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Can the Two-Tier Wage Structure in the Labour Market for Nurses in Stockholm be
Rationally Justified by Economic Reasoning?

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ABSTRACT: In this thesis we aim to investigate if the two-tier wage structure observed in the labour market for nurses can be rationally justified, considering the current development of the market. The existence of the two-tier wage level depends on two conditions, namely that the two-tier wage structure should be rational for hospitals as well as nurses. A thorough background research and previous literature study is conducted and used as the foundation for a theoretical model. The model presents a parallel market for temporary staffing nurses, and has three defining properties: heterogeneity, flow of labour and transparency. By applying the model to observations from reality, we receive results suggesting that the two conditions necessary for the two-tier wage structure to exist are satisfied. Thus, we conclude that the two-tier wage structure can be rationally justified.

Keywords: Monopsony, Temporary Staffing, Two-Tier Wage, Labour Market for Nurses

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1. Introduction

The shortage of nurses within the healthcare sector has been a topic of discussion for many years, reoccurring every summer as hospitals fail to staff emergency wards and are forced to cut down on available hospital beds. As of recent years, the healthcare staffing issues appear to have extended to the rest of the year as well, leaving the hospitals understaffed on a permanent basis and unable to maintain a sufficient number of hospital beds. The on-going staffing issues have opened up lucrative market opportunities for staffing companies. In addition to supplying extra personnel during holidays, staffing companies have, in response to an increasing shortage of permanent employees, been used to cover permanent positions for time periods stretching up to one year. Nurses employed by hospitals typically earn a low fixed monthly wage, whereas temporary staffing nurses are compensated on an hourly basis. As more temporary staffing nurses have started working full time during longer time periods, large wage inequalities have emerged between permanent and temporary staffing nurses, which has had a number of negative consequences. Filling permanent positions with temporary staffing nurses has raised questions about the functionality and efficiency of current staffing systems in terms of its effect on nurses as well as quality and accessibility of healthcare.

The purpose of this essay is to evaluate if economic reasoning can explain the structure of the labour market for nurses as it exists today. This is of importance as the current development of the market has led to a reduction of health care capacity, jeopardizing the health care availability in Sweden.

1.1 Specification of Detailed Research Focus

To be able to analyse the labour market for nurses we must understand that nursing shortages and hospitals demand for nurses can depend on a number of different factors, and depending on the problem, staffing companies serve various different functions. In order to isolate the problem and do a controlled comparison of permanently employed nurses and temporary staffing nurses, we will eliminate all possible variable elements.

Firstly, we will geographically only focus on Stockholm, to create a model that will be applicable in other big cities. The reason for this is that the staffing process which sends nurses to different locations affects their wage, because they are compensated for something more than the tasks they are performing at work. The pay raise that a nurse receives for doing his/her job in another location is justified because of their extra effort. Further, we will focus on standard nurses only, defined from hereon as those who have not undergone any specialist education. Finally, as we will describe more in upcoming sections, it is cost efficient for hospitals to keep a low level of permanent nurses and hire temporary staffing nurses, just temporary staff are brought in during demand peaks in other sectors. However, this essay will focus on the longer assignments, which are meant to be permanent, but are filled by staffing nurses instead.

Now that the specific focus has been established, we return to the situation described where standard nurses working at staffing companies are filling positions at hospitals that should be employed permanently. These staffing nurses work side by side with permanently employed nurses. Both groups have undergone the same education degree and perform the same tasks; yet staffing nurses earn much more. Typically staffing nurses are compensated for

going to another location, or working holidays, but in these cases they are doing exactly the same job as permanently employed nurses. The only reason to be compensated more than a permanently employed nurse is the “risk” factor of not knowing where and when you will be assigned next. In a big city like Stockholm with multiple hospitals and a large shortage, this “risk” could be seen as relatively low.

Given this situation, this essay will try to understand the labour market for nurses, and answer the following question: *Can the two-tier wage structure in the labour market for nurses in Stockholm be rationally justified by economic reasoning?*

For a two-tier wage structure to exist, there are two fundamental conditions that need to be satisfied. Firstly, the two-tier wage level should be rational for employers. In this case, it implies that hospitals need to have an incentive to hire temporary workers despite higher wages, as they would otherwise opt for permanent nurses that can be employed at a much lower wage level.

Secondly, the two-tier wage level should be rational for the labour force. In this case, this implies that nurses have an incentive to have the permanent market as their market of preference despite lower wages, as all nurses would otherwise opt for the temporary market with much higher wages.

If both of these conditions are satisfied, the two-tier wage structure should be considered rationally justified.

1.2 Method

In order to answer this question, we will develop a model capturing the dynamics of the labour market for nurses in Sweden. We will use economic reasoning to perform a descriptive statistical analysis, followed by a theoretical attempt to illustrate our understanding of the market through the application of the developed model. This will enable us to determine if the two-tier wage structure will be rational for hospitals as well as nurses, thus providing us with an answer to our research question.

1.3 Thesis Outline

The following section will go through the structure of this essay. Firstly, a thorough review of the background of the labour market for nurses will be presented, explaining the characteristics of the stakeholders and what market conditions are like today. Further, this information will be supported and completed with quantitative and qualitative data. This information outlines the exact nursing shortages, wage differences, and specifies the differences between permanent and temporary employment forms in more depth. Following this description, we will present a literature review which will describe relevant previous studies and theories about the labour market for nurses and temporary staffing agencies. In the next section, based on the theories from the literature review, we will present a theoretical model describing the labour market for permanently employed nurses in Sweden, with an extension to include the temporary staffing market. The model will be shown in equilibrium and in model shifts, to illustrate the movements between markets going on today. Finally, the model will be applied to reality, and from there we will discuss possible limitations and potential future outcomes.

2. Background

This section aims to provide an overview of the labour market for nurses in Stockholm. However, since information specific to Stockholm is difficult to find, the information collected will be from Sweden as whole, and thus indirectly applied to the market in Stockholm. As a step in providing a rigorous foundation for further analysis, we will begin by defining and describing the most important stakeholders within the labour market for nurses. We will begin by introducing the characteristics of the labour force, nurses, along with valuable information on their working environment and other aspects of the profession. Then, we will then continue with essential information on the hospitals as employers, including their finance, governance and dependence on nurses. Finally, we will observe the role of the union and its level of power within the negotiations between nurses and hospitals before introducing staffing agencies and exploring their role as an intermediary in the labour market.

After establishing the key stakeholders in the labour market, we will proceed by outlining the development of the market and highlight trends that may help us answer our research question. The overview will start around the millennium with focus on staffing agencies taking a more prominent role within the labour market. We will then turn our focus to the shortage of nurses and the reported reasons for this trend. Finally, we will summarize this section by investigating how the different stakeholders have reacted to the shortage of nurses this far, and how they plan to proceed.

2.1 Stakeholders

2.1.1 Nurses

In Sweden, nurses undergo a standard 3-year education, equivalent to a bachelor's degree, before they can be registered by Socialstyrelsen and are allowed to formally take on a position as a nurse. They can later extend their education by pursuing a specialist degree, such as anaesthesia nurse or surgical nurse. The majority of the departments, however, do not require any additional education.

Nurses' main responsibility is "nursing care", a phrase used to summarize tasks intended to sustain patients' health and execute treatment directives. These tasks include control of vital parameters, monitoring and administering medication, taking patient samples and providing emotional support to patients and relatives. Nurses are required to take on long working shifts during daytime as well as night-time, given the need to provide nursing care around the clock [1].

Nurses' tasks and responsibility are in general only limited by their education, and are not affected to a large extent by age or experience. Aside from an initial introduction received upon starting at a new department, new nurses are quickly expected to operate independently and uniformly with more experienced nurses within the same department [1]. Even though experienced nurses often enjoy more informal leadership, there is no distinction between the tasks performed by experienced nurses and the tasks performed by inexperienced nurses. As a consequence, undifferentiated tasks also lead to the lack of an explicit career ladder for standard nurses [2]. Instead, their career progression is typically limited to advancements into administrative roles, such as ward coordinators or managers.

2.1.2 Hospitals

In Sweden, specialized healthcare is essentially only conducted in hospitals, whereas primary care is conducted by district health centres. Together, they employ the vast majority of all nurses within clinical health care. Hospitals however, are the largest independent employers of nurses and the exclusive employer in terms of specialized departments [1]. Further, most hospitals are publicly governed on a regional level through county councils. As a result, the county councils act as indirect employers of nurses and have a dominating power in the labour market. For example, to avoid competition between hospitals in the same county, labour policy passed by the county council prohibits hospitals in the same county to compete through wages, by forbidding them to offer a wage increases in the event of recruiting a nurse from another hospital.

Healthcare in Sweden is heavily subsidized by the government, which is financed through taxes levied by the county councils. The funds from the county councils are partly given as a fixed allotment, and partly as a variable contribution based on various outcomes. Thus, there is an upper limit to how much healthcare that can be produced depending on the fixed allotment, as the variable contribution does not fully compensate the cost for treatment procedures. The variable contribution does, however, provide an economic incentive rewarding the most effective hospitals with additional funds [3].

Hospitals most significant cost is labour, accounting for more than 50% of the total cost of a typical hospital [4]. Aside from determining healthcare production, there is also strict regulation dictating the maximum number of hospital beds allowed per labour category. The *limiting* labour category is in general always nurses, and according to most regulations there can be a maximum of 6 hospital beds per nurse. [1] Therefore there is a direct relationship between how many hospital beds can be “open”, and thus how much healthcare output can be provided, with the number of nurses working at the hospital.

2.1.3 Union

The nurses union in Sweden is Vårdförbundet. Historically, the union has been responsible for negotiating wages on the behalf of all nurses in centralized negotiations. Generally regarded as a poor system due to the restriction to independently influence the wage progression, the union successfully passed an agreement with SKL¹ to decentralize wage negotiations. This allowed nurses to individually negotiate their wage with employers. The result has, however, not been as positive as anticipated, due to two factors. The first is that the county council have put policies in place which dictate that they cannot offer an increased wage for a nurse who applies to a same-level position at another hospital, to reduce competition among hospitals in the same county [3]. This same concept has become an indirect policy for newly graduated nurses, even though there is no formal policy [5, 6]. Aside from being rigid, another reason why newly graduated nurses' wages are low is because hospitals do not want to offer newly graduated nurses as higher wage than their existing nurses to avoid bad working morale.

¹ SKL is an authority which collects municipalities and counties in Sweden

2.1.4 Staffing Agencies

Staffing agencies arose as a response to demand for short-term labour, especially on short notice and during holiday seasons. This demand stems from the consistent need to uphold health care availability throughout the year. Staffing agencies provide hospitals with the possibility to urgently employ labour in the event of short-term shortages of labour, for example connected to vacations or sick leave. In such an event, hospitals contact staffing agencies to communicate their demand. Staffing agencies are then responsible for providing a nurse according to the specification of the hospitals. The staffing agency is thus provided with a job by the hospitals, and the nurse provided is typically an employee of the staffing agency [7].

To elaborate more on the various differences of short-term labour demand faced by hospitals, the demand can generally be divided into three categories. The first and initial demand for short-term labour has already been presented as the reason inducing the staffing sector within healthcare, namely the necessity to uphold health care availability connected to short-term labour shortages. The second cause for demand is the lack of labour in rural areas in light of increasing urbanization. While hospitals are looking to employ permanent nurses, many have been forced to resolve the labour shortage temporarily during the search period as to uphold health care until securing sufficient permanent staffing. The third reason for short-term demand is the overall shortage of nurses with specialist degrees, for which the supply is further restricted in rural areas. This has resulted in nurses with specialist degrees often combining permanent positions with employments at staffing agencies in order to sustain the need for specialist nurses in hospitals lacking them [7].

For nurses, staffing agencies offer an opportunity to be more flexible in their working schedule as they are typically employed on an hourly basis. The nurses employed at staffing agencies can thus choose to accept or turn down any job offer forwarded by the staffing agency from the hospital [7]. Furthermore, nurses employed through staffing agencies also receive a higher compensation than permanently employed nurses at the hospitals, due to their more “risky” employment form. Conclusively, the conditions of working as a permanent nurse compared to working as a temporary staffing nurse through staffing agencies differ in several aspects, the details of which will be further discussed in Section 3.2.1.

2.2 The Labour Market 2000–2016

The labour market for nurses has historically been characterized by a shortage of labour. Along with poor wage compensation [8], the understaffing of hospitals was often reported as an area which needed great improvement [9]. This has later been described as a result of having one dominating employer, a subject further discussed in Section 5.1. In the year 2000, the dissatisfaction of the employment condition in general, and with understaffing in particular, nurses reportedly demanded hospitals to increase the level of staffing, as they could no longer guarantee the safety of patients. The nurse’s demands were not met, leading to several nurses leaving their permanent positions at the hospital [10]. The trend of nurses leaving their job out of dissatisfaction due to the employment conditions continued, as wage and working conditions demands were not met [11, 12].

Growing complaints along with nurses leaving their jobs forced hospitals to take action. While trying to keep costs to a minimum, hospitals increasingly made use of staffing agencies in order to boost staffing levels whenever needed. Apart from compensating for the

loss of labour due to nurses leaving, staffing nurses also enabled them to react on shocks in health care demand without increasing the permanent labour level [1].

The use of staffing agencies did, however, not stop nurses from leaving, and shortage of nurses continued to increase [7]. This led to an increasing dependence on staffing agencies, which also had negative effects on the hospital's costs. By 2003, the use of staffing agencies had become an immense issue and hospitals finally decided to instantly freeze out staffing agencies [13]. This rapidly improved the supply of nurses available for permanent positions, possibly aided by the economic downturn at that time.

Today, the trend within the labour market for nurses resembles the development of the market during the beginning of millennium. In light of a growing economy, the shortage of nurses reported by employers is reaching new heights [14]. This is happening at the same time as nurses are complaining about low wage levels and poor working environment. In addition, staffing agencies are playing a much more central role as a key source of discontent, which is mainly directed at the negative effects on health care [15]. However, evident from interviews with union leaders as well as permanently employed nurses, wage level differences may be a strong contributing factor to the dissatisfaction of the permanently employed nurses. Especially in light of the strong reluctance to increase wages for permanently employed nurses, as is exemplified by nurses quitting their permanent jobs only to come back, with a much higher wage, through staffing agencies [16].

As a result, nurses are currently leaving their permanent positions while staffing agencies are growing in numbers of employees. The trend of nurses moving from permanent employments to temporary staffing employments is further amplified by the efforts of staffing agencies to replicate the benefits of permanent positions. In addition, the younger generation of nurses are seemingly valuing monetary compensation much higher than older generation [1]. Consequently, with opportunities for higher wage elsewhere, hospitals are not able to attract enough permanent nurses at the current wage level that they are offering [1]. This has resulted in labour levels below what is required to uphold minimum capacity of expected health care output, which has forced hospitals to utilize temporary staffing nurses for long-term positions.

