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Migration and Trade

Substitutes or complements?

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Abstract

Countries interact more and more and borders open up, especially in Europe and within the European Union. A more intertwined world raises the question of how more free movements of goods and people –migration and trade – will affect each other. The purpose of this thesis is to establish whether migration and trade are complements or substitutes.

Different theories on international trade and factor mobility predict different outcomes and the discussion about whether migration and trade are complements or substitutes continue. The research area is well explored on a theoretical level but less so empirically.

A gravity model approach is used to investigate the link between migration and trade. In order to assess the relationship two gravity equations are tested through regression analysis. Bilateral data for five European countries and their partner countries in the rest of the world are used in the empirical analysis that covers the years from 1997 to 2001. The results are unambiguous and show that migration and trade are complements. The intra European Union effect differs slightly from the general effect but is still complementary.

Keywords: Trade, migration, gravity model, EU.

Sammanfattning

Länder samverkar allt mer med varandra och gränser öppnas upp, framför allt i Europa och inom den Europeiska unionen. I en alltmer sammanflätad värld uppkommer frågan om hur friare rörlighet av varor och människor – migration och handel – påverkar varandra. Uppsatsens syfte är att fastställa ifall migration och handel är komplement eller substitut.

Olika teorier kring internationell handel och faktorrörlighet förutspår olika utkomster och diskussionen om handel och migration är komplement eller substitut fortsätter att vara aktuell. Detta forskningsområde är väl utforskat på en teoretisk nivå, men mindre så empiriskt.

Den empiriska delen av uppsatsen utgår från en gravitations modell och två gravitations ekvationer är framtagna för att fastställa relationen mellan handel och migration. Detta görs sedan genom regressions analys. Bilateral data för fem Europeiska länder och dess partnerländer i resten av världen används i den empiriska delen och undersökningen sträcker sig mellan 1997 till 2001. Resultaten är tydliga och visar att migration och handel är komplement. Effekten mellan de dåvarande femton EU länderna skiljer sig något från den generella effekten, men visar fortfarande på ett komplementärt förhållande mellan migration och handel.

Nyckelord: Handel, migration, gravitations modell, EU.

Table of contents

1	Introduction	3
1.1	The European Union.....	3
1.2	Research question and aim of the study	4
1.3	Limitations.....	4
1.4	Main findings.....	5
1.5	Outline of the thesis.....	5
2	Background	6
2.1	The four economic freedoms in the EU.....	6
2.1.1	The free movement of people.....	7
2.1.2	Formal and informal barriers.....	7
2.2	Previous research.....	9
3	Theoretical implications of the free movement of goods and production factors	11
3.1	Migration	11
3.2	International migration and trade – substitutes or complements?	13
3.2.1	Summary.....	16
3.3	Implications for the EU	16
4	A gravity model approach	19
4.1	The gravity model.....	19
4.2	Derivation of a gravity model of trade	20
4.2.1	The gravity equation of trade.....	21
4.3	A gravity model of migration	21
4.3.1	The gravity equation of migration	22
4.4	Data and variables	22
4.4.1	Implications of data limitations	23
4.4.2	Variables.....	23
5	Econometrics and methodology	26
5.1	System equations	26
6	Results and analysis	28

6.1	Import equation.....	28
6.2	Migration equation	31
6.3	Migration and trade	34
6.3.1	Migration and trade within the EU	35
7	Conclusion and final thoughts	38
	References	40
	Appendix	44

1 Introduction

International trade and migration interact in several ways and are closely intertwined. The relationship between the two plays an important role in integration processes and the course towards increased efficiency and economic growth. The purpose of the introduction is to present the means of the European Union as a background of the research questions and aim of the study. Further follows a brief discussion of the purpose of the study and more detailed research questions followed by limitations to the study. The chapter ends with a disposition of the thesis.

1.1 The European Union

The European Union (EU) was first established in the aftermath of the Second World War in order to prevent future conflicts by increased cooperation between the leading European countries. Since then, the EU has undergone great changes as a region and gone further in terms of deepening integration than any other integration area. The EU has also increased the number of member countries from 6 to 27 and further widening of the Union is under discussion. Both the deepening of the integration process between the member countries and the widening of the EU, resulting in a greater diversity of countries, will change the effects of integration and, the effect of international flows of trade and migration.

From the beginning the EU was solely a customs union and integration was associated with trade. Trade concerns were understandably the focal point of research and analysis of the effects of integration in the EU area. The introduction of the Single Market Program promoting an internal market and the free movement of goods, services, capital and people demanded a shift away from trade and a widening of the research area to include all four freedoms. Migration, that has been and that will take place in the EU, impact upon both factor and goods markets and thus impact on the location of production and the welfare of the region.

This study will focus on the link between two of the four freedoms in the EU – people and goods – and thus investigate the relationship between migration and trade.

1.2 Research question and aim of the study

The main purpose of this study is to examine the link between migration and trade and to establish if they are substitutes or complements. This will be done both from a migration and an import point of view. The link between trade and migration is of increasing importance in a more integrated world. The study focuses on the EU and whether the link between migration and trade are different within the EU compared to the rest of the world – this will help establishing the effect of deepened integration between countries and group of countries in the world. The main research questions are specified below.

- *Are migration and trade substitutes or complements?*
- *Is the relationship between migration and trade within the EU different due to the implementation of the Single Market Program and the internal market?*

To accomplish the purpose I have chosen to conduct an empirical study of five member countries in the European Union – Austria, Finland, Germany, Sweden and Great Britain – during the years between 1997 and 2001.

1.3 Limitations

One limitation to this study is that it only accounts for a subset of migrants – permanent legal immigrants. In the case of the EU this neglects the impact of so called circular migration when people work in another country than their resident country for a few months and then return to their home country with the salary. This is unfortunate but due to data limitations. I also wish to stress that the empirical study include bilateral data for five European countries and their partner countries in the rest of the world. Also this is partly due to limitations in

data availability that restrains the number of countries in the empirical investigation. However, these five countries are also all members of the EU - important since I wish to isolate the intra EU effect. They are also similar in terms of pull factors of migration (push and pull factors of migration will be discussed further in chapter 3.1. See also implications of data limitations 4.4.1) i.e. the attraction forces of incoming migration as well as relatively similar purchasing power. Notable is also that this study uses data on inflows of migration and imports as a way of measuring migration and trade. However, these limitations do not mean that no general insights can be extracted from the present cases.

1.4 Main findings

The results from the empirical study conclude that migration and trade are complements. The general effect – between the five receiving countries and their bilateral trade and migration partner countries in the rest of the world – is strong. If migration increases by one unit the import volume will rise up to 28 per cent and, if the import volume increases by one unit immigration will increase by approximately 24 per cent. Despite the vision of free movements of both goods and people in the EU is the complementary effect less strong between EU countries than in general. This could be due to a number of reasons that will be discussed further on in the thesis.

1.5 Outline of the thesis

Chapter two present the four freedoms in the EU and follow up with previous research. The third chapter presents the economic theory of international trade and migration related to the research questions. The fourth and fifth chapter explains and justifies the choice of methodology used to conduct the empirical investigation – the Gravity model and econometrical methods. Chapter six discusses the empirical findings and combines the theory presented in chapter three with the empirical results and presents the analysis. The final chapter resumes the main results and conclusions and presents some final thoughts.

2 Background

The second chapter will discuss the background to the four economic freedoms in the EU in more detail and also briefly go through previous research in line with the aim of the study and the research questions.

