,45466	,64935
Prod/sur/06-1	-,00311	,21388	,09346	-,03331	,97343
Prod/sur/06-2	,01610	,21407	,09354	,17215	,86332
Prod/sur/06-3	,00006	,21423	,09361	,00066	,99947
Prod/sur/06-4	,10676	,21434	,09366	1,13992	,25432
Prod/sur/07-1	,16544	,21447	,09371	1,76535	,07751
Prod/sur/07-2	,29371	,21470	,09381	3,13075	,00174
Prod/sur/07-3	,16756	,21483	,09387	1,78505	,07425
Prod/sur/07-4	,09304	,21497	,09393	,99049	,32194
Prod/sur/08-1	,09982	,21511	,09399	1,06201	,28823
Prod/sur/08-2	,07997	,21534	,09409	,84988	,39539
Prod/sur/08-3	,26923	,21521	,09404	2,86306	,00420
Prod/sur/08-4	,10795	,21552	,09417	1,14627	,25169
Prod/sur/09-1	,04935	,21564	,09423	,52377	,60044
Prod/sur/09-2	,12336	,21580	,09430	1,30817	,19082

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Country Fixed Effects (I)

	White's estimated standard errors				
	b	se(b)	wse(b)	wt	wp
Constant	-57,63643	2,54289	2,53981	-22,69317	,00000
DENMARK	,81466	,04220	,04241	19,21092	,00000
ESTONIA	-1,32777	,04237	,04467	-29,72577	,00000
FINLAND	,31212	,04219	,04304	7,25114	,00000
FRANCE	,27423	,04219	,04236	6,47419	,00000
HONG KONG	-1,29248	,04246	,04263	-30,31579	,00000
INDIA	-,90743	,04252	,03999	-22,69235	,00000
IRELAND	-1,33387	,04246	,04396	-30,34086	,00000
ITALY	-,02609	,04219	,04253	-,61350	,53955
JAPAN	-1,27585	,04231	,04326	-29,49272	,00000
CHINA	,12367	,04230	,04025	3,07266	,00212
KOREAN REP	-1,01397	,04261	,03986	-25,43613	,00000
LATVIA	-1,40636	,04269	,04550	-30,90854	,00000
LITHUANIA	-1,18878	,04262	,04551	-26,12268	,00000
NETHERLANDS	,50506	,04174	,04210	11,99608	,00000
NORWAY	,39992	,04270	,04510	8,86818	,00000
POLAND	-,42035	,04222	,04454	-9,43718	,00000
RUSSIA	-1,22321	,04271	,04711	-25,96389	,00000
SWITZERLAND	-1,17760	,04223	,04167	-28,25913	,00000
SLOVAKIA	-,99482	,04291	,04202	-23,67316	,00000
SPAIN	-,76772	,04223	,04087	-18,78299	,00000
GREAT BRITAIN	,46303	,04219	,04259	10,87182	,00000
TAIWAN	-1,18560	,04248	,03938	-30,10487	,00000
THAILAND	-1,37009	,04249	,04005	-34,21191	,00000
CZECH REP	-,96330	,04238	,04180	-23,04549	,00000
TURKEY	-,98916	,04250	,04139	-23,89991	,00000
GERMANY	1,73950	,04221	,04157	41,84446	,00000
HUNGARY	-1,50593	,04245	,04356	-34,57401	,00000
USA	-,37787	,04219	,04214	-8,96788	,00000
AUSTRIA	-,72204	,04225	,04087	-17,66808	,00000
Product_type	,35557	,02407	,01661	21,41183	,00000
Survival	8,51490	,01954	,01570	542,32511	,00000
ln_Swe_gdp	2,19283	,09614	,09605	22,83104	,00000
Crisis	-,10548	,03754	,03066	-3,44025	,00058
Prod/crisis	-,08643	,05711	,04183	-2,06610	,03882
Surv/crisis	,02541	,04362	,03444	,73789	,46058
Prod/surv	-1,26472	,03567	,03141	-40,26309	,00000
Pro/Sur/crisis	,03726	,08439	,07796	,47788	,63274

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Country Fixed Effects (II)

