Aid (f)or Trade

An evaluation of aid and the Dutch disease in developing countries

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Summary

In this bachelor thesis examines the relationship between aid and trade by looking at the impact of aid on the export sector through Dutch disease effects. The theory of the Dutch disease as described by Corden and Neary (1982) is discussed, where it is shown that in the long run, a discovery of natural resources can lead to Dutch disease symptoms in two ways. First, the spending effect occurs when a country receives more income. An increase in demand will drive the prices of non-tradable goods up, leading to a higher relative price of the non-tradable good to the tradable good. Second, the resource movement effect can lead to reduced competitiveness of the manufacturers sector, because increased labour demand will lead to increased wages. In the short run, monetary factors have to be taken into account. In this case, a resource boom causes the nominal exchange rate to appreciate if this is flexible, and inflation will occur if the nominal exchange rate is fixed, leading to an appreciation of the real exchange rate.

This mechanism can be applied to aid. Development aid is primarily spent on the social sector, which is non-tradable. In the long run, the spending effect and resource movement effect can occur due to a large capital inflow of aid. An increase in income will lead to an increase in demand, which will raise prices in the non-tradable sector. Since prices of the tradable goods are determined on the world market, the relative price of non-tradable goods will increase, which will leave the non-tradable sector more profitable. The resource movement effect will occur when labour is drawn to the non-tradable sector, which is booming, leading to higher wages. This will leave the tradable sector less competitive, where the agriculture and the manufacturers sector in the case of aid can be crowded out. In the short run, aid can lead to an appreciation of the nominal exchange rate if this is flexible, and the money reserves in the economy can lead to inflation if the nominal exchange rate is fixed, leading to a higher relative price of non-tradable goods.

The appreciation of the real exchange rate can be a problem, because aid is often only given temporarily and it might be difficult to reverse the changes that the economy underwent when aid stops. Furthermore, the reduced competitiveness of the tradable sector leads to reduced investments in this sector, because it is less profitable. This will reduce productivity in the long run.

The findings discussed above, however, are theoretical. In reality, this theoretical model might not hold, especially in the complex context of a developing country. The model is based on assumptions that might not be realistic for a developing country, such as full employment at all times. This is not realistic, because developing countries often face high rates of unemployment. Furthermore, aid can improve productivity in the long run, and therefore counterbalancing the negative effects of the Dutch disease. These complexities point out the importance of empirical evidence.

The findings of empirical research are mixed and somewhat limited. Cross-country studies found mainly supporting evidence, suggesting that aid indeed leads to a reduced competitiveness of the export sector. Country specific research, however, had contradicting results. Some country specific research found supporting evidence, while other studies did not find signs of aid-induced Dutch disease. For some countries that were studied, such as

Ghana, different studies on the same country draw different conclusions on whether or not this country suffers from the Dutch disease. Therefore, more empirical research is needed in order to determine to what extend aid leads to the Dutch disease. Furthermore, it is suggested that policy measures had led to a reduced visibility of the Dutch disease, which could explain the ambiguous findings. The empirical evidence shows that the relation between aid and the Dutch disease is not as straightforward as the theory.

The country specific situation should be taken into account when designing policy in order to avoid Dutch disease symptoms. Furthermore, it is important for a recipient to decide whether or not they expect the aid flow to be temporary or permanent. If the aid is expected to be temporary, it might be more beneficial to avoid effects on the real exchange rate, by using monetary policies. If the money is not spent in the domestic economy, changes in the real exchange rate might be avoided. In the case of a permanent flow, it might be more beneficial for a recipient to adjust to the changes and counterbalance the negative effects on the export sector. This can be done by using aid to stimulate productivity, or by reducing transaction costs. Although conditionality is criticized for political reasons, this can be an instrument for the donors to make sure that aid is put to good use and implement monetary and fiscal measures.

This research examines at one specific mechanism that might impair the effectiveness of aid. It is important to look at the country specific circumstances in order to understand the working of this mechanism. More empirical research is required to gain better understanding of the impact of aid on the competitiveness of the export sector. There is a possibility of a negative impact of aid on the export sector, and donors and recipients should take this into account when designing aid policy. Understanding of specific mechanisms such as aid-induced Dutch disease can contribute to understanding why aid is often not meeting its objectives and what can be done to make aid more effective.

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Introduction

It is presented as a very simple story in donor countries: people in large parts of the world, especially in Africa, are poor, underdeveloped, suffer from famines and are uneducated. Rich countries give money and other supplies to these developing countries, so they start developing and become rich, just like the donor countries. Yet, no clear relationship is found between development aid and economic growth[1]. This led to discussion on the effectiveness of development aid. Aid is aimed at promoting development (Perkins, Radelet and Lindauer, 2006). However, as van Wijnbergen (1985: p. 16) states: *"aid, like many otherwise effective medicines, has unwanted side effects that require explicit policy attention."* One of these negative effects of aid for recipient countries is the "Dutch disease," where the export sector of the recipient country becomes less competitive on the world market due to appreciation of the real exchange rate, caused by large amounts of capital inflows (Adenauer and Vagassky, 1998).

The theory of the Dutch disease was first identified in the Netherlands, when in the 1960s reserves of natural gas were found. People in the Netherlands expected that the natural gas would bring them prosperity. In the 1970s however, inflation in the Netherlands increased, which led to lower exports, lower rates of income growth and rising unemployment. These effects occurred, because the export boom that was caused by the newly found natural resources led to an appreciation of the real exchange rate. Later, this so-called Dutch disease was found in developing countries as well. It was suggested that large amounts of aid flows can trigger Dutch disease effects. Not only an export boom, but all kind of capital inflows, such as aid, can cause the real exchange rate to appreciate, leading to a lower competitiveness of the export sector for the recipient country. (Perkins, Radelet and Lindauer, 2006)

This study examines the relationship between development aid and the Dutch disease. One of the aims of development aid has been stimulating the export sector, because trade is often associated with economic development (van Wijnbergen, 1985). According to the World Trade Organization (2011a), in the past few years approximately thirty per cent of Official Development Assistance (ODA) was spend on trade related programmes. However, if aid triggers Dutch disease effects, and thus makes the export sector less competitive, the objective of aid is not met and aid might even undermine trade. Examining the Dutch disease effects in developing countries brings us one step closer to understanding why there is such a weak relationship between aid and economic growth, and how aid could be improved to make it more effective.

The structure of the thesis is organized as follows. In the chapter two, I will describe the theoretical background of the Dutch disease by discussing Corden and Neary's (1982) theoretical framework. This is followed by an application of the development aid on the Dutch disease in chapter three. In chapter four, the empirical evidence on aid and Dutch disease effects for recipient countries is discussed. This is followed by a description of how

[1] Adenauer and Vagassky (1998) argue that there is no significant correlation between aid and economic growth. Moyo (2009) argues that there is a negative relationship between aid and economic growth. Lesink and White (2001) find a positive relationship, but when aid is increased, the impact on growth diminishes.

Dutch disease effects can be avoided and thereby looking at the policy implications of my research in chapter five. Finally, this thesis finishes with the conclusion in chapter six.

2. Theory of the Dutch disease

In the 1960s, major reserves of natural gas were discovered in the Netherlands. This promised to be a boost for the Dutch economy. However, the Dutch economy suffered from rising inflation, declining exports of manufactures, lower income growth and an increasing unemployment (Perkins, Radelet and Lindauer, 2006). Corden and Neary (1982) describe this paradox in a theoretic model and call this the "Dutch disease." Before applying the Dutch disease model to development aid in the next chapters, I will now describe the theoretical framework of the Dutch disease.

Assumptions of the model

In the 1970s and 1980s, several countries experienced the same paradox as the Netherlands did: a boom in primary exports did not result in prosperity. Instead, it had side effects such as inflation, lower exports, lower rates of income growth and rising unemployment (Perkins, Radelet and Lindauer, 2006). As the Dutch disease became increasingly known as a general phenomenon in the 1970s and 1980s, the paradox received its theoretical foundation by Corden and Neary (1982). Initially, the model was designed to understand the negative side effects of export booms due to the discovery of natural resources, where the booming sector reduces competitiveness of other exporting sectors (Jones, Neary and Ruane, 1986). Later on it was acknowledged that not only the discovery of natural resources can trigger Dutch disease effects, but other sources of a booming sector, such as development aid, can trigger similar effects.

Corden and Neary (1982) use the Salter-Swan model as the basis for their framework, which is a model for a small open economy. Their model contains several assumptions. First of all, it concerns an open economy, which implies that the domestic economy is affected by international capital flows and trade. Second, the economy is assumed to be small so that the demand for imports or supply of exports does not affect the world prices. Third, the economy is divided into two sectors, the sector of tradable and the sector of non-tradable goods.[2] The tradable goods sector produces two types of goods, a leading good and a lagging good. The leading good is the good that is booming. In the original model, which was designed for the case of the Netherlands, the leading good was energy. The lagging good in the model of Corden and Neary was manufacturers. The second sector produces only one type of non-tradable good. In the original model, the non-tradable sector produces services.[3] Fourth, the model only concerns real values and therefore ignores monetary concerns. If a boom of exports occurs after the discovery of natural resource, the economy experiences a real shock, not a monetary shock. Therefore, the model analyzes the impact of the shock on real income and allocation of production factors rather than monetary effects (Neary and van Wijnbergen, 1985). The fifth assumption is that there are no distortions in the markets for

[2] Perkins, Radelet and Lindauer (2006) identify tradable goods as goods that are imported, exported or could be imported or exported and are sold for world market prices. Non-tradable goods are not competing on the world market, are produced domestically and have prices determined by local supply and demand.

[3] Energy, manufacturers and services are goods that are used for the original case of the Netherlands. These goods were typical for the tradable leading and lagging good and the non-tradable good in this case. For the application of the model on other cases, other goods than energy, manufacturers and services may be used. In developing countries, for instance, agriculture is often an important good. However, for now, I will use the goods that were used in the original model in order to explain the model.

both commodities and factor inputs. This is especially important in the labour market, where the real wages are assumed to be perfectly flexible and there is full employment at all times. Finally, although the boom can have several causes, the model assumes that an exogenous factor, such as the discovery of natural resources, causes a onetime increase in production, which leads to a boom in one sector (Corden, 1984).

The real exchange rate

Corden and Neary's (1982) model identifies two major effects of an export boom: the spending effect and the resource boom effect. These effects, which will be elaborated later in this chapter, occur through changes in the real exchange rate (Perkins, Radelet and Lindauer, 2006). As stated above, the model uses real values and therefore the real exchange rate rather than the nominal exchange rate. The effect of the nominal exchange rate on the real exchange rate will be discussed later in this chapter. Neary and van Wijnbergen (1985) define the real exchange rate as "the relative price of tradable to non-tradable goods."[4] It must be noted that the price of tradable goods is equal to the world price and cannot be affected by the domestic economy, because it is a small open economy. Therefore, for a small open economy, the prices of tradable goods are determined exogenously, whereas the prices for non-tradable goods are determined domestically.