2.1 The four economic freedoms in the EU

The four economic freedoms – the free movement of goods, services, capital and people – are part of the fundamental principles of the EU. These four freedoms were first set out in the Treaty of Rome in 1957 and the implementation has continued throughout the years and now forms the basis of the Single Market Program in the EU. As stated in the introduction, for many years the main concern of the integration process was trade. The EU started as a customs union with the removal of internal barriers to trade and the implementation of a common tariff towards the rest of the world. This would increase the intra-EU trade as the cost of trading with other member countries would decrease relative to third countries. A greater market would result in increased specialization and gains from economies of scale. The full completion of the single market implies the removal of formal as well as informal barriers to trade, services, capital and the movement of people. After the introduction of the Single Market Program focus of the integration process in the EU changed from solely trade and instead concerns all of the four freedoms. Perhaps the most controversial one has been the freedom of movement of people.

Pro-arguments for a single market stress the importance of strengthening the economic freedoms in order for member countries to gain from economic growth and a higher standard of living and also to be competitive in a changing global market and to improve the status and negotiability of the EU in the international arena. Counter arguments stress the independence and sovereignty of the individual countries and that deepened integration and free movements within the EU can lead to increased income disparities between member countries and perhaps especially between core and periphery locations.

The main concern of this paper will be the free movement of goods and people as the aim of the thesis is to explore the link between international migration and trade with focus on the EU.

2.1.1 The free movement of people

The free movement of people was first introduced to enable labour mobility but today the right of free movement of people within the Community also concerns other categories such as students, pensioners and EU citizens in general and the freedom of establishment applies both to companies and self-employees. This regulation states that all EU citizens exert the right to move freely and live and work in any member state. It promotes the right to free movement for all EU members and their families, and the guarantee of equality of treatment with citizens of the member state in which they choose to reside (European Communities). The freedom of people is a means of creating a European market for employments and establishing a more flexible and efficient labour market (Commission 2002:3) The implementation of the internal market is expected to create more job opportunities due to increased competition, reduced price level and growing demand within the region (Kommerskollegium et al 2000:25).

The nature and the effects of migration are varied and practically the political effects are often stressed more than the economic effects. This has been the case in many EU countries and the free movement of people is often impeded by political interests (Senior Nello 2005:147). Member states have the right to restrain the freedom of movement of people on the grounds of public security, public order and public health (European Communities). The concern of large migrant flows due to the enlargement of the EU in 2004 also resulted in a restriction of migrant flows from the new member countries for the first seven years of their membership. The difficulties to reach an agreement of a common policy about migration are another example that show the political difficulties associated with migration and what a controversial political question migration is.

2.1.2 Formal and informal barriers

In order to achieve an internal market characterized by free movement of goods, services, capital and people both formal and informal barriers have to be removed. An internal market

with free movement will increase competition and usage of scale economies which is especially important for relative small countries such as the European ones. This will lead to product differentiation and more efficient resource allocation which in turn increase the economic welfare through economic growth and increased production and employment (Kommerskollegium 2000:18-19).

The creation of a customs union reduced the formal barriers to trade but trade was still impeded by for example import quotas, different standards and time consuming border controls. The implementation of the Single Market Program continued the reduction of formal barriers to trade through the harmonization of national standards, liberalisation of financial institutions the implementation of common legislations. However, the movement of goods within the community is still impeded by duplication as similar requirements must be met repeatedly and because national rules differ. This lead to increasing transaction costs and uncertainty in trade (Maur 2008:984-985, 998). Formal barriers to the movement of people such as border controls have been reduced within the EU but still many practical, administrative and legal barriers such as access to employment, language requirements, equal treatment and social advantages still prevent individuals from exercising their freedom of movement (Commission 2002:3).

International trade is impeded by transaction costs that exceed the direct trade costs from transportation and formal trade barriers such as border controls and tariffs – so called informal barriers to trade. These informal trade barriers are seen as an explanation to the phenomenon that countries trade too much within their own country and too little internationally and this results in less than efficient competition and that the European countries do not fully gain from economies of scale (Rauch 2001:1177). Even if the removal of formal barriers to trade has come a long way and also formal barriers to the movement of individuals have been removed in many instances, many informal barriers remain.

Informal barriers are many times harder to overcome and are often linked to culture and social differences, i.e. communication. There are also informal barriers such as indirect discrimination. This can, for example, increase the risk of getting unemployed and make it harder to find a place to stay and therefore affect an individual's decision whether to migrate or not since the cost of migration increase (Commission 2002:7). Indirect discrimination might as well affect trade and increase trading costs due to greater uncertainty. Trade can also be affected as consumers tend to have their preferences biased towards domestic products – home biased preferences. Both migration and trade are impeded by formal as well as informal

barriers and the flows of both goods and people are reduced. The effects from the Single Market Program are hence not fully accomplished.

2.2 Previous research

The scientific contributions on trade and factor movements are substantial – resulting in a variety of theoretical research on the subject of international trade and labour migration. Earlier studies tend to focus solely on either the effect of migration on trade or the effect of trade on migration. Only a few studies cover both aspects.

Mundell (1957) was the first one to propose the Heckscher-Ohlin framework in a study about international factor mobility and trade as substitutes. He stated that differences in factor prices would induce factor movement and lead to the elimination of trade. According to this, a pareto-optimal allocation can be reached either by free trade in goods or free movements of factors.

Markusen (1983) questions if factor movements and trade in commodities are substitutes. He claimed that this result only holds for the Heckscher-Ohlin framework and examined a number of situations where factor movements instead increased trade volumes. Usage of theory were international trade patters are not determined by relative factor endowments show that factor movements and trade are complements and that factor mobility spur international trade and thus increase the volume of trade.

Razin and Sadka (1992) expanded the theory of international factor mobility and international trade, building on both Mundell and Markusen, and examined how these can work as either substitutes or complements of each other under different assumptions.

Venebles and Norman (1995) investigated the connection between migration and trade by relaxing the assumptions of non-tradable factors of production. Assuming transaction costs, goods trade alone will not equalize factor prices and incentives for factors to move across countries arise. Taking their starting point in the Heckscher-Ohlin theory they conclude that this theory not only shows the pattern of trade but also whether trade occurs and which goods or factors that will be traded. They further state that trade liberalisation is likely to affect the cost of factor mobility and that changes in relative transactions costs can radically affect the pattern of trade. Whether or not liberalisation will facilitate or impede

trade depends on the relative factor endowments, preferences, and technology and transaction costs.

The empirical contribution to investigate the link between migration and trade is less extensive and the majority of previous empirical studies focus on the effects in a single country. The empirical results are as well varied and show both tendencies towards complement and towards substitute but the complementary effect is more frequently occurring. However, the results are not directly comparable as the aim of the studies as well as the methods and measurements differ.

Bruder (2004) performed a case study on Germany where she looked into both the effect of trade on migration and the effect of migration on trade between the years of 1970 to 1998. She found that labour migration had no significant effect on imports but that all immigration has a small positive relation to trade. Testing the other aspect the results indicate that labour migration and trade are substitutes.

As one can see, neither the theoretical nor the empirical contributions are straight forward. Different theoretical aspects will therefore be discussed further in more detail in the next chapter.

3 Theoretical implications of the free movement of goods and production factors

Following chapter aims at describing the theoretical relationship between international trade and labour movements in order to sort out the differences between substitutes and complement theories. The chapter begins by explaining the basic theoretical aspects behind migration. It is important to be aware of the distinction between international migration and labour movements. Labour migration is caused by pull factors in another country – expectations of higher future living standards – while aggregated migration that is used in the empirical part is migration driven by both push and pull factors. The theoretical exposition is followed by a discussion about the different implications for the EU if trade and migration are substitutes or complements.

3.1 Migration

Economic theory states that individuals act in order to maximize their utility. Migration across national borders is driven by social, political, economic and ethnic factors and is a weighted decision between expected benefits and costs of migration (Karemera et al 2000:1746). The causes and effects of migration are diversified and migration flows between two countries will be based on characteristics in both home and destination countries. The decision to migrate can be based on either a security risk that force people to leave their home countries or, be a voluntary decision driven by the attractive forces in another country and the willingness to improve ones living standard – push and pull factors of migration.