------------------- White's estimated standard errors -------------------

	b	se(b)	wse(b)	wt	wp
Constant	-53,86869	2,82683	1,24865	-43,14146	,00000
DENMARK	,73486	,15642	,06909	10,63578	,00000
ESTONIA	1,20473	,29697	,13118	9,18394	,00000
FINLAND	,27568	,15266	,06743	4,08826	,00004
FRANCE	-1,21184	,21348	,09430	-12,85125	,00000
HONG KONG	-1,22323	,08385	,03704	-33,02715	,00000
INDIA	-2,91047	,27917	,12331	-23,60222	,00000
IRELAND	-,61453	,09245	,04084	-15,04906	,00000
ITALY	-1,45278	,20608	,09103	-15,95935	,00000
JAPAN	-3,43410	,31689	,13998	-24,53358	,00000
CHINA	-2,69164	,35334	,15608	-17,24579	,00000
KOREAN REP	-2,20080	,17194	,07595	-28,97694	,00000
LATVIA	,75096	,25708	,11356	6,61305	,00000
LITHUANIA	,55702	,20852	,09211	6,04767	,00000
NETHERLANDS	,09194	,07307	,03227	2,84869	,00439
NORWAY	,11465	,16263	,07184	1,59601	,11049
POLAND	-,89364	,10123	,04472	-19,98528	,00000
RUSSIA	-2,97835	,24742	,10929	-27,25185	,00000
SWITZERLAND	-,89942	,06532	,02885	-31,17153	,00000
SLOVAKIA	,02301	,14253	,06296	,36555	,71470
SPAIN	-1,80953	,16616	,07340	-24,65426	,00000
GREAT BRIT	-1,02228	,21337	,09425	-10,84639	,00000
TAIWAN	-1,88661	,11204	,04949	-38,12289	,00000
THAILAND	-1,89044	,09784	,04322	-43,74312	,00000
CZECH REP	-,65361	,06831	,03017	-21,66109	,00000
TURKEY	-1,82252	,16287	,07194	-25,33339	,00000
GERMANY	,01377	,22778	,10062	,13690	,89111
HUNGARY	-,98709	,08772	,03875	-25,47495	,00000
USA	-3,55005	,43067	,19023	-18,66164	,00000
AUSTRIA	-,48957	,05832	,02576	-19,00588	,00000
ln_openness	,12571	,07266	,03209	3,91675	,00009
Product_type	,35578	,02407	,01063	33,46327	,00000
Language	,79925	,18296	,08081	9,88989	,00000
FTA	-,12769	,05636	,02489	-5,12961	,00000
Survival	8,51382	,01955	,00863	986,13500	,00000
ln_For_gdp	,91634	,10800	,04771	19,20758	,00000
ln_Swe_gdp	1,09705	,16777	,07411	14,80378	,00000
Crisis	-,08399	,03776	,01668	-5,03600	,00000
ln_timetoexp	,15376	,04555	,02012	7,64258	,00000
Prod/crisis	-,08919	,05710	,02522	-3,53578	,00041
Surv/crisis	,02698	,04368	,01930	1,39846	,16198
Prod/surv	-1,26601	,03566	,01575	-80,36589	,00000
Pro/Sur/crisis	,04455	,08439	,03728	1,19502	,23208

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Time and country fixed effects – (III)

------------------- White's estimated standard errors -------------------

	b	se(b)	wse(b)	wt	wp
Constant	,26988	,07129	,03150	8,56695	,00000
Q2 2004	,07183	,09097	,04020	1,78704	,07393