At this point, the shortage of nurses along with the increasing usage of temporary staffing nurses has resulted in hospitals reducing available hospital beds as they are trying to keep within budget. In certain counties, attempts at freezing out staffing agencies has been made, but with no success [17]. Instead, hospitals have initiated attempts to increase benefits in order to compensate for lower wages, the effect of which is yet to be determined. Nonetheless, temporary nurses employed in long-term positions, but with a higher wage, demonstrates the two-wage structure currently existing in the labour market for nurses.

3. Data

Having thoroughly described the stakeholders and the key features of the labour market development for nurses, we will continue by presenting collected data. This portion of the essay is divided into quantitative and qualitative sections. The quantitative section will provide the supporting facts behind concepts described above, for example nursing shortages and wage inequality. The qualitative section will elaborate on how the employment conditions for permanent nurses and temporary nurses differ.

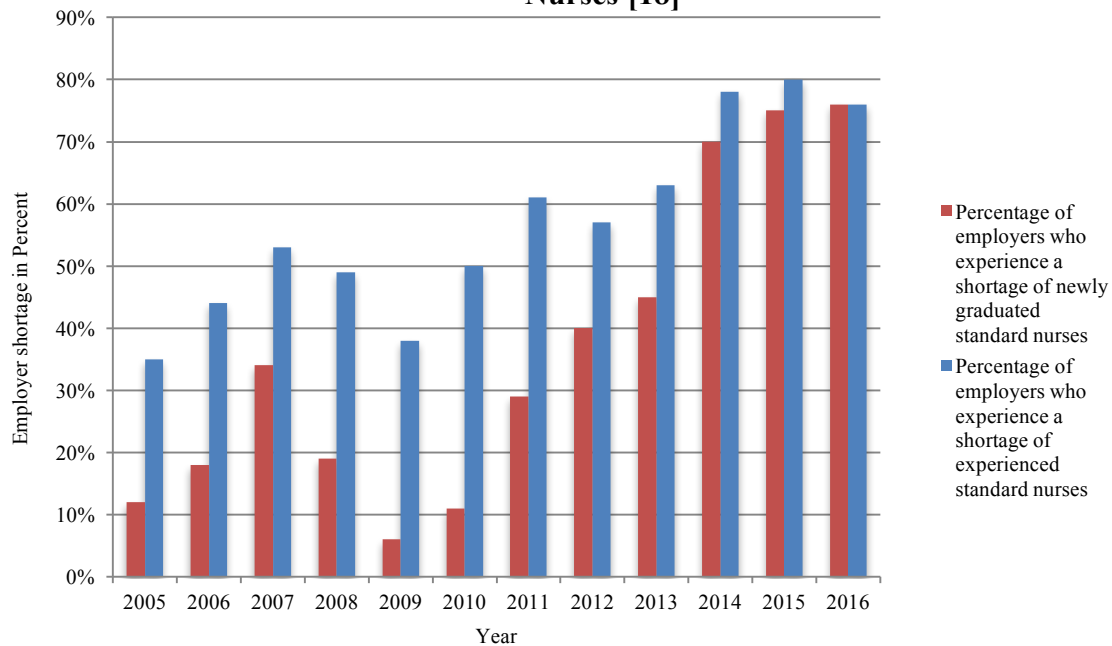
3.1 Quantitative Data

In the previous section we described the current situation in the labour market for nurses in Sweden. In the following section, we will quantify these problems with statistics gathered from several statistical authorities such as Statistics Sweden (Statistiska Centralbyrån, SCB). Firstly, we will show the current shortage figures and reasons for the shortage, followed by trends for the total number of nurses. Next we will outline the wage differences between permanent and staffing nurses and how wage inequality can affect nurses' employment form choice. Further we will present figures on the increasing use of temporary staffing nurses, resulting in large cost increases for hospitals. Finally, we will present the staffing companies and their current priorities.

3.1.1 Nursing Shortage

Graph 1 presents employers perceived shortage of nurses over the past 10 years. A first and overall trend is that shortages for both newly graduated and experienced nurses have increased. Within this increase, the figures move from large shortage of experienced nurses, and a relatively small shortage of newly graduated nurses, to the two shortages being equally large in 2016. Reasons for the declining number of newly graduated nurses can be attributed to negative aspects of the profession, such as low wages and long working hours, making it an unattractive profession to pursue. Further implications of these negative aspects will be described further below. The consequences of these findings in relation to our research question is that hospital demand for temporary staffing nurses is likely to rise as a result of an increasing shortage.

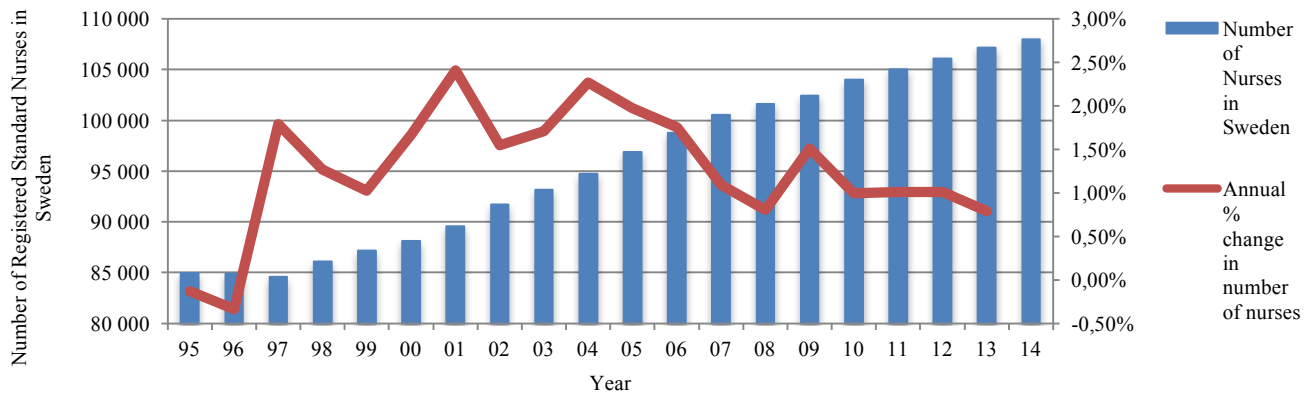
Graph 1 - Employer Shortage of Newly Graduated and Experienced Nurses [18]



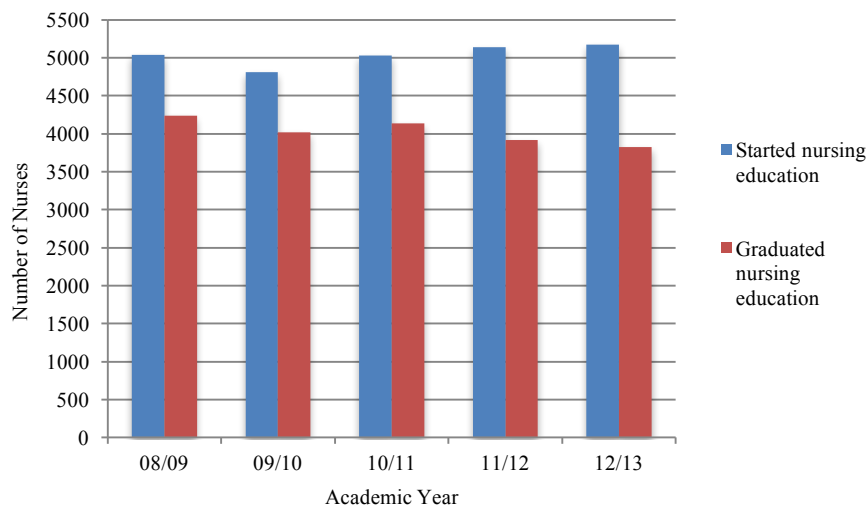
3.1.2 Number of Nurses in Sweden

Graph 2 shows the number of registered standard nurses in Sweden since 1995. Although growth year to year is positive, it has been following a negative trend since the early 2000s, seen in red. Graph 3 shows the number of people who have started and finished a nursing education. The number who have begun a nursing education programme has fluctuated around 5,000 a year, and the number who have graduated has slowly started to decline. These figures show that fewer young adults are choosing to become a nurse, and the overall growth in the number of nurses is decreasing, which is in line with the trend in the shortage graph above. This means that at the current wage and benefits levels, fewer people are joining, and staying in the nursing profession, which constitutes an increasing shortage in the number of nurses.

Graph 2 - Number and Annual Growth in Number of Registered Standard Nurses in Sweden [19]



Graph 3 - Nurses Who Started and Graduated From a Nursing Education in Sweden [20]



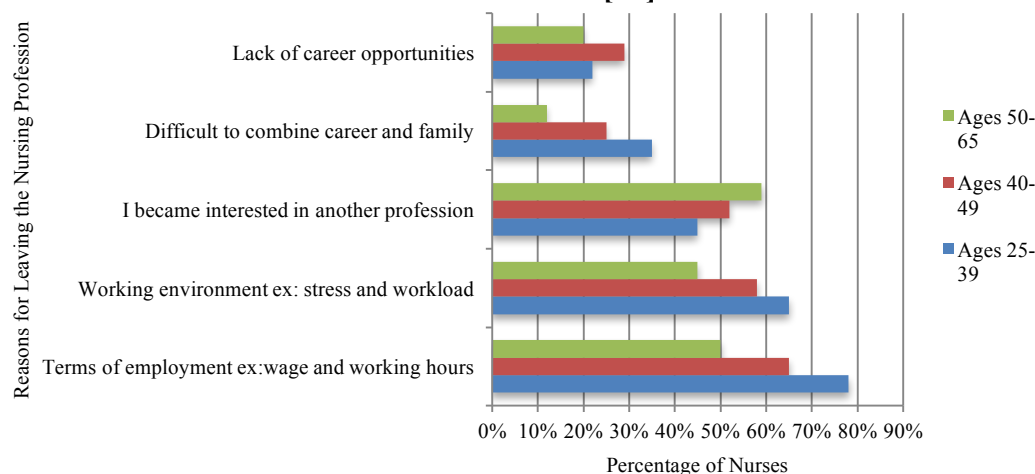
3.1.3 Nurses Leaving the Profession

To understand the reasons for the nursing shortage, Statistics Sweden (SCB) recently presented a study on why nurses leave the nursing profession [21]. The report describes the results of a study asking nurses who have left the nursing profession why they left, and we will present some of the reasons most relevant to our study below.

The SCB survey presented the different professions that nurses leave the nursing profession for. The most popular of these were organizational development, which implies working with organization and management at state owned agencies, teaching professions at a high school or university level, and finally corporate sales at for example pharmaceutical companies.

From Graph 4 below we can understand some of the main reasons why nurses chose to leave the profession. The oldest group stated the number one reason for leaving was becoming interested in another profession, which is expected given that nurses over 50 may not be fit for long working hours, nights, and physically active tasks. Nurses aged 25–39 and 40–49 both stated terms of employment and working environment to be the first and second respective reasons for leaving. The main figure to emphasize is that almost 80% of nurses aged 25–39 indicate that wage and working hours is one of the primary reasons indicated to explain their departure from the nursing profession. If this is a strong reason for leaving the profession, it is also a strong disincentive for young adults to become nurses as explained earlier. It also indicates that hospitals reported shortage of permanently employed nurses is caused by nurses leaving for other professions, and not only to staffing agencies, as a results of their discontent.

Graph 4 - Reasons Nurses Cited for Leaving the Nursing Profession [21]

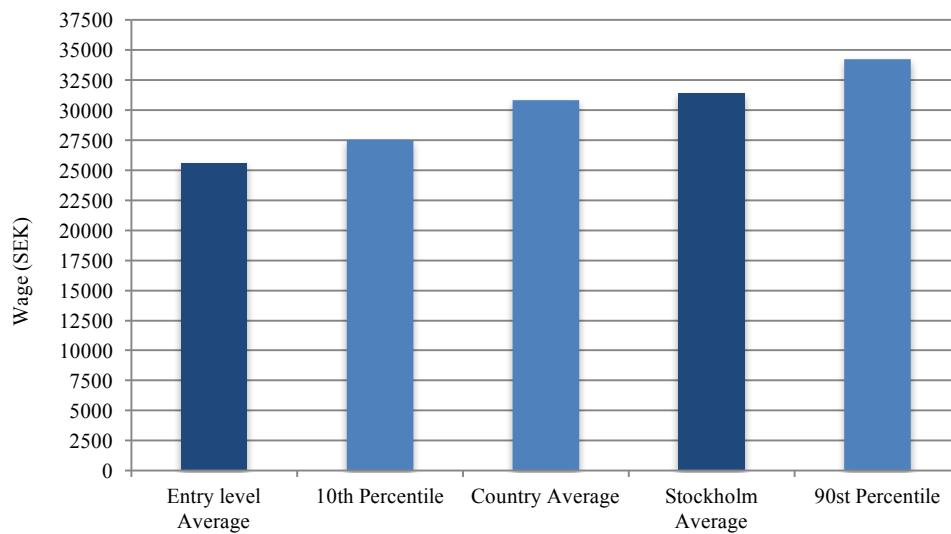


3.1.4 Nurses Wage Levels

In Graph 4 above, wage is included in terms of employment, which as stated is one of the highest ranked reasons for leaving the nursing profession. As described in the introduction of this paper, nurse wage levels differ depending on employment form. Graphs 5 and 6 present wage data regarding permanently employed nurses collected from the nurses' union, and regarding temporarily employed nurses from staffing companies.

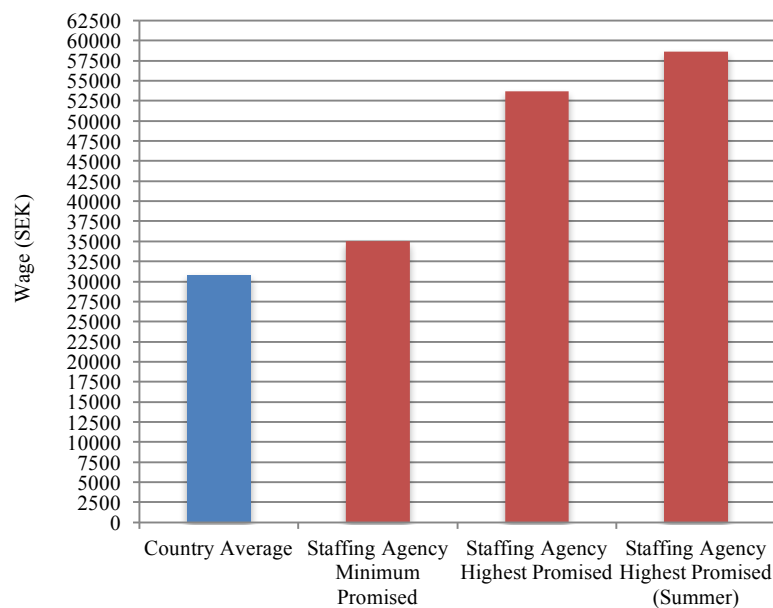
Graph 5 presents the 10th percentile, the average, and the 90th percentile of permanently employed standard nurses in Sweden. To have a point of comparison we have also included the average entry-level wage in Sweden, and the average standard nurse wage in Stockholm. Firstly, we can observe that the entire range of permanently employed nurses is just under SEK 10,000. This clearly shows that the possible wage range for a permanent nurses' entire career is very small, which can be attributed to the homogenous tasks that nurses perform, and hospitals limited budget for wage increases. Secondly, the average wage in Stockholm in comparison to the country average differs with SEK 600. This shows that even though the hospitals are free to set their own wage levels, they are very similar, giving no incentive to leave the county for the possibility of a higher wage.