The earliest, and simplest, economic models of migration state that migration is based on actual wage differentials that are due to specific labour market conditions in different countries. Harris and Todaro (1970) refined these models and their approach is still widely recognised. They stated that the supply of migration is driven by expected income rather than actual income. Hence, they also included the uncertainty that individuals face

when they move from one country to another – expected income is thus estimated by wage differentials and probability to be employed. However, research based on the Harris-Todaro approach has had various results and income differentials only elucidate part of the story. Migration is rarely as elastic to wage differentials and unemployment rates as the simple model of migration predicts (Mansoor – Quillin 2006:78).

In many cases the expected flows of migrants from low income countries to high income countries has default, one example is expected migration flows in connection with earlier enlargements of the EU. One of the main concerns due to the upcoming enlargement in 2004 was large flows of migrants from Eastern Europe to the rest of the EU. However, there is empirical evidence that migration between countries with unequal income levels often remain low when expectations of economic growth, higher future income levels and more stable institutions are prevailing (Mansoor – Quillin 2006:75-79). Accession countries are often in such a situation where the future is expected to be more affluent than the past. The concern about large migration flows are therefore often exaggerated, at least during the first years of a membership. Hence, aside from economic ones, other factors have to be taken into account. Migration involves economic and psychological costs, such as leaving friends and family, and adjustment costs to a new country and culture. Individuals tend to favour their home countries for social, cultural and linguistic reasons – these are all important parts of the cost of migration and will hence impede migration flows (Lewer and Van den Berg 2008:165). Therefore, the regular utility measure in economics is often replaced by a broader quality of life measure that includes not only economic variables, but also political and social ones.

The migration within Europe has changed during the previous decades as the security risk has diminished. The intra-EU migration is therefore mostly driven by opportunities to improve ones living standard and expected future utility and the main motive is employment and expected income differentials (Mansoor – Quillin 2006:77). One can therefore reach the conclusion that intra-EU migration is mostly driven by pull factors and are to a larger extent labour migration.

3.2 International migration and trade – substitutes or complements?

Both migration and trade patterns are determined by the attractive forces between source and destination countries. With an imperfect labour market there are large discrepancies between supply and demand of labour in different parts of the world. To be able to understand the relationship between migration and trade and to recognise how migration and trade can facilitate or impede each other one has to begin by examining the economic theory behind it – the theory of trade and factor mobility.

In the Ricardian model the direction of trade is determined by differences in production technology and comparative advantages. With free movement of factors higher factor rewards will induce an inflow of factors to the country with the higher productivity. If labour is the sole production factor, labour mobility changes the comparative advantages between countries and thus the direction of trade. Trade will no longer be determined by comparative advantages but by absolute cost advantages. Migration will alter the patterns of international trade (Razin – Sadka 1992:18). The free movement of factors lead to a factor inflow of the factor used intensively in the export sector and thus complement trade and strengthen a country's comparative advantages (Bruder 2004:5). However, the Ricardian model of trade is one of the simplest models and this set aside several important factors that alter the effect of migration on international trade. Further understanding of the relationship between migration and trade are acquired through additional understanding of economic theories dealing with the potential linkages between the two.

The Heckscher-Ohlin framework states that in the absence of international factor mobility relative factor endowments determine the direction of trade. Trade will continue until commodity prices and factor prices are equalized. The opposite is also true, in the absence of any trade and transportation costs, migration from a labour abundant country to a labour scarce country will continue until factor prices are equalized and thus also the commodity prices. Price equalisation removes the incentives for either trade or migration. When allowing factor movements between countries the Heckscher-Ohlin model illustrates that international migration and trade are perfect substitutes. What is shown in studies based on the Heckscher-Ohlin model is that an increase in trade impediments increases incentives for factor movements and that restriction to factor movements tends to increase trade in

commodities. Gains from trade can thus be realised through movement of either goods or factors (Mundell 1957:331). Hence, if the only difference between two countries is relative factor endowments, commodity trade and labour mobility are perfect substitutes and when both are allowed there will be indecisiveness between the two (Razin – Sadka 1992:21, 22). This conclusion is based on the assumption of free movements without any distortions. However, price equalization will not be realised even in the presence of small restrictions but, as shown by Venebles and Norman (1995), this does not change the basic result of substitutability.

Due to the transaction costs associated with transportation and trade neither goods nor factor prices will converge completely in reality and thus create a demand for factors of production and promote factor movements. Factor returns will differ between countries and therefore induce factor mobility (Venebles – Norman 1995:1489-1490, 1496). According to the Heckscher-Ohlin theorem, the decision to trade in goods or factors of production depends on differences in endowment ratios and thus factor price ratios. Venebles and Norman (1995) conclude that patterns of trade in goods and factors depend on the relative reduction in international factor reward differences. Whether factor movements or trade in goods will take place depends on which results in the greatest reduction in international differences in factor rewards. The direction of trade in both goods and factors of production is thus determined by price differences. The magnification effect in trade prices implies that a small change in goods prices result in a greater change in factor prices. Hence, the production cost rises more than the consumer price. Thus, trade in factors will occur as long as the gap between the transaction costs is less than the relative price difference (Venebles – Norman 1995:1497). The conclusion to be drawn is that changes in transaction costs will in turn affect trade patterns both between countries and within regions. Under certain circumstances factor movements will decrease trade volumes and in other contexts trade will increase and incorporate both commodities and factors of production (Venebles – Norman 1995:1502). Hence, Venebles and Norman conclude that migration and trade could be either complements or substitutes depending on the prevailing assumptions and context.

Even a small reduction in the cost of migration within the EU could for example result in migration flows into a labour scarce country if the differences in the return to labour are higher than the cost of migration. Trade patterns change if the previous labour scarce country starts exporting labour intensive products (Venebles – Norman 1995:1502). Liberalisation of trade in goods might also decrease the incentives to migrate if trade costs decrease. Economic liberalisation that effect transaction costs will affect trade within a region

and thus also change the migration flows. Therefore, both the implementation of the Single Market Program and the enlargement of the EU could effect the directions of trade and factor mobility within the European Union.

As stated above, the understanding of international migration and trade as substitutes is based on the assumption that trade is caused by unequal factor endowments and that factor movements will equalize this disparity. However, if one instead assumes models with non-identical technologies or increasing returns to scale it can be shown that international trade and migration flows instead are complements (Markusen 1983:341, 342). Assuming non-identical technologies and flows of both commodities and production factors, labour will immigrate to the country that exports the labour intensive good. Wages will be higher due to better technology which increases the marginal product of labour and thus also wages. Capital will move in the opposite direction. Henceforth, factor mobility lead to an inflow of the factor used intensively in the production of a country's export sector and an outflow of the factor used intensively in the production of a country's import good. This means that countries tend to increase specialisation in their production. According to the Rybczinski theorem, a rise in the endowment of one factor will lead to a more than proportional expansion of the output in the sector which uses that factor intensively, and an absolute decline of the output of the other good. Hence, labour mobility and international migration spur international trade – international migration and trade are complements of each other (Markusen 1983:343-347, Razin – Sadka 1992:23-24).

Neary (1995) made an interesting contribution to question in focus. He developed a model where factor movements and trade are substitutes given that the mobile factor is used in the import sector. Inflow of factors of production used in a country's import sector would increase the country's domestic production and thus reduce trade. If the mobile factor instead is used in the export sector, production output would increase and instead promote trade and factor movements and trade would work as complements (Neary 1995:20). This last notation is in line with Markusen (1983).

Also in models of New Trade Theory, trade and factor movements are complementary. Considering external economies of scale where countries have similar factor endowment but differ in size the larger country will have a lower marginal rate of transformation and countries will specialise their production. Each country will have higher relative prices for the factor used intensively in the sector they specialise in. Since factor rewards differ between countries factors will move and create excess supply of export output and thus increase trade (Bruder 2004:6, Markusen 1983:351-353, Razin – Sadka 1992:25).