Q3 2004	,03709	,09103	,04023	,92200	,35653
Q4 2004	,05300	,09113	,04027	1,31620	,18811
Q1 2005	-,04920	,09115	,04028	-1,22164	,22185
Q2 2005	,06915	,09123	,04031	1,71525	,08630
Q3 2005	,01624	,09129	,04034	,40247	,68734
Q4 2005	,04851	,09136	,04037	1,20157	,22953
Q1 2006	,06171	,09144	,04040	1,52721	,12671
Q2 2006	,07126	,09150	,04043	1,76256	,07798
Q3 2006	,05391	,09157	,04046	1,33236	,18274
Q4 2006	,07566	,09165	,04050	1,86824	,06173
Q1 2007	,12405	,09175	,04054	3,05961	,00222
Q2 2007	,26886	,09188	,04060	6,62200	,00000
Q3 2007	,14367	,09198	,04064	3,53512	,00041
Q4 2007	,14851	,09208	,04069	3,65014	,00026
Q1 2008	,13795	,09215	,04072	3,38794	,00070
Q2 2008	,23023	,09225	,04076	5,64800	,00000
Q3 2008	,17750	,09234	,04080	4,35042	,00001
Q4 2008	,18385	,09244	,04085	4,50074	,00001
Q1 2009	,12888	,09251	,04088	3,15291	,00162
Q2 2009	,18576	,09259	,04091	4,54011	,00001
DENMARK	,81418	,04219	,01864	43,67341	,00000
ESTONIA	-1,32731	,04235	,01871	-70,92329	,00000
FINLAND	,31195	,04217	,01863	16,74089	,00000
FRANCE	,27378	,04217	,01863	14,69254	,00000
HONG KONG	-1,29242	,04244	,01875	-68,91641	,00000
INDIA	-,90844	,04250	,01878	-48,37234	,00000
IRELAND	-1,33307	,04245	,01876	-71,07144	,00000
ITALY	-,02644	,04218	,01864	-1,41846	,15606
JAPAN	-1,27562	,04230	,01869	-68,24736	,00000
CHINA	,12233	,04228	,01868	6,54766	,00000
KOREAN REP	-1,01365	,04259	,01882	-53,85836	,00000
LATVIA	-1,40515	,04268	,01886	-74,50780	,00000
LITHUANIA	-1,18789	,04260	,01882	-63,10449	,00000
NETHERLANDS	,50466	,04174	,01844	27,36294	,00000
NORWAY	,39971	,04270	,01887	21,18547	,00000
POLAND	-,42024	,04221	,01865	-22,53311	,00000
RUSSIA	-1,22298	,04269	,01886	-64,83158	,00000
SWITZERLAND	-1,17726	,04221	,01865	-63,11760	,00000
SLOVAKIA	-,99392	,04289	,01895	-52,44130	,00000
SPAIN	-,76800	,04221	,01865	-41,17379	,00000
GREAT BRITAIN	,46279	,04218	,01864	24,83121	,00000
TAIWAN	-1,18490	,04247	,01877	-63,14037	,00000
THAILAND	-1,36997	,04247	,01877	-72,99496	,00000
CZECH REP	-,96278	,04236	,01872	-51,43477	,00000
TURKEY	-,98939	,04249	,01877	-52,69922	,00000
GERMANY	1,73904	,04220	,01864	93,27212	,00000
HUNGARY	-1,50457	,04244	,01875	-80,23521	,00000
USA	-,37799	,04217	,01863	-20,28477	,00000
AUSTRIA	-,72225	,04224	,01866	-38,69667	,00000
Product_type	,37578	,10020	,04427	8,48772	,00000
Survival	8,39641	,07679	,03393	247,45169	,00000
Prod/surv	-1,29019	,14844	,06559	-19,67003	,00000
Prod/time04-2	-,00160	,14184	,06267	-,02545	,97969
Prod/time04-3	,01078	,14196	,06273	,17184	,86356
Prod/time04-4	,02365	,14211	,06279	,37659	,70648
Prod/time05-1	,01333	,14215	,06281	,21216	,83199
Prod/time05-2	-,06566	,14226	,06286	-1,04459	,29621
PROD/TIME05-3	-,02583	,14232	,06289	-,41069	,68130
Prod/time05-4	,07039	,14248	,06296	1,11812	,26352
Prod/time06-1	,05068	,14264	,06303	,80405	,42137
Prod/time06-2	,03065	,14277	,06308	,48583	,62709
Prod/time06-3	,01095	,14287	,06313	,17342	,86233
Prod/time06-4	-,02505	,14300	,06319	-,39651	,69173
Prod/time07-1	-,06530	,14314	,06325	-1,03242	,30188
Prod/time07-2	-,17982	,14332	,06333	-2,83959	,00452
Prod/time07-3	-,07580	,14344	,06338	-1,19590	,23174
Prod/time07-4	-,05029	,14357	,06344	-,79275	,42793