There is a distinction between the short run and the long run real exchange rate. The real exchange rate in the long run concerns the long run equilibrium, which does not take monetary considerations into account. This can only be affected by changes in fundamentals, such as technological progress or the discovery of natural resources. In the short run, however, the real exchange rate is not always at its long run equilibrium, but fluctuates around the long run equilibrium. Although monetary factors do not affect the real exchange rate in the long run, they can affect the short run real exchange rate. Thus, in the long run, real factors affect the real exchange rate, whereas the short run fluctuations in the real exchange rate are determined by monetary factors. Corden and Neary (1982) use the long run real exchange rate in their model by not taking monetary factors into account. (Edwards, 1988)

Working of the model

So what happens in the case of a booming sector? I will elaborate this by explaining the two effects of a boom indicated by Corden and Neary (1982): first, the spending effect and second, the resource movement effect.[5] As stated earlier, there are two sectors, the tradable and the non-tradable sector, where the traded goods sector produces energy and manufacturers, and the non-tradable sector produces services. An exogenous factor, such as the discovery of natural resources, causes an increase in production possibilities in the tradable goods sector. Figure 2 in appendix 1 illustrates this by a move of a graph that is called the production

[4] Thus, real exchange rate$=\frac{Price\ of\ Non-Tradable\ goods}{Price\ of\ Tradable\ goods}$
This definition used in this model is different from definitions used before this model, which was an important innovation of the Salter-Swan model (Perkins, Radelet and Lindauer, 2006).
[5] For a graphical explanation of both effects on the commodity market and the price of non-tradable goods see appendix 1 and 2.

possibility frontier from TS to T'S. In the case of the spending effect Corden and Neary assume that the booming energy sector does not use any labour. Under this assumption, an increase of production in the energy sector due to the discovery leads to an increase in real gross domestic income, because prices remain equal because they are traded at world market prices (Neary, 1982). Thus, a higher production under equal prices for goods and factor inputs lead to a higher real income of the country.

The increase of real income, due to the increase in production, causes a higher demand for goods. The increased demand for non-tradable goods is illustrated by a shift from D_0 to D_1 in figure 3 of appendix 2. This increase in demand will cause an increase in price of services, the non-tradable good. The prices in energy and manufacturers, the tradable goods, will remain equal, because the model concerns a small open economy that does not affect world prices. Instead of a price change of tradable goods, the increase in demand of tradable goods will be met by increased imports. The increased price of non-tradable goods will cause a higher relative price of the non-tradable good to the tradable good, because the price of the non-tradable good has increased and the price of the non-tradable good remains equal. This is referred to as an appreciation of the real exchange rate. (Corden, 1984)

This appreciation of the real exchange rate discourages production of tradable goods, because the price for non-tradable goods is relatively higher, leaving the non-tradable sector more profitable. This is what is called the spending effect. Higher profitability of domestically produced goods will draw production away from the manufacturers sector to the services sector, leading to a higher output of services and a lower output of manufacturers, and leaving the output in the energy sector the same.

For the second effect, the factor inputs are considered. We now assume that the energy sector does require labour. In the case of a boom, an exogenous factor causes a higher profitability of labour in the energy sector, due to a higher marginal product of labour[6] (Corden, 1984). The newly found resource is abundant; therefore each unit of labour can produce a lot of energy. This leads to a higher demand for labour in the energy sector, which increases the wage rate. This increase in wage rate will draw labour away from the manufacturers and services sectors into the energy sector, because the marginal product of labour is high in the energy sector. Therefore, the supply of energy increases relative to the production of services and manufacturers, which is illustrated by a shift from S_0 to S_1 in figure 3 of appendix 2. This lower supply of non-tradable goods leads to a higher price of non-tradable goods, as can be seen in figure 3 of appendix 2. The higher price of non-tradable goods leads to an appreciation of the real exchange rate. The movement of employment is also referred to as direct de-industrialisation, where the lower accumulation of labour for the production of manufacturers and services causes a lower output of both manufacturers and services (Corden, 1984).

If both effects are put together now, we get the additional effect that is called indirect de-industrialisation (Corden, 1984). Not only did labour move from the manufacturers to the energy sector through the resource movement effect, but this was supplemented by a movement of labour from the manufacturers to the services sector through the spending effect (Corden, 1984). It depends on the strength of the spending and resource movement

[6] The marginal product of labour is the returns of one extra unit of labour.

effect what will happen to the output of services, since both effects have other consequences for the output of services. In figure 2 of appendix 1, both effects together bring the economy from equilibrium point *a* to point *g*, where the production of both tradable and non-tradable goods is higher, which implies that the spending effect is stronger than the resource movement effect. Figure 3 in appendix 2 moves its equilibrium from point *A* to point *E,* where the price of non-tradable goods has increased through both effects and the production of non-tradable goods has increased slightly, because the spending effect was stronger than the resource movement effect. Although these changes might not seem problematic, it is not to say for how long this output will be able to stay up, since natural resources, which are the cause of the boom, are often exhaustive (Perkins, Radelet and Lindauer, 2006).

Nominal exchange rates and the Dutch disease[7]

We will now shortly look at a Dutch disease model that does take monetary considerations into account by looking at the nominal exchange rate.[8] As was stated earlier, the long run equilibrium real exchange rate, as described by Corden and Neary (1982), does not take monetary factors into account. However, in the short run monetary factors do affect the real exchange rate. In this short run approach, the real exchange rate is adjusted by changes in the nominal exchange rate.[9] If the nominal exchange rate is floating, it depends on the supply and demand for a currency. The supply of a currency can be affected by fiscal policy, through government taxation and expenditure, and monetary policy, through money supply. If the nominal exchange rate is fixed, it is officially set by the government and depends on policy rather than supply and demand for a currency.

First, I will discuss the case of a floating nominal exchange rate. When an export boom occurs, more goods from the exporting country will be sold, which will lead to an increased demand for the currency of the exporting country. This will lead to an appreciation of the nominal exchange rate of the domestic currency. A higher value of the currency will lead to a lower price of tradable goods, because now one unit of the domestic currency is worth more of the foreign currency. The lower price for tradable goods will lead to an appreciation of the real exchange rate and therefore cause Dutch disease effects in the short run.

Second, when a nominal exchange rate is fixed, an export boom will lead to a higher production of tradable goods are produced at a given price. This increased production of tradable goods leads to an inflow of money, which causes the economy to be in a surplus, leading to money reserves in the economy. Since the nominal exchange rate is fixed, the prices of tradable goods will remain equal. This increase in supply of money will result in a

[7] Unless stated otherwise, information from this section is based on Perkins, Radelet and Lindauer (2006)
[8] The nominal or official exchange rate is the price of a unit of one currency, for instance the U.S. dollar, in terms of the other currency, for instance the euro. A currency can either appreciate or depreciate. If a currency appreciates, the exchange rate falls. If the U.S. dollar would appreciate and the exchange rate with the euro falls, there are fewer dollars required to buy one euro. This would mean that the dollar is more expensive relative to the euro. In the case of depreciation, the exchange rate rises, requiring more dollars for one euro, leaving the dollar less expensive. (Perkins, Radelet and Lindauer, 2006)
[9] In the short run approach, the price of tradable goods= ePt, where e is an index number for the nominal exchange rate and Pt is the price for tradable goods. This leads to the definition for the short run real exchange rate $=\frac{Pn}{ePt}$, where Pn is the price for non-tradable goods. Thus, in the short run real exchange rate, the relative price of non-tradable goods is adjusted by changes in the nominal exchange rate. (Perkins, Radelet and Lindauer, 2006)

higher money demand, because income has increased due to the export boom. In the short run, this will lead to a higher demand than supply of non-tradable good. The higher demand than supply will lead to inflation in the short run through the increase in demand for domestic goods. In the long run, there will be a new equilibrium with an appreciation of the real exchange rate and a lower level of expenditure, as is described above in the model of Corden and Neary (1982). In the short run, however, the capital inflow due to the export boom leaves the economy in surplus, which leads to inflation.

This chapter shows how the resource movement effect and the spending effect can squeeze the manufacturing sector and therefore the production of tradable goods in the case of an export boom. This occurs through an appreciation of the real exchange rate, e.g. an increase of relative price of services to tradable goods. Furthermore, it was shortly discussed how the resource boom can cause inflation and an appreciation of the nominal exchange rate. In the following chapters this framework will be applied to the case of development aid: not a resource boom, but development aid will be discussed as the cause of a booming sector.

3. Aid and the Dutch disease

The previous chapter introduced the paradox of the Dutch disease, where a booming export sector, usually due to newly found natural resources, can lead to a lower profitability of the other tradable goods. These Dutch disease symptoms however, can result from other capital flows as well. It is argued that development aid can trigger Dutch disease effects, leaving the export sector of the recipient country less competitive (Perkins, Radelet and Lindauer, 2006; van Wijnbergen, 1985). This chapter examines how aid can lead to Dutch disease effect by applying the framework from the previous chapter on aid as the source of a booming sector.[10]

Aid as a capital flow

Before applying development aid to the Dutch disease model, I will now take a closer look at aid as a capital flow. Development aid is difficult to define, because it is given in many ways, both official and unofficial. The Development Assistance Committee (DAC) of the Organization of Economic Cooperation and Development (OECD) distinguishes between three groups of aid flows: Official Development Assistance (ODA), official assistance and private voluntary assistance[11] (DAC according to Perkins, Radelet and Lindauer, 2006). This research considers all three types of development assistance, because changes in the real exchange rate depend on the size and objective of the capital flow rather than who is giving it[12]. DAC states the following two criteria for development aid, which I will use in this research:

- *"It must be designed to promote economic development and welfare as its main objective (thus excluding aid for military or other non-development purposes).*
- *It must be provided as either a grant or a subsidized loan."* (DAC according to Perkins, Radelet and Lindauer, 2006: p. 522)

I will now discuss shortly where aid is going to[13]. Figure 4 in appendix 3 shows that for recipient countries, the social sector[14] is the main sector that receives development aid with

[10] I will focus on discussing aid as the cause of Dutch disease effects. A lot of discussion has been on the resource curse in developing countries. This is the paradox where countries with abundant natural resources face lower economic development. This has often been related to Dutch disease effects in developing countries. However, like Corden and Neary (1982) this theory takes natural resources as the cause for a booming sector. This research focuses on aid as the cause of Dutch disease effects. Although natural resources can trigger Dutch disease effects in developing countries, like aid, the process through which this occurs is different and should therefore not be confused. For more on the Dutch disease caused by natural resources in developing countries and the resource curse see Benjamin, Devarajan and Weiner (1989) and Collier (2008).

