Master Thesis

Economics and Business

The effect of wage raise on unemployment, consumption, labour productivity, investment and the competitive position in the Netherlands

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Abstract

The motivation for this thesis is the high current account surplus in the Netherlands, situated at the non-financial companies. This current account surplus indicates that Dutch non-financial companies save up more than what they invest in the Netherlands. This thesis approached the current account surplus as a demand issue and proposed to raise wages as a solution. The effects of a wage raise on unemployment, labour productivity, investments, competitive position and consumption are analyzed and quantified. A positive relationship was found between a wage raise and unemployment, consumption and labour productivity. A negative relationship was found between a wage raise and labour productivity. The relationship between a wage raise and investments was inconclusive. Based on the estimates found in this thesis a wage raise would benefit the Dutch economy. However, as cohesion effects among the researched variables are not taken into consideration, this thesis does not provide a policy recommendation regarding a wage raise in the Netherlands.

List of figures

List of tables

Table of contents

1. Introduction

In 1982 an agreement was established between the Dutch government, employer organizations and labour unions. This agreement, called the Wassenaar agreement, agreed on wage moderation in order to enhance employment and reduce inflation. In the 1980's, the effects of wage moderation were considered to be so positive that it became a recipe to solve every crisis after that time (Hendriks, 2011). However, criticism is being expressed both nationally and internationally on the relatively low wages in the Netherlands. Where Dutch advocates of a wage increase stress the negative effects of wage moderation on consumption, the European Commission stresses its consequence on macroeconomic imbalances occurring within the European Union (Van Schaik, 2006; European Commission, 2013).

Currently the Dutch economy is experiencing large current account surpluses, situated at the non-financial companies. As these current account surpluses are by definition equal to the savings, there is a large amount of funds not being used for domestic investment purposes. This thesis proposes to use these funds to finance a wage increase. The hypothesis of this thesis is that a wage raise would impel demand in the sectors that currently do not invest in the Netherlands. However, a wage raise is a severe measure that has many consequences both positive and negative. This thesis will focus on the effect of a wage raise on the variables discussed in Dutch literature, raising the research question of 'what is the effect of a wage increase on consumption, unemployment, investments, labour productivity and the competitive position of the Netherlands?'. This thesis will set out the advantages and disadvantages of a wage increase as well as quantify the effects, to see if a wage raise would benefit the Dutch economy. Furthermore, this thesis will also evaluate to what extent different sectors contribute to the savings surplus. If these contributions differ, this thesis will also answer the question of 'whether the effect of a wage increase on consumption, unemployment, investments, labour productivity and the competitive position in the Netherlands is expected to differ between various sectors?'. The hypothesis behind this idea is that sectors creating the savings surplus might behave differently to those who do not, or barely have a savings surplus. If the effects differ between sectors it might be expedient to implement wage differentiation rather than a general wage increase.

To this extent, chapter 2 will set out the motivation for a wage increase and its relation to the Dutch current account. Furthermore, chapter 2 will use Dutch literature to identify the mechanisms associated with a wage increase that will be examined in this thesis. Chapter 3 will discuss theory on how a wage increase could be obtained and use empirical studies to assess whether these theories are applicable to the Netherlands. Second, it will use theory and empirical studies to assess the effect of a wage increase on unemployment and determine if this effect differs between sectors. Chapters 4, 5, 6 and 7 will all use the same method in assessing the effect of a wage raise on an economic variable. First, theory is used to predict what will happen to the economic variable in the case of a wage raise. Second, empirical studies are used to assess whether the theoretical relationship exists, as well as to quantify this relationship. Furthermore, if theory gives rise to the expectation that the researched effect might differ between sectors, we will turn to empirical studies for verification and quantification of this effect. Chapter 4 will focus on the relationship between a wage raise and labour productivity. Chapter 5 will assess the effect of a wage raise on consumption. Chapter 6 will assess how the Dutch competitive position is affected by a wage raise and chapter 7 will assess the effects of a wage increase on the Dutch level of investments. Chapter 8 will end with a conclusion and discussion on the effects of a wage raise on the discussed economic variables.

2. The current account

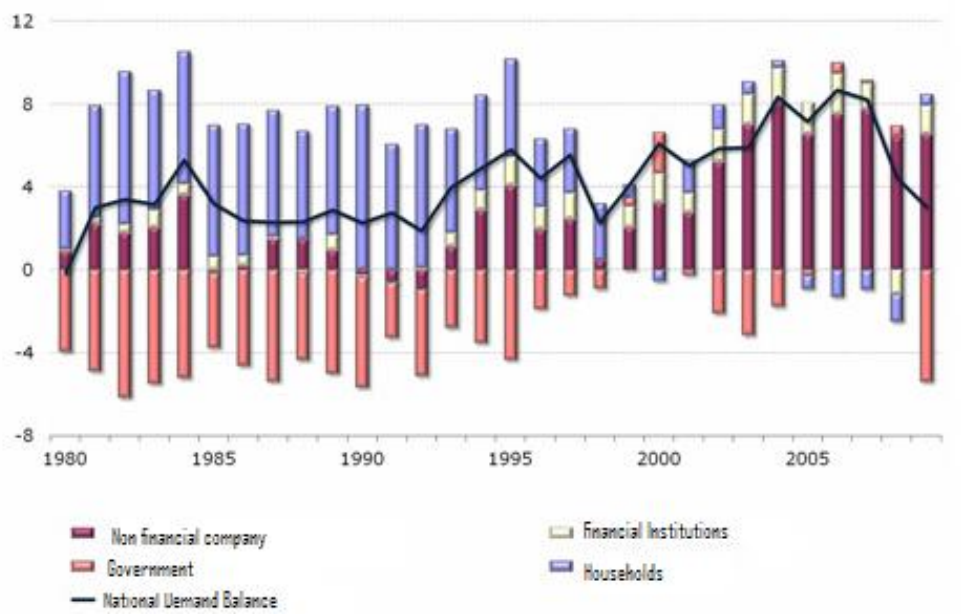
The current account is one of the three components of the balance of payments. It is the 'sum of all cross border transactions that deal with production, expenses and income' (Boonstra, 2008) and keeps record of the 'increase in residents claims on foreign incomes or outputs, less the increase in similar foreign-owned claims on home income or output' (Obstfeld et Rogoff, 1994). In an open economy, the current account is often imbalanced (CIA, 2014). As countries trade, they will either deal with current account surpluses or deficits. A current account surplus is often considered to be positive. It is associated with a strong competitive position, leading the value of exports to exceed the value of imports. However, a current account surplus is by definition equal to the level of savings.[1] Countries with a current account surplus save up more than what they invest in their home economy. This could indicate that the investment opportunities in the home country are slim and that investments will take place abroad. The occurrence of a large and long-lasting current account surplus could also be considered as a signal towards underlying issues related to (lack of) (private) investments.

2.1 The Dutch current account

The Dutch economy has been experiencing consecutive current account surpluses since 1980. Currently the Dutch economy has the highest surplus in Europe (Eurostat, 2015). Figure 2.1 shows the development of the Dutch current account surplus throughout time. The graph shows that although the Dutch current account has been in a surplus for the last 35 years, the way this surplus is generated has not always been the same.

[1] See appendix 1.

Figure 2.1[2] Contribution per sector to the current account surplus, in % GDP



Until the mid 1990's it was mainly the households that created the Dutch current account surplus. The household savings were so vast that they exceeded the level of domestic investments, creating a surplus on the Dutch current account. These savings consisted mostly of so-called contractual savings, where households save through collective labour agreements, life insurances and pensions (Boonstra, 1991). In the Netherlands, workers are obliged by the government to save up in the form of a second pillar pension, where a pension fund or an insurance company administers these pension schemes (Pensioenfederatie, 2013). This, together with the relatively large Dutch labour force during the 1990's, resulted in a tremendous amount of pension savings. These savings are managed by pension funds, making it impossible for households to use these funds for consumption, adding up to the countries' savings.

In the 1990's the Dutch government developed a new tax policy, that resulted in a drop of household savings to almost zero at the start of the new century (DNB, 2011). The Dutch government wanted to stimulate home ownership by allowing households to: subtract paid mortgage interest from the taxable income, take on amortization free mortgages and cash out the overvalue of their home through higher mortgages (Donders, 2012). In this way, home owners were encouraged to take on as much debt as possible, which led to lower household savings.

[2] DNB (2011) Nederlands overschot op de lopende rekening hangt samen met spaaroverschot bedrijven, online resource available at: < http://www.dnb.nl/nieuws/nieuwsoverzicht-en-archief/dnbulletin-2011/dnb251197.jsp>.

Despite the decrease in household savings, the Dutch current account surplus remained largely unchanged. On one hand, this was caused by the entry of the Netherlands to the Economic and Monetary Union, which forced the government to reduce its debt permanently to live up to the stability and growth pact (Grauwe, 2012). On the other hand, the savings of (non-financial) companies increased rapidly, affecting the overall surplus. Figure 2.1 indicates that towards the year 2000 government debt decreased. It also demonstrates that since 2000 the non-financial companies became the largest contributor to the current account surplus. Nowadays these companies almost solely create the surplus.

By definition, the current account surplus is equal to the level of savings. The Dutch (non-financial) companies are the largest contributor the current account surplus and have large amounts of funds that are not used for domestic investment purposes. The question is, why these (non-financial) companies save such large quantities, rather than investing them domestically? Before turning to this question, we determine the sector contribution of the (non-financial) companies making up the surplus. The economic decline following the 2008 financial crisis, combined with varying economic sensitivity of sectors, suggests that sector contributions to the current account differ (Möhlmann et al., 2011).

Table 2.1 shows the contribution to the Dutch current account on a sector base. The results confirm that the contribution to the current account is unequal among sectors and that the sectors Real estate (L), Manufacturing (C), Wholesale and retail trade (G), Financial and insurance (K), Professional, scientific and technical (M), Information and communication (J) and Mining and quarrying (B) are the main contributors to the Dutch current account surplus, located at the (non-financial) companies.[3] This indicates that these sectors save more than what they invest domestically.

[3] See appendix 2a and 2b for the way these numbers are derived, the data description of these numbers and a list of all the main activities of each sector.

Table 2.1. Contribution to the current account per sector

Sector	Sector indicator	Year 2012 (x 1million euros)
Real estate	L	54707.3
Manufacturing	C	16964.1
Wholesale and retail trade	G	5330.6
Financial and Insurance	K	2655.1
Professional, scientific and technical	M	1645.7
Information and communication	J	1143.9
Mining and quarrying	B	506.5
Accommodation and food services	I	188.1
Transporting and storage	H	26.1
Water supply	E	-257.6
Construction	F	-711.8
Administrative activities	N	-1676.2
Electricity and gas	D	-3818
Other	A+Q+R+S+U	-15688.5

This table shows the individual contribution of each sector to the current account surplus of the Netherlands, in the year 2012. The sector that contributes the most is listed at the top, while the sector with the lowest contribution is at the bottom. Appendix 2b shows a list of the different sectors.

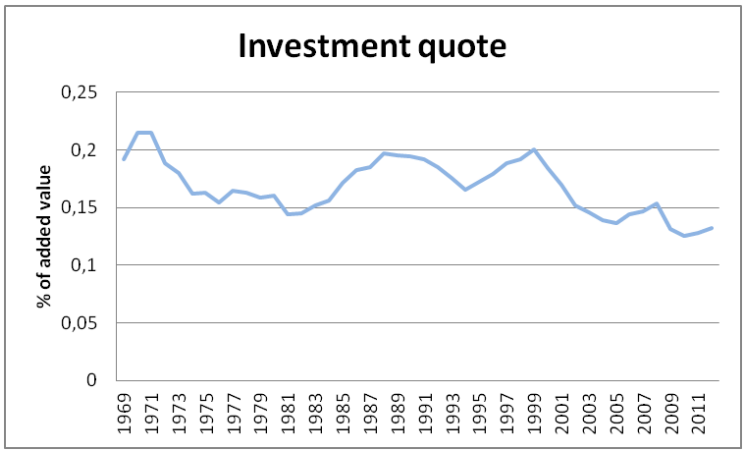
2.2 Causes of the (non-financial) company savings

In order to see why (non-financial) companies have become the largest contributor to the Dutch current account surplus, we turn to both the earnings of a company and their expenses.

The earnings of a company is made up by its sales, where price is multiplied by quantity sold. Labour costs and capital costs, used for the production of goods or services, make up the expenses of a company. If the earnings exceed the expenses, a company saves. The level of savings can be used by a company to finance investments. The difference between savings and investments make up the company's contribution to the current account. The increasing level of savings, that Dutch (non-financial) companies as a whole have been experiencing since 2000, can therefore either be caused by an increase in the level of savings or a decrease in the level of investments.

Based on the investment quote, the increasing savings of the Dutch non-financial companies are the result of a decrease in investments, rather than an increase in savings. Figure 2.2 shows a decreasing investment quote, indicating that the investments of the Dutch non-financial companies have decreased over the years.

Figure 2.2 Nominal investment quote



This graph shows the development of Dutch investments as a percentage of added value. Where

Investment quote = Investment/Added Value *(1)*

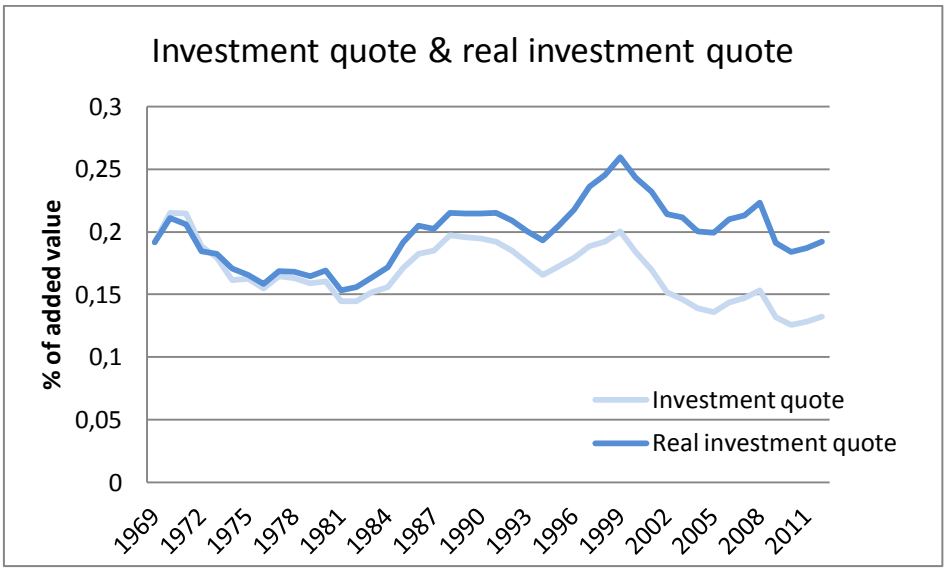
The graph shows a decreasing trend, implying that the investments as a percentage of added value decrease.

Different explanations have been proposed by Leering et Vissenberg (2012) as to why non-financial companies have decreased their domestic investments.

First, substitution of traditional capital goods could have impacted the national level of investments. In the past, the main capital investments were in the form of machines and installations. Nowadays these are often substituted by more technologically advanced investments like computers. Statistics show that the investments in machines and installations have decreased over the past twenty years, while at the same time investments in ICT have increased substantially (CBS, 2011). Dutch demand for ICT has increased over the years because of two reasons. First, computers have become very widely distributed, fulfilling an indispensable job in every industry. The investment volume of computers has increased since 1988 with an average of 20% per year, while the volume of remaining investment goods has only increased with an average of 1,5% (CPB, 2012). Second, the Dutch service industry makes up a large part of the Dutch economy. Traditionally, it is an industry where ICT is commonly used. This substitution of traditional capital goods puts a downward pressure on the level of investments, as the price of ICT has decreased strongly over the past 20 years (CBS, 2011). This downward pressure leads the costs of ICT investments to be, on average, lower than the costs of investments in machines and installations (CBS, 2011). Due to lower prices, less investments are needed to fulfill the same result, increasing the funds available for investments abroad or the company's savings.

Figure 2.3 shows that if the investment quote is corrected for these ICT price falls, by obtaining the real investment quote using constant prices, a more steady investment quote is obtained (CPB, 2012).

Figure 2.3 Nominal investment quote and the real investment quote



The graph shows that the real investment quote has a more constant trend than the nominal investment quote, implying that prices have an oppressive effect on the investment quote.

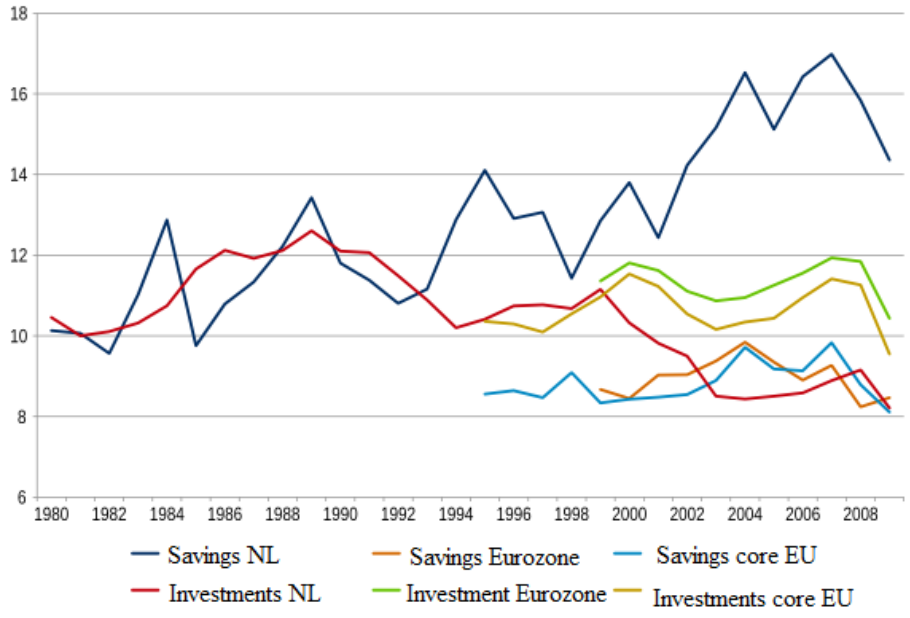
The real investment quote seems to suggest that the decrease in investments is more so caused by a nominal decrease, due to the price of investments, rather than a real decrease. However, even from the real investment quote it is clear that investments have decreased sharply since 2000. This decrease implies that investments have not just decreased on a nominal level but also on a real level.

A second possible explanation for the decrease in national investments looks to why investments take place. Although theory concerning investments will be discussed in more depth in chapter 7, it will be touched upon shortly. The Netherlands is considered to be a capital abundant country, its capital/labour ratio is currently among the highest in Europe (Leering et Schotten, 2012). The concept of diminishing returns states that the marginal product of capital is decreasing, assuming that the marginal product of capital in the Netherlands is relatively low when compared to a country with a lower capital/labour ratio. Empirical research conducted by Blanchard et Giavazzi (2002) showed that within the European Union, wealthier more capital abundant countries such as the Netherlands invest in poorer, less capital abundant countries. Furthermore, Blanchard et Giavazzi (2002) showed that as countries become more closely linked, the number of cross border investments

increase. As the introduction of the euro in the early 2000's led to the elimination of currency risk, the linkage between European countries became closer, leading to an increase in foreign investments by countries with high capital/labour ratios. This could explain why figure 2.3 shows a decrease in national investments starting in the early 2000's, as investors used their funds to invest abroad rather than domestically.

Although the proposed explanations could explain why the level of investments have decreased, it does not explain why the Dutch investments are a lot lower than similar European economies (Leering et Schotten, 2012). Figure 2.4 shows that the investment levels of the 'core EU' countries, consisting of Germany, Belgium, France and Italy are not as low as the Netherlands, despite the fact that these countries have lower marginal products of capital than the Netherlands (Caselli et Feyrer, 2007).