However, Markusen (1983) makes two important remarks to keep in mind. Once a country is specialized continued factor movements might instead reduce output and trade and, he also emphasizes that export output will increase, not necessarily trade flows.

New Trade Theory also considers cases where one sector of production is characterised with imperfect competition and internal economies of scale. With two economies the larger economy will be the net exporter of the monopolistic sector. Real factor returns will be higher and thus induce factor movements. The factor movements increase the differences in factor endowments and increase trade between the two economies – factor movements and trade are thus complementary (Bruder 2004:6).

3.2.1 Summary

As discussed above, according to economic theory, international flows of migration and trade can be seen as either substitutes or complements of each other. Hence, there are no definite theoretical answers to question whether trade and migration are substitutes or complements. The results are instead dependent of the underlying assumptions and the context. If countries differ in relative endowments trade and migration will be substitutes. However, if countries instead differ regarding production technology or in size the link between trade and migration will be complementary.

Theory	Explanation to trade	Migration and trade are:
Ricardian	Comparative advantages and production technology	Complements
Heckscher-Ohlin	Relative factor endowments	Substitutes
Economies of scale	External economies of scale	Complements
New Trade Theory	Increasing internal returns to scale and monopolistic competition	Complements

Table 1

3.3 Implications for the EU

One reason to implement the four freedoms and the Single Market Program in the EU was to increase flows between member countries in order to make the internal market more effective and increase the welfare of the region. The relationship between trade and migration is not determined and the discussion about whether they will spur or impede each other is not settled. Therefore, the effects of the Single Market Program, regarding the link between migration and trade, are not straight forward.

Increased regional integration is supposed to increase competition and efficiency, reduce price-cost margins and allow greater exploitation of economies of scale due to reduced barriers to the four freedoms and thus improve the welfare of the region. The increase in competition is also likely to lead to a restructuring of industry location and change the economic landscape of the region (Baldwin 1997:865, Allen *et al.* 1998:441-442, Marques 2008:365, 377). The political implications are therefore different if trade and migration are complements or substitutes.

In neoclassical theories, gains from integration have mostly been studied due to an integration area as a whole and the effects from migration and trade have been analysed separately (Marques 2008:365). According to the Heckscher-Ohlin theorem, where trade and migration are assumed to be substitutes, countries will specialize according to their relative factor endowments as a country's relative efficiency depends on it. Goods will therefore be exported by more efficient countries and imported by less efficient ones. Factors tend to move in the same directions due to the assumption of perfect competition. Hence, factors will move due to differences in factor rewards and, increased integration is assumed to result in incentives for factors to relocate within the EU until factor and goods prices converge. Free movements of factors are therefore assumed to make countries factor endowments more homogenous. The implication for the EU is that one could assume migration flows from one part of the region to another. Capital and labour are assumed to move in opposite directions due to different factor endowments and thus factor rewards in different parts of the EU (Marques 2008:377). This might change the nature of the population and the labour force in a country and are thus important to acknowledge, not least for policy implications.

In New Trade Theory, where economies of scale, imperfect competition and differences in production technology are acknowledged, trade and migration are instead complementary. Trade is not determined by factor endowments but by country size, returns to scale, technology and experience. With the New Trade Theory gains for different countries and regions have been taken into account and the impact of trade and factor movements on both goods and factor markets have been recognised. The main effect within

the EU is that trade and factor mobility will tend to increase differences between different regions. Increased integration will reduce trade costs but, a concentration of high technology, R&D intensive production and skilled workers is still expected due to market access and gains from cluster effects. However, low skilled labour and low R&D productions are also expected to concentrate. Factor rewards are determined by marginal products and one expect flows of factors from the importing country to the exporting country – the opposite of what is expected from theories where trade and migration are substitutes (Marques 2008:384, 390). Taking core and periphery theories into account, high technology production with high skilled labour tend to locate in the core and production with low skilled labour tend to locate in the periphery – changing the economic landscape and create diversified regions within the EU. A complementary link between migration and trade also lead to expectations of higher welfare gains from integration than what has earlier been known. This insight has led to deepened integration in the EU and has strengthened the effects further. However, this states nothing about the distribution of the expected gains.

Summarizing the implications for the EU, if migration and trade are substitutes, it would mean that low skilled labour would move from a low skilled factor abundant country to a country where low skilled labour were scarce due to higher factor rewards. Capital and high skilled labour would move in opposite directions. If the link between migration and trade instead were complementary, factor rewards are determined by marginal products and production are assumed to relocate to core and periphery locations. High skilled labour are thus assumed to move to parts of the region – presumably the core – characterised by high technology production and R&D. Low skilled labour will instead concentrate in the more periphery areas as the marginal product of low skilled labour increase as production with low skilled labour specialise in those regions.

Even though the reasoning is not taking all variables into account it shows important differences in implications for the EU if migration and trade are complements or substitutes.

4 A gravity model approach

The fourth chapter of the thesis is a bridge between theory and empirics and combines the two. Starting out with a discussion about the gravity model and ending with a representation of the data and variables included in the empirical part of the research. The two equations I have set up for the empirical analysis are also presented.

4.1 The gravity model

The gravity equation descends from the gravity law of physics and explains the attraction between two objects by mass and distance. The basic gravity model in economics is thus based on the assumption that bilateral trade flows are a positive function of economic mass, measured as the product of two countries GDP, and a negative function of the geographical distance between the two (Lewer – Van den Berg 2007:164). The equation below describes the basic gravity model of trade. Imports from country i to country j is a function of the mass and distance between country i and j . T_{ij} is trade between country i and j , X is a variable denoting historical ties, language etc. M is economic mass and D_{ij} is the business distance between country i and j .

$$T_{ij} = X \frac{M_i M_j}{D_{ij}}$$

Figure 1

Business distance is a proxy of trade costs and the costs are assumed to increase with the geographical distance. Geographical distances represent transportation costs but are also linked to social costs associated to different cultures and languages. To better capture such effects the basic model has been extended to include other factors that might affect trade such as common language, adjacency, Regional Trade Agreements (RTA) membership and colonial link etc. Henceforth, the augmented gravity model describes trade flows depending

on economic mass and formal as well as informal bilateral trade barriers between country i and j (Andersson – Wincoop 2003, Fontura – Galán 2007:208, 209).

The economic gravity model was first developed by Tinbergen in 1962 and after a period of disuse the theory underwent a revival during the 1990's for its successful use to describe bilateral trade flows. However, the theoretical foundations of the model have been provided after its empirical breakthrough. Andersson (1979) based the theoretical justification of the gravity model on constant elasticity of substitution (CES) and symmetric trade costs between country i and j . This was followed by theoretical underpinnings developed by Bergstrand (1989 and 1990) and Deardoff (1998) that kept the CES structure but extended the theory by adding assumptions on monopolistic competition and the Heckscher-Ohlin fundamentals based on different factor endowments to explain specialization. Henceforth, Andersson and Wincoop (2003) stated, after controlling for size, that trade flows between two countries depends on the bilateral trade-impediments relative to trade-impediments to all other trade partners – multilateral trade resistance (Andersson – Wincoop 2003:174, 176).

Consequently, there have been a number of attempts to derive the gravity equation from several economic theories. The theoretical base for the model has thus gone from none to plentiful. Today the Ricardian model, New Trade Theory and the Heckscher-Ohlin fundamental are all examples of theories used to derive gravity equations. The gravity model is widely used to describe bilateral trade flows and, since the included variables captures costs to trade that effects the flows between a pair of countries, the model has also been used to describe bilateral flows of capital, services and migration.