[11] Official development assistance is aid provided by donor governments to low and middle income countries. Official assistance is different from ODA, because it is provided to richer countries. Private voluntary assistance is funded not by governments, but by nongovernmental organizations (NGOs). The focus of this research will be on ODA and private voluntary assistance, since these will go to the larger recipient countries. (Perkins, Radelet and Lindauer, 2006)

[12] Although all three types of aid can lead to Dutch disease symptoms and are therefore considered, ODA is easiest to measure, because it is an official flow. Therefore, the empirical studies that I will discuss use ODA as the indicator for development aid rather than all three flows.

[13] See appendix 3 for an elaboration on the statistics on ODA that are described in this section. Unless noted otherwise, all statistics in this paragraph are based on OECD (2011).

[14] The social sector consists of the following sub-sectors: education, health, population programmes, water supply and sanitation, government and civil society and other social programmes. For the exact division see figure 6 in appendix 3.

forty-two per cent, followed by the economic and production sector[15] with twenty-five per cent. The spending of ODA on the social sector has relatively increased during the 1990s, from seventeen till forty-two per cent of all ODA spending (see figure 5 in appendix 3). Within the social sector, most money is spent on governance and civil society, followed by education and health (see figure 6 in appendix 3). In the private sectors, the objectives for development money are similar: private development money is primarily spent on health, education, civil society and good governance (Grimm et al., 2009). Figure 7 in appendix 3 displays the regional distribution of aid, which shows that most official development assistance is going to Africa with thirty-seven per cent, followed by Asia with thirty per cent. The largest recipients are Afghanistan and Iraq, which explains the large proportion of ODA received by Asia (see table 1 in appendix 3).

For the application of the Dutch disease model on development aid, two considerations have to be made. First of all, it has to be considered that the model will be applied to African and Asian economies. The model was originally designed for the case of the Netherlands; it has to be considered whether the model can be applied to the context of African and Asian economies. Second, aid is for the most part spent in the social sector. The model of Corden and Neary (1982) discussed in the previous chapter divides an economy in the tradable and non-tradable sector, where services is the typical good for a non-tradable sector. The social sector includes of health, education and governance. These are all non-tradable goods. Therefore, it can be said that aid is primarily spent on the non-tradable sector, which causes the non-tradable sector to boom. This is different from the original Dutch disease model, where the boom occurs in the tradable sector, usually due to the discovery of natural resources. This is of great importance for the application of the model of Corden and Neary to aid, which will be discussed in the next section.

Application to the theoretical framework

Shortly after Corden and Neary's (1982) model was introduced, van Wijnbergen (1985) applied the framework of the Dutch disease on development aid, suggesting a causal relationship between aid and export performance. Van Wijnbergen uses the distinction between tradable and non-tradable goods; where aid is primarily spend in the services sector[16], which will cause the non-tradable sector to boom. In the previous chapter two effects of the Dutch disease were discussed. First, the spending effect, where higher income causes to higher demand and in turn lead to higher relative prices of the non-tradable good, since tradable goods are traded at fixed world market prices. Second, the resource movement effect is identified, where capital and labour is drawn to the booming sector from the other sectors due to an increase in labour demand in this sector. The increase in labour demand in one sector will lead to an increased labour demand in the economy, which will lead to a higher wage rate, leaving the export sector less competitive.

[15] These sectors consist of the following sub-sectors: transport and communications, energy, banking and business services, agriculture, forestry and fishing, industry, mining and construction and trade and tourism. (OECD, 2011)

[16] Van Wijnbergen assumes that aid is primarily spent in the services sector. The statistical data presented earlier in this chapter and in appendix 3 support this assumption.

Van Wijnbergen (1985) applies both effects to development aid as the capital flow that causes the Dutch disease. I will now discuss the spending effect in the case of aid. Aid will be given to the recipient country as a gift or subsidized loan to the recipient country. Therefore, the capital inflow of aid will lead to a higher income. Like in the framework of Corden and Neary (1982), the increase in income will lead to an increase of aggregate demand in a country. This will drive prices up, because at the same level of production, more goods are demanded now. However, since only the prices of non-tradable goods are determined domestically, the increase in aggregate demand caused by aid will lead to an appreciation of the real exchange rate.[17] As discussed in the model of Corden and Neary, wages are assumed to be fixed in the case of the spending effect, because factor inputs will not be taken into account yet. Thus, the increase in income will make the non-tradable sector more profitable, because the prices will go up but the factor inputs will have the same costs. This will lead to an increased production in the non-tradable sector, which is illustrated by the shift of NT in figure 8 of appendix 4. The spending effect as discussed above is quite similar to the spending effect in the model of Corden and Neary (1982), which was discussed in the previous chapter. In both cases, an increase in income will lead to higher prices in the non-tradable sector, which will lead to an increased profitability of the non-tradable sector, because factor inputs prices are fixed in the short run. The increased profitability of the non-tradable sector will lead to an increased production in this sector.

The resource movement effect however, is different in the framework of van Wijnbergen (1985). It is not the energy sector that is booming now, as was discussed in the previous chapter, but the non-tradable sector, assuming that aid is primarily spend on services. For the resource movement effect, factor input prices are not assumed to be fixed. The increased expenditure on the non-tradable sector will lead to a higher demand for labour in the non-tradable sector, which will lead to a higher wage rate in this sector in the short run. This is illustrated by the change in equilibrium from point A to point B in figure 8 of appendix 4. Assuming that labour is perfectly flexible between the tradable and non-tradable sector and there is full employment at all times, this increased wages in the short run will draw labour from the tradable sector to the non-tradable sector. This, in turn, will lead to a higher wage rate in the tradable sector, until the wages are at the same level as in the non-tradable sector. Thus, the increase in spending on the non-tradable sector will lead to a higher wage rate in both the non-tradable and tradable sector. This will lead to an increase in labour costs in all sectors. Since prices are fixed in the tradable sector and thus revenues in the tradable sector is fixed, the increase in labour costs will lead to lower competitiveness of the export sector and therefore a decline in exports. Thus, if we do not take benefits of aid into account, according to this model, an increase in aid will lead to a less competitive export sector.

A note has to be made on the goods that are produced in the tradable sector. As in the model of Corden and Neary (1982), there is a tradable and a non-tradable good. In the model described in chapter 2, energy and manufacturers were described as the typical tradable goods, where the energy good is booming and services is taken as the typical non-tradable good, based on the phenomena that occurred in the Netherlands. However, when aid is the source of the Dutch disease in a recipient country, the goods that are produced in the tradable sector might be different. The goods that are produced in the sectors will vary among countries. However, the role of agriculture as a tradable good has to be considered,

[17] Real exchange rate is defined as $\frac{Price\ of\ Non-Tradable\ goods}{Price\ of\ Tradable\ goods}$

because agriculture is generally more important in a developing economy than in the case of the Netherlands (Benjamin et al., 1989). Agriculture, in addition to manufacturers, is likely to be hurt due to the higher relative price of non-tradable goods, which will hurt the rural areas in developing countries, leading to rural-urban migration (Benjamin et al., 1989). The energy sector, on the other hand, might be less important in some cases, because this sector is not the source of a boom and a recipient country does not necessarily have abundant natural resources.

Temporary aspect of aid[18]

In order to analyze the impact of aid on competitiveness of the export sector, a distinction has to be made between temporary and permanent aid. Aid is sometimes a permanent source of income; however, usually aid is only given temporarily. For a recipient it is hard to determine in advance whether or not aid will be permanent, which leaves it a policy decision to determine whether or not aid is expected to be a long term flow[19]. In the previous section, where the model of van Wijnbergen (1985) is discussed, this temporary aspect is not taken into account. Now, I will discuss two problems that will occur in the case of temporary aid. First, if capital and labour markets would be perfect, as is assumed in the theoretical model, the economy could return to the equilibrium it had before the aid, thus reversing the changes. If the aid flow would stop, the real exchange rate would depreciate again and labour and capital would go back to the tradable sector, and the economy would be the same as it was before the aid in the long run, so there the economy after the aid would not be worse than in the initial situation. This would occur through a recession due to the loss of income that was gained from aid. However, the problems when aid stops will be larger than a recession due to a loss of income. Factor input markets are often far from perfect in developing countries. The higher wages on traded products have made the export sector less competitive, by drawing the resources away from the tradable sector. When aid will stop and the exchange rate depreciates again, it is questionable if a developing country with imperfect factor markets can reverse the transformation that has been made and reallocate its resources in the tradable sector.

Furthermore, the appreciation of the real exchange rate will reduce investment in the tradable sector, because this sector is not competitive. This low investment can lead to lower productivity in the long run. When the temporary aid flow stops, the recipient has faced low investment for a certain time in the export sector. Thus, the appreciation of the real exchange rate can cause a country to neglect its tradable sector, due to lead to a lower investment in the short run and therefore lower productivity growth in the long run. This will lead to problems for the recipient country when it has to rely on its tradable sector again, when the aid flows stop.

[18] Unless stated otherwise, this section is based on van Wijnbergen (1985).
[19] Van Wijnbergen (1985) state that aid is almost certainly a temporary flow. However, as stated by Younger (1992), a recipient country can expect aid to be permanent or at least long term. From a donor's point of view, it is almost impossible politically to give a recipient country permanent aid. However, a recipient might expect that it will receive aid for a considerable time. For instance, in the case of Ghana, Younger (1992) expects aid to be a permanent source of income based on the comparison with other recipient countries. Thus, the recipient can decide whether or not they expect to receive permanent aid by looking at patterns of aid.

Nominal exchange rate and the Dutch disease[20]

So far, development aid has been applied to the theory of the Dutch disease according to the model of van Wijnbergen (1985), who uses the model of Corden and Neary (1982) as the basis for his application. However, as was discussed in the previous chapter, this does not take monetary aspects into account. I will now shortly apply aid to the Dutch disease with taking monetary considerations into account, by looking at the nominal exchange rate. First, the case of a floating nominal exchange rate will be discussed. The real exchange rate can now be affected by changes in the nominal exchange rate.[21] The capital inflow of aid to the recipient country leads to a surplus of the currency of the donor country. In the case of a floating nominal exchange rate, this will lead to an appreciation of the nominal exchange rate of the recipient country, because the demand for the currency of the recipient country is higher. The price of tradable goods depends on changes in the nominal exchange rate when monetary considerations are taken into account. The appreciation of the nominal exchange rate will lead to a relatively lower price of tradable goods. This will lead to an appreciation of the real exchange rate, and a reduced profitability of the export sector.[22]

Second, in the case of a fixed exchange rate, the price of tradable goods will not change. In this case, the capital inflow of aid will lead to money reserves within the economy. The increase of money will lead to an increase of income, which will cause a higher demand. This mechanism is the same as discussed earlier in this chapter. In the short run, the increase in demand will not be met by an increase in production. Therefore, the prices of non-tradable goods will rise, since the prices of non-tradable goods will remain the same, and inflation will occur. In the long run, this increase in demand will be met by an increase in production. In the short run, however, aid is likely to cause inflation in the case of a fixed exchange rate.