Figure 2.4 Level of savings in the Netherlands, core EU and EU[4]



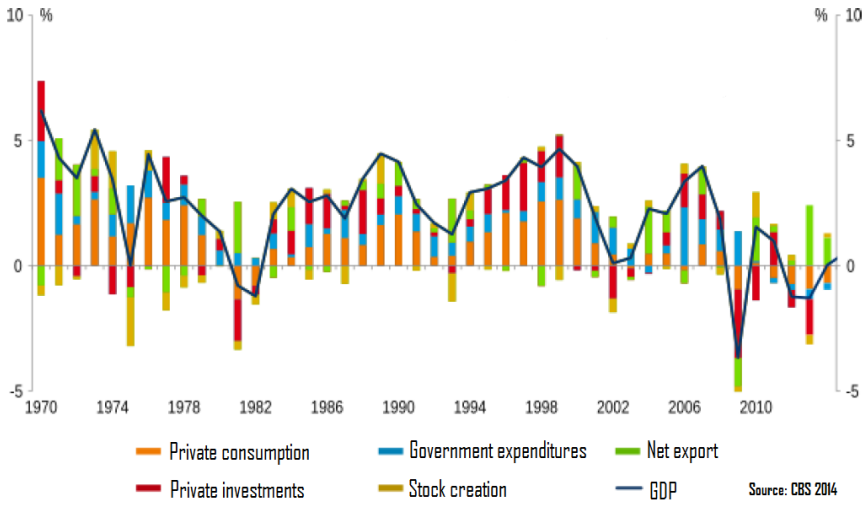
Furthermore, the decrease in national investments has not been offset by an increase in foreign direct investments. Instead, many companies have chosen to use their funds to increase their liquid assets. Since the mid 1990's bank deposits have increased, as well as stocks and other capital (Leering et Schotten, 2012). It seems that these companies are deliberately choosing to hold liquid assets instead of using their funds in a more productive

[4] Leering, R. Schotten, G (2012) De puzzel van het Nederlandse spaaroverschot, MeJudice, online resource available at: <http://www.mejudice.nl/artikelen/detail/de-puzzel-van-het-nederlandse-spaaroverschot>.

way. Leering et Schotten (2012) point out that a reason for this could be an increase in income volatility, providing a third explanation for the decrease in national investments. Income volatility creates uncertainty about the future and is often named as a synonym for income uncertainty (Feigenbaum et Li, 2010). Companies tend to respond to this type of uncertainty by holding more liquid assets as a buffer.

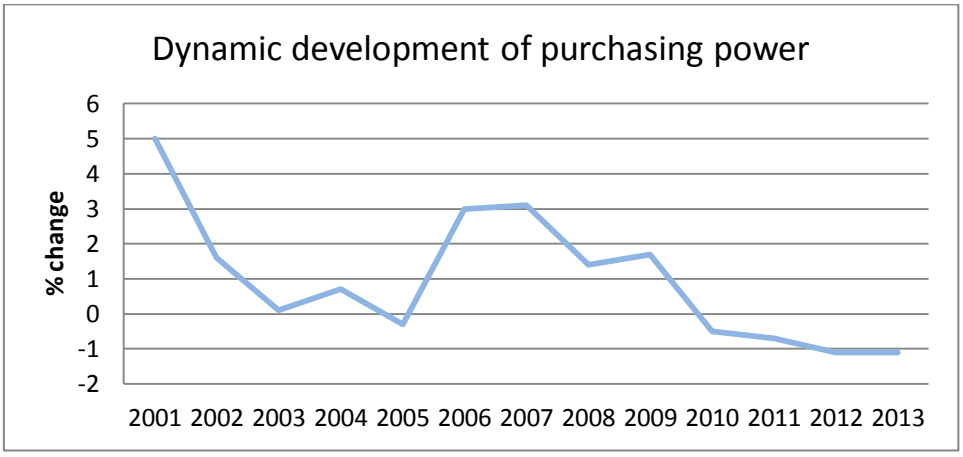
An alternative way to look at the level of investments and how they are influenced, is through the return on investment. The decision to invest or not invest depends on the expected benefit of the investment to the investor. If the expected return is negative, an investor is better off not investing, while if it is positive the investment will take place. Currently the Dutch economy is experiencing low wage levels as well as low interest rates due to the abundance of capital. It is expected that the return on investment is positive, as the costs of investing are so low. However, demand also influences the rate of return. If in the short term demand is low, due to lower levels of private consumption, companies do not need to increase their production capacity (Jorgenson, 1963). If there is no demand, the likelihood of returns on investment exceeding the costs of investment decreases (Van de Beek, 2010). Expansion investments are not worthwhile, limiting the investments as maximizing the net return on investments would only call for replacement investments. If we look at the development and composition of the Dutch economic growth, visualized in figure 2.5, we see that among others consumption has decreased. Since the start of the new century, private consumption has played a very slight or negative role in the Dutch economic growth numbers.

Figure 2.5 Dutch GDP-mutation and contribution per expenditure component



Low consumption levels could be a result of weak purchasing power. Figure 2.6 shows a slowdown of purchasing power growth in the Netherlands since 2000/2001 and even a decrease since 2009. This decrease in purchasing power indicates that consumers can buy less with their disposable income.

Figure 2.6 Dynamic development of purchasing power



This graph shows the development of the Dutch purchasing power over time. The graph shows a negative trend, implying that the growth numbers of purchasing power have decreased. The graph also shows that ever since 2009/2010 purchasing power is decreasing, implying that people can buy less with their money than before

The decrease in consumption, following a negative development of purchasing power, indicates that the Dutch economy is experiencing low demand. Low demand removes the need for firms to invest, making private investments fall despite the low costs of investment. Although there are different ways in which demand can be positively affected, there has been a lot of debate on wage increase as the proposed remedy. This thesis views a wage increase as a possibility to enhance demand. Besides, through introducing a wage increase it could be achieved that funds currently creating the Dutch current account and invested abroad, are redirected back to the Dutch economy in the form of higher labour costs. Wages would play the role of indirect tax on capital. However, a wage increase is considered to be a drastic measure, fuelling the debate on the effects of a wage increase.

2.3 Wage increase

In Dutch literature wages and the possibility of a wage increase have always been a controversy. Economists, politicians and institutions all have their opinion on the effects of a wage increase on the Dutch economy. Advocates of a wage increase, such as Kleinknecht et Naastepad (2002), Van Witteloostuijn (1999), Van Schaik (2006), Teulings (2013), Asscher

(2013) and Rabobank (2011) point out the benefits of increased consumption and productivity growth. On the other hand, opponents such as Huizinga (2004), Jansen (2004), Mulder (2004), Van den Berg (1993) and VNO/NCW (2009) weigh the proposed negative effects of a wage increase. Some examples being higher levels of unemployment, damaging of the competitiveness of Dutch companies and lower levels of investments as well as question whether a wage increase will indeed reduce the level of savings (CPB, 2015).

Multiple relationships between a wage raise and macroeconomic factors have been identified in the discussion between advocates and opponents of a wage increase. Given there is much discussion about whether the benefits of a wage increase in the Netherlands weigh up to the costs, the next chapters will discuss each of these identified relationships. The effect of wage on (i) consumption, (ii) productivity, (iii) unemployment, (iv) investment and (v) competitiveness of the Dutch economy will all be dealt with in separate chapters.

3. Unemployment

In the discussion on the proposed effects of a wage increase, opponents stress rising unemployment as a negative effect (Huizinga, 2004; Jansen, 2004; Mulder, 2004). Analysis of the motives of these statements, demonstrates that opponents believe that a wage increase will reduce labour demand, affecting unemployment through the demand side. It is this negative effect that causes them to oppose a wage raise. Although this effect is stressed by all opponents, the classical labour theory does not offer an explanation for the existence of a wage above the market-clearing level nor for involuntary unemployment.

3.1 Theoretical framework

The neo-classical labour theory views the labour market just like any other market, where price (wage) is determined by (labour)supply and (labour)demand. In the light of this theory a change in wage can only be explained through a change in either labour demand or labour supply. At the intersection of demand and supply, one finds the market-clearing level of wage, leaving no room for involuntary unemployment. The neo-classical theory states that a wage raise without changes in supply or demand, as proposed in this thesis, would therefore only be possible in the short run. If the wage is set above the market-clearing level, labour supply will be excess of demand, causing involuntary unemployment as there are still people willing to work for the wage offered, but no jobs available. This involuntary unemployment puts a downward pressure on the wage level until it reaches the labour market-clearing level.

The neo-classical labour theory has several shortcomings in explaining the Dutch labour market and the effects of a wage raise. First, it assumes that all workers are wage takers and that they have no say at all in their working conditions. Second, the theory offers no explanation for the occurrence that, also in the long run wages can be above the market-clearing level. According to the neo-classical labour theory, all wages will eventually return to their market clearing level due to the downward pressure of involuntary unemployed. This does not coincide with the Dutch labour market which has disruptive factors, such as minimum wage and union presence. These disruptive factors cause wages to be and remain above the market-clearing level, despite the downward pressure of unemployed. Third, the neo-classical labour theory assumes that supply and demand find each other instantly, while the opposite is true for the Dutch market. Even in times of economic boom the Dutch

economy experiences some unemployment, while the neo-classical labour theory offers no explanation for (involuntary) unemployment in the long term. On the same note, even in times of economic crisis there are still job vacancies available, while the neo-classical labour theory does not offer an explanation for unfilled vacancies. The Dutch labour market does not consist of workers that are all the same or jobs that all require the same workers. Due to the difference in both, it takes time for supply and demand to find each other, creating unemployment.

As it becomes clear that the neo-classical labour market theory has its shortcomings in explaining the Dutch labour market, the remainder of this chapter will focus on two models that do offer an explanation for how wages can be altered and why unemployment exists. In section 3.1.1 trade union models will be discussed, where the bargaining power of unions offers an explanation for the adjustability of wages and the occurrence of wages above the market clearing level. In section 3.1.2 search theory and matching theory are used to explain how unemployment can occur, even if there are no wage-pressing factors present, due to the search effectiveness of unemployed.

3.1.1 Union wage theory/model

Although the literature on union models comprises of three main models (Ahmed et Miller 1999), they are all based on the assumption that product markets are imperfect and companies are able to make a profit. Imperfect markets have no freedom of entry and exit of firms, creating the possibility of firms having different cost structures. Due to these different cost structures, firms with the lowest costs are able to enjoy a profit. Workers are unable to enjoy (part of) this profit through a higher wage, since they have no bargaining strength against their employer. Labour unions, on the other hand, do in the form of collective strikes; therefore a labour union can negotiate with a firm. Of the three models, being the 'monopoly union' model (Dunlop, 1944) with its affiliated 'right-to-manage' model (Leontief, 1946), the 'efficient bargaining' model (Calvo, 1978; McDonald et Solow, 1981) and the 'median voter' model (Farber, 1978; Grossman, 1983), this thesis will focus on the right-to-manage model as the broader version of the monopoly union model. This thesis will not focus on the efficient bargaining model and the median voter model as it demonstrates that their assumptions are not in line with the Dutch economy. The efficient bargaining model assumes that labour unions negotiate over both wages and employment, while Dutch labour unions hardly

negotiate over employment (Rijksoverheid 2015). Only in the special case of collective redundancies will labour unions negotiate employment by trying to bring the number of redundancies down (Van Vliet et Filippo, 2012). The median voter model has little empirical value to the Dutch economy due to the fact that it assumes that the action points of a union are determined by the union members through a voting procedure (Kaufman et Martinez-Vazquez, 1990). In the Netherlands such a voting procedure is not present (FNV, 2015), a union representative bargains on behalf of the workers, but his points of action are not determined by the union members (FNV, 2015).

As mentioned before, this thesis will use the right-to-manage model, an affiliate of the monopoly union model, in order to explain how a wage raise can occur and what its effect is on unemployment. The right-to-manage model describes a setting where the labour union and the firm negotiate over the surplus present (Booth, 1995). The monopoly union model, in this respect, is considered to be 'a special case of the right-to-manage model where it is assumes that the firm has no bargaining power at all' (Booth, 1995). For the Netherlands, a less fitting assumption as 'a union never gets everything it wants, it bargains' (Layard et al., 1991). In the model, labour unions and firms bargain over wage and not over the level of employment. Employment is not of interest to the current employees and with that to the 'customers' of the union. The level of employment is solely determined ex-post by the employer, based on its labour demand curve (Booth, 1995).

Union

The model[5] states that both unions and firms want to maximize their expected utility.

The union's expected utility consists of both the employed union members that obtain the utility of the union income and the union members that are not employed who obtain the alternative, non-union income.

$$\mathrm{EU}_{\mathrm{union}} = \frac{n}{t}u(w) + (1-\frac{n}{t})u(b) \qquad (2)$$

Where n is the number of workers and t is the total number of union members, therefore making (n/t) a union member's probability of being employed. Furthermore $u(w)$ is the utility of the union income and $u(b)$ the utility of the alternative, non-union income. b can also be viewed as the unemployment benefit.

[5] A.L. Booth, the economics of the trade union, pp. 120-156; see also R. Layard, S. Nickell, R. Jackman, Unemployment, pp.100-111.

The union's net gain in utility from a wage above the alternative wage is the expected utility obtained from the union income (2) minus the expected utility from the alternative income, which leads to (3)

$$\text{Net gain} = \text{EU}_{\text{union}} - \text{EU}_{\text{alternative}} = \left(\frac{n}{t}\right)(u(w) - u(b)) \qquad (3)$$

Where the net gain is positive in the case of an agreement between the union and the firm, as only then $u(w)$ is higher than $u(b)$, the utility obtained from the alternative income.

Firm

The firm also wants to maximize its expected utility. Where the firm's expected utility is based on its operating profit:

$$\text{EU}_{\text{firm}} = pq(n) - wn \qquad (4)$$

Where p is the price, $q(n)$ the quantity produced and wn the labour costs, both depending on the number of workers employed.

Its net gain is the same as its expected utility, as the firm will not make a profit in the case no agreement occurs due to the fact that it will not be able to find labour.

Bargaining

In order to be able to predict what will happen in the bargaining between the firm and the union the model uses a generalized Nash bargaining solution, where 'wages are determined by the maximization of the product of each agent's gains from reaching a bargain, weighted by their respective bargaining strengths' (Booth, 1995). This leads to (5).

$$\text{Max}_{\text{w}}\ B = \left\{\frac{n}{t}\left[u(w) - u(b)\right]\right\}^{\beta} \left\{pq(n) - wn\right\}^{(1-\beta)} \qquad (5)$$

Where β is the bargaining strength of the union ($0 \leq \beta \leq 1$). In the case of β=1 the union has all the strength and will be able to capture the entire profit leaving none for the firm, this coincides with the monopoly union model. On the contrary, if β=0, the union will have no bargaining strength and therefore the bargained wage (w) will be no higher than the alternative wage (b).

The union and the firm will bargain over wages until they have reached the level of wage where the marginal benefit of a wage increase is equal to the marginal cost, weighed by the

bargaining strength. This is obtained by taking the first-order condition from (5) and maximizing, which leads to:

$$\frac{\beta w u'(w)}{u(w)-u(b)} = \beta\varepsilon \frac{(1-\beta)wn}{pq(n)-wn} \quad \xrightarrow{\text{rewriting}} \quad \frac{u(w)-u(b)}{u'(w)} = \frac{(pq(n)-wn)}{\varepsilon \cdot (1-\beta)wn} \quad \xrightarrow{\text{rewriting}}$$

$$\frac{u(w)-u(b)}{u'(w)} = \frac{1}{\varepsilon}\frac{1}{(1-\beta)}\frac{\Pi/Y}{wn/Y} \tag{6}$$

Where $\varepsilon = -n'(w)w/n$, the wage elasticity of labour demand, Π is the level of profits, Y total output and $u'(w)$ is the marginal utility gain from income.

By dividing $u(w)$-$u(b)$ by $u'(w)$ we can assess what determines the markup of wages in units of money (euro) rather than utility. Equation (6) shows that wages are endogenous under the labour union model and that the markup of union wage over the alternative wage depends on the union power (β), the wage elasticity of labour demand (ε) and the profit of the firm (Π) with respect to the wage costs (wn), both as a share of output. Equation (7) sums up how these variables affect wages.

$$w = f(\overset{-}{\varepsilon}, \overset{+}{\beta}, \overset{+}{\Pi/wn}) \tag{7}$$

The wage elasticity of labour demand determines how many workers a firm will employ given a certain wage. A high labour demand elasticity will lead to a high reduction in labour demand if wages are increased. The labour union takes the elasticity of labour demand into consideration, as its utility depends on both employed and unemployed union members. This leads to a negative relationship between wage and the wage elasticity of labour demand.

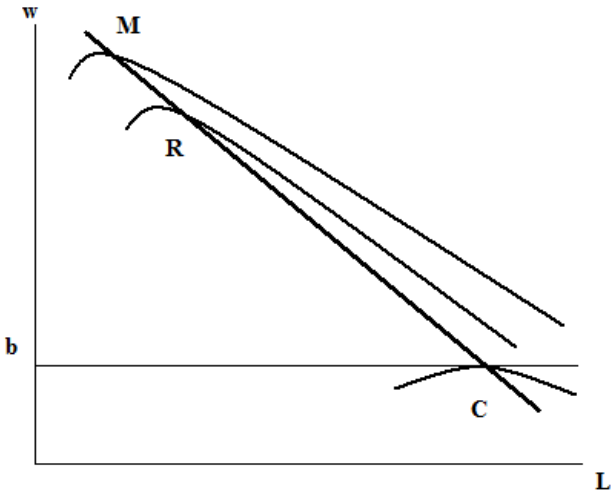
Union power is positively related to the wage level, as it encompasses the ability to reduce labour supply (Booth, 1995). This reduction in labour supply comes about through the possibility of organizing a strike (Layard et al., 2005). The effect of a strike, and with that the power of the union is larger when the trade union membership is higher. In the Netherlands union membership is not equally divided. Some sectors have a higher membership percentage than others (CBS, 2012). However, due to the fact that collective agreements are regularly declared generally binding, even in sectors with low union density, collective bargaining coverage remains high (70+%) (OECD, 2004).

The profit of the firm with respect to labour costs, has a positive effect on the wage level. One of the principles underlying the right-to-manage model is that product markets are imperfect, enabling companies to make a profit. Negotiations between labour unions and firms focus on the distribution of this profit between the firm and the worker. A higher profit with respect to its wage costs is expected to lead to a wage increase, as the worker's absolute share will increase accordingly.

Following equation (7) the only way to reach the policy goal of increasing wages, is via an increase in union power. The wage elasticity of labour demand and the profit of the firm with respect to its wage costs are firm specific and can't be altered by policymakers.

A markup over the alternative wage *b* can be achieved as long as $\beta>0$. An increase in union power will lead to higher wages, as a larger portion of the available rents is captured in the union wage. Wages will be highest for union workers when the union power is closer to 1, as is the case in the union monopoly model. These results can also be viewed in figure 3.1 where point C represents the competitive outcome which is the alternative wage *(b)*, R the right-to-manage outcome and M the monopoly outcome.

Figure 3.1[6] Different wage outcomes in the right-to-manage model



The right-to-manage model is able to explain how a wage increase could be implemented, as well as how wages are able to stay above the market clearing level. Furthermore, the model can be used to predict what will happen to the level of employment in the case of a wage

[6] Different wage outcomes in the right-to-manage model (Heijdra et Van der Ploeg, 2002).

raise. The model assumes that the decision of the firm on how much labour to employ occurs ex-post and is based on its labour demand curve. This labour demand curve is assumed to be decreasing, where its slope depends on the firm's wage elasticity of labour demand. Under the labour union model a higher wage is therefore expected to lead to less labour demand, ceteris paribus leading to a higher level of unemployment. To see whether the above mentioned is also applicable to the Dutch economy, the next paragraph will turn to empirical studies assessing the validity of the labour union model.

3.1.1.1 Empirical testing of labour union models

In order for the right-to-manage theory to have empirical value, studies will have to show that a relationship exists between union power and wages, through which labour demand/unemployment is affected. Table 3.1 lists a number of studies that estimated this relationship, using either union density or collective bargaining coverage as a determinant of union power (OECD, 2004).

Table 3.1 Empirical testing of the labour union model

Author	Sample	Method	Type of Data	Main results	Conclusion
Budd et Na (2000)	US (1983-1993)	OLS	Time series	There is a wage premium for union members relative to non-union members of 12-14%	In favor of the theory; union wage is higher than non-union wage
Traxler et al. (2001)	20 OECD countries, 1986-1996	OLS	Cross sectional	Higher degrees of coverage are associated with higher growth of labour costs in all periods, but fail to reach statistical significance.	n/a the relationship between union power and wage is as predicted by the theory, but no statistical significant results
Checchi et Lucifora (2002)	14 European countries 1960-2000	GLS with time dummies and country dummies	Panel	Union density is affected by benefit duration (-0.11), unemployment (-0.21), workplace representation(+0.19)	Indicates an endogeneity problem with studies focusing on the effect of union density on unemployment
Nickell et al. (2003)	20 OECD countries 1960-1995, using 5-year average values	GLS with time dummies, country dummies and country-specific trends	Panel	Real labor cost per worker is affected by union density(+0.41), employment protection(+0.023) coordination (-0.026)	In favor of the theory; bargaining power has an upward effect on real labor cost per worker
OECD (2004)	OECD countries 1970-2000, using 5-year average values	OLS with period dummies	Panel	Statistically insignificant and varying results	Not in favor of the theory: no evidence that overall earnings are systematically related to bargaining power
Belot et Van Ours (2004)	18 industrial countries, 1960-1994 using 5 year periods	unknown	Cross sectional and time series	Union density (ud) has both a direct effect as well as an interaction effect on unemployment. Direct effect (+0.16). Indirect effect (tax rate*ud; -0.32), (replacement rate*ud; 0.17), (employment protection regulation*ud; 0.46), (coordination*ud; -0.08).	In favor of the theory; union density positively affects unemployment, but endogeneity problems.
Nickell et al (2005)	20 OECD countries, 1960-1995	GLS with time dummies, country dummies and country-specific trends	Panel	55% of the changes in European unemployment over 1960-1995 period is caused by changes in labour market institutions. Unemployment is affected by union density (+0.12)	In favor of the theory; bargaining power positively affects unemployment, but endogeneity problems.