Graph 5 - Permanently Employed Nurse Wages 2016 [2]



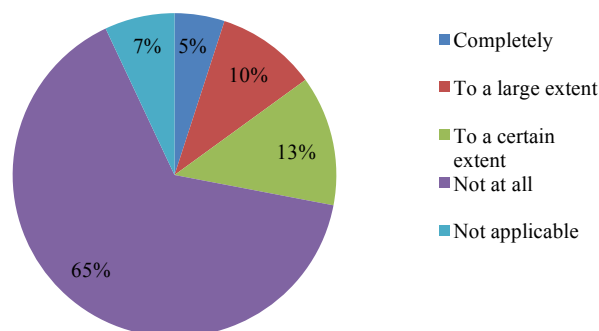
Graph 6 presents the collected wage data from staffing companies, and the permanent nurse country average is included as a reference point. When speaking to the staffing companies, they explained that wages change depending on what contract a nurse works on, which hospital, and the duration of the contract. Some did not provide any wage information, some provided approximate figures. The bar “Staffing Agency minimum” is the only exact minimum level given by a staffing agency, others stated that the wage would be at least a bit higher than a permanent wage, and the highest promised bars were the highest exact wages provided. [22] These were the highest and lowest exact levels discovered, and from indications from the staffing companies we expect the other companies to provide wages somewhere within this range. The companies varied in their wage levels for graduates and experienced nurses, some paid everyone the same wage, some rewarded experienced nurses who stayed with the staffing agency with a higher wage [23]. We cannot make a direct comparison between the wage levels for permanently employed nurses and temporary staffing nurses because the values are not measured at the same points and therefore not comparable. However, seen as all the reported wages for temporary staffing nurses are above the country average, we can assume that temporary staffing nurses’ wages are typically higher than permanently employed nurses.

**Graph 6 - Temporary Staffing Nurse Wages
2016 [22]**



We have now described and confirmed within reason, the wage discrepancy between permanent and staffing nurses. The question which follows is how this discrepancy affects the nurses themselves, the hospitals, and the patient care quality. In the SCB report described earlier [21], one of the questions asked in the survey was ‘To what extent did your wage make you leave your nursing profession?’ (p.20), the range of answers to one of the response alternatives is presented in Graph 9. The nurses whose choice was to some extent affected by the wage levels of other nurses at the workplace was in total 28%. It is important to note that the results below are in no way connected to the presence of staffing nurses at the workplace. The purpose for bringing up this graph is to show that, caused by staffing nurses or not, wage inequality at the workplace has a significant impact on nurses’ choices to leave the nursing profession.

**Graph 7 - My wage in relation to other
nurses wages at my workplace [21]**

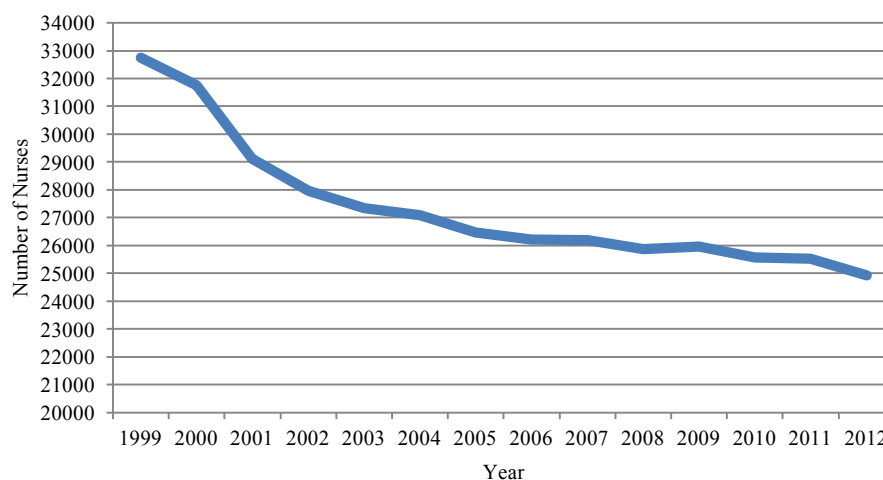


3.1.5 Hospitals

As described, hospitals have experienced growing nursing shortages, which has contributed to the growth of the nurse staffing market during the previous years. Reasons for this growth has been attributed to the fact that hospitals want to reduce labour costs and increase flexibility [24]. Other factors include inter-hospital competition increasing cost pressure, uncertainty of demand for healthcare, the value of fringe benefits and health insurance for permanent employees, union power and hospital location [24]. Among other contributing factors, the nurse shortage has lead hospitals to reduce the amount of permanently available hospitals beds, seen in Graph 8.

In 2015, the total cost for staffing nurses in Sweden grew with 90% to over MSEK 500, and was forecast to rise 70% in 2016 [25]. These figures give an indication as to how large the staffing situation is, keeping in mind the different forms of nurse staffing, ex: short term staffing nurses, and nurses sent to other geographic locations. In a more specific case, the costs for staffing nurses at Karolinska Hospital in Stockholm rose from MSEK 3 in 2014, to MSEK 110 in 2015, an over 350% increase [25]. It is difficult for us to quantify the exact increase in the demand or costs, specifically for the increased use of temporary nurses to fill long-term positions which we are investigating. However, given the strong overall demand increase in staffing nurses and the increasing shortage, we can assume that the demand for the long term staffing nurses has increased as a part of this.

Graph 8 - Number of hospital beds in Sweden [26]



3.1.6 Staffing Companies

There are around 18 active nurse staffing agencies in Sweden, but exact market share figures cannot be found. The agencies compete for the hospital's staffing needs, as the hospitals will not contact all the agencies every time they need staffing nurses. Therefore, agencies compete amongst themselves to attract nurses in order to be able to provide hospitals with a large nurse pool to choose from. The agency's size is also positive from the nurse's perspective as this often means a better relationship with hospitals, and thus a better ability to provide a consistent stream of work contracts. Aside from providing a higher wage level, to gain nurses

the agencies compete against hospitals and amongst themselves on providing the best and most valued benefits.

3.2 Qualitative Data

This following section will describe qualitative features of nurse's employment and driving factors. We will explain the factors which differentiate permanent and temporary staffing nursing employment, and explain how we perceive information transparency to play an important role in a nurse's employment choice.

3.2.1 Factors Differentiating Nursing Employment Form

The information below has been collected through interviews with the nurses' union, and conversations with different staffing companies. Below is an explanation of the factors that differentiate nurse's employment types: wage, contract type, pension, illness compensation, qualification, and flexibility. These factors will from hereon be referred to as benefits. This information has been gathered to gain an understanding of what affects nurse's employment form choice, which will thus affect how labour flows between the permanent and temporary staffing nurse labour markets in the model in Section 5.3.2.

Wage

Wage is the first factor which differentiates the permanent and temporary staffing employment forms. Permanently employed nurses receive a fixed monthly wage, whereas temporary staffing nurses employed at staffing agencies receive a per hour wage. Some agencies have a fixed minimum monthly pay, but often under certain circumstances for example: they must take whatever contract is offered to them.

Contracts

Regarding contracts, they can either be a collective agreement established by the nurses' union, or an individually drawn up contract that varies from agency to agency. All permanently employed nurses have collective agreements if the hospitals are owned by the municipality. Staffing companies can either use collective agreements or individual contracts. Further, there are several types of employment contracts: permanently (until-further notice), part-time, project employment, hourly employment [7]. Permanently employed nurses have until further notice contracts [1] and temporary staffing nurses typically have hourly employment contracts [7]. Both of these employment factors imply certain rights implications when it comes to each employment type, like a right to holiday days, maternity leave, illness compensation but also financial status, for example you can only receive a mortgage if you have a permanent until-further-notice employment type. Depending on nurse's priorities, these factors can strongly affect employment choice.

Pension

Depending on their contract type, nurses can receive different pensions. Permanently employed nurses receive a saved pension through their employment contract, as they are

employees of the municipality [1]. Pension saving has only recently been provided by staffing companies, depending on the agency the nurses receive pension savings from their first worked hour, whereas some have a minimum 10 week working requirement before pension savings begin [7].

Illness Compensation

Permanently employed nurses receive illness compensation according to the rules of their contract. Nurses from staffing companies must be actively staffed on a contract, or have been staffed recently within a certain time period to receive illness compensation.

Qualification

After a standard 3-year nursing education, nurses can be permanently employed into any standard nurse role [1]. Some staffing agencies allow newly graduated nurses to start working for them, others have a minimum working experience level of ex: 2 years, to be able to ensure healthcare quality [7].

Flexibility

By flexibility we mean nurses ability to choose their own working hours. As a permanently employed nurse, power over your own schedule may vary among departments. In some departments, you are simply assigned a schedule, while at others you can indicate your preferences. Regardless of how the days are spent, nurses must clock a minimum number of hours worked per month [1]. Temporary staffing nurses indicate what kind of hours they want to work when searching for contracts, and therefore have substantially more power over their schedule than permanently employed nurses do [7].

3.2.2 Transparency

In order to understand how nurses make decisions about their employment type, we gathered as much information as possible about factors differentiating permanent and staffing employment. We uncovered this information with a varying degree of difficulty, and with the ambition to know as much as possible about the employment form choice that nurses face. However, it is unclear how much nurses know, and how much effort and time they put into finding all the information available about the two employment forms, before making a decision. A concept which will be introduced more thoroughly in the literature review below is information transparency, which aims to capture how available the information about employment terms is to nurses. To test if information transparency impacts nurses' employment decision we asked 24 permanently employed nurses the following questions².

² This survey was sent out online between 9-24th April, to a Facebook group of nurses who have studied their nursing education at Uppsala University. The survey was intended to understand nurses' willingness to work either permanently or as temporary nurses.

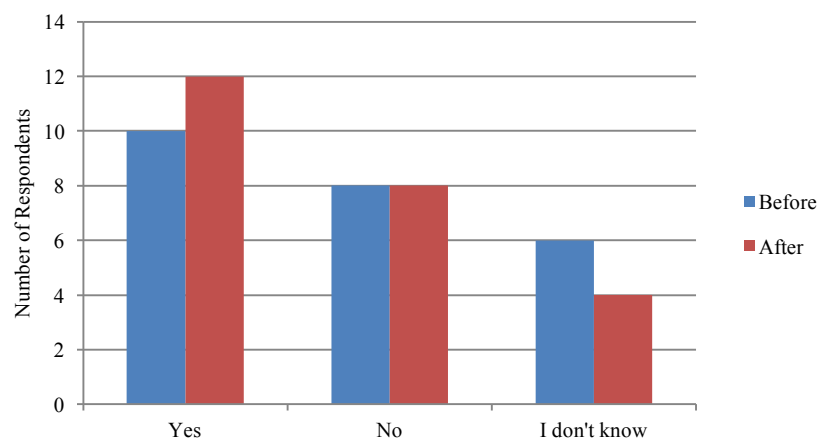
Question 1 (before) - Would you consider working for a staffing agency?

Question 2 (after) - If we now tell you that if you would want to work full time as a temporary staffing nurse, you would with a strong probability receive:

- A collective agreement
- Pensions savings
- The power to choose whichever shifts you want
- The “risk” of not being staffed is very small
- Complete the same tasks as you would on your permanent position
- Receive a higher wage

Would you consider working for a staffing agency?

Graph 9 - Answers to questions 1 (Before) and 2 (After)



The results presented in Graph 9 show that after hearing what they could be offered as a staffing nurse, none of the nurses who said no changed their minds, but two who were previously unsure moved over to being willing to work for a staffing agency. The idea is not that all nurses should want to work at staffing companies upon receiving this new information. As will be discussed further in the coming sections, nurses have different valuations of utility for working as a permanent or temporary staffing nurse. Many nurses would never want to be a temporary staffing nurse, but we wanted to capture the effect of those that value the two employment forms almost equally, as in the nurses who could potentially see themselves changing employment form due to increased information awareness. This test is not statistically significant, but it does give a slight indication that there is some degree of information transparency which will affect nurse' employment form choice, and this will be incorporated in the model section.

4. Literature Review

In this section, we will present an overview of previous relevant research on the labour market for nurses in order to set the current state of knowledge. Most of the research on the area has been dedicated to the monopsony structure. This will be the first theory we focus on as it will provide us with the fundamental theoretical structure of the labour market equilibrium for nurses.

Moving on to the main target of this thesis, studies on the role of temporary workers within the labour market for nurses will be reviewed next. By examining the effects and characteristics of temporary staffing nurses, we hope to identify crucial features that may help us answer our research question.

4.1 Monopsony Theory

In their article on monopsony and union power in the market for nurses, Link and Landon [27] state that the buyer's side of the market, as in the employer of labour, approaches classical monopsony theory. They evidenced this by referring to the US where most communities are serviced by only one or a few hospitals, and 'even in cities with several hospitals, evidence suggests that hospital associations frequently arise to 'level' nurses salaries among hospitals in the city.' (p.649) Even though the US has a very different healthcare system than Sweden, the geographic structure of the country with few dense cities and greater portions of sparsely populated areas is similar enough to assume that the findings can also be applied in Sweden. The article also stated how 'the reporting of vacancies at equilibrium is consistent behaviour for the profit-maximizing monopsonist.' (p.649) This theory supports the concept that a profit-maximizing nurse employer will deliberately employ a lower level of labour when exercising monopsonist power, resulting in nurse vacancies in real life.

Other economists have tried to test this monopsony power [28], but have often not been able to identify an exact monopsony power in real life experiments due to hospitals relatively inelastic demand causing some impact on wage level. However, as stated we will use the monopsony market structure as it has been used most before and presents a clear theoretical frame in a labour market with one strong employer.