Assumptions in a development context

So far the story has been theoretical. However, the reality is more complicated. One of the reasons for this is the simplifications and assumptions that are made in the theoretical framework, which might not be realistic for the reality in a developing country. For instance, the model assumes that a country produces on its production possibility frontier, thus using its full capacity (Nkusu, 2004). Developing countries often face high structural unemployment and are therefore not producing at its maximum capacity (Nkusu, 2004). More importantly, the model of the Dutch disease assumes perfect factor input markets. However, as was stated earlier, developing country is not likely to have perfect markets (Van Wijnbergen, 1985). In order to take these complexities into account, it is important to look at the context in which Dutch disease effects occur and thus look at the country specific circumstances.

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[20] Unless stated otherwise, this section is based on Perkins, Radelet and Lindauer (2006).

[21] If monetary considerations are taken into account, the real exchange rate is adjusted by changes in the nominal exchange rate. The nominal exchange rate has to be floating in order to be able to change. The nominal exchange rate depends on supply and demand of one currency relative to another. For more on this see chapter 2.

[22] For more on how a transfer can make the recipient worse of through changes in the nominal exchange rate, see literature on the transfer paradox. For instance, see Suwa-Eisenmann and Verdier (2007) and Yano and Nugent (1999)

Furthermore, the relation between aid and competitiveness of the export sector is more complex than stated in the model. First of all, aid is not all bad and can have benefits that can increase productivity, contradicting the negative effects of the Dutch disease (Torvik, 2001)[23]. In addition, the impact of aid on the real exchange rate depends on certain circumstances. The effect of aid on the real exchange rate is for instance partly determined by what sector the aid is spend, what the supply of skilled and unskilled labour is and how flexible the labour and capital market is (Rajan and Subramanian, 2011). I would like to point out the importance of empirical studies on the relation between aid and the export sector. In the end, whether aid reduces the competitiveness of a recipient's export sector through the Dutch disease depends on the costs and benefits of aid in its context, which can determined through empirical evidence (Rajan and Subramanian, 2011). In the following chapter I will discuss the empirical evidence on aid-induced Dutch disease.

In this chapter the Dutch disease model is applied to development aid as the capital inflow that causes an appreciation of the real exchange rate. It is shown in a theoretical model that aid can crowd out the export sector through two effects. First, the spending effect, where an increase in income leads to higher relative prices of the non-tradable good, which will make the non-tradable relatively more profitable, crowding out the tradable sector. Second, the resource movement effect was discussed, where the increased demand for labour in the aid receiving sector will demand more labour, which will increase the wage rate, leaving the export sector less competitive. When monetary factors are taken into account, aid can lead to inflation if the nominal exchange rate is fixed and an appreciation of the nominal exchange rate when it is floating. Different from the model discussed in chapter 2, agriculture and manufacturers are tradable goods, which are likely to be crowded out by the services sector. Aid particularly can cause problems because it is often temporary, leading to low investment in the export sector and problems with reversing the transformations that the economy underwent. However, the theoretical model might not be entirely realistic in a development context, which leads us to the importance of empirical research on aid and the Dutch disease.

[23] For more on how aid can contribute to productivity through learning-by-doing effects see Torvik (2001).

4. Empirical evidence

The previous chapter states the importance of looking at the context when analyzing aid induced Dutch disease. The assumptions of the theoretical model might not hold in the development context, aid can have benefits that might outweigh the costs of the negative Dutch disease effects and the effects on the real exchange rate depend on the circumstances of the recipient country. Therefore, empirical evidence is important in analyzing whether or not a country suffers from the Dutch disease, and in determining what can be done about it. Several studies have been done on this topic, which had mixed results. This chapter will discuss some of the important empirical studies, their outcomes and whether or not this indicates a causal relationship.

Empirical relation aid and exports

Before listing an overview of the empirical research that has been done, it is important to consider what relation the research focuses on. Figure 1 shows schematically how foreign aid is related to the export sector according to the theoretical framework that was discussed so far. Foreign aid can be related directly to a decline in the relative share of tradable goods (channel "A" in figure 1). However, a decline in the share of tradable goods will lead to an appreciation in the real exchange rate, as was discussed in previous chapters. Therefore, it is possible to examine the relation between foreign aid and the real exchange rate (channel "B" in figure 1) as well as the relation between the real exchange rate and the relative share of tradable goods (channel "C" in figure 1). Empirical studies will either look at the direct relation between aid and tradable goods (channel "A"), or examine the relation between the two indirectly, through the relation to the real exchange rate (channel "B" and "C"), or they will consider both relations. (Rajan and Subramanian, 2011)

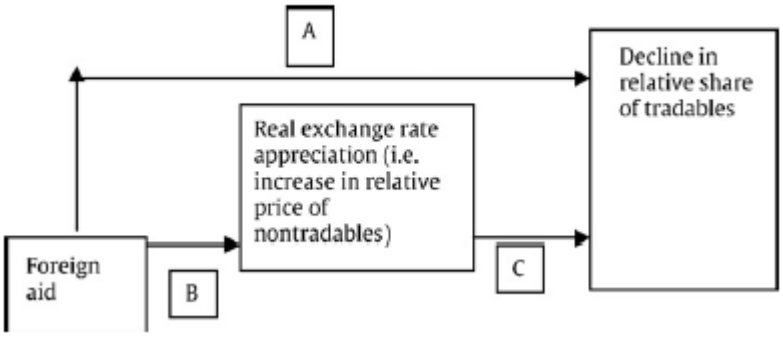

Figure 1: Relation between foreign aid and the export sector (Rajan and Subramanian, 2011)

Cross-country research

Van Wijnbergen (1985) was the first to apply the Dutch disease model to aid, suggesting a causal link, as was discussed in the previous chapter. He supports this hypothesis with cross-country empirical evidence on the impact of aid on the real exchange rate between 1969 and 1983. His research considers six countries in Africa[24], looks at two relations. First, he focuses on the relationship between aid and the real exchange rate and second, he looks at the relation between the real wages per product in the traded sector, thus considers the relations

[24] Van Wijnbergen's (1985) sample consists of Kenya, Egypt, Malawi, Sierra Leone, Tanzania and Ghana, using data between 1969 and 1983.

that are described in channel "A" and channel "B" in figure 1. Van Wijnbergen calculates the impact of aid on the real exchange rate and the impact of aid on the real product wages using data between 1969 and 1983, where he estimates the coefficient of the impact of the aid (see table 2 in appendix 5 for the findings of van Wijnbergen). Van Wijnbergen concludes that aid is positively related to real exchange rate appreciation as well as real wages per product in the traded sector. Therefore, his findings support the theoretical framework.

The discussion on whether or not aid causes the Dutch disease in recipient countries was started by White (1992). White is critical on van Wijnbergen's statistical methodology and therefore claims that there should not be a reliance on van Wijnbergen's findings.[25] Furthermore, White criticizes van Wijnbergen on the formulas he uses, because van Wijnbergen only takes the fundamental determinants of the real exchange rate into account in his research, and ignores short run determinants such as nominal exchange rate changes and inflation. These monetary aspects can have an impact on the real exchange rate in the short run and monetary policies can be used to avoid or limit these effects on the real exchange rate, which will be discussed in the next chapter.

Since then, several other cross-country studies have been done. Elbadawi (1999) does a cross-country research on the relation between non-traditional exports[26] and the level of aid and on the relation between aid and the real exchange rate (channel "A" and "B" in figure 1). He uses a panel of 62 countries, where data from 1990 and 1995 are considered. In contrast to van Wijnbergen's research, Elbadawi takes both short and long run determinants of the real exchange rate into account, thus considers both monetary and productivity factors. On this issue, Elbadawi integrates White's (1992) criticism on van Wijnbergen (1985) into account. Elbadawi's findings are different from van Wijnbergen. He finds a negative relationship between the level of aid and non-traditional exports, but only above a threshold level of aid, which is visible in figure 9 of appendix 5. This implies that there is a certain optimum level of aid. When the level aid is passes this optimum level, aid hinders the non-traditional exports. Countries receiving aid above this optimum level of aid are identified as aid dependent. It should be noted that these aid dependent countries are all African.[27]

Recent research of Rajan and Subramanian (2011) examine the direct relation between aid and the export sector, thereby considering the relation that is represented by channel "A" in figure 1. Figures 10 and 11 in appendix 5 display their findings, which suggests a strong correlation between aid and the relative growth of the exportable sector. Rajan and Subramanian use data from all countries that receive more than one per cent aid of their GDP. They take data from two periods: the average data between 1980 and 1985 and 1995 and 2000. Their research has some limits, because they use manufacturing as the only

[25] I will not discuss the statistical methodology of van Wijnbergen (1985) in detail and White's (1992) criticism on this, because this concerns statistical methodology rather than the theory of the Dutch disease and is therefore not very relevant for this research. For more on the statistical methodology of the research see van Wijnbergen (1985) and White (1992: Chapter 6).
[26] Elbadawi (1999) defines non-traditional exports as "*all exports that are not classified traditional"* (p. 616). For the exact classification between traditional and non-traditional exports see Elbadawi (1999).
[27] According to Elbadawi (1999) the aid dependent countries are Burundi, Mauritania, Gambia, Tanzania, Malawi, Rwanda, Zambia, Egypt, Cote d'Ivoire and to a lesser extent Kenya, Uganda, Burkina Faso and Sudan.

indicator for the exportable sector.[28] However, the research is innovative by its methodology, because differences between manufacturing industries within a country are taken into account. The focus of the research lies therefore on the supply side rather than why aid is given. The analysis by Rajan and Subramanian shows that the correlation between aid and the relative growth of manufacturing might be causal, by looking at the interaction between their variables. Therefore, the empirical research supports the theory of aid-induced Dutch disease. It should be noted that Rajan and Subramanian's research has one limitation: for some developing countries, agriculture, which receives no attention in the research, might be more important than manufacturing as a tradable good.

A final cross-country research that we discuss is a policy research paper of the World Bank by Ferro, Portugal-Perez and Wilson (2011). This paper has different results than the other cross country researches. The research evaluates the impact of aid on five services sectors[29] on exports of manufacturing sectors in developing countries. The research by the World Bank finds a significant positive relation with exports for four out of the five sectors[30] that are evaluated. This research, however, can be criticized for their classification of service sectors, because they use primarily production oriented service sectors, and sectors like health care and education, which receive considerable amounts of development aid, are not taken into account. This research contributes to previous research, because it shows that aid can be positively correlated to manufacturing, by looking at where aid is going.[31]

Country specific research

In the previous section I discussed several empirical cross-country studies. Most studies support the hypothesis that aid can lead to Dutch disease symptoms. Cross-country research, however, has some limitations. Country specific research takes the context into consideration, which might be important when it comes to the complex situations that often exist in developing countries. Several country specific studies have been done on the relation between aid and the export sector, which had mixed results. Some of these studies will be discussed below.