Prod/time08-1	,00802	,14370	,06350	,12631	,89948
Prod/time08-2	-,10442	,14383	,06356	-1,64298	,10039
Prod/time08-3	-,10145	,14396	,06361	-1,59485	,11075
Prod/time08-4	-,07447	,14411	,06368	-1,16944	,24223
Prod/time09-1	-,07568	,14419	,06371	-1,18781	,23491
Prod/time09-2	-,17496	,14428	,06375	-2,74424	,00607
Surv/time04-2	-,05091	,10830	,04786	-1,06388	,28739
Surv/time04-3	-,13803	,10842	,04791	-2,88124	,00396
Surv/time04-4	-,00273	,10854	,04796	-,05684	,95467
Surv/time05-1	,00548	,10861	,04799	,11422	,90906
Surv/time05-2	,03246	,10872	,04804	,67558	,49931
Surv/time05-3	,04489	,10880	,04808	,93378	,35042
Surv/time05-4	,17615	,10888	,04811	3,66123	,00025
Surv/time06-1	,13456	,10898	,04815	2,79439	,00520
Surv/time06-2	,18225	,10905	,04818	3,78231	,00016
Surv/time06-3	,09864	,10913	,04822	2,04542	,04082
Surv/time06-4	,28412	,10922	,04826	5,88722	,00000
Surv/time07-1	,22930	,10933	,04831	4,74620	,00000
Surv/time07-2	,11978	,10947	,04837	2,47614	,01328
Surv/time07-3	,21084	,10957	,04842	4,35470	,00001
Surv/time07-4	,30909	,10967	,04846	6,37849	,00000
Surv/time08-1	,27679	,10974	,04849	5,70802	,00000
Surv/time08-2	,26125	,10984	,04854	5,38254	,00000
Surv/time08-3	,20396	,10995	,04858	4,19797	,00003
Surv/time08-4	,23376	,11005	,04863	4,80719	,00000
Surv/time09-1	,11373	,11012	,04866	2,33737	,01942
Surv/time09-2	,02480	,11022	,04870	,50931	,61053
Prod/sur/04-2	-,04777	,21012	,09285	-,51451	,60689
Prod/sur/04-3	-,14844	,21038	,09296	-1,59675	,11032
Prod/sur/04-4	-,12603	,21067	,09309	-1,35390	,17577
Prod/sur/05-1	-,06691	,21082	,09315	-,71828	,47259
Prod/sur/05-2	,06809	,21098	,09323	,73038	,46516
Prod/sur/05-3	-,05434	,21115	,09330	-,58238	,56031
Prod/sur/05-4	-,06462	,21136	,09339	-,69188	,48901
Prod/sur/06-1	-,02773	,21151	,09346	-,29673	,76668
Prod/sur/06-2	-,01052	,21170	,09354	-,11246	,91046
Prod/sur/06-3	-,02772	,21186	,09362	-,29607	,76718
Prod/sur/06-4	,07830	,21196	,09366	,83595	,40319
Prod/sur/07-1	,13649	,21210	,09372	1,45635	,14530
Prod/sur/07-2	,26457	,21232	,09382	2,82004	,00480
Prod/sur/07-3	,13781	,21245	,09388	1,46804	,14210
Prod/sur/07-4	,06354	,21258	,09393	,67647	,49874
Prod/sur/08-1	,07171	,21273	,09400	,76284	,44556
Prod/sur/08-2	,04928	,21296	,09410	,52365	,60052
Prod/sur/08-3	,24100	,21283	,09404	2,56271	,01039
Prod/sur/08-4	,08876	,21314	,09418	,94251	,34594
Prod/sur/09-1	,01981	,21325	,09423	,21027	,83346
Prod/sur/09-2	,09351	,21339	,09429	,99175	,32132

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value

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Time and country fixed effects – (IV)

White's estimated standard errors					
	b	se(b)	wse(b)	wt	wp
Constant	-33,64217	3,87002	1,71045	-19,66866	,00000
Q2 2004	,07819	,09377	,04144	1,88656	,05922
Q3 2004	,01410	,09393	,04152	,33967	,73410
Q4 2004	,00136	,09424	,04165	,03277	,97386
Q1 2005	-,13083	,09463	,04182	-3,12825	,00176
Q2 2005	-,04456	,09520	,04208	-1,05910	,28956
Q3 2005	-,12188	,09596	,04241	-2,87365	,00406
Q4 2005	-,12129	,09680	,04278	-2,83494	,00458
Q1 2006	-,13914	,09777	,04321	-3,21991	,00128
Q2 2006	-,16100	,09886	,04369	-3,68499	,00023
Q3 2006	-,19661	,09997	,04419	-4,44976	,00001