Lever (1991)	The Netherlands, 1965-1987	3SLS, using exogenous and lagged endogenous variables as instruments	Time series	The equilibrium unemployment is affected by the employer´s (+0.76) and employee´s (+0.50) tax rate, the replacement ratio (+0.17) and the gap between consumer and producer prices (+0.22)	The Dutch wage equation fits a union model of the Stackelberg type, ´where the union acts as leader and the firm as follower´.
Graafland & Huizinga (1999)	The Netherlands, 1967-1993	2SLS using lagged endogenous variables.	Time series	There is a highly significant long-term impact of the tax wedge on wages (+0.5), affecting equilibrium unemployment.	A wage bargaining model is applicable to the Dutch labour market
Broer et al (2000)	The Netherlands, 1966-1995	3SLS, using exogenous, lagged endogenous and dummy variables as instruments	Time series	The set wage depends on the wedge between the real product wage and the real consumption wage (-0.10), the replacement rate (+0.11) and the unemployment rate (-0.42).	The Dutch labour market can be characterized by a bargaining model where 'Equilibrium unemployment is the result from the interactions of wage bargaining and the price and employment determination of firms'.

As stated before, studies that focus on the empirical validity of the labour union model use either union density or collective bargaining coverage as a determinant of union power (OECD, 2004). Most studies use union density rather than collective bargaining coverage as their determinant of union power, most likely due to the fact that it is easier to measure (OECD, 2004). Most of the studies listed in table 3.1, focus on the relationship between union power and wages. Only Belot et van Ours (2004) and Nickell et al. (2003, 2005) focus directly on the relationship between union power and unemployment, finding a positive relationship between union density and the level of unemployment. This finding coincides with the proposed theory, however the theory predicts that this relationship between union density and the increase in unemployment goes via a raise in wages. It is interesting to see that Nickell et al. (2003) also find a positive relationship between union density and real labour costs, allowing for the possibility that it is this increase in wages that led to the increase in unemployment. An important note to be made with respect to the studies conducted by Belot et van Ours (2004) and Nickell et al. (2003, 2005) concerns endogeneity. A study performed by Checchi et Lucifora (2002) on the determinants of union density showed that union density is, among others, negatively affected by unemployment. This would suggest that union density affects unemployment, but that unemployment in itself also affects union density, raising an endogeneity problem. Since none of the studies discuss the use of instrumental variables nor 2SLS, in order to overcome the endogeneity problem, this would mean that the results from the studies measuring the effect of union density on unemployment are biased in the sense that they provide overvalued estimates (Checchi et Lucifora, 2002).

Of the studies focusing on the relationship between union power and wages, the study performed by Traxler et al. (2001) finds a positive relationship between union power and wages. However, just like the study performed by the OECD (2004) no statistically significant results are obtained, not offering valuable information. The study performed by Nickell et al. (2003), on the other hand, do find a significant relationship between union density and real labor costs per worker, finding empirical evidence pleading in favor of the right-to-manage theory. The same counts for the study performed by Budd et Na (2000), as they find a difference between union wages and non-union wages, where union wages are significantly higher. Although these results correspond with the theory, this study fails to show a relationship between union power and wages.

Although most studies listed in table 3.1 find relationships that are in accordance with the right-to-manage model, only few have significant results and no endogeneity problems. In order to determine whether these results are representative of the Netherlands we turn to the data. First, we see that mostly industrialized OECD countries are used which can be considered similar to the Netherlands. Second, most studies use union density rather than collective bargaining coverage as a determinant of union power. In the Netherlands this union density is fairly low (20%((OECD, 2004), while collective bargaining coverage remains high (70+%) (OECD, 2004), due to the fact that collective agreements are regularly declared generally binding. As the difference in union density and collective bargaining coverage is fairly high in the case of the Netherlands, it can be expected that the results of regression analysis would differ between the two. Therefore raising doubt on the applicability of the tests to the Dutch case. To see whether Dutch empirics can be explained by the right-to-manage model this thesis turns to studies conducted by Lever (1991), Graafland et Huizinga (1999) and Broer et al. (2000). These studies show that the wage development in the Netherlands can be described rather well by a wage bargaining model between firms and unions. Indicating that the right-to-manage model can explain the occurrences in the Dutch labour market.

3.1.1.2 Comments concerning union wage theories

The right-to-manage model seems to provide a solid base in understanding how the Dutch labour market works. Its main implication, that a raise in wages will lead to an increase in unemployment fits the general idea about wages in relation to unemployment. The theory allows for the idea that firms want to maximize their profits through basing their labour demand decision on their labour demand elasticity. An increase in wages will lead to a decrease in labour demand. Furthermore, the model treats wages endogenously and allows them to be above the market clearing level, where wages increase with union power. An increase in union power will lead to a larger portion of the rent being transferred to the worker in the form of a higher wage. This union power consists of all factors affecting union power, being both union density as well as union coverage. Especially in the case of the Netherlands it is possible that these differ as collective labour agreements are regularly declared generally binding. In terms of the right-to-manage model this common practice increases the union power.

Due to the fact that the model describes the labour market in the long run, it does not provide for any of the complications that occur in the short run. Labour is considered flexible in the

long run, allowing for the idea that a decrease in demand leads to a decrease in employed workers immediately. The same counts for an increase in demand, which would lead to an immediate decrease in the level of unemployed. In the short run these changes would provide complications, consisting of the idea that between increasing demand and filling vacancies there is a period of searching for the right people, respectively the right jobs. Theory dealing with these aspects will be discussed in the next paragraphs.

3.1.2 Search theory and matching theory

Theories concerning labour unions explain the rate of unemployment through 'wage pressure factors' (Layard et al., 2005). Another theory that explains the level of unemployment is the so called search theory that focuses on friction unemployment, created by the imperfectness of the labour market (Mortensen, 1986). This theory is based on the idea that an unemployed worker needs to gather information on where the available job is located, as well as how much wage this job offers. It is during this time that the worker is unemployed, creating friction unemployment. The length of unemployment depends on the one hand on the worker's characteristics and on the other hand on the minimum wage that the worker demands, the so-called reservation wage (Mortensen, 1986). As long as the worker does not find a job that offers at least the reservation wage he will continue to search, as the utility obtained from searching is larger than the utility from accepting the job.

The matching theory is an extension of the basic search theory, where the filling of vacancies is considered a concurrence of the unemployed looking for jobs and firms looking for people to fill their vacancies (Diamond, 1982; Mortensen, 1982; Pissarides, 1984). During the time it takes firms and workers to match, where an unemployed worker is hired by a firm looking to fill a vacancy, the worker is unemployed, creating friction unemployment.

Matches[7]

The probability of a match occurring, depends on both the number of vacant jobs as well as the number of unemployed workers.

$$mL = m(uL, vL) \tag{8}$$

Where mL is the number of hirings (or matches) per period, denoted as a function of uL and vL. Where uL the total number of effective job-seekers and vL the total number of vacancies.

[7] For the purpose of this paragraph and the following paragraphs I have made use of Layard, R Nickell, S Jackman, R (2005) Unemployment, macroeconomic performance and the labour market, oxford university press, pp. 216-220. As well as Wincenciak, L (2007) Search and Matching theory, university of Warsaw, pp. 1-47.

Since the model assumes that matches have a constant return to scale, where each match results in an equally productive job, the chance of an unemployed worker finding a job is equal to equation (8)/*u*.

$$\frac{m(u,v)}{u} = m(1,\frac{v}{u}) = p(\Theta), \text{ where } \Theta = \frac{v}{u} = \text{labour market tightness} \quad (9)$$

From equation (9) it follows that the probability of an unemployed worker finding a job ($p(\Theta)$) is positively related to the tightness of the market, while the probability of a firm filling a job ($q(\Theta)$) is negatively related to the tightness of the market.

Unemployment

The matching theory assumes that since it takes time to find a job there is always a pool of people searching for a job, making up the number of unemployed. The pool of unemployed workers increases with the number of workers becoming unemployed (due to job ceasing) and decreases with the number of workers finding a job. If the probability of becoming unemployed due to the ceasing of a job is assumed constant and set at *s*, the total number of unemployed is equal to equation (10).

$$u = \frac{s}{s + p(\Theta)} \quad (10)$$

Vacancies

What counts for the unemployed looking for a job, also counts for the firm looking to fill a vacancy. As it takes time to find the right person to fill a vacancy, there are always vacancies present, even in times of crisis (Layard et al., 2005). A firm will create a vacancy when the expected profits of filling the vacancy are larger than the costs of creating it. The expected profits in case of filling the vacancy consist of the output generated by the employee (y) minus the wage paid to the employee (w), while the costs of creating the vacancy consist of the time and resources it takes to search for the right candidates; denoted as (c). The value attributed to a vacancy $V(t)$ can be denoted as follows:

$$rV(t) = -c + q(\Theta(t))(F(t) - V(t)) \quad (11)$$

where r denotes the time value of filling a vacancy, c the costs of opening up a vacancy and $q(\Theta(t))(F(t)-V(t))$ denotes the probability of obtaining a gain through filling the vacancy. The value attributed to a filled job $F(t)$ can be denoted as:

$$rF(t) = (y - w(t)) + s(V(t) - F(t)) \tag{12}$$

where y-$w(t)$ denotes the expected profits in case the vacancy is filled and $s(V(t)-F(t))$ denotes the value that is lost if a worker becomes unemployed due to the ceasing of a job at that firm.

Assuming free entry of firms (V=0) and equating (11) and (12) leads to the marginal condition for opening a vacancy (13).

$$y - w = (r + s)\frac{c}{q(\Theta)} \tag{13}$$

Wage

The model assumes that a successful match between an unemployed worker and a vacancy generates a surplus as the value of the match is larger than the combined value of the unemployed worker and the unfilled vacancy. This surplus will be bargained between the worker and the firm using a Nash bargain with bargaining strength β for the worker.

$$\text{Worker's surplus} = \beta(\text{worker's surplus} + \text{firm's surplus}) \xrightarrow{\textit{rewriting}}$$

$$\text{Worker's surplus} = \frac{\beta}{(1-\beta)}\text{Firm's surplus} \tag{14}$$

Where Worker's surplus = $\dfrac{w-z}{r+s+p(\Theta)}$ and Firm's surplus = $\dfrac{y-w}{r+s}$

Rearranging (14) in combination with (13) leads to the wage expression (15)

$$w = z + \beta(y + c\Theta - z) \tag{15}$$

Where (y + $c\Theta$ - z) is the total surplus of filling a job over a vacancy. Consisting of the surplus of the firm; the value of output (y) and cost savings when the firm fills the job ($c\Theta$) minus the wage (w), and the surplus to the worker; the wage (w) minus the value of the alternative income (z).

3.1.2.1 Theoretical implications of the model

Now that we know how the model works, it is interesting to see what the implications of a wage raise would be according to the theory. Equations (10), (13) and (15) sum up the model's key findings. Just like in the union model, wages are considered endogenous in the matching model. To see how this model explains a wage increase we turn to equation (15). Equation (15) shows, just like the union model, that wages can be increased through an increase in the bargaining strength of the worker. The larger a worker's bargaining power, the higher its wage will be, as it is able to capture more of the surplus created by the match. The wage increase, as proposed in this thesis, is possible through an increase in workers' bargaining power. However, the increase in wages reduces the value of a filled job to the firm and will lead to fewer vacancies. In the model this is denoted as an increase in $q(\Theta)$, implying that the tightness of the market decreases. Compared to the situation before the wage increase, there are now less vacancies available and more unemployed workers. Since $q(\Theta)$ and $p(\Theta)$ are the opposite of each other, the increase in $q(\Theta)$ is equal to the decrease in $p(\Theta)$. As a decrease in $p(\Theta)$ implies that it is harder for an unemployed worker to find a job, it will take more time to become employed, increasing friction unemployment.

Per the latter, a wage raise will lead ceteris paribus to an increase in friction unemployment as the labour market becomes less tight. However, according to the matching theory the number of unemployed workers depends not only on the labour market tightness, but also on the probability of becoming unemployed. It is the probability that might differ across sectors. The reason can be found in the wage elasticity of labour demand; the higher this elasticity, the higher the probability of becoming unemployed when wage increases. As was stated earlier, the differences in labour intensity between sectors are a reason to assume that labour demand elasticities differ between sectors. Depending on the conclusion drawn from the empirics with respect to elasticities, the chances of friction unemployment increasing might differ across sectors.

3.1.2.2 Comments concerning matching theories

The theoretical framework put forward by the matching theory seems to provide a solid base in understanding the short-run behavior of the Dutch labour market. The model's outcome that a higher wage will lead to more friction unemployment as the labour market becomes more tight, is in line with the expectations of what would happen when wages are increased. The model offers an explanation for the simultaneous occurrence of unemployment and

vacancies, as it assumes that vacancies are not filled instantaneously. Its assumption that it takes time for a match to occur between an unemployed worker and a firm trying to fill a vacancy, offers an explanation for frictional unemployment. Furthermore, as the model determines wages endogenously it allows for wages to be above the market clearing level. This higher wage can be obtained through union power, as followed from the previous paragraph. Higher union power will lead to a larger portion of the firm's surplus being transferred to the employee in the form of higher wages. It is therefore that also in the case of the matching model union power plays a role in determining wages.

The theories used to assess the effects of a wage increase on the Dutch labour market both assumed that firms conduct in profit maximizing behavior, leading them to decrease their labour demand in the case of a wage raise. Both frictional unemployment as well as structural unemployment are predicted to increase due to the decrease in labour demand, following the proposed wage increase. Although the theories are clear in that the effect of a wage increase on labour demand is negative, the size of this effect is unknown. In order to assess the predictions of these theories as well as make an assumption concerning the size of the effect, we will turn to empirical studies that measured the wage elasticity of labour demand for multiple countries.

3.2 Empirical research

The effect of a wage increase on labour demand is a well researched area of labour economics, resulting in many studies that have attempted to determine the wage elasticity of labour demand. In an extensive study, Hamermesh (1993) determined that the wage elasticity of labour demand is somewhere between -0.3 and -0.7. These outcomes suggest that there is a negative correlation between wages and labour demand, just like the labour union theory and the matching theory predicted. To see whether there are more recent studies that confirm these numbers, this thesis turned to multiple empirical research outlined in table 3.2.

Table 3.2 Wage elasticities of labour demand on the firm level

Author	Location	Period	Time/space dimension	Method of estimation	Estimated labour elasticity			
Abraham and Konings (1999)	Belgium	1990-1995	Panel	Generalised Least Squares (GLS), random effects approach	-0.6			
Barba Navaretti et al. (2003)		1994-2000	Panel	Difference Generalized Method of Moments (GMM)	Short run		Long run	
					Multinational	National	Multinational	National
	Belgium				-0.45	-0.53	-0.56	-5.77
	Denmark				-0.43	-0.74	-0.4	-2.3
	Spain				-0.73	-1.06	-0.75	-2.96
	Finland				-0.54	-0.42	-0.53	-0.53
	France				-0.73	-0.91	-0.73	-1.32
	Germany				-0.71	-0.88	-0.77	-1.68
	Italy				-0.9	-0.96	-0.9	-1.63
	The Netherlands				-0.47	-0.58	-0.55	-2.51
	Norway				-0.68	-0.75	-0.7	-0.89
	Sweden				-0.5	-0.31	-0.5	-0.56
Konings and Murphy (2004)	Bulgaria, Czech republic, Estonia, Poland, Romania, Slovak Republic, Austria, Belgium, Denmark, France, Germany Luxembourg, Netherlands, UK	1990-1996	Panel	System Generalized Method of Moments (GMM)	-0.65			
Becker et al. (2005)	Germany	2000	Cross-section	Multinomial logit model	-0.26			
	Sweden				-0.41			
Addison and Taxeira	Portugal	1977-2001	Time series (used already existing data)	System Generalized Method of Moments	-0.21			
	Germany				-0.57			

(2005)				(GMM)	
Godart et al. (2009)	United Kingdom (UK)	1997-2005	Panel	System Generalized Method of Moments (GMM)	-0.34
Buch and Lipponer (2010)	Germany	1997-2004	Panel	System Generalized Method of Moments (GMM)	-0.37
Hakkala et al. (2010)	Sweden	1990-2002	Panel	System Generalized Method of Moments (GMM)	-0.36
Kölling (2012)	Germany	2000-2007	Panel	Fractional Panel Probit Model	-0.38

The studies summed up in table 3.2 are organized according to Hamermesh' (1993) scheme of classifying studies of labour demand, where distinction between studies is being made on the basis of the unit of observation, the time/space dimension and the method of estimation. The studies are all fairly recent, ranging from 1999 to 2012 and covering data from 1977 to 2007. Although this thesis focuses on the Netherlands, most studies concern other countries. These countries, however, are similar to the Netherlands, in the sense that they are developed and either neighboring to the Netherlands or part of the European Union.

Turning to the results of table 3.2 it becomes clear that all studies find a negative wage elasticity of labour demand, implying that a wage increase will lead to a decrease in demand for labour. These results coincide with both the predictions made by the theory observed, as well as Hamermesh' (1993) outcomes. Furthermore, although the size of the found elasticities differ across the various studies, all results fall in Hamermesh' (1993) estimated values.
Observing the different studies in table 3.2 shows that most studies use the Generalized Method of Moments (GMM) in estimating the elasticity of labour demand. The reason can be found in the fact that the 'labour force is considered rigid due to the fact that hiring and firing of employees is costly' (Hakkala et al., 2010). This rigidity would imply that the current labour force depends on the labour force at (t-1), which on its turn would depend on the labour force at (t-2) etc. This rigidity could lead to an endogeneity problem as the error terms of the independent variable and dependent variable could be correlated. In order to model the elasticity of labour demand without incurring endogeneity, we would need a dynamic model where lagged dependent variables are used as regressors. In that case OLS would not be a good estimator as it could lead to biased estimates, a so-called dynamic panel bias. In order to overcome this issue, GMM developed by Arellano et Bover (1995) and Blundell and Bond (1998) is being used; their measures use instruments in order to come up with good estimates of the lagged variables. For these reasons studies using GMM are preferred over the use of OLS as an estimation method. Furthermore, one can distinguish between two versions of the GMM estimator; the system GMM (Blundell et Bond, 1998) and the difference GMM (Arellano et Bond, 1991). In general the system GMM is considered superior over the difference GMM (Blundell et al., 2002) as it 'improves efficiency by using more instruments as compared to the difference GMM' (Hakkala et al., 2010). The use of either system GMM or difference GMM could explain why the results obtained by Barba Navaretti et al. (2003) differ from those obtained by studies using system GMM. The outcomes of Barba Navaretti et al. (2003) imply more elastic labour demand than studies using system GMM. Indeed Buch et

Lipponer (2010) explain the difference between the outcomes in that 'the system GMM estimator provides superior instruments to control for the endogeneity of wages'. Therefore, studies that use system GMM are expected to lead to more accurate outcomes.

If we take a closer look at the values of the different studies using system GMM, we find an elasticity around -0.4. The only exception to this, is the research conducted by Konings et Murphy (2004) as they find a wage elasticity of -0.65. The difference in labour elasticity between these studies that use the same method of estimation, could either be due to the fact that the research covers different countries, or due to the fact that Konings et Murphy's (2004) research covers the long term wage elasticity while the others cover the short term elasticity. Wage elasticities differ across countries due to country specific reasons, such as the ease of firing people or the productivity of workers. The chosen dataset could therefore provide an explanation for the difference in elasticities found by Konings et Murphy (2004) and the others. Konings et Murphy's (2004) dataset contains eastern European countries, while the other studies use mostly western European countries. On the other hand, the difference could also be explained due to the fact that labour is considered rigid, making labour demand more elastic in the long run than in the short run (Hakkala et al., 2010). Since the research conducted by Konings et Murphy (2004) covers the long run, its results are expected to be more elastic than the results of studies covering the short run. The difference between short term and long term wage elasticities can also be derived from the study conducted by Barba Navaretti et al. (2003), where it is apparent that the wage elasticity in the short term is less elastic than in the long term.