Adenauer and Vagassky (1998) examine Dutch disease effects in Burkina Faso, Cote d'Ivoire, Senegal and Togo. They find that the trade balances of all four countries were negatively affected in the 1980s, which can be linked to an appreciation of the real exchange rate due to an increase in aid inflows. However, other factors should be taken into account as well. The study does not look at changes in commodity prices and nominal appreciation of the exchange rate in the countries, which might have affected the trade balance as well. Adenauer and Vagassky suggest that due to policy measures, the effect of aid on the export

[28] Rajan and Subramanian use data from four industries that they consider most typically growing for countries that move out of agriculture: textiles, clothing, leather and footwear. The focus on manufacturing is mainly driven by availability of data.
[29] The five service sectors are: transportation, information and communications technologies, energy, banking/financial services and business services.
[30] Only aid to the information and communications technologies sector was not correlated positively with the exports of manufacturing. Aid to four other sectors (transportation, energy, banking/financial services and business services) was positively correlated with exports of manufacturing. (Ferro, Portugal-Perez and Wilson, 2011)
[31]For other cross-country empirical evidence that supports the theory see Yano and Nugent (1999).

sector was less visible in the 1990s than in the 1980s. The policy measures that were used will be discussed in the next chapter.

There has been some discussion about whether or not the Dutch disease has occurred in Ghana, one of the largest aid recipients. Younger (1992) finds evidence in his analysis, suggesting that the private sector was crowded out by the government sector through changes in the real exchange rate. Sackey (2001), on the other hand, does not find empirical evidence for the Dutch disease in Ghana. It is hard to say whether Younger or Sackey is right, but it is important to note that such contradictions in the empirical research on aid and the Dutch disease exist.[32] Other country specific research on aid and the Dutch disease shows mixed results as well.[33] The ambiguous empirical evidence indicates that the relation between aid and the Dutch disease is not as straightforward in reality as in theory and that more research on the topic is necessary.

Cross-country research supports the theory that is discussed in the previous chapters, but the country-specific studies have contradicting results. It is hard to draw any conclusions from such mixed results. However, a couple of points can be made. First of all, it is important to take the country specific situations into account when doing empirical research. Although cross-country research finds a negative correlation between aid and the real exchange rate, the country specific evidence is less straightforward. A closer look at a country suggests that this is not necessarily a causal relationship. Other factors might be important, which can be captured in country specific research. Second, aid does not always lead to a reduced competitiveness of the export sector. The implication of this finding is that aid is not necessarily bad, but policy should be designed in order to avoid negative Dutch disease effects. Third, it was discussed in the previous chapter that the agricultural sector might suffer from the appreciation of the real exchange rate. However, the empirical studies discussed pay no or little attention to this sector, but focus on the manufacturers sector. Including the agricultural sector in empirical analysis might contribute to understanding on aid and the Dutch disease in developing countries. Finally, more empirical research is required on the topic in order to determine to what extend aid causes Dutch disease effects. As Berg et al. (2011: p. 58) state: "*Despite substantial body of theoretical literature on the implications of Dutch disease from aid flows, empirical work is limited – particularly in low-income countries.*" Thus, more empirical research on aid and the Dutch disease is needed in order to have more clarity on the impact of aid on the export sector.

[32] Similar to case of Ghana, contradictions in findings are found in the case of Sri Lanka. White and Wignaraja (1992) find supporting empirical evidence. Bandara's (1995) findings on de case of Sri Lanka do not support the theory on aid and the Dutch disease.
[33] Studies supporting the theory include Arellano et al (2009) for Cote d'Ivoire. Studies challenging the theory include Hussain, Berg and Aiyar (2009) for five African countries and Nyoni (1998) for Tanzania.

5. Policy implications

So far, I have discussed the theoretical background of the Dutch disease, how this can be applied to aid and what empirical evidence there is on this theory. Some relationship is found between aid and a decline in exports, but an increase in income from aid does not necessarily lead to a decline of exports. Also, it was suggested that policies have led to reduced visibility of Dutch disease effects caused by aid in the 1990s (Adenauer and Vagassky, 1998). This chapter looks at some of the policy implications of the findings from the previous chapters. I will look how symptoms of aid induced Dutch disease can be cured or avoided, and indicate some of the things that should be kept in mind for both the donor and the recipient country.

Circumstances

As stated earlier, the country-specific circumstances are important to consider when analyzing impact of aid on the export sector. The previous chapter shows that the empirical evidence on aid and the Dutch disease is not as straightforward as the theory, especially when in the case of country specific research. This does not mean that aid cannot lead to a decrease of competitiveness of the export sector. Rather, it implies that the relation of aid and the export sector is complex and that it is difficult to make some generalizations about it, especially in the complex context of a developing country.

There are certain conditions under which the Dutch disease symptoms are expected to be more severe. When the export sector requires a lot of labour, it is more likely to suffer from the Dutch disease (Berg et al., 2006). A possible explanation for this is that the increase in wage rate that results from the increase in aid will have more impact on labour intensive industries than industries that do not require a lot of labour, which leaves certain industries more sensitive to the Dutch disease than others. In a small open economy, the prices of capital, which is a tradable good, are determined on the world market (Perkins, Radelet and Lindauer, 2006). Thus, the prices of labour will increase due to the export boom, whereas the capital prices will remain equal. Therefore, an increase in costs of labour will affect industries that require relatively a lot of labour more severe than industries that require a lot of capital, because capital prices will not change.

Another factor that determines how much aid affects the export sector is the flexibility of labour markets. If labour markets are not flexible, labour will not be drawn out of the tradable sector to the non-tradable sector, and therefore the wage rate in the tradable sector will remain the same (Elbadawi, 1999). In this case, the wage rate in the tradable sector will remain equal and the competitiveness of the export sector will not be affected by the aid through the Dutch disease.

Finally, one of the main circumstances that should be taken into account is the temporary aspect of aid. The appropriate reaction on Dutch disease symptoms depends for a large part on whether or not the recipient expects the flow to be permanent. When aid is expected to be temporary, it is more beneficial to avoid an appreciation of the real exchange rate, because it might be hard to reverse the changes that will occur due to the appreciation of the real

exchange rate, as was argued in chapter three. Avoiding an appreciation of the real exchange rate can be done through monetary policies, which will be explained below. In the case of a permanent aid flow, however, the economy of the recipient country has to adjust to the capital inflow and look at how the negative effects of the appreciation of the real exchange rate can be limited, and how the economy can benefit from the aid. (Younger, 1992)

Monetary policy

I will now first consider the policy implications for a temporary aid flow, in which it can be beneficial to avoid an appreciation of the real exchange rate. The best way to avoid an appreciation of the real exchange rate is through monetary policy. This policy reaction considers at the Dutch disease model in the short run, because monetary factors are taken into account, as was discussed in chapter three. An aid inflow leads to a surplus in the economy. In the case of a fixed exchange rate, this surplus leads to inflation, while in the case of a floating exchange rate this surplus will lead to a surplus of the recipient's currency, and hence to a nominal appreciation. Both the inflation and the appreciation of the nominal exchange rate will lead to higher relative prices of the non-tradable good[34], which is an appreciation of the real exchange rate.

If the capital inflow of aid is used for reserves rather than spend, aid will not lead to a surplus in the economy. In general, a large capital inflow of aid leads to increased money supply and a surplus of the domestic currency, which causes an appreciation of the nominal exchange rate or to inflation. Thus, when an appreciation of the real exchange rate has to be avoided, the government should avoid a large surplus of the domestic currency through monetary policy. There are several policy measures that will avoid the surplus of money in the domestic economy that can result from a large aid flow. First of all, large part of the aid inflow can be saved (Younger, 1992). If most of the money is not in circulation, the aid inflow will not lead to a surplus in the economy, and an appreciation of the real exchange rate will be avoided. The spending of the aid flow can be spread over time, which will avoid a shock and thus a strong temporary appreciation of the real exchange rate (Younger, 1992). The recipient country can buy foreign reserves from the saved money, which provides them instruments to stabilize the currency (Berg et al., 2006). Furthermore, the saved money can be used to pay off its foreign debts (Berg et al., 2006). This can be especially beneficial for countries that face high public debts and are at risk of a debt repayment crisis (Berg et al., 2006).

A second policy option is absorbing the shock by spending the aid money on imports (Younger, 1992). When an exchange rate is floating, the spending on imports will decrease the relative supply of the domestic currency to the foreign currency, and therefore counterbalance the appreciation of the nominal exchange rate due to the aid inflow. If the nominal exchange rate is fixed, the surplus will be spent on tradable goods, which have an

[34] As was discussed in chapter 2 and 3, when monetary factors are taken into account, the real exchange rate = $=\frac{Pn}{ePt}$, where Pn is the price for non-tradable goods, *e* the index number for the nominal exchange rate and Pt the price for tradable goods, which is determined on the world market. In the case of a fixed nominal exchange rate, reserves will lead to a higher Pn, and thus a higher relative price of non-tradable goods. In the case of a flexible nominal exchange rate, an appreciation will mean that *e* goes down, which means that the real exchange rate will go up.

exogenously given price, and the demand for non-tradable goods will remain equal. Therefore, the real exchange rate will remain equal. Spending the aid money on imports can be promoted by removing import barriers, through trade liberalization (Younger, 1992). Although this might be a monetary option in the short run, absorbing the aid flow with imports is controversial. The increase in imports can lead to a deficit on the trade balance of the country, which in turn requires more aid flows to fill up this gap, which can lead to dependency on aid of the recipient country[35] (Suwa-Eisenmann and Verdier, 2007).

I have discussed some monetary policy options that will avoid the real exchange rate from appreciating, because it might be difficult to reverse the changes that occur due to a temporary shock of aid. Although theoretically it might be possible to avoid such negative effects, in practice this might me more difficult or undesirable. First of all, a donor might put constraints on where the aid is spend, which might obligate the recipient country to invest the donor money in domestic goods and services (Younger, 1992; Berg et al., 2006). Furthermore, it is questionable to what extend aid is beneficial for a recipient country in the long run if it is used to buy import goods or saved. Therefore, these measures can be used to prevent negative effects due to a temporary shock (Younger, 1992). However, if a capital flow is a long term flow a country can benefit from aid by putting the aid to good use and counterbalancing the negative side effects (Younger, 1992). The next section discusses how Dutch disease effects can be counterbalanced in the long run.

Counterbalance negative effects

As stated earlier, another policy option is counterbalancing the negative effects of aid on the export sector. It was showed in earlier chapters that in the long run aid can crowd out the export sector, first of all through a relative increase of production of non-tradable goods and second of all due to an increase in wage rate, because of the increased demand for labour in the non-tradable sector. This can lead to reduced competitiveness of the export sector. The reduced competitiveness of the export sector can be counterbalanced in two ways. First, the export sector can become more productive by spending aid on sectors which enhance productivity (Perkins, Radelet and Lindauer, 2006). If productivity increases, workers produce relatively more, which counterbalances the fact that they cost more for the companies, due to the increase in wages. The second option spending aid aiming to lower the costs of a transaction.