4.2 High Skilled and Low Skilled Temporary Staffing Workers

There are many different kinds of temporary employment. In the temporary job market the complexity and skill level of the job will determine wage, benefits, and employment level. Houseman, Kalleberg and Erickcek [29] examined the use of temporary employment in tight labour markets during the 1990s, where they made a distinction between high and low skill workers. Low skill workers are characterized by a low level of education, performing simple tasks. The high skill workers, like nurses, have a high level of education with complex tasks. During the 1990s, employers were under pressure to raise wage levels, and thus many cost-minimizing employers started to wage discriminate. This was done by keeping a low level of permanent employees, and hiring temporary workers when needed. This cost-minimizing behaviour is what we have seen hospitals do with their permanent and temporary staff, in the market equilibrium.

The temporary workers described were employed during demand fluctuations but also while searching to fill permanent positions, which often took time due to long screening processes to find good employees. In the high skill temporary staffing market, temporary staffing workers were paid more than the permanently employed workers. The justification was to pay the temporary staff more, rather than raising the wage level for all permanent employees.

It is important to understand the differences in preferences or goals between high and low skilled workers. Many temporarily employed low skill workers have the aim to become permanently employed. High-skill workers like nurses for example, have chosen this type of employment willingly over a permanent employment, the reasons for which will be discussed further below. Nonetheless, these results show that the comparatively high wage levels earned by temporary staffing nurses is not a phenomenon unique to the labour market for nurses.

4.3 Nurse Preference Heterogeneity

From the hospitals point of view, the standard nurses are homogenous as they all perform the same tasks. The nurses themselves however, are differentiated in how they value wage and benefits. In the article 'Temporary Employment Decisions of Registered Nurses', Bellemore [30] tests how different factors affect nurses' value ratio between wage and benefits. This valuation would in turn factor into the decision of whether to work as a permanently employed nurse or a temporary staffing nurse, where permanent offers a lower wage and higher benefits, and vice versa for temporary staffing. Factors that positively influenced the likelihood of working for a staffing agency were preschool children, age and being female. This was often due to the fact that nurses with younger children between 0-6 years wanted to have a more flexible schedule. The age factor described that as an older nurse you were more likely to work for a staffing agency, this could also be to be able to work less, and more flexibly. In contrast, the negative factors were spousal income, experience and being white. Nurses who were more experienced were therefore more likely to be employed permanently at a healthcare facility.

A second study by Luleå Technical University [31] studied an emergency room in Norrbotten where both permanent and temporary staffing nurses worked. They found that other than a higher wage, the temporary staffing nurses primarily valued flexibility of work hours and location, and enjoyed working in different places. On the other hand, the permanently employed nurses expressed that they valued being at the same workplace, being part of a team and the healthcare development on site. In Sweden we know that nurses can all value their wage to benefit ratio differently. Staffing companies have captured the part of the market that values wages higher than benefits, whereas permanent employers have captured those who value benefits more. [30]

To understand the differences in nurses' wage to benefits valuation is crucial in understanding why some nurses choose to work permanently and others at staffing agencies. As described in the background section, recent trends from staffing companies imply that they are trying to mimic the benefits of permanently employed nurses. Previously compensated for lower benefits by higher levels of wage, this trend supports the intuition that if benefits are more equal now, wage would be the determining factor in deciding which market to work in.

4.4 Two Tiered Wage Levels and Transparency

The result of staffing nurses entering the market has led to what can be described as a two-tier wage level where the otherwise homogenous nurses are being paid two different wages depending on their employment type. Houseman, Kalleberg and Erickcek [29] argue that such a wage system, if set by the hospital itself, would provide ‘serious morale and productivity problems’ (p.108). They argue however, that these productivity and morale problems can be avoided, if the staffing nurses who are being paid more, are hired through a third party, a.k.a. the staffing agency. This theory builds on transparency; the idea is that a two-tier wage system provided by the hospital would be 100% transparent. As mentioned in Section 3.2.2, this means that all nurses would be aware of the exact wage levels, benefits provided, hours worked, etc. for both employment types. The disparity in wages would then be *so* evident, that it would cause the above-described problems, and would not hold in the long run. When the temporary staffing nurses are employed through a staffing agency however, the degree of transparency decreases. For the permanently employed nurses there appears to exist a social effort or monetary cost to obtain information about the wage and benefit levels of the staffing nurses. The permanent nurses may also have less social contact with staffing employees, resulting in fewer opportunities to share employment information. According to the article when the temporary staffing nurses are employed through a staffing agency, the permanently employed nurses are less aware of the wage and benefits the staffing nurses receive, and therefore do not perceive an injustice. As a result, no or fewer problems occur. In Section 3.2.2, data suggest that transparency do in fact contribute to the upholding of the two-tier wage structure. However, data also suggests that the degree of intransparency is not strong enough to prevent inequality causing bad working morale to some extent.

4.5 Effects of Introducing Temporary Staffing Nurses into the Market

Introducing temporary staffing nurses into the labour market has allowed hospitals to efficiently and cost consciously solve demand and supply fluctuations to keep hospitals running smoothly. However, several studies show that introducing temporary staffing nurses into the market has had significant negative outcomes to productivity, working morale, and healthcare quality.

4.5.1 Working Morale

Another negative consequence of the two-tier wage level is the negative working environment and morale that can be caused by the perceived injustice, as described above. In their study, McFarlin and Frone [32] look at the attitude differences between low-tier and high-tier workers, in a two-tier wage system caused by union presence. Although the wage levels we are investigating are not caused by unions, the focus of the outcomes lies in the perceived inequality, which is applicable in the two-tier system we are describing. McFarlin and Frone found that low-tier employees are ‘more likely to perceive the wage structure as unfair, have lower pay satisfaction, organizational commitment, and report poorer worker-management relations than high-tier employees’ (p.146). This frustration and effect on nurse attitude has become common in hospitals with obvious wage differences. In relation to our purpose and model, the wage inequality in itself will have a negative impact on nurse’s benefits.

4.5.2 Productivity

Bartel, Beaulieu, Phibbs and Stone studied human capital and productivity in a team environment in the healthcare sector [33]. Through observing panel data from several hospitals, their outcomes were that disruptions to the team such as experienced nurses' departure and the inclusion of temporary staffing nurses were associated with significant productivity decreases, other than those caused by decreases in nurses' skill and experience. Causes of productivity decreases could be that temporary staffing nurses do not know how things work. Hence, it takes longer for them to do their work, and they also have to be looked out for by permanent staff which in turn increases the permanent nurses' workload, decreasing their productivity [34]. With this in mind, higher wages for temporary staffing nurses seem irrational as wage levels are assumed to correlate with output according to basic economic theory. Therefore, productivity factors do not provide any rational explanation to why temporary staffing nurses earn a higher wage than permanent nurses.

4.5.3 Healthcare Quality

In England, Hall, Propper and Van Reenen [35] conducted a study on the impact of surrounding wage levels on the quality of healthcare. In England, the nursing wages are regulated on a countrywide level, although this is not the case in Sweden anymore which is now regulated on a municipality wide level, the observations are still relevant to our study. They measured the effects of the local wage level in other professions, and how it affected the quality (measured by number of deaths) and productivity. They found that a 10% increase in surrounding wage lead to a 4-8% increase in death rates. The main cause was that in areas where outside wages were higher, hospitals were struggling to attract competent permanent staff since they could not offer them a wage higher than the regulated wage level. This resulted in hospitals in these areas being forced to rely more on temporary agency staff, which attributed to the decrease in healthcare quality.

Nursing wages in Stockholm can be higher than in other areas in Sweden [2], but in comparison to the overall Stockholm wage level, they are low. This makes it more attractive for overworked nurses to leave their profession to work elsewhere with better hours and wage, contributing to the increased shortage and use to of temporary staffing nurses.

Other than decreased productivity and quality, Roseman and Booker present a study where medication errors increased with the number of shifts worked by temporary workers, and errors decreased with more overtime worked by permanent nursing staff [36]. This further supports the idea that staffing nurses decrease healthcare quality.

5. Model Setup

In this section we will set up the theoretical framework of the model which aims to depict the labour market for nurses in Stockholm. First, we will begin by describing the monopsony model which will constitute the core onto which our model extension will be added. Next, the model extension along with its several properties will be presented, starting by an introduction of a parallel market for temporary staffing nurses. We will then go on to define three specific properties of the extension: heterogeneity of nurse preferences, flow of labour between the permanent and temporary staffing markets, and information transparency. Finally, will incorporate the concept of a budget constraint into the model, reflecting the financial premises of hospitals in Sweden.

Once the model characteristics have been thoroughly described, this will set the stage for the next section in which we will aim to elaborate on the model application by demonstrating the model dynamics and then apply it to reality.

It is also worth noting that the role of the union was not incorporated into the model framework. The exclusion of unions follows from the research presented in Section 2.1.3 which suggests the effect of unions in the labour market for nurses in Sweden to negligible.

5.1 The Monopsony Model

The labour market for permanently employed nurses can most precisely be described by a monopsony market structure according to existing literature. This is motivated by the fact that as mentioned in Section 4.1, the model has successfully been applied within the labour market for nurses in several preceding studies. The model was introduced by Joan Robinson [37] describing a structure in which there was only one dominating employer of a specific group of labour, in contrast to a monopoly where there is only one dominating producer of a specific good.

In the permanent labour market for nurses, hospitals are the buyers of labour, and their demand for nurses is determined by the demand for health care, which is relatively stable over time. The supply is determined by the number of nurses available to employ, which is a result of the number of registered nurses available in the healthcare sector. This distinction is important in light of the current trend of nurses exiting the health care providing market as described in Section 3.1.3.

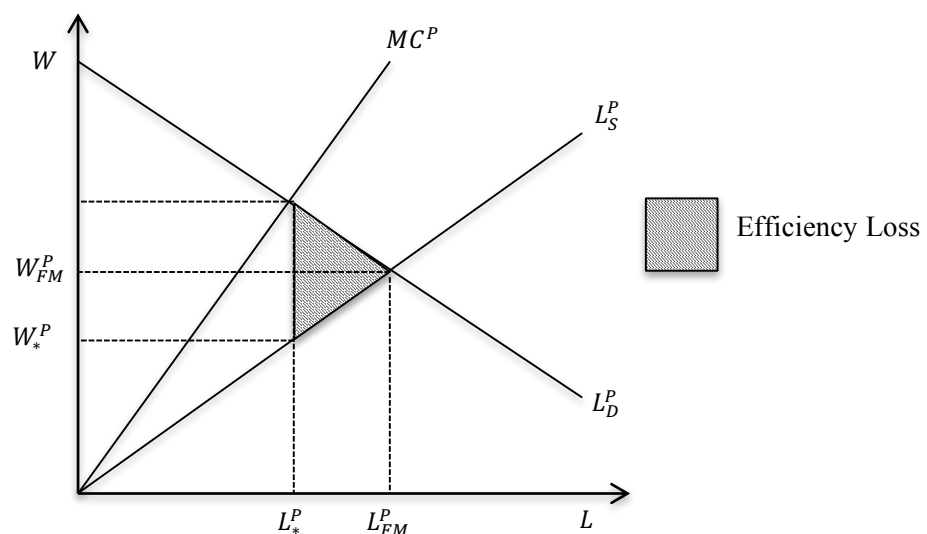
To be able to apply this model to the labour market we must specify a few details regarding wage. Firstly, equal to similar models, we will take as given that the wage paid by the employer equals the wage received by the employee, denoted as W . Furthermore, we will assume that all permanently employed standard nurses will be paid equally. In reality, this is not the case. However, the anti-competition policies and flat wage progression described in Section 2.1.3 indicates a relatively narrow wage spread, which is further supported by quantitative data in Section 3.1.4. In addition, although hospitals are free to set any wage for newly graduated nurses, observations from reality suggest that they do not. As stated in the Houseman, Kalleberg and Erickcek [29] article, if a hospital would try to set different wage levels for nurses performing the same tasks, the current nurses would not accept it and there would be serious negative consequences. Hospitals would thereby be pressured into increasing wages correspondingly for current nurses, increasing the wage level for all permanent nurses. Therefore, hospitals cannot attract additional nurses by offering higher

wages, as this would entail a wage increase for all permanently employed nurses. Thus, we arrive at the following assumption.

Assumption 1: All permanently employed standard nurses are paid the same wage

In a monopsony, as with the case of a monopoly, the dominating player has an incentive to deviate from the free market equilibrium (FM), of setting the wage and labour level according to the intersection of demand and supply, if aiming to maximize its profit or healthcare output in this context. Therefore, in a monopsony the level of labour is determined by the intersection of the marginal cost (MC) and demand (D) curves. In turn, the equilibrium wage level will be set where the $MC=D$ intersection level meets the supply curve as demonstrated in Graph 10 below. According to the law of supply, to increase the labour level with one marginal unit of labour, the wage must increase, leading to the MC curves' upward slope. Thus to employ one marginal nurse, he/she must be offered a higher than equilibrium wage. However, we know that all nurses must be paid the same wage, therefore the marginal cost of one more unit of labour is not only one additional higher wage, but also the wage increase for all the already employed nurses. As labour levels increase this cost will become greater and greater, leading the MC curve to be steeper than the Supply curve (S) as seen in the graph below.

Graph 10 – The Permanent Nursing Labour Market



The result of the monopsony equilibrium is the wage level W_*^P and a labour level L_*^P . As shown in the graph the monopsonist will employ both a lower level of labour and wage than would exist in the free market, leading to an efficiency loss. At this monopsony equilibrium wage, the employer can employ a low level of labour, which is the monopsonist's deliberate choice, and should not be confused with the actual nursing shortage. To further justify the monopsony theory as a relevant choice of market structure, we refer to Section 2.2 where we learned that hospitals have been repeatedly reported with deliberately low permanent nurse labour levels.

5.2 Extension: Parallel market

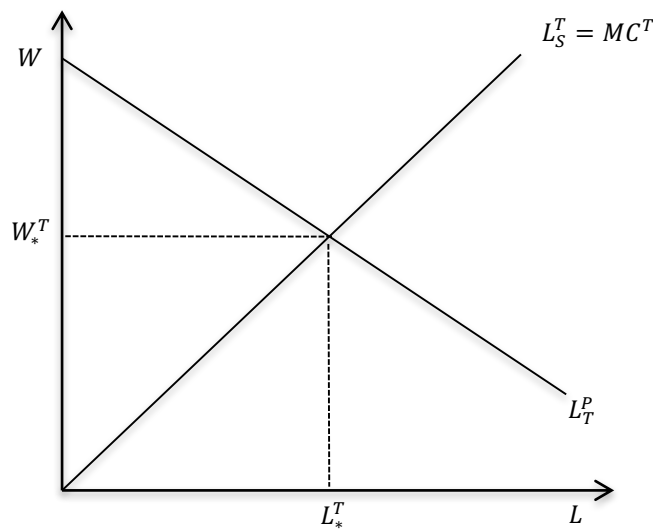
As described in the previous section, in the permanent market hospitals exploit their monopsony power and hire a lower level of permanently employed nurses than would exist in a free market equilibrium. From the background section we know that this has led them to hire temporary staffing nurses from staffing agencies to be able to handle the demand fluctuations and meet the demand for healthcare. The monopsony market above only describes how hospitals employ their permanent nurses, not their temporary staffing nurses. Firstly, we evaluated whether the temporary staffing nurses could be included in the permanent monopsony market in some way. However, we found that the actors, and the rules governing demand and supply were too different to be placed into the monopsony model. Therefore, we will extend the model by adding the market for temporary staffing nurses as a parallel market to the permanent market.