A final difference between the studies listed in table 3.2, is that almost all studies use panel data, except for the studies conducted by Becker et al. (2005) and Addison et Taxeira (2005). There are a number of advantages to panel data over cross-section analysis and time series analysis. Panel analysis is not limited to one dimension only, allowing more general conclusions to be drawn from the outcomes (Hsiao, 2003). Furthermore, Hsiao (2003) points out that there are also econometric advantages, such as the ability of controlling for omitted variables. Especially since panel analysis allows more general conclusions, studies based on panel analysis are most valuable for the purpose of this thesis.

Based on the analysis of the different studies listed in table 3.2 it becomes clear that studies using panel data and system GMM as the method of estimation should give the most accurate

results. Hamermesh (1993) concluded that wage elasticities of labour demand vary between -0.3 and -0.7. The results from the studies listed in table 3.2 that use panel data and system GMM all give a wage elasticity of around -0.4. Wage elasticity of labour demand in the long run is expected to be higher however, due to the rigidity of labour demand.

3.3 Sector level

As part of the theoretical framework discussed in this chapter, the right-to-manage model showed that wages depend on the wage elasticity of labour demand, the level of union power and the profit of the firm with respect to labour costs (see also equation (7)). The more elastic labour demand is, the higher unemployment will be in the case of a wage increase. As is clear from the previous paragraph, a wage raise will lead to less labour demand due to a negative relationship between wage and employment. However, it is unclear whether the extent of this effect would be the same between all sectors. It could well be that the implementation of a higher wage will lead to less unemployment in one sector than another. Whether elasticities differ between sectors would have to be shown by empirics. To that extent table 3.3 lists several studies that focus on the wage elasticity of labour demand on a sector level.

Table 3.3 Wage elasticities of labour demand on the sector level

Author	Location	Sector	Period	Time/space dimension	Method of estimation	Estimated labour elasticity	
Gunter et al. (1992)	United States	Agricultural	1969-1987	Panel	Log linear regression	Long run	-2.44
						Short run	-1.19
Slaughter (2001)	United States	Manufacturing	1961-1991	Panel	OLS fixed effects	Production	-0.7
						Non production	-0.63
Falk (2001)	Germany	Services	1995-1997	Panel	OLS fixed effects		-0.36
Molnar and Taglioni (2007)	11 OECD countries	Manufacturing and services	1993-2003	Panel	OLS fixed effects	All sectors	-0.56
						Manufacturing	-0.57
						Services	-0.87
Adam and Moutos (2014)	EA-12 (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain)	Multiple	1970-2007	Panel	OLS fixed effects	Food and beverages	-0.51
						Textiles	-0.6
						Printing & publishing	-0.21
						Chemicals	-0.29
						Rubbers and plastics	-0.5
						Fabricated metal	-0.38
						Electrical machinery	-0.36
						Motor vehicles	-0.43

The general idea obtained from the results listed in table 3.3 is that the wage elasticity of labour demand does indeed differ between sectors. Molnar et Taglioni's (2007) research shows that the service sector is more elastic than the manufacturing sector. As service sectors are characterized by their labour intensity, it could provide a reason for a higher wage elasticity. The same counts for the results obtained by Adam et Moutos (2014), where textiles have a larger elasticity than capital intensive sectors like machinery and other forms of manufacturing. Although there are differences between the different sectors, almost all results listed in table 4.3 show elasticity estimations that are between -0.3 and -0.7, coinciding with Hamermesh' (1993) research. Only Gunter et al. (1992) find a far higher elasticity for the United States' agricultural sector, both for the long run and the short run. Although it is not exactly clear what the reason is for the large difference in outcomes, it could be that the agricultural sector was a lot more labour intensive during the estimated time period (1969-1987) than all other sectors.

When we turn to the econometrics of the studies listed in table 3.3 we notice that almost all make use of ordinary least squares (OLS) with fixed effects. As was stated earlier, the use of OLS in the case of estimating wage elasticities brings forth a problem in the fact that it can cause endogeneity bias. The key assumption in using OLS is that the regressors are exogenous, if this assumption is violated the OLS estimates become invalid. For this reason, OLS is not the ideal way of estimating the elasticities, as the results listed in table 3.3 will have to be interpreted with caution. Other than that, in general it shows that wage elasticities of labour demand differ between sectors. Services are in general more elastic than manufacturing and especially the sectors printing and chemicals have low elasticities.

4. Labour productivity

Proponents of a wage increase stress rising labour productivity as one of the reasons for welcoming a wage increase. Furthermore, Krugman (1994) views labour productivity as one of the most important topics in economic policy, as 'a country's ability to improve its standard of living over time, depends almost entirely on its ability to raise output per worker'. Unlike the previous chapters, dealing with unemployment, the relationship between labour productivity and the economy might be less obvious. To see why a rise in labour productivity is considered to be positive for an economy, we turn to this shortly.

Labour productivity is defined as 'the output per unit of labour input. An increase in labour productivity means greater efficiency in producing output of goods and services from input' and can be increased through the use of 'better or more capital equipment, new advances in technology, organizational changes, or increased efficiency' (UK office for national statistics, 2008). In the literature, rising labour productivity is considered to be positive for an economy as it results in increased investments, improved international competitive position and increased standard of living (Narayan et Smyth, 2009). Investments are expected to increase with labour productivity, as the use of better or more capital is often at the base of labour productivity growth. This improvement or enlargement of the capital stock is reached through investments. The relation between labour productivity and the international competitive position comes about via a reduction in export prices; less employees are needed to produce the same amount of products, therefore reducing the price per product and increasing the international competitive position. The final proposed effect of increased labour productivity on the economy, sees to the standard of living. This standard of living is associated with labour productivity as less employees are needed to create a similar amount, offering the possibility of shorter working hours.

This thesis focuses on the effects of a wage raise, we will turn to theory and empirics in order to assess if rising wages have an effect on labour productivity and, if so, what the size of this effect is.

4.1 Theoretical framework

The conventional macroeconomic theory concerning labour productivity, views labour productivity as the determinant of (real) wages (Bester et Petrakis, 2002). It assumes that firms want to maximize profits by hiring labour until the marginal productivity of labour (MPL) is equal to the real wage. In the case of an increase in productivity, due to one of the reasons stated above, the MPL increases. This increase is caused by the fact that an increase in productivity means that more output can be produced with one unit of labour now, than before. In other words, there is a higher productivity now than before. The result of a higher MPL will be that firms have an incentive to hire more labour. As the revenue of hiring more labour (the MPL) exceeds the costs (the real wage level). On its turn the increase in labour demand leads to higher wages, resulting in a causal link from labour productivity growth to wage growth.

Since this thesis focuses on the effect of a wage increase on labour productivity, rather than the effect of an increase in labour productivity on wages, it is clear that the conventional macroeconomic theory does not provide a theoretical base for this chapter. Other mechanisms, on the other hand, view wages as the determinant of labour productivity, allowing for the ideas brought forward by this thesis. Hicks' (1932) theory of induced technological change and the neoclassical substitution theory offer explanations for a causal relationship going from wages to labour productivity. In the following paragraphs, these theories will be investigated. In paragraph 4.2 we will assess whether a relationship can also be found in empirics.

4.1.1 Induced technological change

Hicks (1932) was one of the first to come up with a theory that explained how wage growth, as an independent variable, could determine labour productivity. His 'induced technological change' theory, gave rise to the idea that there was a relationship between factor prices and technological innovation. The theory is based on the idea that increasing factor prices, either interest for capital or wages for labour, induce labour saving innovations, leading to an increase in productivity. Upon this idea Kennedy (1964), Von Weizsäcker (1962), Drandakis & Phelps (1966), Samuelson (1965), Bester & Petrakis (2002) and Funk (2002) elaborated. All assume that firms can adjust 'the rates of factor augmentation in order to maximize the current growth rate of output' (Funk, 2002). In other words, firms are able to adjust their level of technology by either increasing the productivity of the factor labour or capital. However, the ability to increase the productivity depends on the 'innovation possibility frontier', where

the decision to innovate in laboursaving technologies limits the possibility of innovating in capitalsaving technology (Funk, 2002).

The induced technological change model is largely based on the neoclassical growth model, where the aggregate production function is complemented with two technology parameters (A_t and B_t), leading to (16).[8]

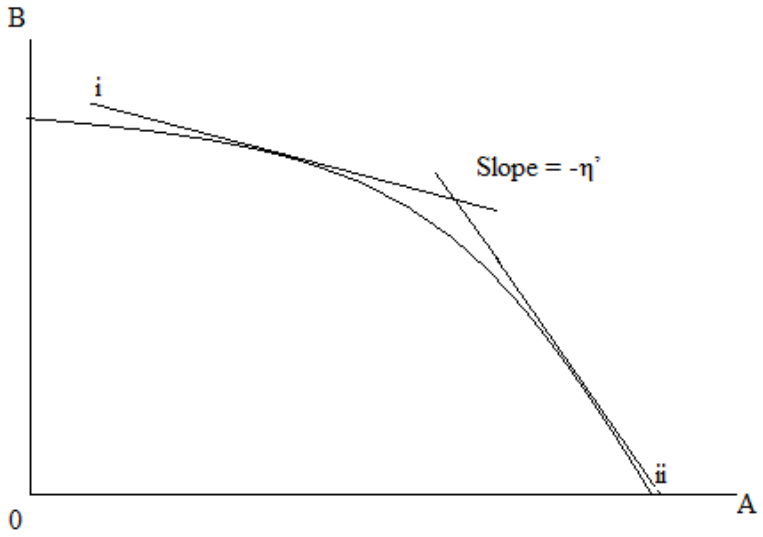
$$F(A_tL, B_tK) \tag{16}$$

Where A_t is the technology parameter for labour (L) and B_t the technology parameter for capital (K). Maximizing the level of production, given the innovation possibility frontier, provides us with (17)[9], where η defines the possibility frontier, w_t the factor price of labour and r_t the factor price of capital.

$$(-\eta') = \frac{w_t \overline{L}}{r_t K_t} \tag{17}$$

From (17) it follows that an increase in wages will lead to an increase in the labour's share in total income, resulting in an increase in ($-\eta'$). As is shown graphically in figure 4.1, this increase leads to a position on the innovation possibility frontier with a steeper slope, indicating that a firm chooses to increase its laboursaving technologies to grow labour productivity. In other words, an increase in wages makes labour more expensive than before, giving the firm an incentive to invest in laboursaving technology and through that increasing labour productivity.

Figure 4.1 Induced technological change[10]



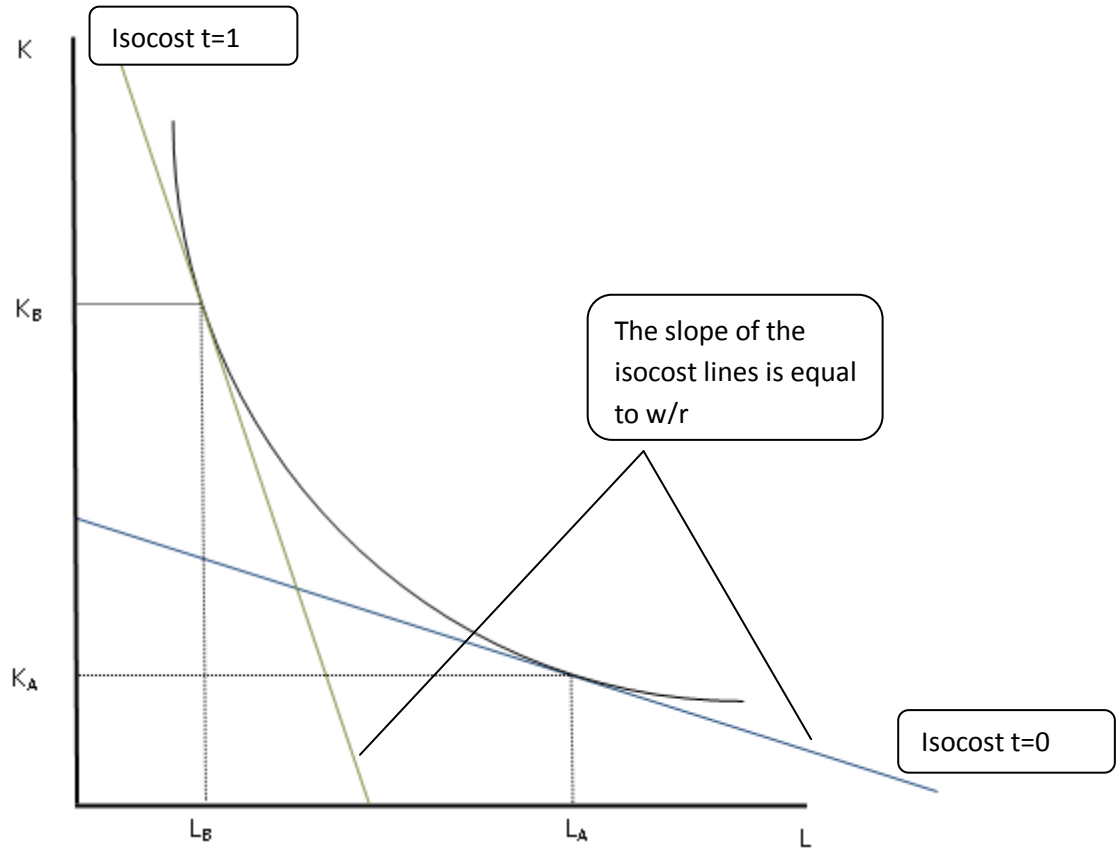
[8] Funk, P (2002) Induced innovation revisited, economica, vol 69, no. 273, pp. 155-171.
[9] Funk, P (2002) Induced innovation revisited, economica, vol 69, no. 273, pp. 155-171.
[10] Funk, P (2002) Induced innovation revisited, economica, vol 69, no. 273, pp. 155-171.

4.1.2 Neoclassical theory of substitution

Although the induced technological change theory is, to a large extent, based on the neoclassical growth model; they differ in the fact that the neoclassical growth model makes use of substitution rather than labour- or capitalsaving investments. The neoclassical growth model assumes that firms can substitute between labour and capital, but that this substitutability between capital and labour is imperfect (Irmen, 2010). This assumption results in the fact that an increase in the price of one of the two production factors will decrease the demand in that factor, but not eliminate it. If labour becomes relatively more expensive than capital a firm will substitute some, but not all, of its labour for capital while keeping the level of output unchanged (Irmen, 2010). Less labour is needed to produce a similar amount of output, increasing the level of labour productivity.

This substitution between capital and labour can also be derived from figure 4.2 where the slope of the isocost line is determined by the factor prices, w/r. If wages are increased the slope of the isocost line increases, shifting the isocost line from isocost at t=0 to isocost at t=1. Given the shifting of the isocost lines, the point of tangency with the isoquant shifts, indicating a substitution from labour to capital. Again, while labour decreases output remains the same, increasing labour productivity. In other words, due to the wage increase labour productivity increases, showing a causal relationship going from wages to labour productivity.

Figure 4.2 Neoclassical substitution[11]



4.2 Empirical research

The number of studies that focus on determining the existence of a causal relationship going from wages to labour productivity is limited. The first to come up with a study that mentions a relationship going from wages to labour productivity was Gordon in 1987. In his study he does not calculate an actual wage elasticity of labour productivity, but later studies do. All studies listed in table 4.1 focused on the relationship going from wage growth to labour productivity growth and found statistically significant positive wage elasticities of labour productivity. These outcomes suggest that there is a positive correlation between wages and labour productivity, just like the induced technological change theory and the factor substitution theory predict. The studies listed in table 4.1 obtained various results due to the use of different estimation methods and different (types of) datasets. In the following paragraphs the methods used will be analysed in order to assess which studies are most powerful and come to a quantification of the wage elasticity of labour productivity.

[11] Popp, D (2013) Economics for public decisions, Lecture 13, fall 2013.

Table 4.1 Wage elasticities of labour productivity

Author	Sample	Method	Type of Data	Estimated elasticity of labour productivity with respect to real wage
Gordon (1987)	USA, Japan and Europe non-manufacturing sector (1964-1984)	3 periods (1964-1972, 1972-1979, 1979-1984)	Time series	Decrease in real wage is responsible for 0.74 decrease in productivity after 1972 for USA 0.84 for Europe and Japan after 1979
Fase et Winder (1999)	Netherlands (1956-1993)	Unit root test (ADF), cointegration test (ARDL), causality test (Granger)	Time series	0.54
Marquetti (2004)	USA (1869-1999)	Unit root test (ADF), cointegration test (EG), causality test (Granger)	Time series	0.99
Van Schaik (2006)	Netherlands (1971-2004)	OLS	Time series	0.4
Vergeer et Kleinknecht (2007)	19 OECD countries (1960-2004)	Fixed effects GLS/IV estimator	Panel	0.28-0.39
Narayan et Smyth (2009)	G7 (1960-2004)	Unit root test (ADF), cointegration/causality test (Pedroni + FMOLS)	Panel & time series	0.6 (for France, Germany and Italy; 0.4)
Kumar et al. (2009)	Australia manufacturing sector (1965-2007)	Unit root test (ADF & PP) cointegration test (GH & Johanson), causality test (Granger) & structural break cointegration test (Gregory & Hansen test)	Time series	0.5-0.8
Vergeer et Kleinknecht (2014)	20 OECD countries (1960-2004)	Difference GMM and 5-year averaged values	Panel	0.35-0.46
Yildirim (2015)	Turkey manufacturing sector (1988-2012)	Unit root test (ADF & PP), cointegration test (EG, GH, FMOLS, ARDL, DOLS), causality test (Granger)	Time series	0.14-0.2

The difficulty in determining the relationship between wages and labour productivity using time series, is the non-stationarity of the variables. If OLS is applied to non-stationary variables a relation might be found which does not exist in reality, a so-called spurious relation. Since both wages and labour productivity vary over time, they are considered to be non-stationary, often indicated by the use of an Augmented Dickey Fuller (ADF) test. In order to overcome the issue of non-stationarity, cointegration tests can be applied. If the variables turn out to be cointegrated, they can still be regressed on one another despite the issue of non-stationarity. Almost all studies identified in table 4.1 use cointegration tests to regress wages and labour productivity on one another, overcoming the issue of non-stationarity. Van Schaik (2006) does not show the use of cointegration tests in his paper, inquiry learned that indeed he did not make use of anything else besides OLS.[12] For this reason the results obtained by Van Schaik run the risk of being spurious. He did not check for stationarity of his variables nor applied a cointegration test to estimate the wage elasticity of labour productivity.

To see if a distinction can be made between the studies using cointegration models in estimating the relationships, it is necessary to know that there are multiple cointegration tests possible. The different tests coming forth from the investigated studies include the Engle Granger test, the Gregory&Hansen test, the ARDL test and the Johansen test. Although all of the tests have their positives and negatives, some are more fit for certain data sets than others. The Gregory&Hansen test is the only test that allows for structural breaks in the data. It is for this reason that Kumar et al. (2009) made use of this test, as they expected to find structural breaks in their data. The use of the Gregory&Hansen test came up with a different and potentially more accurate estimate of the wage elasticity of labour productivity (0.6) than the other tests used. For the same reasons it is notable that Marquetti (2004) does not make use of a test that allows for structural breaks. Given that he makes use of a large data set dating back to 1869, there is a chance of experiencing structural breaks (e.g. industrialization, great depression) in the data. In his paper Marquetti (2004) makes use of the Engle Granger test rather than the Gregory&Hansen test, indicating that he assumes that there is no structural break present. If a test is used that does not correct for a structural break, while a structural break is present, it will lead to spurious estimates. The reason is that due to the presence of a structural break, the cointegration test will say that cointegration is not present too often. The

[12] Email conversation with van Schaik.

elasticity obtained by Marquetti is far larger than the others, therefore it could indicate that there is a structural break present, making the results spurious as a wrong cointegration test is used.

Based on the studies listed in table 4.1 there does not seem to be a clear preference for one of the cointegration tests. Both Kumar et al. (2009) and Yildirim (2015) even use multiple cointegration tests on their data to compare the different outcomes. Although the different studies do not show the use of one test in particular, in general it can be said that the ARDL test is more powerful than the Engle Granger test. In a paper on cointegration tests Kremers et al. (1992) concluded that the ARDL test can be considered more powerful because it imposes less restricting assumptions than an Engle Granger test, eventually leading to better estimates. One can therefore argue that the studies using an ARDL test will come up with better estimates as opposed to an Engle Granger test. Fase et Winder (1999) indicate that their choice for the use of a ARDL test is based on its superior power over an Engle Granger test.