First, there are several ways through which productivity of the export sector can be increased. This depends on what type of product is produced in the export sector. Aid can contribute to the productivity of the labour force, for instance through investments in education and health care (Perkins, Radelet and Lindauer, 2006). In general, healthy people are able to work harder and need less sick leaves and educated people have more skills that allow them to be more productive (Perkins, Radelet and Lindauer, 2006). Improvements in technology and investment in capital, such as machines that facilitate production can also increase the productivity. These improvements can not only occur through investing aid money on capital, but also by using the private sector to invest in the export sector of the recipient country, for instance by subsidizing the private sector. Other factors can contribute

[35] For more on aid dependency see Suwa-Eisenmann and Verdier (2007).

to productivity as well. The most important policy implication here is the objective of aid. The first option of counterbalancing Dutch disease effects is by taking an increase of productivity of the export sector as the objective of aid.

Second, investments that will reduce transaction costs can facilitate production, because lower transaction costs will lower the costs of making a transaction. This policy measure is increasingly popular, since the "Aid for Trade" concept was established in the World Trade Organization negotiations in Doha in 2001 (Suwa-Eisenmann and Verdier, 2007), which aims at reducing the recipient country's transaction costs with aid.[36] Transaction costs can be lowered through improvements in infrastructure, such as investments in roads, ports and telecommunications (WTO, 2011b). Investments that facilitate the connection between the recipient country and the world market can lower the costs of the transactions made by the tradable sector, and thus increase its competitiveness (WTO, 2011b).

Policy implications for the donors

So far I have described some possibilities to avoid negative Dutch disease effects. These policy options have two main implications for the donor countries. First of all, if the donor wants the recipient to invest it in domestic goods, aid should be a long term and predictable capital flow. As stated earlier, short term aid can bring along problems reversing changes when the aid stops. It is shown that if aid is only given temporarily, the best policy option might be to avoid an appreciation of the real exchange rate and therefore not spend the money domestically. It is a political decision of donor to determine whether aid should be aimed at long term and thus be aimed at domestic investment or short term and not be spent domestically. I would like to point out that the donor should be aware of the fact that if the donor is giving aid for domestic spending or investment, it is more beneficial for the recipient to give a long term predictable aid flow (Younger, 1992).

Second, the research so far suggests that although aid does not necessarily lead to a reduced competitiveness of the export sector, it is important that aid is put to good use, in order to counterbalance the negative effects of an appreciation of the real exchange rate. Therefore, it might be a good option for the donors to provide tied aid, thus giving aid with conditionality (van Wijnbergen, 1985). Donors can pay attention to the negative side effects aid by providing it with specific purposes, so it will be put to good use. In addition to using conditionality in order to promote productivity, conditionality is used for monetary and fiscal discipline (Perkins, Radelet and Lindauer, 2006). This measure is used by the World Bank and the International Monetary Fund. The IMF requires the recipient country to adopt more flexible exchange rates, smaller budget deficits, slower growth of money supply, building of foreign reserves, privatization state-owned enterprises, reduction of import restrictions and the implementation of anticorruption measures (Perkins, Radelet and Lindauer). These are monetary measures that can help preventing the Dutch disease and it is argued that conditionality has been effective, making the Dutch disease effects less visible (Adenauer and Vagassky, 1998). However, the principle of conditionality is heavily criticized, because it would allow donors to pursue their own objectives, which might not be in the best interest of the recipient country (Adenauer and Vagassky, 1998; Perkins, Radelet and Lindauer, 2006).

[36] The impact of "Aid for Trade" is not precisely known (Suwa-Eisenmann and Verdier, 2007). For more on "Aid for Trade" see World Trade Organization (2011) and Suwa-Eisenmann and Verdier (2007).

However, based on the findings of this research, conditionality of aid can be used as a policy measure in order to prevent aid-induced Dutch disease.

This chapter considers some of the policy implications that can be drawn from the previous chapters. Some conclusions can be drawn from these policy implications. First of all, country specific circumstances should be considered before designing policy. Second, if aid is only given temporarily, it might not be beneficial for the recipient country to spend it domestically, because changes of the real exchange rate due to this spending might be hard to reverse. However, if aid is long term and predictable, the recipient can benefit from domestic spending of aid, if the negative effects of the changes in the real exchange rate are counterbalanced by increased productivity and/or lower transaction costs. For the donor this means that if it wants to invest aid within the recipient countries economy, it should provide long term aid. Finally, in order to prevent negative effects of aid, it should be targeted well, which can be achieved through tying of aid.

Conclusion

The previous chapters explain the Dutch disease and how this can be applied to aid. Furthermore, the empirical evidence on this theory and how Dutch disease symptoms can be avoided are discussed. The original model of Corden and Neary (1982) considers the Dutch disease effects in the long run, where a resource boom leads to decreased competitiveness of the export sector in the long run through the spending effect and the resource movement effect. This model is applied to aid by van Wijnbergen (1985), where aid can lead to reduced competitiveness of the export sector through the same mechanism. Aid can lead to higher relative prices of non-tradable goods due to an increased demand because of an increase in income. Furthermore, the aid flow will lead to increased labour demand in the non-tradable sector, since aid is mainly spent in this sector. This leads to higher wages in all sectors, leaving the export sector less competitive.

In the short run, monetary factors are taken into account in the model. In the case of a fixed nominal exchange rate, aid can lead to inflation in the recipient's economy, because of increased money reserves. In the case of a flexible nominal exchange rate, however, aid will lead to an appreciation of the nominal exchange rate, leading to a lower price of tradable goods, since the prices of these are determined on the world market. This in turn will lead to an appreciation of the real exchange rate. These monetary factors are important to consider, because monetary measures can be taken in order to prevent Dutch disease symptoms. These symptoms can be problematic, because lower competitiveness of the tradable sector may lead to lower investments and therefore lower productivity in the long run in the tradable sector. A second problem with the appreciation of the real exchange rate is that it causes transformations in the economy, which might be hard to reverse. Aid is often given temporarily and when the aid stops it might be difficult to reverse the transformation that the economy experienced.

Although the theory seems straightforward, the empirical evidence on the relation between aid and competitiveness of the export sector is ambiguous. Cross-country research mainly supports the theory, but case-studies find mixed and sometimes contradicting evidence. Therefore, more empirical research is required in order to determine the impact of aid on the export sector. Furthermore, it indicates that the relation between aid and the export sector is complex. This can be due to unrealistic simplifications made by the theoretical model, or because aid can increase productivity in the export sector and therefore counterbalancing the negative Dutch disease effects.

These complexities indicate the importance of taking the country specific circumstances into account when designing policy on how to avoid Dutch disease symptoms. Furthermore, when designing policy, the recipient government has to decide whether or not they expect the aid flow to be temporary or permanent. In the case of a temporary aid flow, it might be beneficial to avoid the changes in the economy through monetary measures. However, this might lead to resistance of the donor countries, since the aid cannot be spent in the domestic economy in this case. If an aid flow is expected to be permanent, the recipient might be better off adjusting to the changes that are caused by aid, and counterbalance negative side effects by spending aid on things that promote productivity or reduce transaction costs, which will

increase the competitiveness of the tradable sector. A donor can stimulate this by the tying of aid, thus providing aid with conditionality.

As stated by Rajan and Subramanian (2011: p. 115): *"it is perhaps more fruitful to move beyond the inconclusive debate of whether aid is effective, and focus on specific ways it can be made to work better, by better understanding the reasons that might impair or enhance its effectiveness."* I have discussed aid-induced Dutch disease, which is one of the many factors that might impair the effectiveness of aid. The mixed empirical evidence might have led to discussion on to what extend aid-induced Dutch disease exists and more research on this is required. However, both donors and recipients have to be aware of the possibility of aid leading to a reduced competitiveness of the tradable sector. It is important here to look at the country specific circumstances, because the impact of aid on the export sector and how this should be avoided depends on the context of the recipient's economy. More aid is not always better and giving money does not necessarily end hunger and poverty. Aid has to be put to good use in order to counterbalance certain negative effects, and careful analysis of the recipient is required in order to do this. Although aid is often aimed at stimulating trade, this research showed that aid can actually discourage trade. More research on the specific impact of aid can contribute to understanding of why aid is not always meeting its objectives, and more importantly, what can be done in order to make aid effective.

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Appendix 1: Effects of a boom on the commodity market

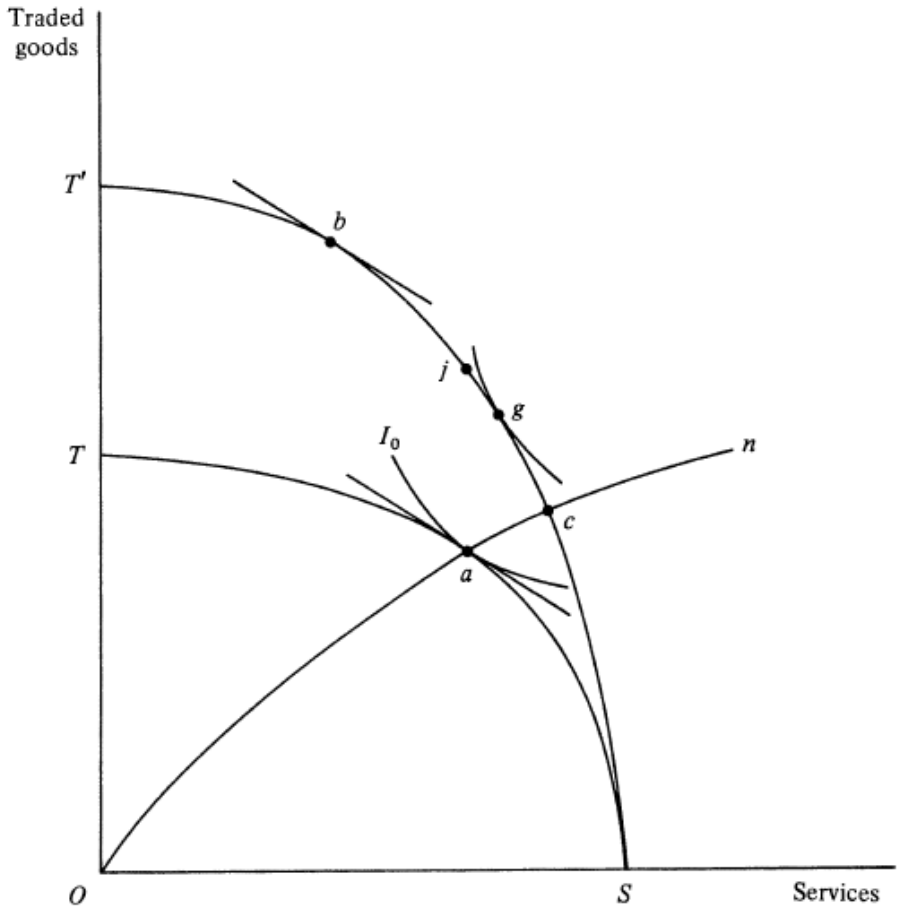


Figure 2: Effects of the boom on the commodity market (Corden and Neary, 1982)