Q4 2006	-,19630	,10090	,04459	-4,40183	,00001
Q1 2007	-,18804	,10260	,04534	-4,14683	,00003
Q2 2007	-,05572	,10322	,04562	-1,22141	,22193
Q3 2007	-,18083	,10357	,04577	-3,95055	,00008
Q4 2007	-,17561	,10361	,04579	-3,83509	,00013
Q1 2008	-,21801	,10516	,04648	-4,69055	,00000
Q2 2008	-,11090	,10456	,04621	-2,39959	,01641
Q3 2008	-,14712	,10397	,04595	-3,20177	,00137
Q4 2008	-,12459	,10339	,04570	-2,72644	,00640
Q1 2009	-,15921	,10249	,04530	-3,51459	,00044
Q2 2009	-,09933	,10246	,04528	-2,19361	,02827
DENMARK	,64039	,16162	,07143	8,96480	,00000
ESTONIA	2,12531	,39226	,17337	12,25903	,00000
FINLAND	,21075	,15583	,06887	3,05998	,00221
FRANCE	-1,86507	,26109	,11539	-16,16254	,00000
HONG KONG	-1,06638	,09297	,04109	-25,95266	,00000
INDIA	-3,66167	,33041	,14603	-25,07450	,00000
IRELAND	-,36518	,11747	,05192	-7,03344	,00000
ITALY	-2,04915	,24659	,10899	-18,80214	,00000
JAPAN	-4,34616	,37978	,16785	-25,89281	,00000
CHINA	-3,71386	,43929	,19416	-19,12819	,00000
KOREAN REP	-2,63205	,20203	,08929	-29,47736	,00000
LATVIA	1,54542	,34705	,15339	10,07530	,00000
LITHUANIA	1,19787	,27998	,12374	9,68033	,00000
NETHERLANDS	-,11026	,08830	,03902	-2,82533	,00472
NORWAY	-,06250	,17126	,07569	-,82575	,40895
POLAND	-1,10111	,10861	,04800	-22,93794	,00000
RUSSIA	-3,58390	,28570	,12627	-28,38291	,00000
SWITZERLAND	-,85842	,07230	,03195	-26,86441	,00000
SLOVAKIA	,47003	,18987	,08392	5,60107	,00000
SPAIN	-2,30911	,19934	,08810	-26,20879	,00000
GREAT BRIT	-1,68829	,26340	,11642	-14,50204	,00000
TAIWAN	-2,07431	,12444	,05500	-37,71635	,00000
THAILAND	-1,97160	,10409	,04601	-42,85414	,00000
CZECH REP	-,50287	,08263	,03652	-13,76995	,00000
TURKEY	-2,14462	,17654	,07802	-27,48639	,00000
GERMANY	-,72522	,29283	,12942	-5,60351	,00000
HUNGARY	-,74910	,11224	,04961	-15,09999	,00000
USA	-4,87972	,53811	,23783	-20,51762	,00000
AUSTRIA	-,45693	,06341	,02802	-16,30441	,00000
ln_openness	,06788	,07650	,03381	2,00753	,04469
Product_type	,36507	,10020	,04429	8,24330	,00000
FTA	-,10084	,06336	,02800	-3,60071	,00032
Language	1,07232	,20934	,09252	11,59003	,00000
Survival	8,36100	,07765	,03432	243,61750	,00000
ln_For_gdp	1,26160	,14422	,06374	19,79277	,00000
ln_timetoexp	,14495	,04584	,02026	7,15448	,00000
Prod/surv	-1,29219	,14846	,06561	-19,69369	,00000
Prod/time04-2	-,00220	,14182	,06268	-,03510	,97200
Prod/time04-3	,01220	,14194	,06273	,19454	,84575
Prod/time04-4	,02714	,14209	,06280	,43224	,66557
Prod/time05-1	,01873	,14213	,06282	,29812	,76561
Prod/time05-2	-,05841	,14224	,06287	-,92913	,35282
PROD/TIME05-3	-,01697	,14231	,06290	-,26988	,78725
Prod/time05-4	,08100	,14246	,06297	1,28637	,19832
Prod/time06-1	,06284	,14263	,06304	,99681	,31886
Prod/time06-2	,04461	,14276	,06310	,70703	,47955
Prod/time06-3	,02492	,14287	,06314	,39473	,69305
Prod/time06-4	-,01017	,14300	,06320	-,16095	,87213
Prod/time07-1	-,04796	,14314	,06326	-,75806	,44842
Prod/time07-2	-,16212	,14332	,06334	-2,55941	,01049
Prod/time07-3	-,05891	,14344	,06340	-,92916	,35281
Prod/time07-4	-,03459	,14357	,06346	-,54509	,58569
Prod/time08-1	,02655	,14371	,06352	,41806	,67591
Prod/time08-2	-,08880	,14383	,06357	-1,39681	,16247
Prod/time08-3	-,08832	,14396	,06363	-1,38818	,16508
Prod/time08-4	-,06558	,14410	,06369	-1,02978	,30311