Besides studies that make use of time series, table 4.1 also lists studies that make use of panel data in obtaining the wage elasticity of labour productivity. Although Vergeer et Kleinknecht (2007), (2014) and Narayan et Smyth (2009) all use panel data, their methods differ. Of these different methods, the Pedroni test conducted by Narayan et Smyth (2009) is considered best. The Pedroni test is a cointegration test especially developed for panel data. The Pedroni test is comparable to the Johansen and Engle Granger test, in that it bases its estimations on the residuals, but is considered more powerful. The Pedroni test is more powerful as it is specifically created for panel data, rather than time series. Vergeer et Kleinknecht (2007), (2014) do not use a specialized estimation method in determining their estimates. Kleinknecht et Naastepad (2014) make use of a generalized Johansen cointegration test in the form of GMM (Quintos, 1998). As GMM makes use of lags it overcomes the non-stationarity issue as well, therefore obtaining good results. The Generalized Least Squares (GLS) test used by Vergeer et Kleinknecht (2007), is not a preferred test in estimating the relationship between wages and labour productivity. The test does not control or deal with non-stationary variables, affecting its estimates. Inquiry with Kleinknecht learned that indeed he chose to use a different estimation method in his 2014 paper, as it was better in estimating than the GLS test used in his 2007 paper.[13]

[13] Email conversation with Kleinknecht.

Based on the findings listed in table 4.1 and the analysis of the econometrics used in the previous paragraph, we can conclude that a positive relationship exists between wage growth and labour productivity growth. This relationship is found to be positive in all studies examined, as well as that all studies find that causality runs from an increase in wages to an increase in productivity. Based on the studies listed in table 4.1 and the analysis of the econometrics behind the estimations, it can be concluded that most studies that used good econometrics find results between 0.4 and 0.6. Fase et Winder (1999), Kumar et al. (2009), Narayan et Smyth (2009) and Vergeer et Kleinknecht (2014) all find results that indicate that the wage elasticity of labour productivity ranges between 0.4 and 0.6. Indicating that a 1% increase in real wages leads to an increase in labour productivity of 0.4 to 0.6 percent. Only Yildirim (2015) does not obtain results within the 0.4-0.6 region, despite the fact that his econometric methods seem correct. Yildirim (2015) states that his results could be explained by country specific aspects, causing the elasticity to be lower in Turkey when compared to other countries.

To assess whether the wage elasticity of labour productivity in the Netherlands can be expected to be in the 0.4-0.6 region, we turn to the data used by Fase et Winder (1999), Kumar et al. (2009), Narayan et Smyth (2009) and Vergeer et Kleinknecht (2014). Fase et Winder (1999) are the only researchers to use just data from the Netherlands in assessing their productivity, obtaining an elasticity of 0.54. Narayan et Smyth (2009) obtain an elasticity of 0.6 for the G7 countries. However, when turned to countries close to and more similar like the Netherlands, they find an elasticity of 0.4 for Germany, France and Italy. Kumar et al. (2009) obtain results for Australia, also a developed country, of which his most accurate method obtains an elasticity of 0.6. Finally Vergeer et Kleinknecht (2014) use OECD countries for their data, of which the Netherlands is part, obtaining elasticities between 0.35 and 0.46. To conclude, only one study focuses on the Netherlands obtaining an elasticity of 0.54. However, other studies that base their estimates on countries somewhat similar to the Netherlands find results in the range of 0.4 to 0.6. Therefore it would be fair to say that the wage elasticity of labour productivity in the Netherlands will be in the 0.4-0.6 region. Indicating that a 1% real wage raise in the Netherlands is expected to lead to an increase in labour productivity of 0.4-0.6%.

4.3 Sector level

Based on the theory discussed in 4.1, the wage elasticity of labour productivity is only expected to differ between sectors if either the substitutability of labour and capital would differ, or if the possibility of implementing labour saving innovation differs. As this thesis has not been able to find any empirical research on this, we can not be conclusive on the existence of sector differences in the wage elasticity of labour productivity.

5. Consumption

Advocates of a wage raise stress the presumed positive effect of a wage raise on consumption. For the past five years household consumption has decreased and although there are some signs of slow recovery, consumption remains fragile and not contributing to Dutch economic growth (CBS, 2012; 2015). As consumption is generally responsible for approximately 45% of Dutch GDP, the effects of any policy implications on consumption should be viewed carefully (Worldbank, 2013). This chapter will discuss the theories underlying the statements of advocates of a wage rise and give an estimation of the effects of a wage increase on consumption for the Netherlands. For this purpose, chapter 5.1 will discuss different consumption theories demonstrated by Keynes, Fisher, Modigliani & Weber and Friedman, while chapter 5.2 will discuss multiple empirical studies that focus on the relationship between disposable income and consumption.

5.1 Theoretical framework

Underlying all consumption theories is the idea that consumption is the decision not to save. In other words, a consumer can decide to either spend his income on consumption or on savings. Keynes (1936) was the first to come up with a theory that modeled this decision, explaining the relationship between income and consumption. In his 'Absolute Income hypothesis' Keynes describes a static relationship between income and consumption, where a consumer increases his utility by consuming more as income increases. This static relationship can also be derived from (18), where the current level of consumption (C) depends on an autonomous level of consumption ($\bar{C}$), such as minimum living costs, and a marginal propensity to consume (MPC) (c) out of current disposable income (Y).

$$C=\bar{C}+cY \qquad (18)^{14}$$

The MPC indicates what happens to consumption when disposable income rises by 1 euro. Under the absolute income hypothesis the MPC is between 0 and 1, indicating that some income is saved and not consumed. An increase in current income due to an increase in wages, as proposed in this thesis, is therefore expected to lead to higher levels of consumption. The extent of this increase will not be one-on-one, due to the MPC being smaller than 1.

[14] Keynes, JM (1967) The general theory of employment interest and money, Macmillan, p. 90.

Since consumption consists of an autonomous part and a part that depends on disposable income, it is expected that the relationship between total consumption and income, denoted by the average propensity to consume (APC) in (19), changes over time. As income rises the APC is expected to decrease.

$$\text{APC} = C/Y = \bar{C}/Y + \text{MPC} \tag{19}$$

Kuznets (1942) showed that although this decreasing APC holds for cross section analysis, it does not hold for time series. Cross-section analysis indeed showed that high income households have a smaller APC than low income households. While a similar result is expected in time series, where income is expected to increase over time, Kuznets (1942) showed that this was not the case. Instead he showed that the APC is constant in the long run, rather than decreasing, giving rise to the so called 'Kuznets' paradox'. On micro level 'Kuznets' paradox' indicated that the MPC changes with the level of income and can therefore not be considered static (Friedman 1957). Both Friedman (1957) and Modigliani et Brumberg (1954, 1979) came up with dynamic theories that allocated consumption intertemporally, offering an explanation for the 'Kuznets' paradox'

5.1.1 Dynamic theories

Fisher (1930) was the first to come up with a dynamic theory regarding consumption. His intertemporal approach assumed that consumers are forward looking and borrow and lend to maximize their lifetime fulfillment. Unlike Keynes's theory, it is not the current income that determines consumption, but more so the life time income. Due to the possibility of borrowing and lending, consumers are not restricted to when income is generated. Modigliani et Brumberg (1954, 1980) and Friedman (1957) built on this intertemporal approach with respectively the 'Life-cycle hypothesis' and the 'Permanent Income hypothesis'.

The 'Life-cycle hypothesis' elaborates on the intertemporal approach. It assumes that during people's lives income varies systematically. The idea behind this assumption is that at the beginning of a career there is little income, while income is highest towards retirement, then from retirement till the end of life, there is no income at all. The possibility of lending and borrowing allows the consumer to move income over the life cycle, causing a constant level of consumption. Summing up these assumptions in a consumption function leads to (20).

$$C = \frac{1}{T} W + \frac{R}{T} Y \qquad (20)^{15}$$

Where $\frac{1}{T}$ is the marginal propensity to consume out of wealth and $\frac{R}{T}$ the marginal propensity to consume out of income. *R* is the years left till retirement, *T* the lifetime in years left and *W* and *Y* the initial level of wealth, respectively the expected income till retirement. From equation (20) it becomes clear that an increase in expected income will lead to an increase in consumption, but that the ratio between consuming and saving depends on the life cycle.

The 'Permanent Income hypothesis' (Friedman, 1957) also elaborates on the intertemporal approach, in that consumers want to level out their consumption. Consumers only base their consumption on what they expect to be their average income for the future; their permanent level of income (Y^p). This level of permanent income can differ from the real income by temporary deviations, considered to be transitory income (Y^t). This shows that income consists of two separate components, as can be viewed from (21).

$$Y = Y^p + Y^t \qquad (21)^{16}$$

Since the consumption decision is only based on the permanent level of income, transitory income does not affect consumption. Any excess transitory income will be saved, while any negative transitory income will be covered by borrowing. This can also be derived from (22), where *k* is the MPC, a constant parameter that indicates a proportional change in consumption with regards to permanent income.

$$C = kY^p \qquad (22)^{17}$$

According to both the 'Life-cycle Saving theory' as well as the 'Permanent Income theory', there can only be a significant change in consumption when there is a structural change in income. Both theories build this idea on the fact that 'consumers have concave utility functions and therefore prefer smooth paths of consumption over variable ones' (Attanasio et Weber, 2010). The life-cycle saving theory explains this by assuming that an increase in income is spread over all years of consumption. A temporary increase will only have a small effect on the expected income till retirement, leaving the current level of consumption largely unaffected. The same counts for the permanent income theory, which assumes that a

[15] Agarwal, P. (2013) Consumption hypotheses, p. 2.
[16] Friedman, M. (1957) A theory of the consumption function, p. 21.
[17] Friedman, M. (1957) A theory of the consumption function, p. 31.

temporary increase in income, like a one-time tax cut or a one-time bonus, is transitory and will therefore not affect consumption. Only a permanent increase will affect the average disposable income for the future; the permanent income.

A wage increase, as proposed in this thesis, will be of a permanent nature and is therefore expected to lead to an increase in consumption under both theories. Under the life-cycle saving theory the wage raise will be processed as an increase in the yearly expected income till retirement. Under the permanent income theory the increase in wages will be processed as an increase in the average income for the future, leading to a higher permanent income. According to both theories the increase in wages will result in an increase in disposable income, leading to higher levels of consumption. However, the extent of the increase in consumption depends on the MPC.

Attanasio et Weber (2010) showed that many of the empirical findings can be consistent with the intertemporal consumption theories, although there are some limitations to the models. Intertemporal consumption models assume that consumers even out their consumption by making use of borrowing and lending. Not all consumers have the ability to lend however, making them liquidity constrained. The inability to make use of borrowing and lending, leaves this group of consumers unable to maximize their utility using intertemporal consumption. According to estimates of the European Central Bank, these so-called liquidity constrained consumers make up 25% of the total population of the European Union (Coenen et Straub, 2005). Besides consumers being unable to consume according to these intertemporal theories, there is a significant group of consumers that choose not to behave accordingly. These consumers are known as so-called 'rule of thumb' consumers and consume their entire disposable income every period rather than maximizing their utility using intertemporal consumption. In the case of the Netherlands, estimations of both the Dutch Central Bank as well as the CPB show that only 20% of the Dutch population maximize their utility through intertemporal consumption, leaving as much as 80% of the total population to be either liquidity constrained or behave as a rule-of-thumb consumer (Hoogduin, 2011; De Jong, 2011). Since a liquidity constrained consumer is unable to maximize his utility through intertemporal consumption, and a rule-of-thumb consumer chooses not to maximize its utility through intertemporal consumption, their MPC is expected to be much higher than of the group that behaves according to the life-cycle hypothesis or the

permanent income hypothesis. Paragraph 5.2 will turn to empirical studies to assess the aggregate effect of a wage increase on Dutch consumption.

5.2 Empirical research

Derived from the theory discussed in paragraph 5.1, disposable income is the main determinant of consumption. In order to see how wages affect the level of disposable income, it is important to realize that disposable income can either be derived from labour in the form of wage, or from capital in the form of profits. Although an increase in wages will increase the level of disposable income from labour, it will, at the same time, have a downward effect on the level of disposable income from capital. Since wages are regarded as the cost of a firm, an increase in wages will ceteris paribus lead to a decrease in profits. As dividends and share prices reflect current and future profits, income from capital is expected to fall due to lower dividends and/or falling share prices. In order to see what the net effect of wages on consumption will be, paragraph 5.2.1 will discuss studies that estimate the effect of disposable income from labour on consumption, while paragraph 5.2.2 will discuss the effect of disposable income from financial assets on consumption.

5.2.1. Disposable income from labour

There is an extensive amount of studies concerning the relationship between disposable income and consumption. Table 5.1 lists some of the more recent studies that estimated this relationship using MPC. The use of MPC rather than elasticities is in line with the discussed theory and quantifies the expected increase in consumption in the case of a 1 euro increase in disposable income. In order to calculate an MPC one can either use data that consists of absolute changes or percentage changes. Souleles (2002) points out that if one chooses absolute changes the MPC can be derived directly, while if percentage change data is chosen one obtains elasticities that have to be converted into MPC afterwards. Both Teppa (2014) and Manitsaris (2006) make use of percentage changes, but state that it is an ‘easy step to convert elasticities into MPC’ and that it should not affect the outcome.

Table 5.1 Marginal propensity to consume out of income from labour

Author	Location	Period	Data Type	Time/space dimension	Method of estimation	Estimated MPC out of labourincome
Souleles (2002)	USA	1982-1983	Micro	Panel data (household survey CEX regarding expenditure)	OLS using household fixed effects	0.6 (non-durables)
Coronado, Lupton Sheiner (2005)	USA	2003-2004	Micro	Panel data (household survey)	OLS using individual fixed effects	0.36
Manitsaris (2006)	Europe	1980-2005	Macro	Time series (private final expenditure & GDP)	OLS using %-change & Durbin-Watson test for auto-correlation	0.87
Berger-Thomson, Chung et McKibbin (2009)	Australia	2005-2007	Micro	Panel data (household survey HILDA regarding income and expenditure)	OLS using household fixed effects	0.8
De Jong (CPB) (2011)	The Netherlands	1971-2008	Macro	Time series (disposable income & consumption expenditures)	Non-linear least squares	0.86
Hoogduin (DNB) (2011)	The Netherlands	1977-2008	Macro	Time series (disposable income & consumption expenditures)	Error correction mechanism; cointegration test based on OLS coefficients for lagged variables	0.8
Agarwel et Qian (2014)	Singapore	2010-2012	Micro	Panel data of consumer financial transactions	Differences in differences regression using bank data	0.8
Altunc et Aydin (2014)	D-8[18]	1980-2010	Macro	Time series (disposable income & consumption expenditures)	OLS, unit root tests	0.98
Osei-Fosu, Butu et Osei-Fosu (2014)	Ghana	1970-2010	Macro	Time series (GDP & consumption expenditures)	OLS & Durbin-Watson test for autocorrelation	0.98
Teppa (2014)	The Netherlands	2009-2012	Micro	Panel (Household survey (LLIS) regarding expenditure)	OLS regressing %change in consumption over %change in household income using fixed effects	0.21

[18] Developing 8; Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, Turkey.

When we turn to these outcomes it becomes clear that all estimated MPCs are positive and greater than zero. This implies that the discussed studies find that an increase in wages leads to an increase in consumption, as is in line with the theory. The estimations however, are not consistent in size. The smallest MPC is estimated to be 0.21, while the largest is 0.98. One of the reasons for this large difference can be the type of data. Of the studies listed in table 5.1, half make use of micro level data obtained through the use of surveys, while the other half makes use of macro level data obtained through national accounts. In general, there are large differences in the results obtained by studies using macro level data and studies using micro level data. Derived from the studies listed in table 5.1, the results of micro level data tend to show estimates of MPCs between 0.2-0.6 (Teppa, 2014), while estimates tend to be a lot higher for studies that make use of macro level data. For example, in the case of the Netherlands, Teppa (2014) makes use of micro level data and obtains estimates for the Dutch MPC around 0.21. While De Jong (2011) and Hoogduin (2011) use of macro level data and obtain an MPC of 0.86 and 0.8 respectively. The Dutch central bank refers to this large difference as a puzzle, as according to them there is no clear explanation for the differences in estimates.[19]

Micro level

One explanation could be that studies based on macro level data, do not adjust for heterogeneous consumers. Studies based on macro-level data experience changing samples because older people exit the sample, while younger people enter. Also, in macro level data one cannot control for consumers that maximize their utility via intertemporal consumption and consumers that mainly base their consumption on their current income. Micro level data could provide more insight in the way the aggregate MPC is constructed and susceptible to changes, therefore providing more valuable information.

There are also some severe downsides to micro level data over macro level data. One of these is the short time span often used in surveys, making the outcomes very susceptible to shocks or crises. Teppa (2014) for example, makes use of data from 2009-2012, which are considered to be 'crisis years' and obtains a low MPC. This could indicate that consumers tend to save up more during times of crisis, leading to a lower MPC than usual. However, the only way to be certain of this is to compare these results to results obtained from a sample prior to the crisis

[19] Email conversation between me and the Dutch central bank.

years. Berger-Thomson et al. (2009) use survey data obtained just before the crisis and come up with an MPC of 0.8. This could indicate that crisis years tend to lower the MPC.

A final comment with respect to the difference in micro and macro level data, concerns the quality of the data. Micro level data is obtained via surveys, leaving the possibility that the quality of the data provided has its shortcomings, influencing the results. If we, for example, compare the studies of Souleles (2002) and Coronado et al. (2005) we notice that, despite the fact that they use the same methodology and data from the same country, their results are substantially different. This indicates that survey results can have a large impact on the estimated MPC. Whether this is due to time specific effects or to the quality of the survey data is difficult to say.

With respect to the methodology of the studies using microeconomic data, there are little differences between the studies of Souleles (2002), Coronado et al. (2005), Berger-Thomson et al. (2009) and Teppa (2014). All studies make use of panel data and OLS with household fixed effects, to come up with their estimates. A Hausman test is used to determine the use of fixed effects, which allows to obtain more general MPCs through correcting for household specific characteristics. Due to the fact that these studies use the same methodology, the difference in results can be attributed to the data used. The study performed by Agarwel et Qian (2014) is the only micro level study that uses a different methodology. Agarwel et Qian (2014) use a difference in differences regression in which two samples are compared to identify the consumption response of an increase in disposable income. One sample consists of people from Singapore that received an increase in disposable income, while the other sample consists of foreigners that live in Singapore, but did not receive this increase. The comparison provided Agarwel et Qian (2014) with an estimate of the MPC of 0.8. However, since this study made use of bank data rather than expenditure data it is unclear whether the reduction in balance is due to an increase in spending or say a decrease in debt. Therefore no conclusion will be based on these results.

Based on the discussed studies it becomes clear that the MPC based on micro level data seems to be susceptible to the chosen data set. Although it is not very clear what causes the large difference in MPC between studies based on macro level and micro level, it might be a signal that during crises consumers might behave differently than usual. This is also stressed by Carroll (2012) who states that during crises, more emphasis should be put on micro level

studies than macro level studies in order to assess the impacts of policy. If we want to look at the long run however, micro level data might not provide the most representative results due to the short time span commonly used.

Macro level

The studies listed in table 5.1 that make use of macro level data come up with results that vary between 0.8 and 0.97. Of these studies, the studies performed by Altunc et Aydin (2014) and Osei-Fosu et al. (2014) make use of data from developing countries, while the studies performed by Manitsaris (2006), De Jong (2011) and Hoogduin (2011) concern developed countries. As the inhabitants of undeveloped countries are generally more liquidity constrained than inhabitants of developed countries and as the theory showed that the MPC of people who are unable or unwilling to consume according to the intertemporal theories will be close to 1, it offers an explanation for the high estimations of both Altunc et Aydin (2014) and Osei-Fosu et al. (2014).

Studies more applicable to the Netherlands are conducted by De Jong (2011), Hoogduin (2011) and Manitsaris (2006). De Jong (2011) and Hoogduin (2011) specifically focus on the Netherlands in obtaining an MPC, while Manitsaris (2006) focuses on the EU as a whole. Manitsaris (2006) states that due to the use of macro level data some variables remain unobservable. In our case this concerns the level of permanent income as macro level data only shows the current level of income. In order to convert the current level of income into the permanent level of income, lagged dependent variables are used (Manitsaris, 2006). It is therefore that all three studies make use of lagged dependent variables and check for autocorrelation. Although De Jong (2011) makes use of non-linear least squares, while Manitsaris (2006) and Hoogduin (2011) make use of ordinary least squares, this is not expected to impact the results as non-linear least squares is only a more general form of ordinary least squares. We can conclude that macro level data will result in an MPC of 0.8-0.85 for the Netherlands.