5.2.1 Actors and Forces

The employer of temporary staffing nurses is staffing agencies that sell the nurses service to hospitals and healthcare centres. As the staffing agencies are private and not owned by the municipality, competition is free, and as a result there are several different agencies. Because of the competition in this market, no one player has the power to set the wage level, leading wages to be set by the forces of supply and demand.

The nurses themselves are employed by staffing companies and work at hospitals and healthcare centres on a contract basis. Since the staffing companies operate differently, the terms of their contracts can vary, and therefore we cannot assume that all temporary staffing nurses will be paid the same wage. Thus, when a hospital needs to employ one more staffing nurse, they are not obliged to increase the wages of their other temporary staffing nurses, meaning that the MC of a temporary staffing nurse is only his/her contracted wage. Therefore, we can assume that in the temporary staffing nurse market $MC=S$, seen in Graph 11.

Graph 11 – The Temporary Staffing Nurse Market



For simplicity, we assume that hospitals' total demand for nurses can be broken down into their demand for permanently employed nurses and temporary staffing nurses, demonstrated in Equation 1.

Equation 1:
$$L_D^{Tot} = L_D^T + L_D^P$$

We can rearrange this equation to get an expression for demand in the temporary staffing market, seen below.

Equation 2:
$$L_D^T = L_D^{Tot} - L_D^P$$

We know from the background section that hospitals will first fill their demand for permanent nurses, before completing the rest of their demand with temporary staffing nurses. In reference to the parallel markets, the hospitals will first employ the equilibrium level of L_*^P in the permanent nurse labour market, before employing the level of L_*^T in the temporary staffing nurse market. Should the equilibrium labour level in the permanent market decrease, yet hospital's total demand stays the same, then the proportion which they demand from the temporary staffing market will increase as a consequence.

5.3 Extension Properties

Now that the parallel market extension has been introduced, the three properties of the extension will be explained, starting with heterogeneity.

5.3.1 Heterogeneity

In the parallel market extension, we explained that nurse supply is divided between the permanent and the temporary staffing markets. We will now uncover how nurses are divided between the two markets. From the qualitative data section, we know that temporary staffing nurses earn significantly more than permanently employed nurses. If this was the only factor influencing which market nurses chose to work in, all nurses would be in the temporary staffing market. Since this is not the case, there must be other factors that nurse's value which impacts their decision.

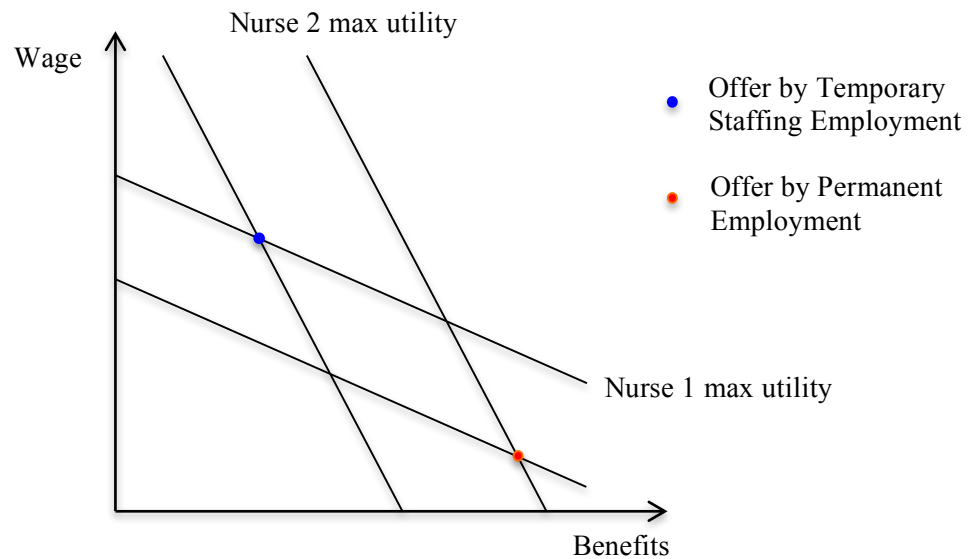
From the descriptive data section, we know that permanent and temporary employment forms vary on a series of factors other than wage, which are defined as benefits. Wage and benefits are the tools that nurse's use to define the utility of employment. The function below presents this concept, namely that utility is a function of wage and benefits.

Equation 3:
$$U = f(w, b)$$

Each nurse has an individual utility function based on his or her valuation of wage and benefits. Graph 12 depicts indifference curves for two nurses' utility showing their different preferences for wage and benefits. At the given level of utility, which is represented by the curve's distance from the origin, the nurses decided preference between wage and benefits is indicated by the slope of the curve. The two red points present the given ratio of wage and benefit that permanent and temporary staffing employment forms could offer.

Depending on the slope of each nurse's utility function, different nurses maximize utility in different employment forms, seen in the graph below.

Graph 12 – Indifference curves



This indicates that the two nurses have a different monetary value of benefits, which leads us to the second assumption:

Assumption 2: Heterogeneity - Nurses value wage and benefits differently

Conclusively, each nurse has an individual preference of wage and benefit determining their own specific utility function. For any given employment offering a combination of wage and benefit, nurses will thus value the utility of the employment differently. This means that each nurse will have an individual perceived utility for the conditions offered by the permanent market, as well as for the conditions offered in the temporary staffing market.

Naturally, each nurse will maximize utility by choosing to work in the market offering the highest utility. However, as perceived utility for each market varies inter individually, so will the choice of market.

U_i^T - individual utility valuation of working in the temporary staffing market

U_i^P - individual utility valuation of working in the permanent market

Any individual nurse will choose the market with the highest perceived utility, defined as their market of preference. Ergo, for a permanent nurse, $U_i^P > U_i^T$.

Beside the inter individual utility functions, there is also an individual subjective valuation of benefits. As defined in Section 3.2.1, benefits include all aspects of the employment apart from the wage, such as working schedule, working environment etc. Although all nurses do value benefits, the conception of benefit varies. For example, some

nurses may perceive the possibility to continuously work at different departments as a positive component of benefits, while others may consider it negative.

Assumption 3: Valuation of benefits is subjective

Hence, it is generally difficult to determine whether a specific change of benefits in a market will increase or decrease the utility of a specific individual. Nonetheless, we can conclude that a change that reduces the difference in benefits of two markets will put a larger emphasis on the wage component in utility valuation.

5.3.2 Flow of labour

This far, the two markets have been assumed to be separated, meaning that the labour supply within each market is set independently from each other. However, in reality we know that nurses move between these markets. Since permanent and temporary positions within the labour market for nurses have equal requirements in terms of education, certification and work tasks, and the fact that market affiliation is an active choice by nurses, it is reasonable to believe that labour will be able to move freely between these two markets without any considerable friction.

Assumption 4: Free movement of labour between permanent and temporary staffing markets

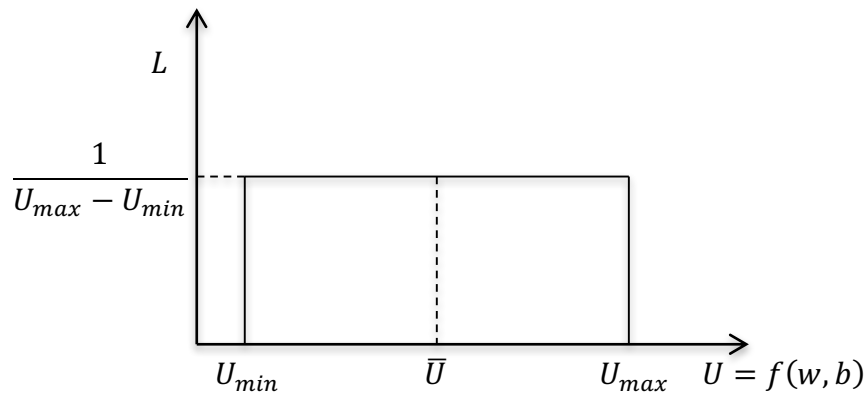
Having established free movement of labour between the permanent market and the temporary staffing market, the next step is to define the underlying factors determining the flow of labour. As stated in the previous section, nurses have an individual valuation of utility for each market. To be able to describe the movement of labour between markets, we must first explore the impact of subjective benefits and the distribution of the individual utility functions.

Intuitively, an increase in utility for a specific market should result in a movement of labour to that market as more nurses will value that market over the other. However, incorporating the subjectivity of benefit valuation, it is impossible to determine the flow of labour by looking at how the utility of any specific individual is affected. This relates to the insight from the previous section explaining that although utility may increase for one individual, it may just as well decrease for two others as a result of the same change in employment conditions. By looking at the average utility valuations instead, this problem is circumvented. Given an increase of the average utility for a specific market, we know that the utility will have increased more than it will have decreased in the nursing population as a whole.

Despite the average utility giving us a better understanding of the general change in utility for the population, an average may also be misleading as a determinant of labour flow. As an example a change in benefits may increase the utility of a minority of the nurses within one market to a great extent, while simultaneously decreasing the utility of the majority of the nurses within the same market by a little bit. The minority will thus be reassured about their market of preference, while the majority may in fact tip over in favour of the other market. Although the utility average may remain the same as the effect of these two changes cancel out each other, the net effect would in that case imply a flow of labour to the other market.

In order to be able to determine the flow without analysing the utility effect for each and every nurse, we must define the distribution of the utility valuation for each market. Although a very complex task in reality, we will limit ourselves to approximate the distribution of the utility valuation as uniform as it satisfies the scope of this thesis. This entails that the individual valuation of the utility for a specific market will be evenly distributed as illustrated by the graph below.

Graph 13 – Uniform distribution

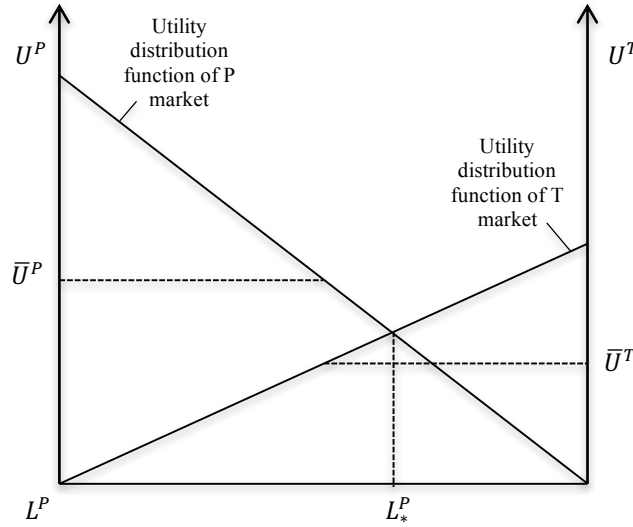


A change in average utility would thus be evenly distributed to nurses in the market population, and the proportion of the number of nurses on each side of the average utility valuation will always be half. These two features indicate that a change in average utility for a specific market would also result in a net flow of labour towards that market.

Assumption 5: Uniform distribution of utility functions

The uniform distribution of utility valuation also allows us to precisely define the proportions of nurses choosing the permanent market and the temporary staffing market respectively by studying the utility averages. By plotting the utility distribution of the two markets for the complete nurse population, the proportion of nurses within each market is determined by the intersection of the graphs. Given the linear function of the utility distributions, the utility average ratio will equal the labour market ratio. Hence, the proportion of nurses with the permanent market as their market of preference will equal the proportion of nurses in the permanent market, and the same applies to the temporary market.

Graph 14 – Utility vs. Labour



These implications provide us with a key insight on the movement of labour. By concluding that the average utility ratio will, in the long-term, be equal to the labour ratio, there should be no flow of labour between markets as nurses are already within their market of preference. Correspondingly, a situation in which the utility ratio does not equal the labour ratio indicates that there are nurses that are not in their market of preference, yielding a flow of labour until the condition of equal ratios is once again fulfilled. The flow of labour can thus be defined by the following equation:

Equation 4:

$$F = 1 - \left(\frac{\bar{U}^T}{\bar{U}^P} \times \frac{L_*^P}{L^P} \right)$$

In the equation, F indicates the flow of labour in which a positive value indicates a flow towards the permanent market and a negative value indicates a flow towards the temporary staffing market. As one of the ratios are inverted in relation to the other, no flow of labour would be defined as when the average utility ratio equals the inverse of the labour ratio in the equation. In that case, the product of the ratios will be equal to one, and the value of F equal to zero. However, in the event of a change in the average utility, for example an increase in the permanent market, the product of the ratios would equal a value less than one. The F -value would in that case equal a positive value indicating a flow towards the permanent market, and the flow of labour would sustain until the labour ratio equals the inverse of the average utility ratio again.

The addition of the value 1 in the beginning of the right side of the equation serves the sole purpose of adjusting the F -value of no labour movement to zero, a feature that will come to be of importance in the next section as we introduce the aspect of transparency.

5.3.3 Transparency

In the previous section, Equation 4 portrayed the flow of labour between the temporary and permanent labour markets as ratios of labour levels average utility, where utility is made up of

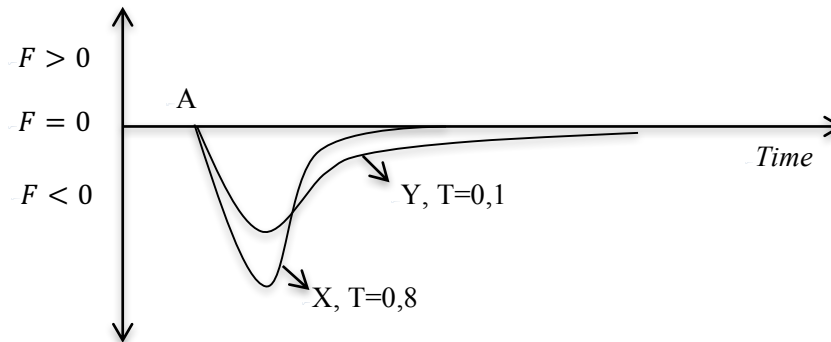
wage and benefits. Changes in wages and benefits within a market will affect the markets perceived utility, which will thus move the labour distribution between the permanent and temporary staffing markets, a concept which will be described more clearly in the model dynamics section. This movement will occur assuming that information about wage and benefits is 100% transparent to nurses. As described in the descriptive data section, in reality nurses are not instantly informed about wage and benefit changes and must make an effort to find this information.