The boom in the energy sector causes the Production Possibility Frontier to go from TS to T'S. Initially, the Indifference Curve is located at I_0. The relative exchange rate is indicated by the slope of the equilibrium point of the PPF and the indifference curve. Initially, the equilibrium point is located at point *a*. The resource movement effect causes the equilibrium point to move up to point *b,* where the real exchange rate remains the same and there is a new optimum. However, the higher demand for services through the income effect leads to a steeper indifference curve. This leads to the final equilibrium point *g*, where the production of both tradable goods and services is higher. This means there is a stronger spending effect than resource movement effect and the relative price of services has increased. (Corden and Neary, 1982)

Appendix 2: Effect of a boom on the non-tradable good

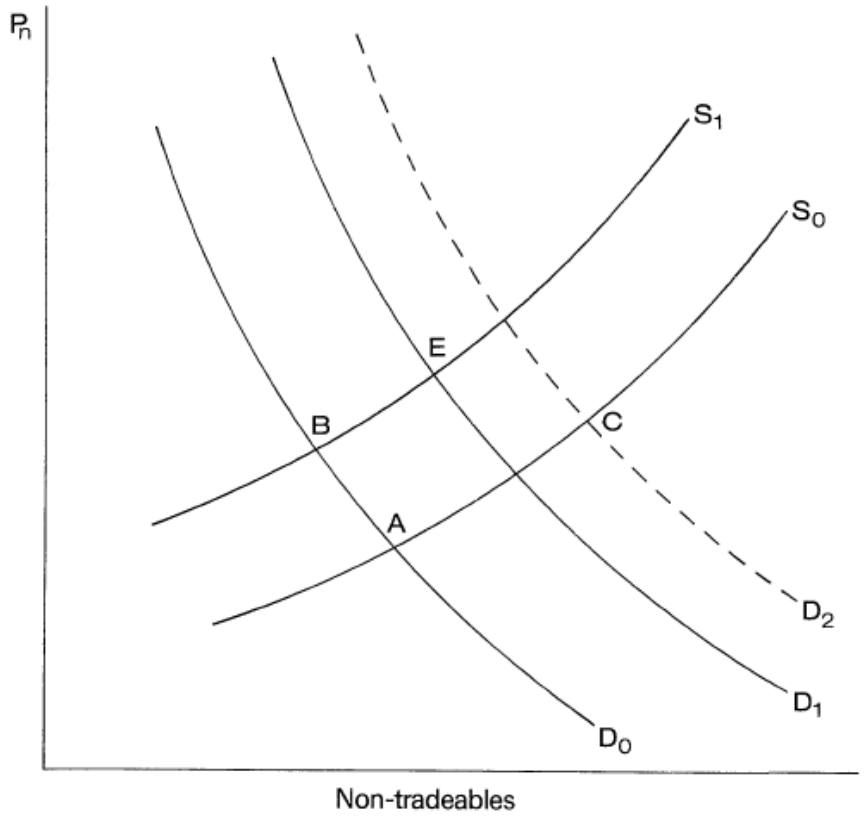


Figure 3: Supply and demand of non-tradable goods (Corden, 1984)

Spending effect: An increase in relative income leads to higher demand for non-tradable goods, shifting the demand curve to the right. This leads to a higher price of non-tradable goods and a higher quantity produced.
Resource movement effect: An increase in marginal product of labour in the energy sector draws labour away from the non-tradable sector, causing a shift to the left of the supply curve. This will lead to a higher price and a lower quantity produced in the non-tradable sector.

Both effects together will lead to the new equilibrium point *E,* where there is a higher price of non-tradable goods, and there is a slightly higher production of non-tradable goods (implying that the spending effect was stronger that the resource movement effect). (Corden, 1984)

Appendix 3: Statistics on Official Development Assistance

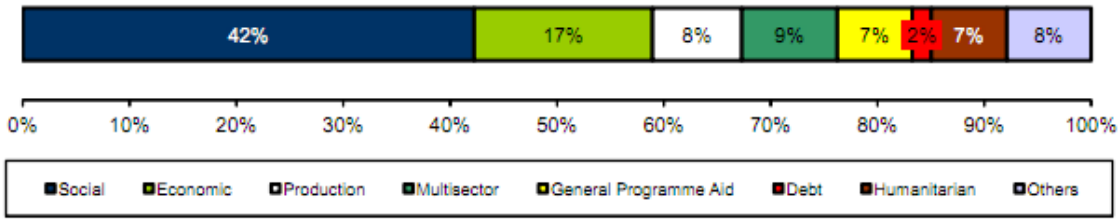


Figure 4: Division of ODA over sectors in 2009 (OECD, 2011)

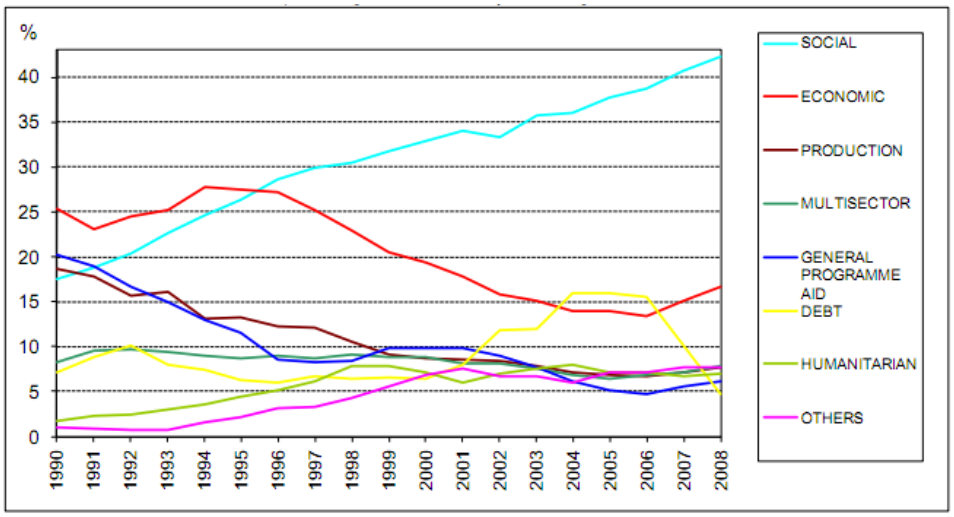


Figure 5: ODA per sector since 1990 (OECD, 2011)

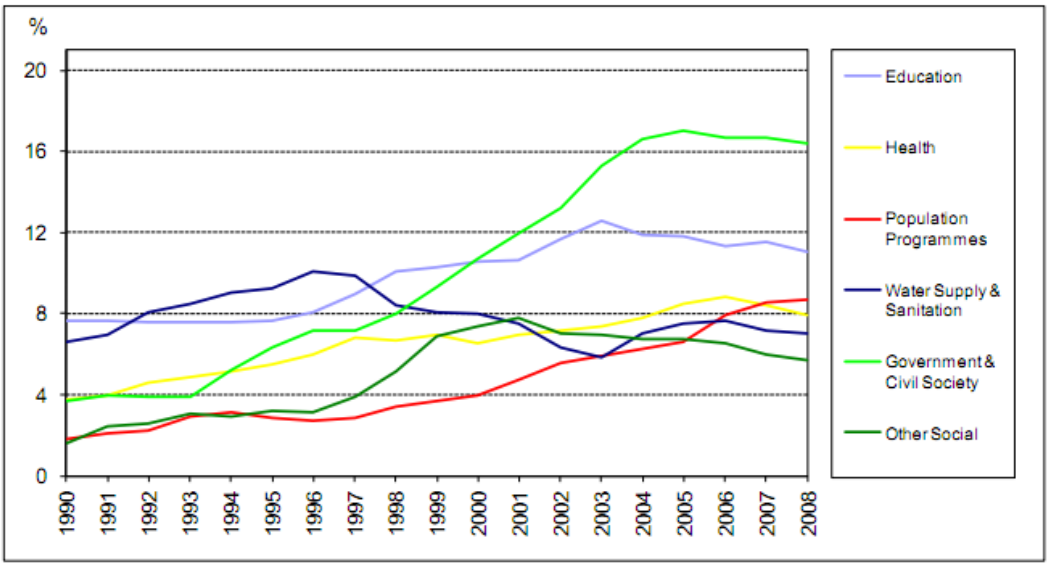


Figure 6: Analysis of ODA to the social sector since 1990 (OECD, 2011)

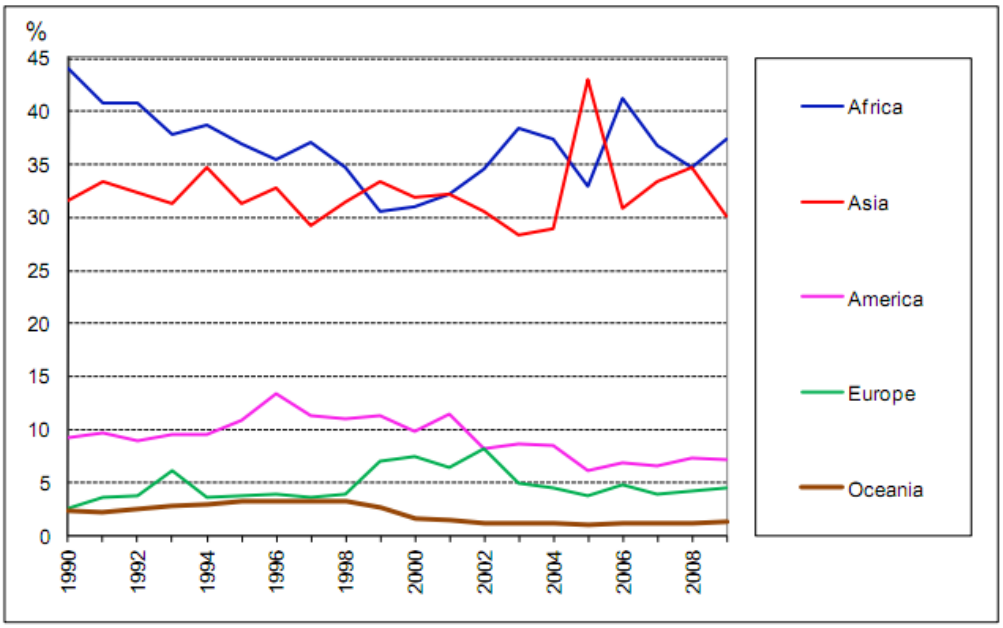


Figure 7: Regional shares of net total ODA (OECD, 2011)

Table 1: The top 10 largest ODA recipients 2007-2009 (OECD, 2011)