5.2.2 Disposable income from financial wealth

The studies concerning the MPC out of capital can be divided into studies that focus on wealth from financial assets and wealth from housing. This thesis only focuses on the effects from financial assets as we do not focus on the possible effects that a wage raise might have on housing prices/wealth. Table 5.2 lists different studies that estimate the MPC out of

dividends and shares, also referred to as financial wealth. From table 5.2 it becomes clear that the effect of a raise in financial wealth only has a small effect on consumption. All estimates are between 0.02 and 0.06. The Dutch CPB (De Jong, 2011) calculated that the effect of a decrease in financial wealth has a larger effect on consumption than an increase in financial wealth. Dutch citizens respond 1.5 times stronger to a decrease in financial assets than to an increase. The results obtained in table 5.2 should therefore be multiplied by 1.5 in order to give a realistic view of what would happen to consumption in the case of a decrease in value of financial assets.

Table 5.2 Marginal propensity to consume out of income from financial wealth

Author	Location	Period	Data Type	Time/space dimension	Method of estimation	Estimated MPC out of financial wealth
Dynan et Maki (2001)	USA	1983:Q1-1999:Q1	Micro	Panel (household survey CEX)	OLS regressing %change in consumption over %change in the passive component of changes in financial wealth	0.03-0.05 (Long run)
Bertaut (2002)	UK	1979-1998	Macro	Time series	Dynamic OLS, unit root test (ADF), cointegration (Johanson)	0.04
Catte, Girouard, Price et Andre (2004)	The Netherlands	1975-2002	Macro	Time series	OLS, unit root test (ADF), cointegration (Engle-Granger)	0.06 (Long run)
Tang (2006)	Australia	1988:Q2-2003:Q1	Macro	Time series	Dynamic OLS, unit root (ADF, PP), cointegration (Johanson)	0.02
Benjamin et Chinloy (2008)	USA	1964:Q2-2003:Q1	Macro	Time series (using a representative household)	OLS, unit root test (ADF), cointegration (Engle-Granger)	0.04
Skudelny (2009)	EU	1980:Q1-2006:Q4	Macro	Time series	Error correction mechanism, Unit root (ADF & PP), cointegration (Johanson), granger causality	0.02-0.036
Carroll, Otsuka et Slacalek (2011)	USA	1960:Q1-2007:Q4	Micro	Time series (household survey)	2SLS IV estimation by using the ratio of changes in wealth to a level of consumption rather than wealth growth	0.06 (Long run)
De Jong (CPB) (2011)	The Netherlands	1971-2008	Macro	Time series	Non-linear least squares	0.045
Christelis, Georgarakos et Jappelli (2014)	USA	2009	Micro	Cross sectional (Household survey)	OLS regressing %change in consumption over %change in financial wealth using differences	0.033
Teppa (2014)	The Netherlands	2009-2012	Micro	Panel (Household survey (LLIS) regarding expenditure)	OLS regressing %change in consumption over %change in financial wealth using fixed effects	0.04

Although the studies listed in table 5.2 come up with fairly similar estimates regarding the MPC out of financial wealth, their methodology and used data is not. Table 5.2 lists studies that made use of panel data, time series data as well as cross section data. Estimates obtained from cross section data are of limited use for this thesis. These estimates are based on one point in time, being less general than estimates obtained over longer periods of time. All studies using macro level data as well as the study performed by Dynan et Maki (2001) use longer time periods to estimate the MPCs and will be looked at more closely.

As followed from the previous chapter, studies that make use of time series run the risk of having to deal with non-stationary variables. If non-stationarity is present the application of OLS could lead to a spurious relationship. Since both wages and consumption vary over time, all studies listed in table 5.2 should check for stationarity of their variables and apply cointegration tests to overcome this issue. Most tests listed in table 5.2 make use of a unit root test and a cointegration test. The only study that does not mention the use of either test is De Jong (2011). The reason for this could be the fact that De Jong (2011) conducted an extensive model and did not only focus on the relationship between consumption and financial wealth. Of the remaining studies we can make a distinction between studies that obtained a long run estimation of the MPC and studies that estimated a short run MPC. Bertaut (2002), Tang (2006), Benjamin et Chinloy (2008) and Skudelny (2009) obtained results to estimate the short run MPC out of financial wealth. Although the studies that focus on the short run MPC do not exactly use the same methodology, it is not expected to influence the results. Where Bertaut (2002), Tang (2006) and Skudelny (2009) make use of a Johansen cointegration test, Benjamin et Chinloy (2008) make use of a Engle-Granger test. This difference in tests is not expected to lead to different outcomes as none of the two cointegration tests is considered superior over the other. Other differences in the methodology concern the use of an error correction mechanism by Skudelny (2009). The variables used by Skudelny (2009) remained non-stationary, not reverting back to their mean. In order to overcome this issue Skudelny (2009) made use of the error correction mechanism, enabling him to obtain good results despite the non-stationarity issue.

Based on the studies examined, the MPC out of financial wealth is expected to be between 0.02 and 0.04 in the short run. Taking the CPB estimate concerning the response sensitivity of a decrease in financial wealth into consideration, this would mean that a 1 euro decrease in financial wealth is expected to lower consumption between 0.03-0.06 euros (De Jong, 2011).

Based on the studies conducted by Dynan et Maki (2002), Catte et al. (2004) and Carroll et al. (2011) the long run MPC out of financial wealth is higher. Their studies obtain results between 0.05 and 0.06. As Dynan et Maki (2002) do not mention the use of unit root tests or cointegration tests their results run the risk of being spurious if the variables are non-stationary. Carroll et al. (2011) point out that their choice for micro level data caused them to use instrumented variables in their regression. They could control for measurement errors and obtain more general estimation. The methodology used by Catte et al. (2004) seems to be solid, obtaining a long run MPC out of financial wealth of 0.06.

Again, taking the CPB estimate of the response sensitivity of Dutch citizens, with respect to financial losses, into account, the long run effect of a 1 euro decrease in financial wealth is expected to be around 0.09 euros.

5.3 Sector level

This thesis assumes that there are no differences between sectors with respect to the MPC. All sectors are assumed to consists of similar consumers, who will respond in an equal way when wages are increased. The MPC is therefore assumed to be equal in every sector.

6. Competitive position

The competitive position of a country is its ability to export more than other countries that produce the same goods and services (CPB, 2010). The Netherlands is considered to be a country with a strong competitive position, as the Dutch market share in exports is high compared to other countries that produce the same goods and services (World Economic Forum, 2012). Opponents of a wage raise stress the importance of a strong competitive position for the Dutch economy and state that an increase in wages will deteriorate this position (DNB, 2012). In order to see how a wage raise is expected to affect the competitive position we turn to basic microeconomics.

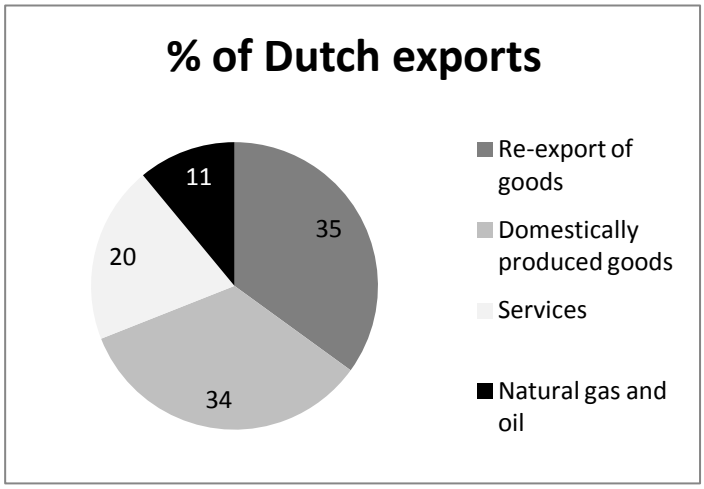
6.1 Theoretical framework

Companies produce goods and services with the input of both labour and capital, therefore the costs of a company constitutes of the costs of labour (wages) and the costs of capital (interest). In the case of a wage raise the costs of labour increase, increasing the overall costs of the company. If the firm is unable or unwilling to absorb this increase in costs, it will have to increase its prices in order to keep (the same) profit margin. Due to the increase in prices, the substitution effect will move demand away from Dutch products as they become relatively more expensive. This decrease in demand is based on a decreasing demand curve, where a higher price will lead to lower quantity demanded. As less demand will lead to less exports, the increase in wages is expected to lead to a deterioration of the Dutch competitive position. The extent of this decrease however, is dependent on the price elasticity of Dutch exports, as the price elasticity determines the slope of the demand curve.

Although microeconomic theory states that a wage increase will lead to a deterioration of the competitive position due to an increase in prices, it is important to realize that Dutch exports consist of more than just domestically produced goods. Figure 6.1 demonstrates that 34% of the total amount of Dutch exports consist of domestically produced goods, 35% consists of the re-export of goods, 20% of services and 11% of natural gas and oil (CPB, 2010). In the case of the Dutch exports, a wage raise is not expected to affect the level of re-exports or the export level of natural gas and oil (CPB, 2010). Re-export is not expected to be affected by a wage increase, as the price of these exports are only affected by Dutch exporters in a very limited degree (CPB, 2010). Therefore, the level of re-exports says only very little about the

Dutch competitive position. For different reasons, the export of natural gas and oil is not expected to be affected by a wage increase either. The prices of natural resources are mostly determined exogenously, the product is characterized by long term contracts and the production is very capital intensive. Resulting, the effect of a wage raise on the export of these products to be minimal (CPB, 2010).

Figure 6.1[20] Build-up of Dutch exports



In order to see what the effect of a wage increase on the export of domestically produced goods and services will be, we will have to assess the price elasticity of Dutch exports. Paragraph 6.2 will turn to different empirical studies to assess this elasticity.

6.2 Empirical research

Table 6.1 lists the studies that focus on the competitive position. As followed from the theory, the competitive position is expected to deteriorate due to a decrease in exports. Table 6.1 lists two types of studies to empirically assess the theory. Two studies focus on the relative unit labour cost elasticity of export market share, while the others focus on the price elasticity of exports. The obtained results are in line with the theory, showing a negative relationship with exports. This indicates that a wage increase will lead to decreased exports and deteriorate the competitive position.

[20] CPB (2010), p. 47

Table 6.1 Unit labour cost elasticity of exports/price elasticity of exports

Author	Location	Period	Type of data	Method of estimation	Estimated unit labour cost elasticity of exports/price elasticity of exports
Carlin, Glyn et Van Reenen (2001)	14 OECD countries	1970-1992	Panel, disaggregate data (export of domestically produced goods)	OLS, firm fixed effects and time fixed effects with exogeneity assumption as estimates are in differences. Dependent variable export market share. Independent variable relative unit labour costs	Long run: -0.27
Decramer, Fuss et Konings (2014)	Belgium	1999-2010	Panel, disaggregate data (export of domestically produced goods)	OLS, system GMM Dependent variable net export value. Independent variable relative unit labour costs	Short run: -0.3 (OLS) to -0.5 (System GMM) Long run: -0.4 (OLS)
Goldstein et Kahn (1978)	Belgium, France, Germany, Italy, the Netherlands, UK, US	1955-1970	Panel, disaggregate data	Non-linear full information maximum likelihood	Belgium -1.6 France -1.3 Germany -0.8 Italy -3.3 Netherlands -2.8 UK -1.3 US -2.3
Hooper, Johnson et Marquez (2000)	G-7	1990-1996	Time series, aggregate data	Test for unit root using ADF-test, formulate a vector error correction model (VECM), estimated using maximum likelihood.	SR & LR Canada -0.5 & -0.9 France not significant Germany not significant Italy -0.3 & -0.9 Japan -0.5 & -1 U.K. -0.2 & -1.6 U.S. -0.5 & -1.5
Behar et Edwards (2004)	South-Africa	1975-2000 quarterly data	Time series, aggregate data	Test for unit root using ADF-test, formulate a vector error correction model (VECM), estimated using maximum likelihood.	-3 till -6
Cardarelli et Rebucci (2007)	United-States	1972-2006	Time series, aggregate data	Use OLS to test for the static version of the VECM to obtain long run estimates	0.02, but when corrected for aggregation bias -0.26

Abbott et De Vita (2010)	Hong Kong	1986-1996 quarterly data	Time series, aggregate data	Test for unit root using ADF-test, formulate a vector error correction model (VECM), estimated using maximum log-likelihood.	-2.1(LR)
Imbs et Mejean (2010)	28 countries	1995-2004	Panel, disaggregate data	System GMM	-1.7 (Slovakia) till -4.1 (Canada)
CPB (2010)	The Netherlands	1970-2008	Time series, Disaggregate data	Test for unit root, formulate error correction model, estimated using 3sls	Goods: -0.7 (SR) & -3.7 (LR) Services: -0.55 (SR) & -2.5 (LR)
Yao, Tian et Su (2013)	China	1992-2006	Time series, aggregate data	Test for unit root using ADF-test, determine the existence of cointegration, determine the number of lags for the Autoregressive Distributed lag model using AIC.	-0.65 (SR)

The two studies listed in table 6.1 that focus on the relative unit labour cost elasticity of export market share are conducted by Carlin et al. (2001) and Decramer et al. (2014). Their studies estimate the direct relationship between wages and the competitive position. Although these studies can not be compared one-on-one with the studies that focus on the price elasticity of exports, two remarks can be made. First, they are both negatively related to export, being in line with the theory. Second, in general, the results for the elasticities of export are a lot lower in the case of unit labour cost elasticity than in the case of price elasticity. An explanation for this could be that the price of export products consist of more than just labour costs. A one percent increase in wages would not have as big of an influence on demand for exports, as a one percent increase in the actual price of the export product. These numbers could only be the same when the price of the product consists completely of labour costs and are fully passed through when wages increase.

When we turn to the econometrics of the studies performed by Carlin et al. (2001) and Decramer et al. (2014), it shows that both studies make use of ordinary least squares (OLS) to estimate their elasticities. Prices take time to adjust however, making it likely that market share is rigid. As followed from chapter 3, rigid variables could lead to an endogeneity problem, making OLS a bad estimator as it could lead to biased estimates. Carlin et al. (2001) state that they assumed exogeneity, indicating that the error terms are not correlated according to them. This seems a somewhat remarkable assumption, as economic reasoning would suggest that endogeneity could be present. Decramer et al. (2014) realizes that endogeneity could pose a serious problem in estimating the elasticities. Therefore, they estimate the elasticities twice, using both OLS and system GMM. Although Decramer et al. (2014) find different, higher estimates with GMM when compared to OLS, they state that when the error terms are taken into account this difference is limited. Rather than testing for the presence of endogeneity with a Durbin-Wu-Hausman test, Decramer et al. (2014) state that the small difference in estimates, when taking the error terms into account, is enough to assume endogeneity is not present. Possibly a wrong call, which would lead to downward biased estimates for the long run elasticity.

The studies listed in table 6.1 that estimate the price elasticity of exports, use two types of data. The studies performed by Goldstein et Kahn (1978), Imbs et Mejaun (2010) and CPB (2010) use disaggregate data, while Hooper et al. (2000), Behar et Edwards (2004), Cardarelli et Rebucci (2007), Abbott et De Vita (2010) and Yao et al. (2013) use aggregate data to

obtain their estimates. The choice for the type of data influences the estimates. Unlike disaggregate data, aggregate data consists of the total exports of a country. Aggregate data does not make a distinction between the export of domestically produced goods, services, re-exports or natural resources like oil and natural gas, influencing the estimated elasticity. Orcutt (1950) states that disaggregate data should be preferred over aggregate data as it produces more accurate estimations. He states that 'in aggregate trade equations goods with relatively low price elasticities, such as oil and natural gas, can display the largest variation in prices and therefore exert a dominant effect on the estimated aggregate price elasticity'. The use of aggregate data could lead to downward biased estimates of the elasticities. The study conducted by Cardarelli et Rebucci (2007) implemented a control for the use of aggregate data and finds a higher elasticity when controlled for aggregate data. This would imply that the use of aggregate data can bias estimates downward. Despite this downward bias, a number of studies still make use of aggregate data given there is a 'smaller chance of incurring measurement error' (Aigner et Goldfeld, 1974). It seems that there is a trade-off between estimating elasticities with data containing a measurement error and obtaining downward biased results.

Turning to the methodology of the different studies that focus on the price elasticity of exports, it shows that most studies make use of dynamic models. Goldstein et Kahn (1978) state that one has to use dynamic models, as 'the presence of adjustment costs and the fact that importers and exporters are not instantaneously on their long-run demand and supply schedules' makes exports rigid. This rigidity is expected to lead to autocorrelation, on its turn leading to non-stationary variables. All studies control for this dynamic aspect by incorporating lags in their models, except for Cardarelli et Rebucci (2007). Cardarelli et Rebucci use a static model, not incorporating lags and are unable to control for autocorrelation. This shortcoming in the methodology could explain the unusually low results when compared to the other studies.

Hooper et al. (2000), Behar et Edwards (2004), Abbott et De Vita (2010) and Yao et al. (2013) all make use of multiple time series models to obtain price elasticities of export demand. These models can consists of either Vector Autoregression models (VAR), Error Correction models (ECM) or Autoregressive Distributed Lag (ADL) models. Of these models, ECM seems the best model to assess the price elasticity of demand as it is able to capture, just like ADL, both short term and long term elasticities. The reason why ECM should be

preferred over ADL however, is due to the non-stationarity of the data. Stationary data is a requirement for the use of ADL, while ECM can also be applied to integrated data and still obtain good estimates (Best, 2008).

The methodology of the studies conducted by Hooper et al. (2000), Behar et Edwards (2004), Abbott et De Vita (2010) and Yao et al. (2013) all start with testing for stationarity of the variables, using an Augmented Dickey Fuller test. Again, if it turns out that the variables are non-stationary, one can only obtain good estimates if cointegration is present. In that case a vector can be estimated and used in an error correction model to analyse the multivariate time series. This vector error correction model (VECM) corresponds to a normal VAR model, but performs better in estimating long run elasticities. This estimation method is preferred over the normal VAR model and the reason why Hooper et al. (2000), Behar et Edwards (2004) and Abbott et De Vita (2010) choose to make use of a VECM model rather than a VAR model. Only Yao et al. (2013) did not make use of a VECM model, instead they used an ADL model to estimate the price elasticity of exports. As stated earlier, an ADL model can only be applied to stationary data. Although Yao et al. (2013) test for stationarity and cointegration of their data and find that the data is non-stationary and cointegrated of order (1), they still apply an ADL model to estimate the elasticities. Since ADL models can only be applied to stationary data, the results obtained by Yao et al. (2013) run the risk of being spurious.

The studies performed by Goldstein et Kahn (1978), Imbs et Mejean (2010) and CPB (2010) used disaggregate data to obtain their estimates of the price elasticity of exports. Where Goldstein et Kahn (1978) and Imbs et Mejean (2010) use panel data, CPB uses time series. Due to the endogeneity risk in panel data, Imbs et Mejean (2010) make use of system GMM to come up with more consistent estimates. CPB (2010) makes use of 3 stage least squares, allowing for both instrumental variables as well as multivariate time series, and Goldstein et Kahn (1978) make use of full information maximum likelihood as a measure of estimation, which could provide good results if well specified (Quinn, 2013). Goldstein et Kahn (1978) do not make notice of testing for endogeneity, nor making use of instrumented variables. Therefore, it could be that the results are downward biased, which could explain the difference with the results obtained by Imbs et Mejean (2010). Imbs et Mejean (2010) obtain elasticities that are approximately 1 percentage point higher (UK: -2.4; US -3.5) than the results obtained by Goldstein et Kahn (1978).

To conclude, the results obtained by the different studies should be dealt with caution. The studies use different types of data, methodology and obtain varying, inconsistent results. It follows from both the estimates of the studies summed up in table 6.1 as well as from the statements of Orcutt (1950) that the choice of data type has a large influence on the estimation. The results also demonstrate that there is a large difference between the unit labour cost elasticity and the price elasticity of exports. Where the latter is far larger than the former. If we follow Carlin et al. (2001) in the opinion that the Netherlands is fairly comparable to both Belgium and Canada, with respect to the absolute market share of exports and its growth rate, we can expect the Dutch estimates of its price elasticity to be in between the Belgian and Canadian. This would mean that the Dutch price elasticity of export demand for domestically produced goods should be in between approximately -2.9 and -4.8. The CPB estimate of -3.7, which looks to be based on solid econometric methods, gives the impression to be correct.