Assumption 6: Transparency - information flow about wages and benefits is affected by a varying degree of transparency.

To illustrate this effect, transparency factor (T) is introduced as a coefficient before the flow function, meaning that flow between the markets is restricted by the degree of information transparency.

Equation 5:
$$F = T \left[1 - \left(\frac{\bar{U}^T}{\bar{U}^P} \times \frac{L_*^P}{L_*^T} \right) \right], T \in (0,1)$$

Graph 15: Transparency



The transparency factor T is valued on a scale of 0 to 1, one being 100% information transparency, and 0 being absolutely no information transparency. In relation to reality, neither of these two extreme points is plausible.

To illustrate this concept with an example, we assume we have a flow from the temporary staffing market to the permanent market, where the utility and labour ratios have a product equal to 2. Graph 15 depicts this example where the flow starts at point A. Curve X is an example of high transparency ex: a coefficient of 0,8 meaning that the flow would be 1,6. Curve Y represents a low degree of transparency with a coefficient of 0,1 which would lead to a flow of 0,2. Transparency will affect how large the flow is, but also how quickly flow returns to equilibrium, as can be seen by the tails of the curves. If transparency is high, nurses will move quickly, if transparency is low, they will move more slowly. This is highly applicable to the situation in Sweden today, as described with our own test on nurses which showed that some changed their mind on which market they would want to be in based on an increased information transparency.

5.4 Budget Constraint

Now that all three properties of the parallel markets extension have been explained, we will move on to the last feature of the model which is the budget constraint that hospitals face. In a commercial setting, there is no fixed budget constraint as the resources available are directly linked to the produced output, meaning the more a company earns the more output they can produce. However, within the public sector there is rarely any correlation between output and resources available. On the contrary, public institutions such as hospitals are, as described in Section 2.1.2, often presented with a specific budget and assigned to deliver as much output as possible with the resources they have been allocated. This creates a cap on the amount of nurses that can be employed, regardless of the relationship between cost/output or marginal cost/demand.

Assumption 7: Hospitals have a fixed budget to allocate on both permanent and temporary staffing nurses.

Equation 6:
$$B^{Tot} = B^P + B^T$$

Given that an amount of resources has been specifically allocated to the employment of nurses, and that hospitals primarily seek to fill their demand for permanent nurses, the maximum wage within the permanent market can be described according to the following Equation 6 below. This equation describes that as the number of nurses (L) increases, with a fixed budget constraint, the wage decreases since a fixed sum of money has to be shared over a greater number of employees.

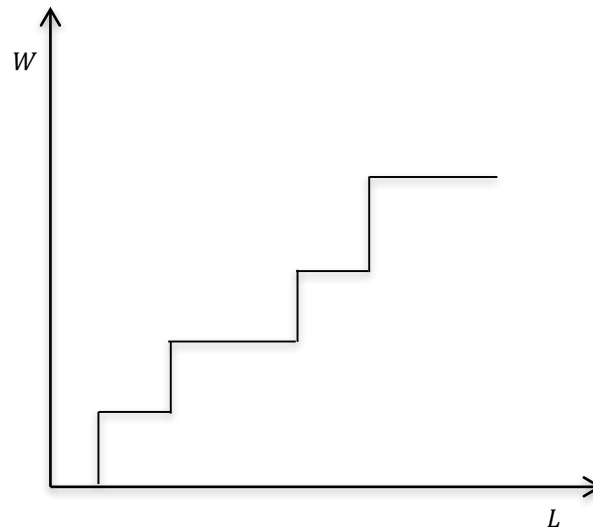
Equation 7:
$$W_{Max}^P = \frac{B^P}{L^P}$$

In relation to reality, the budget and the number of permanently employed nurses is very large. As this is essentially a classical $1/x$ function, the budget constraint becomes relatively flat for large values of x , in this case permanently employed nurses. This will be of importance when applying the model in reality.

As for the budget constraint for temporary staffing nurses, hospitals primarily filling their demand for permanent nurses would indicate that the budget allocated to temporary staffing nurses would be the difference of the total budget and the budget utilized for the recruitment of permanently employed nurses. In other words, the budget for temporary staffing nurses consists of the resources left available after filling the demand for permanent nurses. However, theoretically this poses a problem as this would imply that the budget for temporary staffing nurses would equal zero whenever the budget limit for permanently employed nurses was met. To a certain extent, this can be explained by the marginal cost. As increasing wages in order to attract one more nurse would also imply increasing currently employed nurses' wages, this could potentially result in the marginal cost of one more permanent nurse to be higher than the marginal cost of simply employing a temporary staffing nurse at a higher wage, whilst keeping the wages for the currently employed nurses at their original level. In reality, however, this effect is amplified by the fact that functions are likely to be discontinuous rather than continuous. As evident from the Graph 16, a small increase in wage would not likely attract any additional nurses, whereas a substantial wage increase

would attract a large number of nurses. This indicates that the budget constraint could limit the possibility to employ more permanent nurses whilst still not be fully exhausted in terms of the total budget. A hospital only looking to employ one more nurse would thus be required to raise the wage substantially in order to attract any additional nurses. While the marginal cost of a substantial wage increase for permanent nurses, combined with corresponding increases for currently employed nurses, may surpass the limits of the budget constraint, there may still be sufficient resources available to employ additional temporary staffing nurses.

Graph 16 – Discontinuous Step Function



The reasoning above provides some justification for why employment of temporary staffing nurses can be seen despite the budget for permanent nurses being reached. Incorporating a discontinuous step function in order to capture this feature does however infer an unnecessarily complicated task, especially considering that we do not expect this to influence the reasoning of the model in any other context. Thus, we will limit ourselves by simply allocating a specific part of the budget to the temporary staffing market, thereby allowing us to keep the continuous function while still permitting for a budget in the temporary market regardless of whether the budget for permanent nurses have been reached or not. Should the budget constraint for the permanent market, however, not be reached, the budget for the temporary market will be increased by whatever resources are left from the permanent market. A lower utilisation of the budget for permanent nurses would thereby result in a larger budget for temporary nurses. The following equation defines the relationship of the budget constraints as resulted from our limitation.

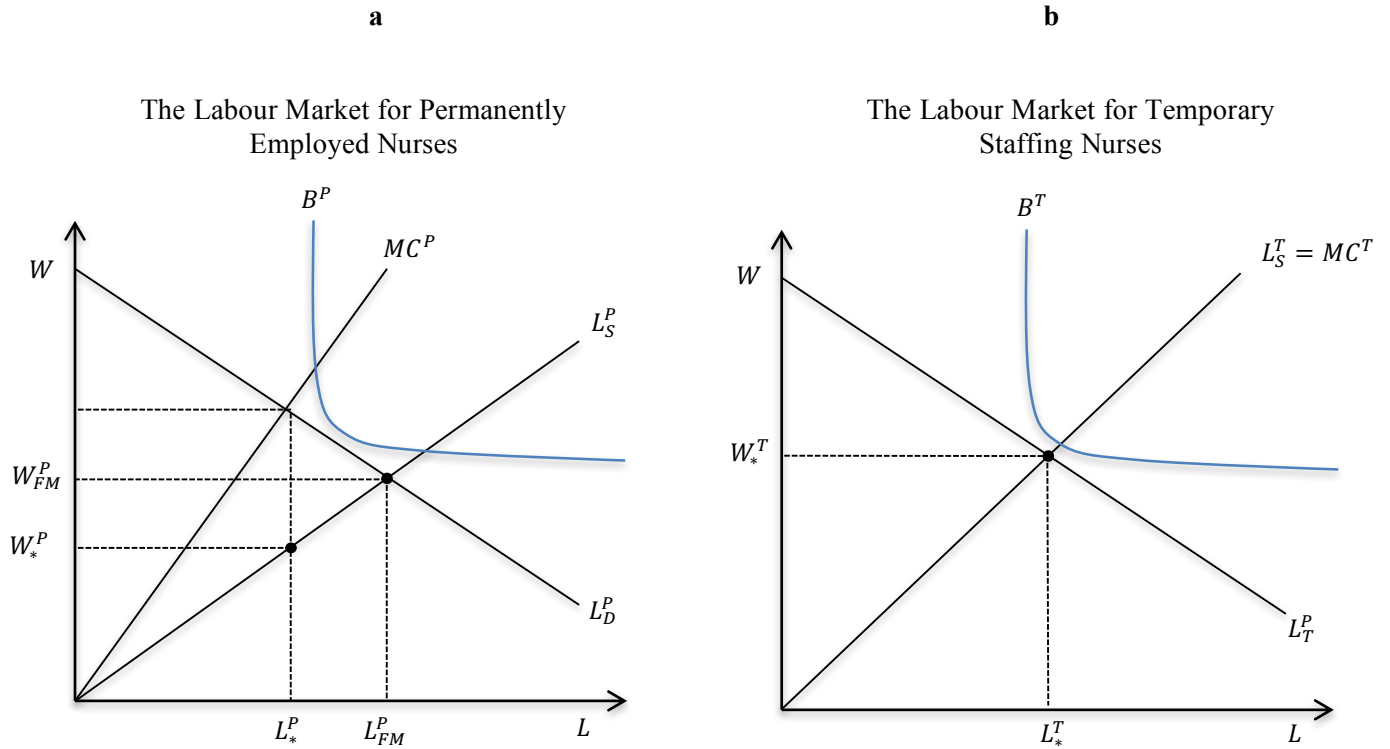
Equation 8:
$$B^P > B^T > 0$$

Correspondingly, the maximum average wage in the temporary staffing market defined by the following equation:

Equation 9:
$$W_{Max\ avg}^T = \max \left\{ 0, \frac{B^T + B^P - (W_*^P \times L^P)}{L^T} \right\}$$

Graphs 17a and 17b show how the budget constraint would look in each market. The position of the curve on the graph would depend on the size of the hospital budget. As will be explained in the following section, the budget constraint can either be binding, or not be binding (seen in the graphs). A binding budget constraint will have implications for labour and wage levels in the market.

Graph 17



6. Model application

After a thorough description of the proposed extension, assumptions, and extension properties, we will now proceed to the application of the model. In this section, we will gather the properties presented in the previous section and demonstrate how they are applied together in a complete model.

First, we will define the characteristics of the equilibrium state. This will be followed by exploring the model dynamics in which we move from one equilibrium to another as a response to a change in a model variable. Finally, after establishing the theoretical mechanics of the model, we will apply our knowledge to reality in order to be able to answer our research question.

6.1 Model Equilibrium

Model equilibrium is generally defined as a stable long-term condition in which there are no forces of movement. In the original monopsony model, the equilibrium state occurs as the

wage level is set according to the equilibrium labour level, which in turn is determined by the intersection of the marginal cost function and the demand function. Including the proposed model extension, the equilibrium state characteristics must also apply in the temporary market in which the equilibrium level of wage corresponding to the equilibrium level of labour is set at the intersection of the supply function and the demand function.

Furthermore, the model equilibrium also requires the flow of labour to be zero, implying that nurses are in their market of preference and have no incentive to move. This requires the labour market ratio to equal the inverse of the average utility market ratio, as evident from Equation 5.

As a final notion, the equilibrium state must also be located within the budget constraint. Thus, the equilibrium level of wage and labour may also be determined as a point along the budget constraint function in case the equilibrium is limited by the constraint. This would mean that the equilibrium is set at the intersection of the supply curve and the budget constraint function as employers seek to maximize the level of labour given their restricted budget.

The equilibrium state in both markets is illustrated in Graph 17 where the flow of labour is equal to zero.

6.2 Model Dynamics

Building on the model equilibrium, we will now illustrate the model dynamics in selected scenarios in which particular equilibrium determinants are altered. This will cause the model equilibrium to shift from one point to another. This shift is comprised of several consecutive movements, and by demonstrating the step-by-step mechanics of the model shift we hope to provide a solid understanding of the intuition driving the movements leading up to the new model equilibrium.

An important factor affecting the new model equilibrium is the budget constraint. We have already established that the model equilibrium must lie within the budget constraint due to the budget constraint limiting the employer to react optimally. This means that the employer is unable to react according to the market forces, as would have been the case without any budget constraint limiting the reaction. As this will have significant implications for the model dynamics, we will begin by presenting the selected scenarios in a case where the budget constraint does not limit the optimal reaction, followed by a case in which it does.

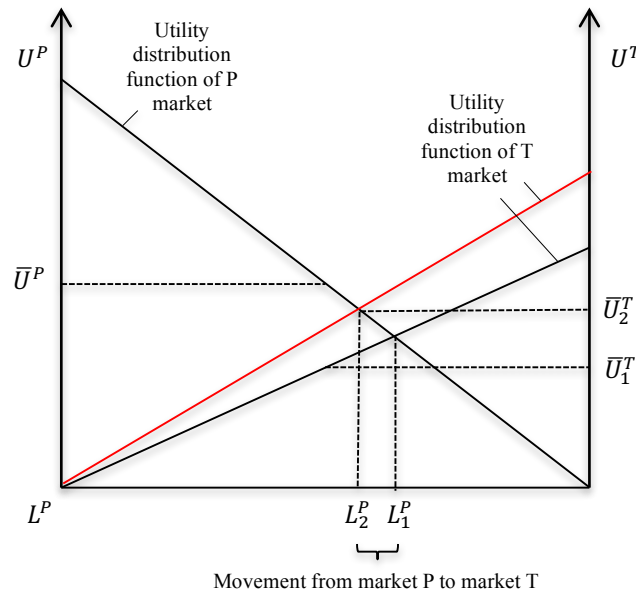
6.2.1 Increase in the Average Utility Perceived in the Temporary Staffing Market with No Budget Constraint Limitation

In this scenario we face an increase in average perceived utility in the temporary staffing market. This means that the number of nurses perceiving the utility in the temporary staffing market to be superior to the utility in the permanent market, increases. The increase can result from either an increase in wage or a change in benefits appealing to a larger number of nurses than before.

The effects of the average utility increase will be described in detail below. The shift from the initial equilibrium to the new equilibrium have been divided into three steps in which the specific movements of the shift is described in detail.