		2007	2008	2009	**3-year average**	% of all recipients
1	Iraq	9 185	9 880	2 791	**7 286**	6%
2	Afghanistan	3 965	4 865	6 070	**4 967**	4%
3	Ethiopia	2 578	3 328	3 820	**3 242**	3%
4	Viet Nam	2 511	2 552	3 744	**2 936**	2%
5	Tanzania	2 820	2 331	2 934	**2 695**	2%
6	Palestinian Adm. Areas	1 872	2 560	3 026	**2 486**	2%
7	Sudan	2 112	2 384	2 289	**2 261**	2%
8	Pakistan	2 244	1 539	2 781	**2 188**	2%
9	India	1 391	2 114	2 393	**1 966**	2%
10	Mozambique	1 778	1 996	2 013	**1 929**	2%
	Other recipients	76 320	93 107	95 665	**88 364**	73%
	Total ODA recipients	**106 775**	**126 656**	**127 527**	**120 319**	**100%**

Appendix 4: Effect of aid on wages

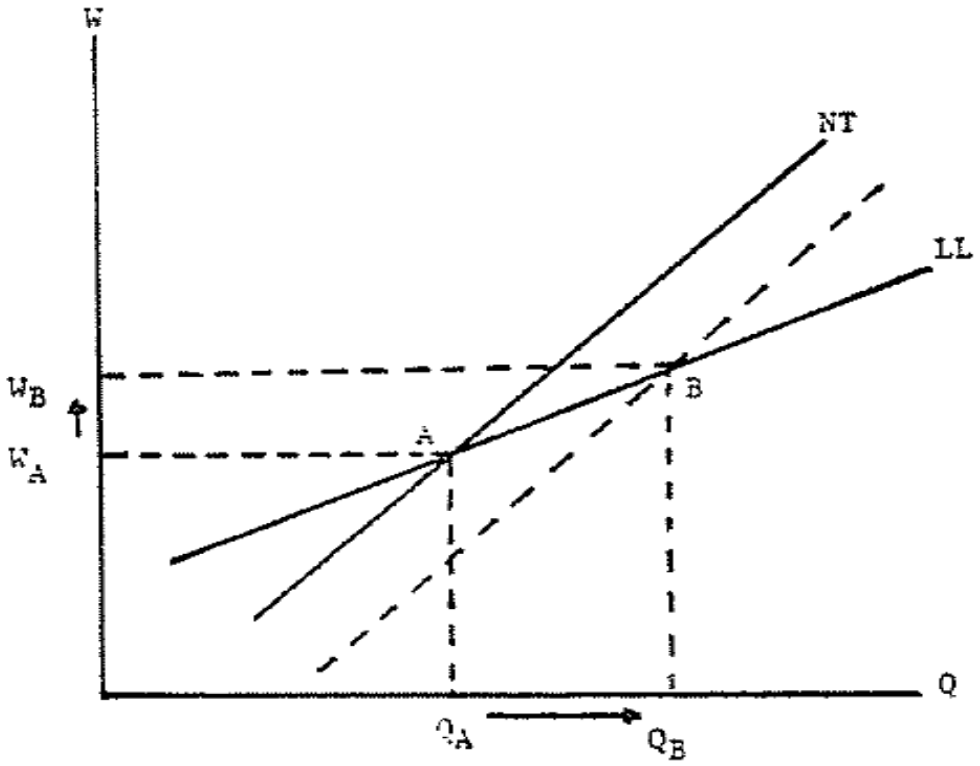


Figure 8: Wage and real exchange rate effects of higher aid (Van Wijnbergen, 1985)

An increase in aggregate demand causes a shift of the NT-curve (production of non-tradable goods) to the right. The LL-curve represents labour market equilibrium. An increase of non-tradable goods production will shift the equilibrium wage from Wa to Wb, and the production of Non-tradable goods from Qa to Qb. Thus, an increase in demand for non-tradable goods will lead to a higher wage rate.

Appendix 5: Empirical findings aid and exports

Table 2: Impact of aid on real exchange rate and real product wages: empirical evidence by van Wijnbergen (1985)

	ln(RAID)	ln(RAID(-1))	ln(RAID)	ln(RAID(-1))
Kenya	-0.37 (-2.78)	-0.18 (-1.43)	0.21 (2.08)	0.40 (3.56)
Egypt	-0.43 (-4.70)	*	NA	NA
Malawi	*	-0.49 (-2.49)	0.14 (0.43)	0.44 (1.35)
Sierra Leone	*	-0.27 (-1.58)	0.09 (0.34)	*
Tanzania [B]	-0.20 (-0.73)	*	NA	NA
Ghana [B]	-0.70 (-2.48)	-0.17 (-0.58)	1.15 (3.90)	1.35 (4.55)

Note: Elasticities of the real exchange rate RXR and the real traded product wage RXRW with respect to the real volume of aid disbursement are estimated by OLS from 1969 to 1983. [B] indicates that the black market exchange rate was used in the calculation of the real exchange rate. * indicates that a variable had a low coefficient with t- statistic below 0.10 and was therefore omitted. NA indicates wage data were not available.

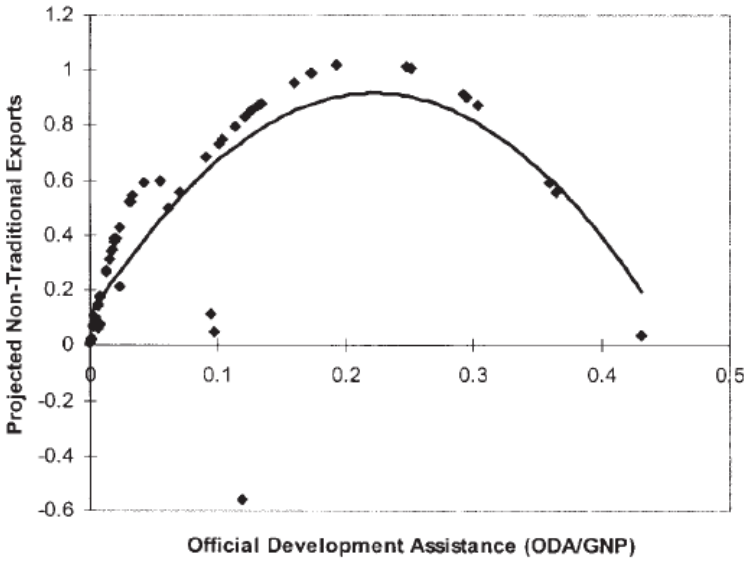
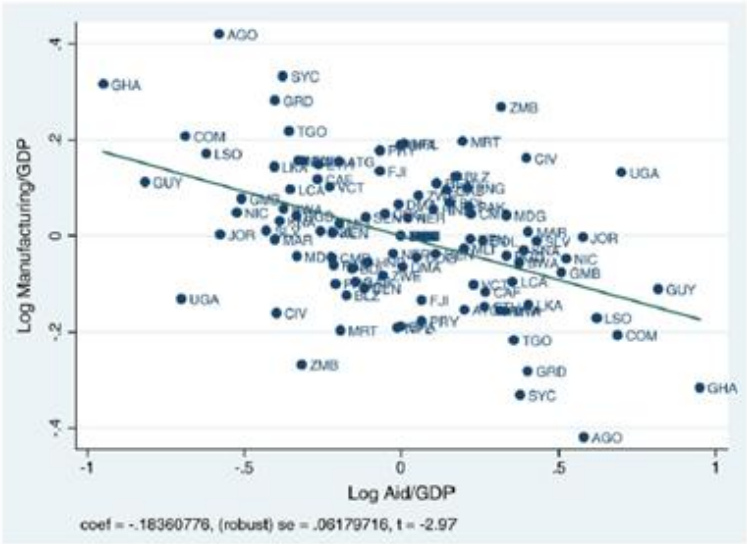
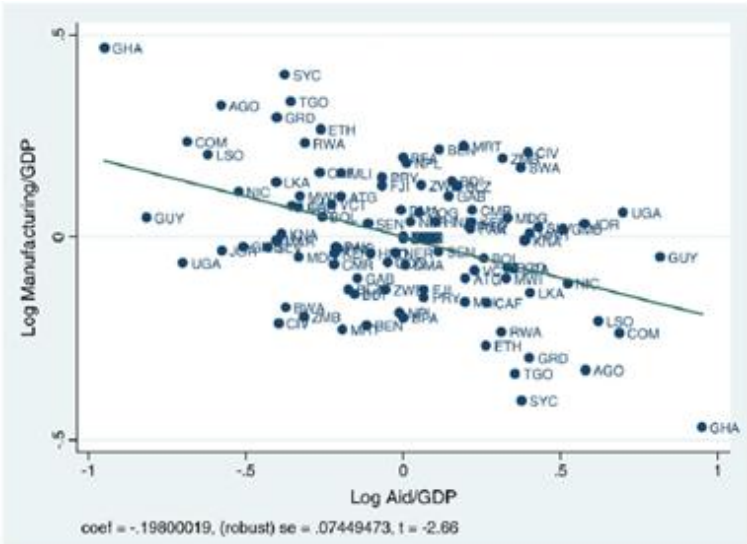


Figure 9: Relation between aid and non-traditional exports (Elbadawi, 1999)



Manufacturing and aid between 1980 and 2000. This plot is based on running a panel regression where the dependent variable is the log of the ratio of the share of value added in manufacturing to GDP for a country (at two dates, the late 1990s and the early 1980s), and the explanatory variables are the country's per capita PPP GDP, per capita PPP GDP squared, and fixed effects for the country and the time period. It can be interpreted as representing the conditional relationship between the change in the size of the manufacturing sector between 1980 and 2000 in a country and the change in aid over the same period. All variables are averages for the period 1980–85 and 1995–2000, respectively. To facilitate comparability with the core results in the paper, the sample was chosen according to the same criteria as in the core sample of the paper, namely to include countries that had an aid-to-GDP ratio greater than 1% or are low-income countries. Data on manufacturing are from the World Bank's World Development Indicators.

Figure 10: Relation manufacturing and aid between 1980 and 2000 based on Rajan and Subramanian (2011)



Share of manufacturing relative to services and aid between 1980 and 2000. This plot represents the conditional relationship between the change in the size of the manufacturing sector relative to the size of the service sector between 1980 and 2000 in a country and the change in aid over the same period. The share of the service sector is obtained as 1-(share of agriculture + share of industry). It is based on running a panel regression where the dependent variable is the log of the ratio of the share of value added in manufacturing to GDP for a country (at two dates, the late 1990s and the early 1980s), and the explanatory variables are the country's per capita PPP GDP, per capita PPP GDP squared, and fixed effects for the country and the time period. All variables are averages for the period 1980–85 and 1995–2000, respectively. To facilitate comparability with the core results in the paper, the sample was chosen according to the same criteria as in the core sample of the paper, namely, to include countries that had an aid-to-GDP ratio greater than 1% or are low-income countries. Data on manufacturing and services are from the World Bank's World Development Indicators.

Figure 11: Relation manufacturing relative to services and aid between 1980 and 2000 based on Rajan and Subramanian (2011)