Furthermore, if we turn to the unit labour cost elasticity of exports it is apparent that these are a lot lower. Although the long run estimate of Decramer et al. (2014) has not been performed with the best econometric methods it can still indicate, based on the short run estimates, that the Belgian estimate is around -0.6. Given the other studies, Dutch exports are in general more elastic than Belgian exports, expecting the unit labour cost elasticity of export to be too. Nevertheless, the estimates obtained by Decramer et al. (2014) would assume that these are not likely to exceed -1.

6.3 Sector level

As followed from paragraph 6.1, the export of oil and natural gas is not expected to be influenced by a wage increase due to its characteristics. This insinuates that the price elasticity of export differs between sectors. As the Dutch economy is an exporting country and dependent on foreign demand, the more inelastic price elasticity is, the better. A wage increase in a sector with price inelastic export demand is therefore preferred over a sector with more price elastic export demand. Few studies were found that focus on the actual price elasticity on a sector level. Table 6.2 lists these studies.

Table 6.2 Sector level unit labour cost elasticity of exports/price elasticity of exports

Author	Location	Period	Type of data	Method of estimation	Estimated unit labour cost elasticity of exports/price elasticity of exports	
Carlin, Glyn et Van Reenen (2001)	12 manufacturing industries across 14 OECD countries	1970-1992	Disaggregate data	OLS with exogeneity assumption as estimates are in differences. Dependent variable export market share. Independent variable relative unit labour costs	Food, drink & tobacco Textiles & clothing Wood & furniture Paper & printing Chemicals Non-metallic minerals Basic metals Metal products Non-electrical machinery Electrical machinery Transport equipment Instruments	-0.26 -0.52 -0.26 -0.13 0.00 -0.14 -0.27 -0.26 -0.28 -0.6 -0.16 -0.02
CPB (2006)	Netherlands	1970-2006	Disaggregate data	Error correction mechanism	**Agriculture** -0.94 (SR) & -1.7 (LR) **Manufacturing** Food, drink & tobacco -1.3 (SR) & -1.2 (LR) Chemicals -1.31 (SR) & -2.0 (LR) Metal -0.6 (SR) & -1.8 (LR) Other manufacturing -0.94 (SR) & -1.6 (LR) Other industry goods -0.75(SR) & -1.8 (LR) **Energy** -0.1 **Services** -0.55 (SR) & -1.9	

Of the two studies listed in table 6.2, the study conducted by Carlin et al. (2001) focuses on the unit labour cost elasticity of exports, while CPB (2006) focuses on the price elasticity. When comparing the study of CPB (2006) with its later study (CPB, 2010), it shows that although both studies estimate the same elasticity for the same country and use a similar methodology, their results differ. CPB (2006) obtains lower elasticities than CPB (2010). This especially shows in the case of services, where CPB (2006) obtains a long term elasticity of -1.7, while CPB (2010) obtains a value of -2.5. Inquiry learned that the CPB blames the used data set for this difference.[21] Due to this inconsistency it is hard to say what the true values of the sector elasticities are. Especially as the previous paragraph showed that the results obtained by Carlin et al. (2001) could also be biased due to the methodology used. However, although we are unable to pinpoint the exact value of the elasticity, it still shows that there are differences in the size of elasticity between sectors. As was stated before and also shows from table 6.2, the energy sector has a very low price elasticity. This insinuates that when wages are increased in this sector the effect for the Dutch competitive position will be very limited. Especially as labour costs makes up a small part of the production costs of oil and natural gas, due to its capital intensity (CPB, 2010). Furthermore Carlin et al. (2001) show in their research that the more high-tech an industry is, the lower its unit labour cost elasticity of export is, as it is more capital intensive. This insinuates that in order to keep the effect of a wage raise on the competitive position limited, a wage raise should occur in the least labour intensive sectors. Based on table 7.2 this would be Mining & Quarrying and Manufacturing, with the exception of textiles and clothing and electrical engineering.

[21] Email conversation between me and Kranendonk

7. Investments

Investments are thought to play an important role in the economy, as they 'enable the production of goods and services in the future' (Burda et Wyplosz, 2005). As discussed in the first chapters, the unbalanced Dutch current account and decreasing investment quote, implied that the Dutch level of investments is lagging compared to other European countries (Verhoeven et al., 2012), creating a large amount of domestically unused funds. This thesis proposes to enhance these investments by increasing demand through higher wages. However, opponents of this wage increase stress that a wage raise will result in a further decrease in the level of investments rather than an improvement. It is hard to assess the direct effect of wages on the level of investments, as wages are the costs of labour and only indirectly influence capital. This chapter will turn to theory and empirics to assess how a wage raise can affect the level of investments in the Netherlands and assess the size of this effect.

7.1 Theoretical framework

Due to the intertemporal character of the investment decision and its important role in the economy, it is not surprising that there is an extensive economic theoretical framework concerning investments. The neoclassical theory (Jorgenson, 1963), the accelerator theory (Clark, 1917), the free cash flow theory (Baumol, 1964) and the q-theory (Tobin et Brainard, 1968) will be discussed to determine how wages influence investments.

The neoclassical theory of investment is based on the idea that a firm wants to maximize profits (Verhoeven et al., 2012). It assumes that the firm will continue to invest in new capital until the optimal stock of capital (K^*) is reached, where the marginal product of capital equals the marginal cost of capital. When a Cobb-Douglas production function is taken into account with $L=1$ (23) and we allow for depreciation, we can derive the optimal capital stock. As can be derived from (24) the optimal capital stock will be proportional to the expected level of output (Y) and depend on the interest rate (r) and the depreciation rate (δ).

$$Y=AK^{\alpha} \qquad (23)[22]$$

$$\text{MPK} + (1 - \delta) = \text{MCK} \qquad (\alpha AK^{\alpha})/K^* = (r + \delta) \xrightarrow{\text{rewriting}} K^* = \frac{\alpha}{(r+\delta)} Y \qquad (24)[23]$$

[22] Burda, M. Wyplosz, C. (2005) Macroeconomics, p. 140-141.
[23] Burda, M. Wyplosz, C. (2005) Macroeconomics, p. 140-141.

The accelerator theory put forward by Clark (1917) elaborates on the neoclassical theory by viewing demand as the most important determinant of investments, as is the case in (24). It assumes that when demand increases, all companies will raise their production to meet this growing demand rather than increasing their price level. As investments are needed to grow production facilities, the theory states that a higher demand will lead to higher levels of investment. In terms of equation (25), where K_t is the optimal stock of capital at time t, a change in Y will lead to a change in the level of investment.

$$\text{Investment} = K_{t=1} - K_{t=0} = \frac{\alpha}{(r+\delta)}\,\Delta Y \qquad (25)^{24}$$

Only when companies are hindered by the availability of credit, higher demand will not lead to higher levels of investment, as companies are unable to finance their investments. The availability of credit is limited due to the credit rationing behavior of banks. Credit rationing is the inability to obtain a loan in a competitive equilibrium, due to the fact that a bank is unwilling to supply more credit (Stiglitz et Weiss, 1981). Banks are considered to have limited information on the quality of their borrowers, leading them to only lend at the optimal rate r^* even though demand and supply may not align. Due to the recent financial crisis banks are very reluctant to lend money, only supplying limited amounts of credit at interest rate r^* (Bank for International Settlements, 2013). It is for this reason that the demand for bank loans exceeds the supply, creating credit rationing as banks are unwilling to supply more credit, even though companies are willing to pay higher interest rates. Firms are therefore forced to rely on their own reserves in financing investments, limiting their investment possibilities to the size of their previous and current cash flows. Despite the fact that demand/output is considered to be the main determinant of investments in both the neoclassical theory of investment and the accelerator theory of investment, the current credit rationing limits a great extent of the investment to current and previous free cash flows.

Unlike the previous theories, the free cash flow theory (Baumol, 1964) does not view demand, but rather available cash flows as the main determinant in investment decisions. The theory assumes that an increase in free cash flow will result in more investment projects, while a decrease will result in fewer investment projects (Chand, 2015). Managers are assumed to prefer investing available cash over distributing 'excess cash in the form of dividends' (Harbula, 2001) or increasing their bank balance, as the costs of own capital are low. Due to

[24]Burda et Wyplosz (2005) Macroeconomics, p. 141

these low costs, firms are assumed to have a pecking order in their choice of financing investment, where financing from free cash flows is most preferred (Verhoeven, 2012). According to the theory, this preference is due to the market imperfections considering credit. Managers do not want to be dependent of lenders that might constrain them in their investment decisions or demand high interest rates affecting the profitability of investments (Harbula, 2001).

The q-theory of investment (Tobin et Brainard, 1968) views the ratio between the market value and the replacement cost of installed capital as the determinant of investment. This ratio, referred to as Tobin's q, determines when investment can be used as an opportunity to add more value to the firm than what it costs. If Tobin's q is larger than 1, shareholders will value the capital in a firm higher than its replacement costs, creating an incentive to invest. Any investment will generate more value than the initial costs of the investment. On the other hand, if Tobin's q is smaller than 1 the market value is lower than the replacement value, implying that companies should disinvest by selling their capital as that will result in surplus when compared to the value given by the market. In other words, if the replacement cost is considered constant, the q-theory of investment views the market value of a firm as the main driver of investment. Since the market value of a firm is considered to consist of discounted future profits, the level of investment changes with future profits. It is therefore that under the q-theory of investment, investments are indirectly affected by the current and future cash flows.

Based on the theory discussed, it becomes clear that an increase in wages will affect investments in two ways; via a change in demand (according to the neoclassical theory and the accelerator theory) and via a change in the cash flow of firms (according to the free cash flow theory and the q-theory).
As demand consists of both domestic and foreign demand (Weyerstrass, 2003), the effect of a wage increase on demand is two-fold. On the one-hand demand will increase due to an increase in domestic consumption, as followed from chapter 5. On the other hand, demand will decrease due to a decrease in exports as followed from chapter 6. However, due to credit rationing, the effect of demand on investment is limited to the availability of internal funds. In all theories discussed, current and previous cash flows play an important role in determining the level of investments.

Since wages are considered to be the costs of a firm, an increase in wages would automatically imply an increase in a firm's costs. On its turn this increase in costs will ceteris paribus have a downward pressure on current and future profit levels. If the increase in costs is not compensated by an equally large increase in turnover, cash flows decrease. This decrease in cash flows negatively affects the level of investments either directly, via the available funds for investments, or indirectly, via decreased market value.

In order to determine the effect of a wage raise on investments it is important to assess the size of the effect of a change in cash flow on the level of investments. In the next paragraph we will determine whether this effect exists and assess the size of this effect using empirical studies.

7.2 Empirical research

Based on the discussed literature, this paragraph focuses on studies that estimated the elasticity of investments with respect to a change in cash flow. The first to research the relationship between cash flow and investment was Fazzari et al. (1988) who found correlations between cash flow and investment for both liquidity constrained as well as non-liquidity constrained firms. Based on the results of the studies listed in table 7.1 the relationship between cash flow and investment is positive and larger than one, implying that a decrease in cash flow leads to a decrease in investment. These empirical results underpin the expectations following from the discussed literature.

Table 7.1 Investment-cashflow sensitivity

Author	Location	Period	Time/space dimension	Method of estimation	Estimated investment-cashflow sensitivity	
Fazzari et Peterson (1993)	United-States, firm level data	1970-1984	Panel data	OLS, firm fixed effects and year fixed effects	0.39	
Chatelain et Tiomo (2001)	France, firm level data	1986-1999	Panel data	ECM; system GMM, Sargan, Lagrange multiplier ARDL; system GMM, Sargan, Lagrange multiplier	0.24 0.21	
Goergen et Renneboog (2001)	U.K., firm level data	1988-1993	Panel data	ARDL; system GMM, Sargan, Lagrange Multiplier	0.40	
Sterken, Lensink et Bo (2001)	The Netherlands, firm level data	1990-1997	Panel data	OLS, firm and time fixed effects	0.11	
				ECM; System GMM & control for time effects, Sargan, Lagrange Multiplier	0.26	
Von Kalckreuth (2001)	Germany, firm level data	1988-1997	Panel data	ARDL; difference GMM, Sargan, Lagrange Multiplier	0.11	
Bond, Elston, Mairesse et Mulkay (2003)	U.K., France, Belgium & Germany, firm level data	1978-1989	Panel data	ECM; difference GMM, Sargan, Lagrange Multiplier	0.36(UK) 0.18(Germany), Belgium and France insignificant	
Mizen et Vermeulen (2005)	UK & Germany, firm level data	1993-1999	Panel data	ARDL; difference GMM, Sargan, Lagrange Multiplier	0.28 (UK) 0.21 (Germany)	
Degryse et De Jong (2006)	The Netherlands, firm level data	1993-1998	Panel data	OLS, firm fixed effects & year fixed effects 2SLS, firm fixed effects & year fixed effects	0.19 0.25	
Erickson et Whited (2012)	United-States, real firm level data & simulations	1967-2008	Panel & cross-section	Erickson-Whited method; apply 2-step GMM on cross section data and then pool via minimum distance technique	0.07	
Lewellen et Lewellen (2014)	United-States, firm level data	1971-2009	Panel & cross-section	Add a control for investment opportunities IV-based estimates (past stock returns as instrument) & robustness checks	Not liquidity constrained	Liquidity constrained
					0.32	0.63

Although the studies listed in table 7.1 all find a significant positive relationship between cash flow and investment, their methodologies and estimates differ. All studies except for Fazzari et Peterson (1993) use instrumental variables to estimate the relationship between cash flow and the level of investment. The reason that the majority of the studies examined use instrumented variables is due to the risk of endogeneity. Cash flows do not just affect investment as put forward by the theory discussed, but investment also affects cash flows due to the fact that cash flows are the difference between profits and capital expenditures. As followed from chapters 3 and 6, the endogeneity issue causes OLS to be unable to come up with unbiased and consistent estimates. When an instrumental variable is used, this endogeneity issue can be overcome. The estimates from studies making use of instrumental variables are expected to provide better estimations than studies making use of OLS. As the results obtained by Fazzari et Peterson (1993) and some of the results of Sterken et al. (2001) and Degryse et De Jong (2006) are obtained with the use of OLS, they run the risk of being biased and inconsistent, and will not be relied upon.

All the studies listed in table 7.1 make use of dynamic panel data. In order to come up with an estimator for such data sets, one can either choose an error correction model (ECM) or an autoregressive-distributed lag model (ARDL). The number of studies listed in table 7.1 that make use of ECM is fairly equal to the number of studies making use of ARDL, Chatelain et Tiomo (2001) make use of both. In general, ARDL models are preferred when small time periods are present, as it is 'specifically developed for datasets with small time dimensions' (Oxera, 2010). Mizen et Vermeulen (2005) and Goergen et Renneboog (2001) recognize this and make use of ARDL models as the time span of their panel data is limited. On the other hand if there is no small time dimension applicable Hall et al. (2001) state that ECM should be preferred over ARDL as it is better in 'dealing with the collinearity of variables'. This would assume that the results obtained by Chatelain et Tiomo (2001) with the ECM model should obtain better results than with the ARDL model. In other words, it is more likely that over the time span of 1986-1999 the elasticity of investments with respect to cash flow is 0.24 instead of 0.21.

Studies that make use of instrumental variables can use different estimation methods. A generalized method of moments (GMM) is the most commonly used. The studies listed in table 7.1 use different types of GMM: difference GMM, system GMM and 2SLS. Difference GMM developed by Arellano et Bond (1991) calculates its instrumental variables through

lagged dependent variables and lagged independent variables. Although this method will provide a solution to endogeneity, in certain cases it may still lead to downward biased estimates, especially 'when the period of study is relatively short' (Goergen et Renneboog, 2001). Therefore, Blundell et Bond (1998) came up with a different type of GMM, called system GMM. Due to the fact that system GMM makes use of two equations with instruments in order to calculate an estimate, it is able to provide good estimates even when the period of study is short. Degryse et De Jong (2006) and Lewellen et Lewellen (2014) do not make use of GMM in their estimation of the elasticity. Instead, they come up with their own instrumented variables where Degryse et De Jong (2006) use past net working capital as an instrument and Lewellen et Lewellen (2014) use past stock returns.

Of the studies that make use of difference GMM, the studies performed by Von Kalckreuth (2001) and Mizen et Vermeulen (2005) make use of fairly short time periods. Mizen et Vermeulen (2005) recognize this and state that it is due to the availability of the data. Due to these short time periods the use of difference GMM is notable, as it followed form the above that it can lead to downward biased estimates. When we compare the results of Von Kackreuth (2001) for Germany and Mizen et Vermeulen (2005) for the UK they are lower than the results obtained by Goergen et Renneboog (2001) and Bond et al. (2003). This difference might be due to the data period used or to the use of difference GMM over system GMM.

Although the study performed by Erickson et Whited (2012) uses GMM as a part of its methodology, they obtain their estimates in a completely different way than all of the other studies listed in table 7.1. Erickson et Whited (2012) first perform a so called Erickson-Whited (EW) method. They first perform a cross sectional analyses on each year of their data, after which they pool the results to obtain an estimate. Almeida et al. (2010) used simulation data in order to assess the performance of the EW method in obtaining estimates. Their conclusion stated that the EW method suffered from 'a number of limitations' as the estimator will provide inefficient and mismeasured estimates when fixed effects or heteroskedasticity is present (Almeida et al., 2010). This poses a problem in the estimation of the investment-cash flow elasticity. As according to Fazzari (1993) it is very likely that there are fixed effects present. Fazzari (1993) states that the cash flows of firms are expected to be correlated with individual firms due to 'the managerial ability or depreciation rate differences'. The results

obtained by Erickson et Whited (2012) could be mismeasured, offering an explanation for their low estimates.

The studies performed by Degryse et De Jong (2006) and Lewellen et Lewellen (2014) make use of own instruments in their estimator. These instrumented variables are only valid if they comply with two conditions; 1) covariance is present between the instrument and the independent variable, 2) no covariance is present between the instrument and the error term of the dependent variable. A Sargan test can be used in order to test whether the variable complies with these conditions and can be regarded as a good instrumented variable (Sterken et al., 2001). Both Degryse et De Jong (2006) and Lewellen et Lewellen (2014) do not mention the use of these tests, therefore their results should be interpreted with caution.

The results listed in table 7.1 vary between 0.07 and 0.63. Based on the above mentioned, some of these results will not be taken into consideration as they are expected to be mismeasured of biased. The investment cash flow elasticity is expected to be between 0.18 and 0.4. From the results listed in table 7.1 it becomes apparent that there are some differences between countries. Agarwal et Elston (2001) state that market centered economies are more affected by changes in cash flows than bank centered economies. They state that the information asymmetry in bank centered economies is smaller than in market centered economies, leading to lower elasticities as they are less dependent on their own funding. This difference is also apparent in the data as the UK and USA are considered market centered economies while most European countries are considered bank centered economies (Mizen et Vermeulen, 2005). UK estimates obtained with good methodologies range between 0.36-0.40, being larger than the elasticities for other European countries, which range between 0.18-0.26. Estimates for the USA listed in table 7.1 are not mentioned here due to the fact that it is not clear to what extent the chosen methodology came up with good estimates, but they are expected to be more in line with the UK, than with other European countries. The current credit rationing by banks might increase the elasticities of bank centered countries, however they will become more dependent on their own cash flows than before.

To conclude, based on the discussed studies it becomes clear the Netherlands, or countries similar to the Netherlands, find cash flow elasticities of investment between 0.21 and 0.26, with estimates being found for the Netherlands of 0.26. However, due to the current credit rationing by banks, traditional bank centered economies might find themselves closer to elasticities of market centered economies. As these market centered economies have

elasticities ranging between 0.30 and 0.40, it is expected that the elasticity of the Netherlands is currently higher than 0.26, potentially being closer to 0.30.

7.3 Sector level

Paragraph 7.1 showed that the level of investments is affected by wages through a change in cashflows. Although the level of investments are expected to differ between sectors, due to the capital intensity of their production, the theory does not predict that the cashflow elasticity will differ between sectors. In their studies Almeida et Campello (2003), Mizen et Vermeulen (2005) and Rauh (2006) identified the determinants of the cashflow elasticity of investments. They found that the credit worthiness of a firm and whether it is constrained, are the main drivers of the cashflow elasticity. Although these determinants do not seem to differ between industries, Khramov (2012) found that during times of crisis the cashflow elasticity is also determined by industry-specific effects. His research showed that especially the sectors mining, manufacturing and transportation, communications, electric, gas and sanitary services have lower sector specific effects than other sectors researched. Khramov (2012) states that this difference could be explained due to the value of the collateral. He explains his findings by stating that companies with more valuable collateral are less likely to become constrained and are therefore expected to have lower cashflow elasticities. Khramov (2012) shows that at least during times of crisis, there are differences between sectors in their cashflow elasticities. Table 7.2 sums up the discussed studies.