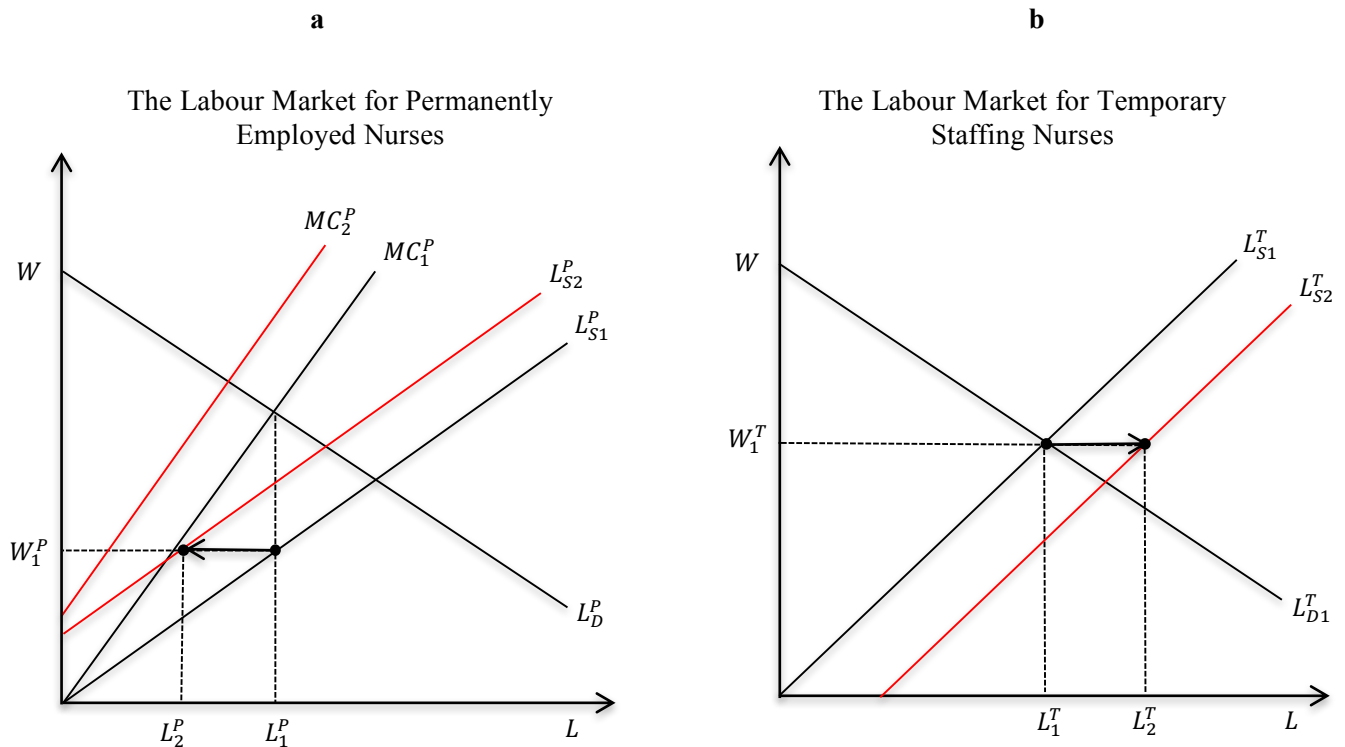
1. In response to the increase in average utility perceived in the temporary staffing market, the average utility ratio will increase proportionally according to Equation 5. This indicates an upward shift in the utility distribution of the temporary staffing market, as illustrated by Graph 18. Ergo, the utility distribution functions of the two markets will intersect at a new point, yielding a new equilibrium distribution of labour between the markets. In Equation 5, the average utility ratio will thus no longer equal the inverse of the labour market ratio, indicating that there are nurses who are not in their market of preference. Hence, nurses from the permanent market will move to the temporary staffing market, which is consistent with the equation yielding a negative value for flow of labour (F). Subsequently, the movement of labour will affect the distribution of nurses between the permanent market and the temporary staffing market, decreasing the labour market ratio. The movement of labour will persist until the labour market ratio equals the average utility ratio, indicating that nurses have redistributed themselves according to their new perception of perceived utility and are once again in their market of preference. The distribution of nurses between the markets will at that point equal the equilibrium distribution as depicted by Graph 18.

Graph 18 – Utility vs. Labour



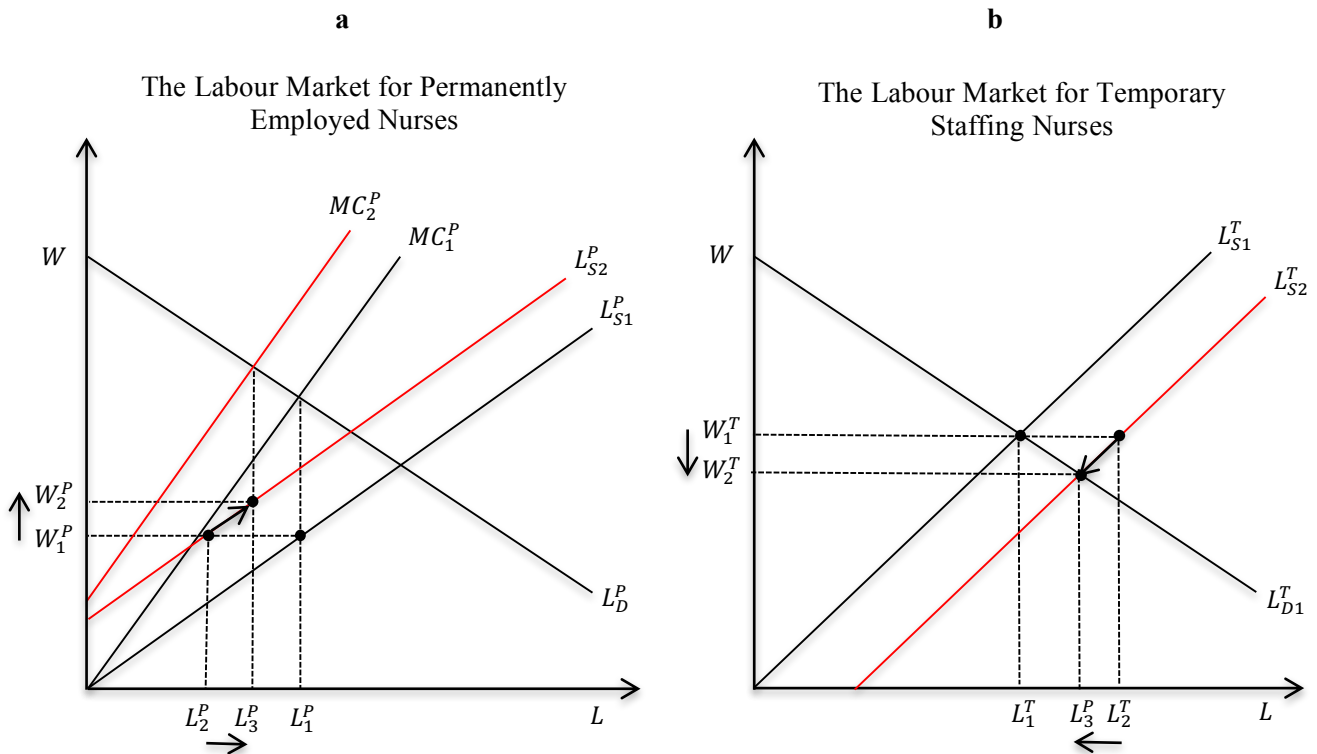
2. The negative flow of labour, capturing the movement of nurses from the permanent market to the temporary staffing market, causes an inward shift of the supply function for permanent nurses and an outwards shift in the supply function in the temporary staffing market. Intuitively, this indicates that the supply of permanent nurses has decreased and the supply of temporary staffing nurses has increased. As a result, employers will initially struggle to employ the level of permanent nurses they would prefer, and the level of labour would decrease from L_1^P to L_2^P . On the other hand, there will be an abundance of temporary staffing nurses, increasing the level of temporary staffing nurses from L_1^T to L_2^T .

Graphs 19



3. As a response to the changes in supply within each market, employers will look to increase wages in the permanent market in order to attract more permanent nurses, whereas wages will be decreased in the temporary staffing market. This will result in an upward movement along the new supply function in the permanent market, and a downward movement along the new supply function in the temporary staffing market. The arrow in Graph 20 a leads us to the new equilibrium in the permanent market, indicating a lower level of labour and a higher level of wage compared to the initial equilibrium. Correspondingly, the new equilibrium in the temporary staffing market indicates a higher level of labour and a lower level of wage than the initial temporary staffing market equilibrium.

Graph 20



6.2.2 Increase in the Average Utility Perceived in the Temporary Staffing Market with Budget Constraint Limitation Solely in the Permanent Market

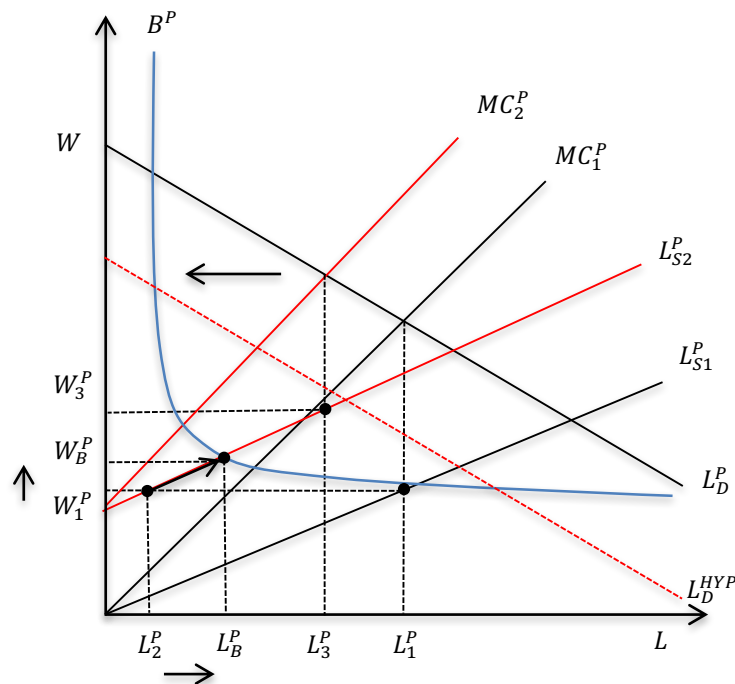
In this scenario, we face the same situation as above, only with the difference that in this case the budget constraint will limit the employer's possibility to react optimally in the permanent market. This will entail a different new equilibrium compared to the previous scenario; along with modified movements to take us to the budget constraint limited equilibrium.

Nonetheless, the initial movements occurring as a response to the increase in the average utility perceived in the temporary staffing market will remain the same. It is only in step three that the effects of the budget constraint enter by limiting the employer's reaction. Thus, we will build upon step 1 and 2 from the previous scenario, and focus on what happens next when including the effect of the budget constraint, starting from step 3.

3. Like to the previous scenario, employers will look to increase wages in the permanent market and decrease wages in the temporary market. However, as evident from Graph 21, the budget constraint in the permanent market will restrict the wage to be increased to the level required in order to attract the labour level defined as L_3^P . Aiming to maximize the level of permanent nurses, the wage will instead be set to at the intersection of the supply curve and the budget constraint function. The new equilibrium will thus be at the level of wage W_B^P and the level of labour L_B^P , and will thus be lower than the equilibrium levels without budget constraint limitations.

Graph 21

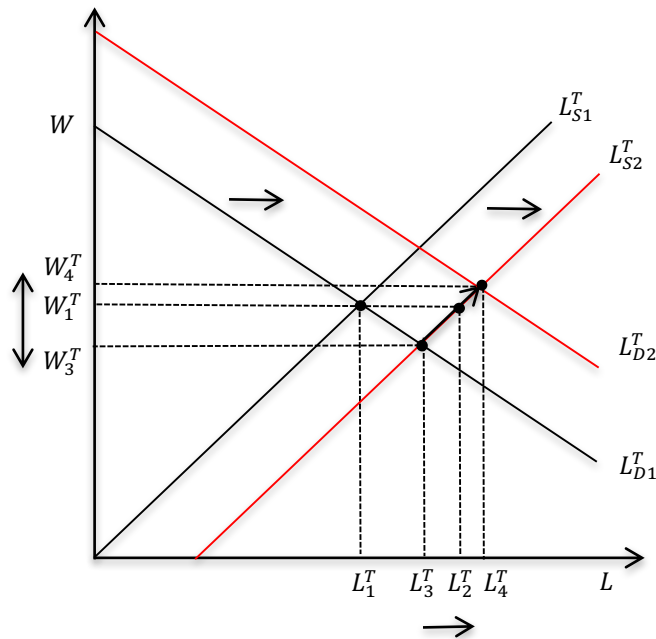
The Labour Market for Permanently Employed Nurses



4. The inability to increase wages according to the optimal reaction can be regarded as a hypothetical decrease in demand corresponding to the equilibrium wage level forced by the budget constraint. Hence, following Equation 5, the demand in the temporary staffing market would increase in an attempt to compensate for the labour shortage in the permanent market. This implies an outward shift in the demand function in the temporary staffing market. Thus, the increase in supply described earlier in the temporary staffing market will now also be accompanied by an increase in demand, resulting in an even larger increase in the level of temporary staffing nurses. Furthermore, the outward shift of the demand function counteracts the intended wage decrease, and the equilibrium wage level will remain higher than it would have without the budget constraint in the permanent market. We are unable to determine whether the equilibrium wage level is higher or lower than the initial equilibrium as it would depend on the size of the shifts in supply and demand.

Graph 22

The Labour Market for Temporary Staffing Nurses



6.2.3 Increase in the Average Utility Perceived in the Temporary Staffing Market with Budget Constraint Limitation in the Permanent Market and in the Temporary Staffing Market

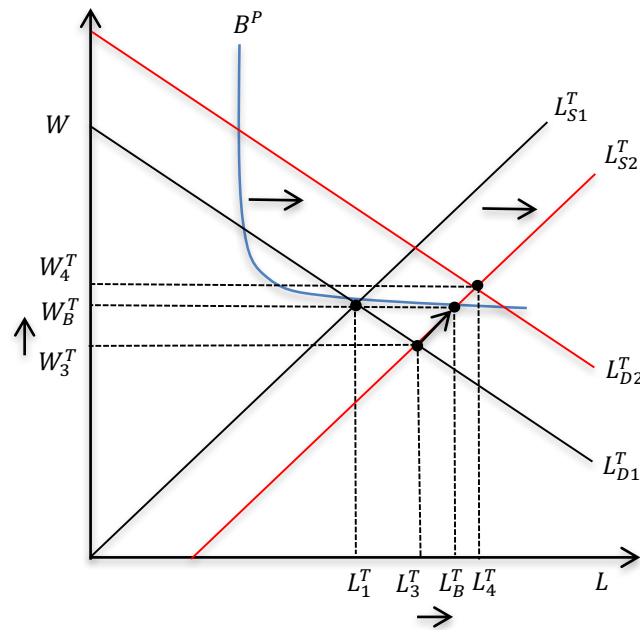
In this scenario, we add the effect of a limiting budget constraint to the temporary staffing market as well. The employer will thus not be able to optimally compensate the shortage in the permanent market by increasing wages in the temporary staffing market.