Prod/time09-1	-,07019	,14418	,06372	-1,10145	,27070
Prod/time09-2	-,17043	,14430	,06378	-2,67240	,00753
Surv/time04-2	-,06073	,10882	,04809	-1,26281	,20666
Surv/time04-3	-,14081	,10893	,04815	-2,92460	,00345
Surv/time04-4	,00133	,10906	,04820	,02754	,97803
Surv/time05-1	,01590	,10914	,04824	,32972	,74161
Surv/time05-2	,04985	,10927	,04830	1,03214	,30201
Surv/time05-3	,07016	,10937	,04834	1,45142	,14666
Surv/time05-4	,20768	,10948	,04839	4,29202	,00002
Surv/time06-1	,17202	,10961	,04844	3,55089	,00038
Surv/time06-2	,22668	,10972	,04849	4,67439	,00000
Surv/time06-3	,14394	,10986	,04855	2,96464	,00303
Surv/time06-4	,33336	,10997	,04860	6,85861	,00000
Surv/time07-1	,28798	,11016	,04869	5,91466	,00000
Surv/time07-2	,17996	,11032	,04876	3,69090	,00022
Surv/time07-3	,26866	,11043	,04881	5,50456	,00000
Surv/time07-4	,36433	,11052	,04885	7,45847	,00000
Surv/time08-1	,33975	,11065	,04890	6,94721	,00000
Surv/time08-2	,31756	,11068	,04892	6,49152	,00000
Surv/time08-3	,25923	,11092	,04902	5,28804	,00000
Surv/time08-4	,27285	,11081	,04897	5,57134	,00000
Surv/time09-1	,14587	,11080	,04897	2,97873	,00289
Surv/time09-2	,05703	,11089	,04901	1,16357	,24460
Prod/sur/04-2	-,05378	,21011	,09286	-,57911	,56252
Prod/sur/04-3	-,15376	,21037	,09298	-1,65365	,09820
Prod/sur/04-4	-,13097	,21066	,09311	-1,40665	,15953
Prod/sur/05-1	-,07145	,21081	,09317	-,76689	,44315
Prod/sur/05-2	,06453	,21097	,09325	,69206	,48890
Prod/sur/05-3	-,05567	,21114	,09332	-,59653	,55082
Prod/sur/05-4	-,06529	,21135	,09341	-,69892	,48460
Prod/sur/06-1	-,02758	,21150	,09348	-,29499	,76800
Prod/sur/06-2	-,00936	,21168	,09356	-,10001	,92033
Prod/sur/06-3	-,02594	,21185	,09363	-,27708	,78172
Prod/sur/06-4	,08086	,21195	,09368	,86320	,38803
Prod/sur/07-1	,14032	,21209	,09374	1,49700	,13440
Prod/sur/07-2	,26867	,21231	,09384	2,86314	,00420
Prod/sur/07-3	,14202	,21244	,09389	1,51257	,13039
Prod/sur/07-4	,06857	,21258	,09395	,72984	,46549
Prod/sur/08-1	,07583	,21272	,09402	,80656	,41992
Prod/sur/08-2	,06011	,21297	,09413	,63858	,52310
Prod/sur/08-3	,24692	,21282	,09406	2,62516	,00866
Prod/sur/08-4	,09757	,21314	,09420	1,03576	,30032
Prod/sur/09-1	,03169	,21325	,09425	,33623	,73670
Prod/sur/09-2	,10628	,21341	,09432	1,12679	,25983

b = estimated coefficient, se(b) = OLS standard error
wse(b) = White's standard error, wt = White's t value, wp = White's p value
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