4.2 Derivation of a gravity model of trade

Carrère (2006) use a gravity model framework to investigate the effect of Regional Trade Agreements on bilateral trade. Carrère, among others, have shown that a theoretical derivation of a gravity model result in an equation very similar to empirical gravity equations. In order to accomplish the aim of this study and distinguish the effects of the Single Market Program in the EU I follow Carrère's derivation of the gravity model.

The gravity model in Carrère (2006) is derived from a framework where individuals maximize utility and firms maximize profits according to Dixit-Steiglitz preferences - based

on the love of variety and diversified consumption for consumers as well as monopolistic competition and increasing returns for firms (Carrère 2006:225). Carrère conclude that the theoretical gravity model is remarkably close to the model used in the empirical literature. The theoretical model includes the product of a country pairs GDP, a measure of the capital-endowment ratio, a variable for barriers to trade and a proxy for the relative country pair trade resistance compared to the multilateral trade resistance. The multilateral trade resistance has earlier been proxied by a price index – see for example Andersson and Wincoop (2003) – in order to capture trade resistance. However, Carrère follows the Bier and Bergstrand approach and estimate the multilateral trade resistance term by a country’s GDP compared to its distance to the rest of the world (Carrère 2006:226). For a more detailed review of the gravity model of trade see Andersson and Wincoop (2003) or Carrère (2006).

4.2.1 The gravity equation of trade

$$\begin{aligned}
 \text{Import} = & \alpha + \beta_1 \text{Distance} + \beta_2 \text{Mass} + \beta_3 \text{colony} + \beta_4 \text{comlang} + \beta_5 \text{contig} + \beta_6 \text{AUT} + \\
 & \beta_7 \text{DEU} + \beta_8 \text{FIN} + \beta_9 \text{GBR} + \beta_{10} \text{Africa} + \beta_{11} \text{Asia} + \beta_{12} \text{South America} + \beta_{13} \\
 & \text{North America} + \beta_{14} \text{Oceania} + \beta_{15} \text{EU accession} + \beta_{16} \text{EUrest} + \beta_{17} \\
 & \text{Migration} + \beta_{18} \text{Trend} + \beta_{19} \text{Trend*EU15} + \beta_{20} \text{Trend*EU accession} + \beta_{21} \\
 & \text{Migration*EU15} + \beta_{22} \text{Migration*EU accession} + e_i
 \end{aligned}$$

Figure 2

The gravity equation of trade is specified as a regression model that describes the change in import volume in relation to distance, mass, migration and a number of dummy variables controlling country and region specific characteristics as well as historical ties, language and contingency. Sweden and the EU 15 are left out of the regression as they are used as references. Interaction variables are included to specify the link within the EU15 and the accession countries.

4.3 A gravity model of migration

Like international trade flows, migration flows are determined by the attractive forces between source and destination country and impeded by distance and the cost of migration.

Therefore, modified gravity models are used to investigate bilateral migration flows between countries.

Mass is represented by the product of two countries population instead of GDP and migration flows are expected to be positive correlated with large populations. A large population in the source country indicates the possibility of larger migration flows at the same time as a large population in a destination country resembles a greater labour market and hence greater opportunities of employment. Distance represents the cost of migration for the same reasons as distance represent trade costs in the original gravity equation. The cost of adjusting to a new country increases if the cultural differences are greater – correlated to the geographical distances. The migration gravity model is often extended with variables affecting the decision to migrate and thus future expected utility. Per capita income as well as unemployment rates is thus often included in gravity models of migration. Furthermore, ethnical and social variables will effect migration in the same fashion as they affect trade (Lewer – Van den Berg 2007:164, 165).

4.3.1 The gravity equation of migration

$$\begin{aligned}
 \text{Migration} = & \alpha + \beta_1 \text{Distance} + \beta_2 \text{Mass} + \beta_3 \text{colony} + \beta_4 \text{comlang} + \beta_5 \text{contig} \\
 & + \beta_6 \text{AUT} + \beta_7 \text{DEU} + \beta_8 \text{FIN} + \beta_9 \text{GBR} + \beta_{10} \text{Africa} + \beta_{11} \text{Asia} + \beta_{12} \text{South} \\
 & \text{America} + \beta_{13} \text{North America} + \beta_{14} \text{Oceania} + \beta_{15} \text{EU accession} + \beta_{16} \text{EU} \\
 & \text{rest} + \beta_{17} \text{Import} + \beta_{18} \text{Trend} + \beta_{19} \text{Trend*EU15} + \beta_{20} \text{Trend*EU accession} \\
 & + \beta_{21} \text{Import*EU15} + \beta_{22} \text{Import*EU accession} + \beta_{23} \text{Conflict} + ei
 \end{aligned}$$

Figure 3

In this gravity equation, migration serves as the dependent variable and is explained by imports as well as the other explanatory variables found in the import equation. Added in the migration equation is also a conflict dummy variable.

4.4 Data and variables

The models are estimated using bilateral data for five European countries – Austria, Finland, Germany, Sweden and the United Kingdom. Data is structured in a three dimensional panel

data setting sorted after receiving country, partner country and year. Due to limitations in availability, data cover the years from 1997 to 2001. All variables except the dummy variables are expressed in logarithms in order to establish a linear relationship and the coefficients thus represent elasticities. An overview of the included variables can be found in appendix.

4.4.1 Implications of data limitations

As stated earlier, data are restricted to a limited time period and accounts for a limited number of countries. The five years between 1997 and 2001 was for the EU a prosperous time and this can of course impact upon the results. During an economic boost one can suspect trade to increase due to increased production and consumption. Considering migration one can distinguish two effects. As a country's pull factors and attractiveness increases as the employment rates and expected income raises a greater inflow of migrants from less prosperous countries is expected. However, if the home country itself is a growing economy one can instead expect reduced migration as the expected future income at home increases. For the used data set this insinuates that the inflow of migrants from poorer countries might be relatively large at this time period while inflow from the accession countries instead is relatively small.

The selection of countries will also impact upon the results. As mentioned before the countries are chosen due to similar pull factors of migration and purchasing power as well as the fact that they are members of the EU. Increasing the number of countries could change the results if the other countries differ much from the EU countries concerning push and pull factors of migration and purchasing power.

4.4.2 Variables

Import flows are used as a measure of trade, the reason for doing so is that the data on imports is more reliable than data on exports – countries tend to have stricter controls for commodity flows into a country. There is neither an option to use aggregated data of both imports and exports as the effect on and from migration might not go in the same direction (Augier et al 2007:20). Data on imports are from the UN COMTRADE database measuring total bilateral imports of country i from country j in current US dollars. The numbers show

aggregated import data for all commodities. The HS (Harmonised System) 1996 is used for classification of products. A positive value of the import coefficient indicates a complementary relationship between trade and migration and a negative coefficient indicates substitutability.

Migration flows are estimated by the inflow of foreign population by country of nationality. Data are compiled by the Migration Policy Institute database, but is originally from each country's statistical department. There are missing values in the migration data and this data are approximated to zero. The research area also differs if one investigates flows instead of stock. The reason to use flows of migrants instead of stock of migrants is due to the aim of the thesis. This is to investigate the effect of the free movements within the EU. While stock of migrants is related to network-building theories and reduced cultural and linguistic barriers to trade, data on flows allow one to study the link between migration and trade characterised by substitution or complementarity. A positive value indicates complementarity and a negative value show that trade and migration are substitutes.

Distances as well as dummies for colonial ties, common language and contingency are from the Cepii distances database. Cepii (Centre D'Etudes Prospectives et D'Informations Internationales) is the leading French research centre for international economics. Increased distance should reduce trade and to some extent also migration as the costs increase while historical ties and contingency are expected to increase trade and migration.