Table 7.2 sector level cash flow elasticities

Author	Location	Period	Time/space dimension	Method of estimation	Results
Almeida et Campello (2003	USA	1971-2000	Panel	OLS with fixed effects & difference GMM	Financial constraints and credit worthiness affect cash flow sensitivity
Mizen et Vermeulen (2005)	UK & Germany, firm level data	1993-1999	Panel data	ARDL; difference GMM, Sargan, Lagrange Multiplier	Credit worthiness is the main driving force of cash flow sensitivity
Rauh (2006)	USA, firm level	1990-2003	Panel data	ARDL; difference GMM, Lagrange Multiplier	Credit ratings play an important role in determining the cash flow sensitivity
Khramov (2012)	USA, firm level	1990-2011	Panel data	Difference GMM-IV estimation	Industry specific effects with constant CF elasticity of 0.17 Agriculture: 0.12 Mining: 0.08 Construction: 0.15 Manufacturing: 0.09 Transportation et al: 0.04 Wholesale: 0.20 Retail: 0.20 Services: 0.16

8. Conclusion and Discussion

The Netherlands has been experiencing large current account surpluses since the early 1980's. A current account surplus indicates that a country saves more than it invests domestically and represents a large amount of domestically unused funds. These savings are mostly created by Dutch non-financial companies, making them the largest contributor to the Dutch current account surplus. This thesis established that the lack of investments in the case of Dutch non-financial companies is demand driven. Wage moderation has been a popular policy measure since the Wassenaar agreement in 1982. Back then, it led to increases in employment and a stronger competitive position, improving economic performance. However, purchasing power has deteriorated over the years, negatively affecting consumption and, with it, the need for investments. This thesis proposes to redirect the current level of savings not used for domestic investment purposes back to the domestic economy, by increasing wages. Reasoning that this will lead to more consumption and increase demand, enhancing investments. The main research question of this thesis is 'what is the effect of a wage increase on consumption, unemployment, investments, labour productivity and the competitive position of the Netherlands?'.

Furthermore, this thesis demonstrates that the contribution of different sectors to the current account is unequal, indicating that not all sectors have savings which could be redirected back to the Dutch economy via a wage increase. Different sectors could respond differently to a wage increase, making some sectors more fit for a wage increase than others. The sub question of this thesis is 'is the effect of a wage increase on consumption, unemployment, investments, labour productivity and the competitive position in the Netherlands different among various sectors?'.

Before turning to the questions mentioned above, this thesis applied labour union and searching and matching theory to assess how a wage raise could be achieved in the Netherlands. By increasing a union's bargaining power, it is able to capture more of the rents available and raise wages. To assess the research questions related to this wage raise, this thesis turned to economic theory and assessed different empirical studies. The results of this research are summed up in table 8.1.

Table 8.1 Results

Wage raise	Effect (+/-)	Effect on GDP (+/-)	Expected effect based on studies examined	Do we expect to find a difference between different sectors?
Unemployment	+	-	[-0.4] wage elasticity	yes
Labour productivity	+	+	[0.4;0.6] elasticity	n/a
Consumption	+	+	[0.8;0.85] MPC income [-0.09] MPC financial wealth	no
Competitive position	-	-	[-2.9;-4.1] price elasticity [-0.6;-1] wage elasticity	yes
Investments	+/-	+/-	[0.21;0.30] cash-flow elasticity	yes

Table 8.1 shows the results for every economic variable evaluated. It becomes clear that the Dutch level of unemployment is expected to rise due to lower labour demand. With every 1% increase in wages, labour demand is expected to decrease by 0.4%. Although the effect of a wage increase is fairly large, it shows that labour demand in general is somewhat inelastic. Furthermore, this thesis lists empirical evidence that the elasticity of labour demand with respect to wages differs between sectors. Some sectors are more inelastic than others with respect to a wage raise. This finding indicates that wage differentiation is preferred over a general wage increase, given a rise in unemployment is generally considered the most negative effect concerning a wage raise. To limit this negative effect as much as possible, sectors with the most inelastic labour demand are preferred over sectors with more elastic labour demand.

Labour productivity is expected to increase due to the fact that employers will try to do the same amount of work with fewer employees. With every 1% increase in wages, the productivity of labour is expected to increase by 0.4-0.6%. No empirical research has been found that focuses on the relationship between wages and labour productivity on a sector level. This suggests that there has not been any research in this field yet, or that the rise in labour productivity can be expected to be equal among workers, irrespective of the sector they are active in.

The effect of a wage raise on consumption is measured via a marginal propensity to consume. Wages affect consumption in two ways. One, via an increase in disposable income and two, via a decrease in the returns on financial instruments, decreasing financial wealth. The effect of the former is a lot bigger than the effect of the latter. With every 1 euro increase in income,

consumption is expected to rise by between 0.8 and 0.85 euro, while with every 1 euro decrease in financial wealth, consumption is only expected to decrease by 9 eurocents. These effects are not expected to differ between sectors given the assumption that employees working in the different sectors are similar in their consumption behavior.

The competitive position of the Netherlands depends on the ability to export more products than other countries that produce the same products or services. As wages rise, the costs of producers will rise as well. In all, negatively affecting the Dutch competitive position as importers will substitute away from Dutch products. The empirical results of studies that focused on this relationship were diverse, giving a best estimate of the price elasticity for Dutch exports varying between -2.9 and -4.1. Studies that focused more directly on the relationship between wages and competitive position found lower elasticities, ranging between -0.6 and -1. Where these outcomes show that a wage raise has a large influence on the competitive position of the Netherlands, the elasticities differ between sectors. The products produced by some sectors are very elastic while others, such as the oil and gas industry, are very inelastic. This difference in elasticity of export demand has to be taken into consideration when deciding to implement a wage increase.

Investments are predominantly to a large extent determined by their cashflows. In the current situation, where credit rationing by banks is present, cashflows determine the investments. This also follows from the empirics, where the expected cash-flow elasticity of investment is between 0.21 and 0.3. These elasticities differ between sectors, where the cashflow dependence of investments differs per sector. Whether there is a positive or a negative relationship between investment and a wage raise is, hard to say. As investments are, to a large extent, determined by cashflows, it is the effect of wages on cashflow that determines the relationship between wages and investment. On one hand, we expect cashflows to grow due to an increase in consumption. On the other hand, the rising costs associated with a wage raise and decreased foreign demand put a downward pressure on the cashflows. The effect of a wage increase on investments depends on which of these effects is stronger.
The research also showed that the cashflow elasticity of investment is different between sectors. This indicates that some sectors are more dependent on their cashflows in their investment decision than others. If a wage raise is expected to lead to a decrease in cashflow, it would be best if the wage increase would be implemented in sectors with the most inelastic

cashflow elasticity. If the wages are expected to lead to an increase in cashflow, it would be best to implement the wage increase in those sectors with the largest cashflow elasticity.

Based on the obtained results it is clear that, in terms of a wage raise, there are both positive and negative effects. A loss of employment due to lower labour demand, is an evident disadvantage of a wage raise. To get an idea of the implications, a general wage increase of 1% is expected to lead to a loss of 29.5 thousand jobs, negatively affecting GDP via a decrease in disposable income.[25] Although consumption is negatively affected by a reduction of the total labour force, overall consumption is still expected to grow. Taking the loss of jobs and the MPC into consideration, a 1% wage raise is roughly expected to increase GDP by 0.4%.[26] This increase in consumption is an evident advantage of a wage raise. More so, as we have seen that currently consumption remains fragile and has not contributed to economic growth (CBS, 2015; CBS, 2013).
Where domestic demand is expected to increase and positively affect GDP growth, foreign demand is not. An evident disadvantage of a wage raise is the aggravation of the Dutch competitive position, decreasing foreign demand and negatively affecting the Dutch level of GDP. Based on the most negative results obtained, a 1% wage raise will lead to a 1% decrease in export demand for domestically produced goods and services. This coincides with a decrease in GDP of 0.35%.[27]

Based on these rough estimates the increasing effect of a wage raise on domestic demand appears to be stronger than the decreasing effect it has on foreign demand. All in all positively affecting total demand and GDP. On its turn, this increase in total demand is expected to lead to an increase in the level of investments, as cashflows are expected to grow. If it is assumed that output and cashflow are equal, an increase in total demand of 0.05% of GDP is expected to result in an increase of the level of investments of 0.01% of GDP.[28]

If we turn to the effects of wage differentiation, rather than a general wage increase, we find that these effects might be different. The empirical studies examined demonstrated that

[25] Based on a workforce of 7,387,000 people (CBS, 2012) and a wage elasticity of -0.4
[26] Based on a workforce of 7,387,000 people (CBS, 2012), a wage elasticity of -0.4, an MPC of 0.8 and GDP of 600 billion euros.
[27] Based on total exports of 385 billion of which 54% is produced domestically (34% goods, 20% services; CPB, 2010; CBS, 2015), a wage elasticity export demand of -1 and GDP of 600 billion euros.
[28] Based on an increase in domestic demand of 0.4% of GDP, a decrease in foreign demand of 0.35% of GDP and a cash-flow elasticity of 0.21.

different sectors respond in different ways to a wage increase. Where the marginal propensity to consume is assumed equal among sectors, the negative points are not. If a wage increase is implemented in those sectors that have the lowest wage elasticities of labour demand and the lowest price elasticities of export demand; the positive effects of a wage increase will remain high, while the negative effects are lower than in a the case of a general wage increase. Further research will have to point to which exact sectors would be the most suitable for a wage increase. Based on the observed studies, with respect to unemployment, competitive position and the contribution of the different sectors to the current account, it would point in the direction of Manufacturing and Mining & Quarrying.

Although it becomes clear that there are evident advantages and disadvantages of a wage raise which impact the Dutch economy, it remains difficult to say whether a wage raise would benefit the Dutch economy. This thesis focuses on the effect of a wage increase on multiple economic variables, which are used to assess the effect on the Dutch economy. This method provides a problem in that these economic variables can have effects among themselves too. For example, wages affect both consumption and unemployment, but consumption also affects unemployment via demand. Research, that make use of macroeconomic models to control for these cohesion effects, find that a 1% wage raise would negatively affect the Dutch economy (CPB, 2010; DNB, 2011). Both CPB (2010) and the Dutch central bank (2011) predict that a wage raise would negatively affect the Dutch economy due to the emergence of a so-called wage-price spiral, where the increase in domestic consumption negatively affects the competitive position. Unlike these research, this thesis shows (using rough estimates based on the findings presented in table 8.1) that the overall effect of a wage raise on the Dutch economy is expected to be positive. However, as this thesis does not take cohesion effects among macroeconomic variables into consideration. Further research will have to be conducted in order to determine whether a wage increase would benefit the Dutch economy.

Besides the inability of capturing cohesion effects, this thesis has some other shortcomings. One concerns the use of literature as a way to assess the effects of a wage increase. Although this thesis assessed the different studies and commented on their econometrics in order to explore the validity of the studies, there are a lot of different methods, datasets and outcomes, making it hard to compare them. Future research should use the statements in this thesis as a guide to obtain good results in its own empirical research. Own empirical research is also preferred over literature research as the focus can be on the Netherlands. Literature research is

always limited to the available research, which might comprise of countries similar to the Netherlands, but are never completely the same as the Netherlands.

If we assume that a wage increase in certain sectors would result in a positive outcome for the Dutch economy, future research would have to assess the actual size of this wage increase. This thesis focused on determining the effect of a one percent wage increase through elasticities, or a one euro increase through marginal propensities. Assessing the size of the actual wage increase has not been part of this research and should be taken into consideration in future work. Furthermore, if wage differentiation turns out to be more positive for the Dutch economy than a general wage raise, it should be considered that the implementation will bring some problems with it. Labour unions might see wage increases in one sector as a reason to demand higher wages for themselves as well. It may be difficult to convince unions not to demand higher wages in certain sectors, while other unions are able to demand higher wages. Therefore, the question is how to limit the union power with some unions while increasing it with others.

9. References

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Appendix

Appendix I

National output is built up by all the goods and services produced in an economy. When this national output is sold it generates income, mounting up to the national income. In other words, national income is equal to national output. By decomposing both the national output as well as the national income, we see that in an open economy the current account is by definition equal to the level of national savings.

Decomposing an economy's output (Y) shows that it depends on, both domestic spending on domestic goods and services (C^d, I^d, G^d), as well as foreign spending on domestic goods and services (X).

$$Y = C^d + I^d + G^d + X \quad (1a)$$

Where Y is the output, C^d is consumption of domestic goods and services, I^d are investments in domestic goods and services, G^d are government purchases of domestic goods and services and X are the exports of domestic goods and services.

When taken into consideration that, total consumption (C) consists of consumption of domestic goods and services (C^d) as well as foreign goods and services (C^f), total investments (I) consists of investments in domestic goods and services (I^d) as well as in foreign goods and services (I^f) and total government purchases (G) consists of government purchases of domestic goods and services (G^d) as well as foreign goods and services (G^f). And when taken into consideration that C^f, I^f and G^f mount up to the imports (M), we can rewrite equation (1a) into equation (2a) (Mankiw, 2002).

$$Y = C + I + G + X\text{-}M \quad (2a)$$

When we decompose (Y) as the national income, we look at the final expenditures. People can either spend their income on consumption (C), saving (S) or taxes paid to the government (T), resulting in equation (3a).

$$Y = C + S + T \quad (3a)$$

Substitution of equations (2a) and (3a) leads to (4a).

$$(X\text{-}M) = (S\text{-}I) + (T\text{-}G) \quad (4a)$$

Where (X-M) are the net exports, (S-I) the private savings and (T-G) the public savings (Burda et Wyplosz, 2012).

Since the current account is equal to the net exports and the sum of the private and public savings mount up to the national savings, this substitution shows that the current account is equal to the level of national savings.

Appendix IIa

In determining the contribution to the current account on a sector level, the (non financial) companies are broken down into different sectors. By doing this it will be clear whether the imbalances, that are apparent on the current account level, are also apparent on a sector level. This breakdown will also identify which sectors have the highest level of savings compared to their investments and with that which sectors contribute the most to the Dutch current account surplus. In order to identify the contribution of each sector to the current account, both the net savings as well as the net investments will be identified on sector level. After subtracting the net investments from the net savings, it will be clear which sector contributes the most to the current account surplus. The contribution of each sector will be calculated over 2012, the year with the most recent available data.

The available data is obtained via the Dutch CBS, Dutch central bank and Eurostat. The different sectors are used to segment the companies that add to the national savings. Through determining which sector contributes most to the national savings, one can see which sectors invest less in the Dutch economy. The different sectors are based on a distinction made by the Dutch bureau of statistics called the 'SBI' (Standaard Bedrijfsindeling). This mapping on its turn is based on both the European 'NACE' (Nomenclature statistique des Activités économiques dans la Communauté Européenne) and the united nations' 'ISIC' (International Standard Industrial Classification of All Economic Activities). In this way all companies are characterized by their main activities.

Table A.1 Sector distinction based on SBI

A	Agriculture, forestry and fishing
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
E	Water supply; sewerage; waste management and remediation activities
F	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transporting and storage
I	Accommodation and food service activities
J	Information and communication
K	Financial and insurance activities
L	Real estate activities
M	Professional, scientific and technical activities
N	Administrative and support service activities
O	Public administration and defence; compulsory social security
P	Education
Q	Human health and social work activities

R	Arts, entertainment and recreation
S	Other service activities
T	Activities of households as employers; undifferentiated goods- and services-producing activities of household for own use
U	Activities of extra-territorial organizations and bodies

A more detailed version of the different sectors and subsectors can be found in appendix IIb.

By calculating the amount each sector contributes to the current account surplus, we determine where the surplus originates. Based on the European system of national and regional accounts, the savings consist of the available, not remitted profits after depreciation (European Commission, 1996). It concerns the net savings, which differ from the gross savings by the level of depreciation (OECD, 2014).

Per sector savings (*S*) according to the current account = gross result per sector – remitted profits per sector – depreciation per sector (7a)

The average yearly net saving (*S*) of all sectors, in the most recent year 2012, is 4.1 billion euros. The sector Real estate activities (L) has the highest level of net savings, mounting up to 46 billion euros in 2012. The sector with the lowest savings is the Electricity, gas, steam and air conditioning supply (D) sector with a negative saving of -2.2 billion euros in 2012.

The investments per sector (*I*), as used in the definition of the current account, consist of the net investments, therefore not taking into account the replacement investments as they have already been incorporated in the depreciation.

The average yearly net investments (*I*) of all sectors, in the most recent year 2012, is 611 million euros. The sector Financial and insurance activities (K) has the highest level of net investments, mounting up to 3.2 billion euros in 2012. The sector with the lowest level of investments is the Real estate activities sector (L) with a negative investment of -8.7 billion euros in 2012. A disinvestment indicates the withdrawal of assets from the production process (CBS, 2014).

Appendix IIb

Table A.2 Detailed sector distinction based on SBI

A	**Agriculture, Forestry and Fishing**
	Crop and animal production, hunting and related service activities
	Logging
	Fishing and aquaculture
B	**Mining and Quarrying**
	Mining of coal and lignite
	Extraction of crude petroleum and natural gas
	Mining of metal ores
	Other mining and quarrying
	Mining support service activities
C	**Manufacturing**
	Manufacture of food products
	Manufacture of beverages
	Manufacture of tobacco products
	Manufacture of textiles
	Manufacture of wearing apparel
	Manufacture of leather and related products
	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
	Manufacture of paper and paper products
	Printing and reproduction of recorded media
	Manufacture of coke and refined petroleum products
	Manufacture of chemicals and chemical products
	Manufacture of basic pharmaceutical products and pharmaceutical preparations
	Manufacture of rubber and plastic products
	Manufacture of other non-metallic mineral products
	Manufacture of basic metals
	Manufacture of fabricated metal products, except machinery and equipment
	Manufacture of computer, electronic and optical products
	Manufacture of electrical equipment
	Manufacture of machinery and equipment n.e.c.
	Manufacture of motor vehicles, trailers and semi-trailers
	Manufacture of other transport equipment
	Manufacture of furniture
	Other manufacturing
	Repair and installation of machinery and equipment

D	**Electricity, gas, steam and air conditioning supply**
	Electricity, gas, steam and air condition supply
E	**Water supply; sewerage; waste management and remediation activities**
	Water collection, treatment and supply
	Sewerage
	Waste collection, treatment and disposal activities; materials recovery
	Remediation activities and other waste management services
F	**Construction**
	Construction of buildings
	Civil engineering
	Specialized construction activities
G	**Wholesale and retail trade; repair of motor vehicles and motorcycles**
	Wholesale and retail trade and repair of motor vehicles and motorcycles
	Retail trade, except of motor vehicles and motorcycles
H	**Transporting and storage**
	Land transport and transport via pipelines
	Water transport
	Air transport
	Warehousing and support activities for transportation
	Postal and couriers activities
I	**Accommodation and food service activities**
	Accommodation
	Food and beverage service activities
J	**Information and communication**
	Publishing activities
	Motion picture, video and television program production, sound recording and music publishing activities
	Programming and broadcasting activities
	Telecommunications
	Computer programming, consultancy and related activities
	Information service activities
K	**Financial and insurance activities**
	Financial service activities, except insurance and pension funding
	Insurance, reinsurance and pension funding, except compulsory social security
	Activities auxiliary to financial services and insurance activities
L	**Real estate activities**
	Real estate activities
M	**Professional, scientific and technical activities**
	Legal and accounting activities

	Activities of head offices; management consultancy activities
	Architectural and engineering activities; technical testing and analysis
	Scientific research and development
	Advertising and market research
	Other professional, scientific and technical activities
	Veterinary activities
N	**Administrative and support service activities**
	Rental and leasing activities
	Employment activities
	Travel agency, tour operator reservation service and related activities
	Security and investigation activities
	Services to building and landscape activities
	Office administrative, office support and other business support activities
O	**Public administration and defence; compulsory social security**
	Public administration and defence; compulsory social security
P	**Education**
	Education
Q	**Human health and social work activities**
	Human health activities
	Residential care activities
	Social work activities without accommodation
R	**Arts, entertainment and recreation**
	Creative, arts and entertainment activities
	Libraries, archives, museums and other cultural activities
	Gambling and betting activities
	Sports activities and amusement and recreation activities
S	**Other service activities**
	Activities of membership organizations
	Repair of computers and personal and household goods
	Other personal service activities
T	**Activities of households as employers; undifferentiated goods- and services-producing activities of household for own use**
	Activities of households as employers of domestic personnel
	Undifferentiated goods- and services-producing activities of private households for own use
U	**Activities of extra-territorial organizations and bodies**
	Activities of extra-territorial organizations and bodies