The addition of a limiting budget constraint in the temporary staffing market will not affect the equilibrium nor the reaction of the employer in the permanent market. Thereby, step 3 from the previous scenario will remain the same. Instead, we will focus on the implications of the budget constraint in step 4 as it restricts the employer's possible reactions.

4. Given the demand discrepancy in the permanent market, the demand in the temporary staffing market would increase as the employer attempts to compensate the labour shortage in the permanent market by attracting additional labour in the temporary staffing market. However, in this case, the wage increase required to attract additional labour in the temporary staffing market is restricted by the budget constraint. Instead, the equilibrium will be set by the intersection of the supply curve and the budget constraint function as in the permanent market. With no additional possibilities to compensate for the labour shortage, a demand surplus will exist, as employers are restricted from employing the number of labour rationally preferred due to budget constraint limitations. The level of labour would thus be lower than without the budget constraint, both in terms of the labour level in the temporary market and the total labour level in both markets combined, as a result of a lower equilibrium wage level.

Graph 23

The Labour Market for Temporary Staffing Nurses



6.3 Analysis: Application in Reality

In the previous section, we explored the intuition behind the equilibrium shifts by breaking down the movements into specific steps. By altering the limitations set by the budget constraint, we also learned that the final equilibrium is dependent on the employer's ability to act optimally. These findings will be used as we proceed to apply the model to reality by connecting the theory to the current circumstances.

The first part of the section will be dedicated to a comparison of the model dynamics and the actual development in the labour market for nurses since the millennium. This will provide an indication as to how well the model has been able to capture relevant market forces determining the development of the market historically. Furthermore, by studying the development observed in reality and relating it back to the model, we also hope to gain a better understanding of the approximate relationship of the budget constraint. By estimating equilibrium determinants and utilizing the model that has been presented, we will attempt to predict the development of the labour market by defining the equilibrium outcome given current circumstances.

6.3.1 Retrospective Comparison

Studying the equilibrium determinants for the last couple of years, there has been an increasing trend in the perceived average utility for the temporary staffing market. Already offering a higher wage than the permanent market, as exhibited in Section 3.1.4, recent development also indicates strong efforts to increase benefits in the temporary staffing market in Stockholm. In terms of the model this would lead to the scenario analysis described previously. Furthermore, consistent with the effects we derived from the models, a movement

of labour from the permanent market towards the temporary staffing market have also been observed in reality.

The shift described above has had several consequences both in the model and in reality. Firstly, building on the data from the background section, there seems to be a limiting budget constraint in force as hospitals are unable to increase wage levels for permanently employed nurses. This wage rigidity in combination with the shift of labour force between markets described above has lead hospitals to use more temporary staffing nurses, which can be justified in reality with hospitals cost increases in Section 3.1.5.

Further, in light of a continuously decreasing supply within the permanent market, staffing levels have begun to fall below the level required to uphold the minimum capacity of hospitals, opening up long-term positions for staffing agencies. Thus, staffing agencies have been able to offer stable and long-term placements for temporary staffing nurses, while continuing to eliminate any benefit differences between the market and putting a larger emphasis on the wage in nurses' employment choice. As a response, hospitals have been trying to improve benefits within the permanent market in response to the diminishing supply in the permanent market. The full result of this effort is still unknown, but is currently seemingly unimportant as nurses are still moving towards the temporary staffing market.

With the dependence of temporary staffing nurses continuing to increase, applying the model would suggest that hospitals would eventually reach the limits of the budget constraint in the temporary market as well. This would result in a decrease in the total labour level, causing an absolute shortage of labour (illustrated as the difference between L_4^T and L_B^T in Graph 23). Hence, hospitals would be forced to cut down on health care output, as hospital beds are directly proportionate to the number of nurses. This is in fact the development currently taking place in the Swedish health care, not only in the long run seen in Graph 8, but also on a monthly basis [38].

To summarize, the developed extensions of the monopsony model seem to capture and explain the development observed in the labour market for nurses during the last couple of years to some extent, both in terms labour movements and equilibrium levels of wage and labour. Moreover, building on the effects observed in reality, there is reason to believe that the hospitals are currently pushing the boundaries for their budget constraints in both markets.

6.3.2 New equilibrium outcome

Using the retrospective comparison as a stepping-stone, the average utility ratio seems to have changed significantly in favour of the temporary staffing market. This resulted in an unbalanced flow equation, which is confirmed in reality as nurses move from the permanent market to the temporary market. This suggests that the labour market ratio has not yet reached its new average utility ratio, and nurses will continue to move until it is.

At the current wage level, the model indicates that demand is already limited by, and therefore replaced by, the budget constraint function, which would take on a very flat form given the large proportion of permanent labour. Normally, this would be compensated by an increasing demand in the temporary market. The decrease in hospital beds due labour supply does, however, imply that the budget constraint has also been reached in the temporary market, as explained by the scenario analysis in section. Thus, similarly to the permanent market, the budget constraint will act as the demand function. As a result, the continuous flow of labour from the permanent market to the temporary market will not affect the demand of the temporary even though the labour level in the permanent market will decrease due to

diminishing supply. The flow of labour will however still affect the supply in the temporary market, which given the budget constraint will result in an increase of labour and a decrease in wage.

In comparison to the current state of the total labour market for nurses, we should thus expect a continuing flow of labour from the permanent market to the temporary market. The time span required for the labour market to redistribute itself according to the new average utility ratio may stretch over several years, much depending on the level of transparency.

Nonetheless, the new equilibrium towards which the market seems to be moving should entail an even lower level of labour than seen today. This follows from the flat form of the budget constraint in the permanent market, making it more sensitive to shifts in the supply function. As a result, the net effect of supply moving from the permanent market to the temporary market would be a decrease in total labour level as the loss of labour in the permanent market would be larger than the increase in the temporary market. A decrease in total labour level is also the definition of an absolute shortage in labour, which further suggests that hospitals may be forced to reduce health care output.

Given that the budget constraint in both markets were already reached, costs will have remained the same. A decrease in total labour level does however imply a higher cost per nurse. This can, however, not be explained by any wage increases. Instead, the explanation for the increased cost per nurse can be found in the fact that the proportion of temporary nurses will have increased. As for wage levels, wages in the permanent market are likely to remain static due to the flat budget constraint limiting any increases, whereas wages in the temporary market should be pushed down by the combined effects of an increasing supply and the limiting budget constraint. The extent of the decreased wage level in the temporary market depends on the new average utility ratio and the subsequent flow of labour.

For the wage level to decrease to the point of perfect conversion, the value of the average utility ratio would need to approach zero. This could come from differences in benefits being completely eliminated, leaving wages as the only determining factor of perceived utility. Consequently, all nurses would move to the market offering the highest wage level, which would result in converging wages or the elimination of the market with the lowest wage level. Although the reduction of differences in benefits is likely to be the spark of the increase in average utility perceived in the temporary market, there is no observable evidence pointing to the differences being eliminated completely as there are still fundamental distinctions separating the two employment forms. Therefore, the utility change will cause a labour ratio change between the markets, but the markets and two-tier wage levels are expected to coexist, as the benefits will never be completely the same.

7. Result

As presented in Section 1.1, the answer to our research question depends on the satisfaction of two conditions. The first condition required the two-tier wage structure to be rational for the employers. Given current circumstances, the model presented in this thesis provides a solid argument for the rationality of employing temporary nurses despite higher wages, thus satisfying the first condition. The argument is strictly based on the assumption that every nurse within the permanent market will be paid the same wage, resulting in an increasing marginal cost for permanent nurses while the marginal cost for temporary nurses equal their wage.

The second condition required the two-tier wage structure to be rational for nurses. Given current circumstances, the model presents convincing arguments for nurses to have different markets of preference despite wage discrepancies, thus satisfying the condition. The arguments are primarily based on the assumptions of individual and varying utility functions. Accordingly, the application of the model suggests that any difference in benefits would have to be eliminated in order for one market to strictly dominate the other, resulting in all nurses moving to the dominating market of preference. As the elimination of any difference in benefit is implausible in reality, this is unlikely the case.

Both conditions satisfied suggests that the two-tier wage structure can be rationally justified given current circumstances.

8. Discussion

In this section, we will discuss the results presented in the previous section. We will begin by interpreting our results and their implications in reality, followed by relating the result to the public opinion and the academic current state of knowledge. Next, we will discuss the limitations of our results by evaluating the model extensions presented in this thesis, along with the assumptions on which it is based upon. Lastly, we will finish off by presenting additional extensions that we believe would be of interest for future studies.

8.1 Interpretation of Results

The results generated by the model imply that both conditions on which our research question depend upon are satisfied. Thus, according to the model results, the two-tier-wage structure can be rationally justified given current circumstances. Nonetheless, for the justification to hold in the future, it is important to stress that the results only hold under the circumstances that things proceed according to the current market forces. In light of the reduction in health care output that have been seen as a result of the nurse shortage, it is unlikely that this development will be allowed to progress without any intervention. The result of the model should hence be considered as an economically rational explanation to the two-tier-wage structure, rather than a prediction of the future equilibrium and corresponding levels of wage and labour.

In comparison to the public opinion on the matter of the two-tier wage structure, we earlier described that professionals within the health care, and nurses in particular, are very sceptical to its justification. As permanent nurses and temporary nurses are performing the same tasks, the “risk” factor of not being staffed is very low, and temporary staffing nurses are generally perceived to be performing worse, there does not seem to exist any plausible indications for them to earn higher wages. From the hospital's perspective, the phenomenon is however clearly explained by studying the effects on homogenous wages on the marginal cost function in the permanent market. These insights have also been acknowledged by the union, Vårdförbundet, who are currently working actively to increase the wage spread by promoting heterogeneous tasks to generate heterogeneous wages based on more specific experience and competence criteria.

Reviewing the current academic literature, most of the research on staffing agencies seem to share the public opinion in terms of temporary staffing nurses’ effects on health care performance. Studies presented in Section 4.5 show that temporary staffing nurses have negative impact on working morale, productivity and health care quality, providing strong arguments for hospitals not to use temporary nurses at all. The aspect of labour productivity was completely left out of the model based on the discussion in Section 4.5.2, as observations from reality do not support hospitals taking productivity into account in employment decisions. We, however, chose not to investigate the reason for this further, but simply limited ourselves by confirming that this is the currently the case.

Current academic literature does however support the model result suggesting individual and varying utility functions as it have been showed that permanent nurses and temporary nurses differ in their valuation of several aspects of employment conditions. This is presented in detail in Section 4.3.

8.2 Limitations

Similarly to other theoretical studies, certain assumptions have been made in order to be able to analyse and model the market in a comprehensive manner. The assumptions are made with the aim to capture the reality, but to ignore minor abnormalities and variances that are unlikely to affect the results of the model. Nevertheless, the assumptions are rarely flawless and do generally infer some limitations due to oversimplifying specific aspects of the reality. In this section, we will discuss the assumptions we believe may limit the results, and the implications that may result.

A central assumption on which the results of the model are very dependent on is the assumption that all nurses in the permanent market are paid the same wage. As highlighted in connection to the assumption introduction in Section 5.1, this is not completely consistent to reality. The wages are, however, limited to a narrow span and nurses are unable to renegotiate wages within the same county due to the anti-competing policies described in Section 2.1.3. Yet, the policy does not apply to newly graduated nurses that are just about to enter the market. Although the justification for the assumption reasons that nurses would not accept to be paid less than another nurse performing the same tasks, also supported by the study described in Section 4.4, these norms may come to change in the future.

Another assumption worthy of discussion is the assumption of uniform distribution of utility functions. Even though there is convincing evidence of a wide spread of utility functions, some of which are presented in Section 4.3, the distribution is unlikely to be uniform in reality. Nonetheless, the different distributions of the utility function would not influence the directions of the labour movement, but merely the number of nurses moving in response to a specific change in the average utility. As this lies beyond the scope of the model, we considered the uniform distribution as satisfactory for the purpose of this model.

Finally, we will criticize the risk of biased sources. In addition to the quantitative data collected from administrative authorities such as SCB and Socialstyrelsen, a large amount of qualitative data has been required in order to fully understand the current situation in the labour market for nurses. As the sources of this information are also stakeholders in the market, they should not be considered objective as they are clearly biased in favour of their own agenda. Although this has been known to us throughout the whole process, and rigorous efforts have been made to validate the information received by the various sources, it is still a notion worth emphasizing.

8.3 Future extensions on the Labour Market for Nurses

In his thesis, we have made an attempt to collect observations from reality and evidence from previous research in order to model the labour market for nurses and gain a greater knowledge on how different factors influence the market equilibrium. This has been done with the aim of determining whether the two-tier wage structure can be rationally justified by economic reasoning. A distinctive choice in setting up the model has been to consider the stakeholders of the market as passive, only reacting to exogenous changes in equilibrium determinants. These changes have been justified through observations from reality, and subsequently inputted in the model framework in order to generate a new equilibrium outcome and analyse the effects this would imply on wage development and movement of labour.

A key aspect that has been left out of the model is thus the stakeholder's ability to act strategically in order to optimize its conditions. An example of such a strategic action was made by the hospitals in 2003 as they decided to freeze out staffing agencies and thereby induce a significant increase in labour supply in the permanent market as staffing agencies went bankrupt. Considering the current development of the market and the estimated new equilibrium outcome generated by the model, a strategic action in order to secure a labour level sufficient to uphold the health care capacity is likely to be seen in the near future. Although this may not necessarily influence the existence of a two-tier wage structure, we believe it to be of great importance to study the market with a strategic approach in order to understand the factors driving the decisions of the market stakeholders.

In addition, as the model presented in this thesis is the only theoretical framework currently described to capture the staffing agencies role in the labour market for nurses, further studies and applications of the model will be of great importance in order to validate the model mechanism and discover possible improvements and extensions.

9. Conclusion

The aim of this thesis is to answer the research question: Can the two-tier-wage structure be rationally justified by economic reasoning? In order to answer that question, we defined two conditions in Section 1.1 that needed to be satisfied in order for the two-tier wage structure to persist. By incorporating observations from reality, the model presented in this thesis generated a result suggesting that both these conditions were satisfied under the current circumstances of the labour market for nurses. This implies that the two-tier wage structure *can* be rationally justified by economic reasoning.

Although the model does not provide a flawless framework to describe the labour market for nurses, it should be considered a valuable and meaningful contribution to the understanding of the market as it provides a theoretical base that future studies may relate to. In terms of its ability to answer the research question, we consider the results generated by the model as a strong argument indicating that the two-tier wage can be rationally justified. Although specific assumptions may not fully be representative to reality, the model as a whole is, to our belief, able to capture the dynamics of the market to the extent that it the research question can be answered. The main concern that risks jeopardizing the result generated by the model would probably be attributed to the current market development which may possibly breach assumption 1 of the model. We do, however, not believe this to be the case.

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