Economic mass used in the gravity equation for trade flows is estimated by the product of a country pairs GDP. Data on GDP is from the World Bank database WDI-online. Larger economies are likely to trade more and the expected value is thus positive. Mass in the second gravity equation is the product of two countries populations. Population numbers are from the Penn World Table. The more people there are in a source country, the more people are likely to migrate and a large population in a destination country indicates a large labour market (Lewer – Van den Berg 2007:165). A positive result is expected.

A conflict dummy is included in the migration equation. The data are from a database at Uppsala University. This variable is expected to result in a positive sign indicating increased migration flows from conflict areas.

Regional dummies capture region specific factors that might influence the dependent variables – for example how relative factor endowments influence bilateral trade flows (Head – Ries 1998:52). Regional dummies captures what is specific to the country pair that effect the level of the dependent variable that is not captured by other variables included in the equation (Carrère 2006:229). I have chosen to include EU dummies for EU15, the

accession countries and the rest of Europe to be able to distinguish if the relationship between trade and migration show any specific characteristics as a result of the implementation of the Single Market Program and, thus estimate the effect of a deepened integration and cooperation within the EU area. EU dummies capture, not only the effect of the elimination of formal barriers but also, the removal of informal barriers to trade and migration. These dummies will also allow for regional effects even before the actual membership. It is likely that trade increase a few years before the implementation of an agreement. Future member countries in the EU sign free trade area agreements prior to the actual membership. At the same time is migration restricted even after a country's entrance in the EU – a result of the sensitive political question migration is.

Country specific dummies are included in the regression to separate specific characteristics for the five receiving countries not captured by the explanatory variables.

According to theory, migrants base their decision to migrate on expected future income as a weighted measure of income level and probability of employment in a new country. GDP per capita could be used as a proxy for wage differentials between countries. GDP is used instead of GNI since GDP reflects the income level in a specific country. However, the GDP per capita ratio showed no significant values once all the variables were included in the regression. Probably due to the region dummies which also captures the income effect. Therefore, I choose to exclude the income variable.

A remoteness variable is used as a measure of a country's market potential and is the inverse to Carrères remoteness variable used to proxy multilateral trade resistance. Also a price index between two countries can be used to proxy the multilateral trade resistance (see for example Andersson and Wincoop, 2003). However, a price index will not be relevant in a study using panel data as it includes not only cross-section series but also a time dimension and the price index do not develop over time. Instead Carrère use a remoteness variable to proxy multilateral trade resistance. I have calculated a variable for each country's market potential by dividing a country's GDP by the distance between source and destination country. The sum of this relative distance to the rest of the world measures a country's market potential. Due to multicollinearity between the remoteness variable and the mass and import variables this variable had to be excluded in order to avoid biased results.

Other variables could be of interest. However, what is most interesting is how migration and trade are linked together and I therefore wanted focus to be on these variables. Other factors that might affect the dependent variables are captured by the country and region specific dummies.

5 Econometrics and methodology

The aim of this study is to investigate how international migration and trade affect each other. In order to do so I have estimated two equations – one to analyse the effects of trade on migration and another to study the effects of migration on trade. The equations are presented in previous chapter. In chapter four are also the main factors that affect the relationship between migration and trade identified from a gravity model approach. The following chapter will focus on the econometrical estimations and methodology.

5.1 System equations

This paper investigates the relationship between international migration and trade using two equations where the left hand side variables of the equations – inflows of migrants and imports - are functions of each other. The migration and trade variables are thus endogenous as they are decided simultaneously. Hence, the two equations can be rewritten as a single equation and endogeneity can appear in the error terms. Endogeneity results in biased results that might lead to that the wrong conclusions are drawn. The problem of endogeneity also arises when an independent variable is correlated with the error term. In order to avoid the problem of endogeneity a system equation method - that accounts for endogeneity - will be used.

In system equation models the error terms might be correlated as well. Therefore the efficiency of the estimation may be improved by taking cross-equation correlations into account – both the Seemingly Unrelated Regression (SUR) and the Three Stage Least Squares (3SLS) accounts for this. The SUR estimation method estimates the system accounting for heteroskedasticity and contemporaneous correlation in the error terms across the equations. The 3SLS method is in turn the Two Stage Least Square version of the SUR method and generalise the two stage least square method in the same way as the SUR method generalise the OLS estimation. 3SLS provides consistent estimates both for correlation between equations error terms and correlation between explanatory variables and

error terms. The 3SLS specification requires a list of instrument variables to estimate a relationship between the dependent and the explanatory variables (Eviews 5 user's guide 2004:699-700).

The instrument variables are used to estimate the endogenous variables. There are two conditions for instrument variables. The first condition states that the instrument variables must be exogenous which states that they can not be correlated with the error term and, the last of the two conditions are that the instrument is relevant to explain the dependent variable. These conditions enable isolation of the exogenous variation in the dependent variable and thus estimation of the endogenous variation (Stock 2001:7578). Instruments are used to improve the consistency of the results. However, an important note is that correct specified instruments deliver strong results but the results may differ depending on the specification of the instruments. This generates a certain insecurity to the estimation which must be considered when one interprets the results and draw conclusions from the estimates.

In the following chapter the results will be presented and analysed. The notification above is one reason to present the results from both the SUR and the 3SLS estimation. The 3SLS method is the more advanced econometrical method. However, the results are somewhat insecure due to the instrument variable identification. Both results will therefore be presented to prove the significance and the robustness of the results.

6 Results and analysis

In this sixth chapter of the thesis, the results from the empirical part will be discussed and the research questions stated in part 1.2 will be answered. The results will first be presented in tabular form in order to facilitate the understanding of the results and the following discussion. I have chosen to present the results from both the SUR and the 3SLS estimations. The results are similar to a large extent which proves robustness in the equations. The variables of higher importance according to the aim of the study and research questions will be analysed further in part 6.3.

6.1 Import equation

The R-squared values for both of the estimation methods are almost identical – 0.735 and 0.737 – showing that close to 74 per cent of the variation in import volumes are explained by the independent variables included in the equation.

Starting out with the basic gravity model and adding variables for migration flows and cultural and historical ties the distance coefficient showed a significant and negative result – as expected from the theory and previous studies. However, introducing different dummy variables the distance coefficient turned non-significant. This is due to that the distance effect is instead captured by the region dummies. As distance is introduced as an approximation of trade and transportation costs variables such as contingency and regions also capture this effect. When Europe was divided into three dummies - in order to distinguish the effects from the EU15 and the accession countries - the distance variable turned positive and significant. This could be explained by a rather high import volume from periphery European countries due to lower production costs.

Mass is positive and highly significant. The coefficient value explains that if the product of two countries GDP would increase by one unit, the import volume would increase by approximately 110 per cent. The result is as expected – larger economies are expected to trade more and therefore two large economies will trade more with each other. Two large

economies are also expected to have more similar preferences and thus benefit more from trading with each other.

The colony variable, which indicates if there is a colonial tie after the year of 1945, is highly significant and confirms a strong relationship between colonial ties and trade. I have included the variable for official common language instead of a common language spoken by at least nine per cent of a countries population since the official language proved to be more relevant. This coefficient is highly relevant in the 3SLS estimates but, only significant on a ten per cent level when all other variables in the regression are included in the SUR estimation method regression. Part of the effect from a common official language are captured by other variables – both region dummies but not least the variable for colonial ties as they often also share an official language. Another possible reason is that the relevance of sharing the same language decrease as countries develops and increases their base of knowledge in English. One must remember that the current study investigate five highly developed European countries. As proved by the mass variable countries with a higher GDP tend to trade more with other countries with higher GDP – where one can assume that English is a widely spoken and commonly used business language. The variable describing contingency is both highly significant and shows a strong positive relationship to the dependent variable. This is also expected as the variable captures trade costs associated with the costs of transportation.

The country specific variables – Austria, Germany, Finland and Great Britain – control for country specific characteristics compared to a reference country, here the fifth country Sweden. The four country specific coefficients are all positive and significant on a 1 per cent level indicating that Sweden is the country that imports the least regarding the other variables as country size etc. This is not surprising considering Germany and Great Britain which are both much larger economies and have larger populations then Sweden. Austria is a geographical small country and might not have as large domestic production as Sweden and thus be more dependent on imports. Also Finland might be less self-sufficient then Sweden and have a higher import volume.

Region dummies control for region specific attributes and the reference group is the fifteen EU member countries at the time. The region dummies outside Europe are all negative, stating that the five European countries that are the focal point of this study, import more from the EU15 then the rest of the world outside of Europe. This is expected both regarding the noteworthy integration between the EU countries with the implementation of the internal market and as well according to the gravity model approach that stresses the

importance of mass and distance in trade. The region dummies partly capture distances and income disparities as this is region specific characteristics.

Imports from the accession countries is not significant different to imports from the EU15. This could be explained by the free trade agreements between EU and the accession countries. The process of integration starts ahead of the membership, especially in trade. The imports from the rest of Europe (Eastern Europe that are not part of the accession countries and the EEA countries Norway, Island and Switzerland) to the five European countries are less then the intra-EU15 and significant on a five per cent level in the SUR regression estimation. However, according to the 3SLS method imports from the rest of Europe are not significantly different. It is possible that this effect would be larger if the three EEA countries were excluded as the group called EU rest consists of dissimilar countries.

The migration inflow variable is highly significant and positive. According to this there are a positive linkage between migration inflows and imports – establishing a complementary relationship between migration and trade. If the migration inflow increases by one unit the import volume would increase by 20 to 28 per cent. To distinguish the effect in the EU15 and the accession countries I have included interaction variables between these groups and migration. When it comes to the effect from intra-EU15 migration, this migration has a smaller positive effect on imports then the general. However, the effect is still positive and thus complementary in the SUR regression while the effect from migration flows from the accession countries do not depart from the general effect. None of the interaction variables are significant with the 3SLS estimation method and the complementary link between migration and trade within Europe does not differ significantly from the generally effect according to this.

The trend variable makes it possible to see the development of the dependent variable during the relevant time period (1997 to 2001) relative the development of the explanatory variables. The coefficient is highly significant and negative. The five countries willingness to import relatively their GDP, population et cetera has thus decreased. The trend within the EU15 departs from the general trend and is much less negative. This could indicate stable trade conditions and also that the EU15 production have become more specialised and thus more dependent on trade (the interaction variable between trend and EU15 was removed from the 3SLS estimation and only included in the instrument list). The trend for the accession countries do not differ from the general trend and are thus negative.

Import Equation	SUR	3SLS
Variable	Coefficient	Coefficient
Distance	0.302***	0.212**
Mass GDP	1.076***	1.140***
Colony	0.986***	1.204***
Common language	0.356*	0.537***
Contiguous	1.260***	0.885***
Austria	0.851***	0.853***
Germany	0.499***	0.445***
Finland	0.726***	0.809***
Great Britain	1.000***	0.666***
Africa	-2.239***	-1.829***
Asia	-2.409***	-2.032***
South America	-2.436***	-2.060***
North America	-2.269***	-1.947***
Oceania	-2.656***	-2.214***
EU accession	0.046 not sign	0.470 not sign
EU rest	-0.831**	-4.354 not sign
Migration	0.279***	0.199***
Migration*EU15	-0.122***	0.037 not sign
Migration*EU accession	-0.023 not sign	0.085 not sign
Trend	-0.191***	-0.150***
Trend*EU15	0.167**	-
Trend*EU accession	0.142 not sign	0.101 not sign

Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 2: Results from the import equation

6.2 Migration equation

The migration equation show slightly lower R-squared values – 0.606 and 0.599 – indicating that around 60 per cent of the variation in migration during the years of the study are explained by the included variables.

The distance coefficient is highly significant and negative as expected from theory. The cost of migration increases with the distance.

The product of a country pairs population indicating the mass variable in a migration setting of a gravity equation has a positive coefficient, also this is an expected result from the theory where one assume that a larger population in the source country is able to bring forth larger flows of migration at the same time as a larger population in the destination country indicates a large labour market which is an attractive pull factor of migration.

The variable controlling for colonial ties shows a strong positive link that proves the importance of cultural and historical ties regarding migration and the costs of adjusting to a new society. This variable might also capture the effects of earlier migration to a country. For the same reason – decreasing costs of adjusting to a new country – the common language variable are both strongly significant and positive. The contingency variable is not statistically significant. This is probably an effect of decreased travel costs and that other aspects become more important when migration costs are reduced – aspects such as historical and cultural ties as well as the possibility of employment and expected future income.

The country specific variables, whose functioning is explained in previous chapter, are all negative indicating, after controlling for other variables affecting migration, that Sweden accepts more migrants than the other four countries. This could be due to different migration policies since the EU neither at the time period in question nor today has agreed upon a common migration policy.

The region specific variables are all negative indicating that the inflow of migration from all other regions outside of Europe is lesser then the inflow from other EU15 countries. This result implies that the free movement of people within the EU has had an effect on migration and affected the extent of movements. However, this result is also expected considering the close distance within the EU.

Both the variable for the accession countries and the rest of the EU are significant and negative so the migration from these countries is less then the intra-EU15 migration – once again pointing towards an effect of the four freedoms. As noted above the trade from the accession countries did not departed from the intra-EU15 trade but the migration does so. The integration process begins with free trade agreements years before the actual membership and trade has also been the focal point of integration within the EU. Part of the results from this process might be what is seen here.

The import variable is highly significant and positive which means that if imports increase so will migration inflows. Thus, migration and trade are complements also from this point of view. Also in this equation interaction variables are included for trend and imports in interaction with the EU15 and the accession countries. The effect on migration from imports from other EU15 countries are smaller than the general effect. The effect is still complementary but to a lesser extent. The interaction variable between import and the accession countries is instead both highly significant and positive thus strengthening the complementary effect.

The trend variable for migration inflows is significant and positive – the migration inflow tendency to the five countries has increased during 1997 to 2001 relative the development of the other variables. The interaction variable between the EU15 and trend show that the trend within the EU15 countries is considerably smaller than the general development. In fact so much that the effect turns negative which indicate that the intra-EU15 migration flows have decreased over time relative the other variables – a somewhat surprising result considering the free movement of people between these countries. One explanation could be the economic boost during the time period in question. Earlier research show that bright prospects tend to decrease migration as the opportunity cost of migration increase and the expected future income in the home country is higher. The trend in the accession countries do not differ significantly from the general trend. Nevertheless, the general trend is positive so the migration flows from the accession countries have increased during the years between 1997 and 2001. Economic growth within the EU15 might have increased the demand for less-skilled labour and have therefore worked as a pull factor of migration. The probability of getting employed increase and thus also future expected quality of life.

Controlling for conflicts allow one to distinguish the effects from different sorts of migration since labour migration is particular interesting here. The conflict variable is positive and highly significant as expected. War and other conflicts strengthen the push factors and thus increase migration.

Migration Equation	SUR	3SLS
Variable	Coefficient	Coefficient
Distance	-1.099***	-1.090***
Mass population	0.528***	0.539***
Colony	2.018***	1.706***
Common language	1.256***	1.000***
Contiguous	-0.271 not sign	0.071 not sign
Austria	-0.221**	-2.229**
Germany	-0.335***	-0.287***
Finland	-1.407***	-0.873***
Great Britain	-2.378***	-1.808***
Africa	-3.805***	-4.547***
Asia	-3.482***	-4.189***
South America	-3.195***	-3.913***
North America	-3.430***	-4.104***
Oceania	-2.208**	-2.192***
EU accession	-9.422***	-4.788***
EU rest	-3.504***	-4.197***
Import	0.246***	0.227***
Import*EU15	-0.173***	-0.251***
Import*EU accession	0.309***	0.244***
Trend	0.308***	0.273***
Trend*EU15	-0.341***	-
Trend*EU accession	-0.036 not sign	0.005 not sign
Conflict	0.579***	0.585***

Significance levels: * 0.10, ** 0.05, *** 0.01.

Table 3: Results from the migration equation

6.3 Migration and trade

As mentioned earlier in chapter 6.1 and 6.2, the results show a strong complementary link between migration inflows and imports. If migration increases by one unit the import volume

will rise up to 28 per cent and if the import volume increases by one unit immigration will rise by approximately 24 per cent.

Reviewing the theories of international trade and migration, this result indicates that the complementary effects explained in trade models based on technological differences and scale economies are dominant and that migration strengthen countries export sector rather than their import sector. Models that explain trade by different technologies and increasing returns to scale (external and internal) suggest that migration will impact upon trade as diversified technology results in different factor prices. The price of each factor reflects the value of a factors marginal product. Labour will migrate to a country were labour is used intensively in the country's export sector as wages are determined by marginal productivity. The export sector is strengthened further and so are country specialisation and thus international trade. The five receiving countries in this study are high income countries and are thus attractive to migrants and the complementary relationship indicates that the countries export sector has been strengthen rather than their import sector. The results suggest further that trade and factor movements increase specialization and enable further utilization of scale economies and therefore spur international trade.

A complementary relationship considering the effects of trade on migration also supports the assumption that bilateral trade indicates strong ties between countries that affect also other areas and thus promote migration. Noteworthy is that the effect of migration on trade is larger than the effect of trade on migration, both in general terms and within the EU15.

6.3.1 Migration and trade within the EU

As discussed in chapter 3.3 – implications for the EU – a complementary link between migration and trade suggests that, both due to a deepening of integration and a widening of the union, one could expect industries to relocate. Industry relocation will result in increased diversity between member countries and presumably also lead to a greater diversity between core and periphery areas. High skilled labour, high technology and R&D will gather in the centre of the EU and production with low skilled labour will move to more periphery areas.

Somewhat surprising is that the interaction variables in the SUR estimation show that the complementary effect within the EU15 is less strong than the general effect and the 3SLS estimation show a reduced effect in the migration equation and no significant

distinction from the general effect in the import equation. As the result suggests that the general effect is complementary, one could assume that the free movement of goods and people between EU countries would strengthen the general effect as countries can specialize more and utilize economies of scale further. This should result in increased trade and factor movements. However, exemplifying with the results from the SUR estimation, the complementary effect of migration on imports within the fifteen EU member countries is 16 per cent to be compared with almost 30 per cent viewing all countries and the general effect. If one instead regards the effect of trade on migration it is even less so – only 8 per cent compared with the general effect of 25 per cent.

One reason for the reduced complementary effect within the EU15 is perhaps not a lower effect but, a stronger substitution effect between migration and trade. Following the Heckscher-Ohlin theorem, migration and trade are substitutes as goods and factor prices converge. When goods and factor prices equalise the incentives to trade or migrate diminish. Despite regulations of free movement of people there are social costs associated with migration and therefore a certain difference in factor rewards are necessary to induce factor movements. Trade liberalisation and free factor movements between EU countries therefore can strengthen the substitution effect relative the rest of the world as prices within the union converge – the complementary effect showed in the results from the regression analysis are thus reduced. Venables and Norman (1995) also emphasize that price equalisation is indifferent to movements of goods or labour. Both from the results in this study and from earlier papers it is established that the EU member countries tend to trade more with each other than the rest of the world. This could indicate that trade in goods has led to that both goods and factor prices within the union has converged and thus reduced the incentives for migration. However, we know that prices has not fully equalised within the EU and there may be other explanations as well.

Theories predict that migration and trade are complementary if migration results in a larger export sector. As the five receiving countries in this study are highly developed and industrialised countries their export sector are more dependent on skilled labour and their imports consists to a large extent of manufactured products from unskilled labour. Therefore, one could assume that immigration from other EU15 countries would strengthen the export sector to greater extent than migration from the rest of the world and thus show a stronger complementary effect. However, the results show that the opposite has taken place. One must remember that this study focuses on trade in commodities and do not account for trade in services. The service sector is growing all around the world, not least in the EU. An

increasing part of the developed countries export is today highly qualified services such as engineers, researchers, medical personnel etc. As the service sector accounts for a growing part of the intra-EU trade, so does migration that are part of the service sector. Hence, the effect of highly qualified labour disappears into the service sector and does not affect the production of goods. The effect viewable in the regression analysis is therefore to a large part the effect from migration of unskilled labour that influences the production of commodities and will thus mainly affect the import sector and create a substitutability effect. Since the substitutability effect from less skilled labour will impact upon the commodity sector and the complementary effect from highly qualified services the service sector, the results show a reduced or a non-divergent complementary effect within the EU15 despite the vision of free movements of goods and people.

7 Conclusion and final thoughts

The aim of this thesis is to establish the relationship between migration and trade and to investigate if the intra EU effect differs from the more general effect due to the Single Market Program and the internal market.

The results are straight forward and the obvious conclusion to be drawn from the empirical investigation is that migration and trade are complements. Interesting is how the intra EU results differ from the general results. The complementarity between migration and trade are weaker where free movement of goods and people are allowed. However, this could be due to a number of factors and as discussed in chapter 6 the answers are never as straight forward as they first appear to be. Many factors needs to be considered and, because of this study's interest in the EU, the internal market and free movement between member countries, it would be more than interesting to extend the research area to include also the freedoms of services and capital.

Namely, one important notification in the analysis is that part of the results might be misleading due to the fact that this study is limited to commodity trade and part of the effect might be veiled in the service sector. It would therefore be of interest to extend this study to include also services. The service sector accounts for a growing part of trade between countries and are therefore of growing interest to studies in this special field of research. Even the forth freedom – capital – would be of interest as different factors of production also are linked to each other. By studying the movement of capital through Foreign Direct Investments and include the growing service sector one might reach further insights about the link between migration and trade.

It is also possible that one reason for the intra EU effect to be reduced from the more general effect is a greater substitutability effect within the EU. EU member countries tend to trade more with each other than with countries outside of the EU and one might therefore see tendencies towards price equalisation and hence an increased substitutability effect.

The effect within the EU might also have been different towards a greater substitute effect if circular migration (see 1.3 for explanation) could have been included in the study.

This effect is what is often up to both public and political debate, that the free movements of people would lead to greatly increased migration flows from, for example, Eastern Europe to the northern and central parts of the EU. It would therefore also be of interest to study this intra EU relationship for the years after the widening of the EU to the east. A widening of the EU results in a more heterogeneous group of countries and by extending the study with this effect of more diversified countries might as well lead to further insights about the link between migration and trade and if this relationship varies due to different contexts.

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Appendix

The table below show the included variables with a brief explanation, the source of the data and, if not a dummy variable, its mean value.

Variable	Explanation	Source	Mean
MASS GDP	GDP destination country * GDP partner country (GDP in constant prices year 2000)	WDI-online	1.0704E+23*
MASS population	Population destination country * population partner country	Penn world table	8.9446E+14*
Distance	Distances between two countries capitals	cepii	
contiguous	Contiguous / adjacency / common border	cepii	
Common language	Same official language in both countries	cepii	
Conflict	Armed conflicts	Uppsala University, UCDP database	
colony	Common colony after 1945	cepii	
distance	Distance between capitals, incorporate internal distances	cepii	6712.06013
Migration	Inflow of foreign population by country of nationality, 1996/1997-2001	mpi-migration policy institute	1307.26996
Import	HS1996 classification, total bilateral import volume in current US dollar	UN comtrade database	1047291562

Region and country dummies have been excluded by purpose.

* E+23 indicate that the comma should be shifted 23 steps to the right. E+14, 14 steps.