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Master Essay I

The Swedish VAT reduction on restaurant services and its effect on the employment rate

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Abstract

The thesis examines whether the VAT reduction for restaurant services imposed in Sweden on the first of January in 2012 affects the employment rate. A fixed effect panel data analysis was performed with total employment as dependent variable and correlated against groups of Swedish regions. The groups are classified depending on how large share of total employees that are working in the restaurant sector. It can be shown that those regions with a higher employment rate in the restaurant sector have experienced a lower decrease in employment than other regions.

1. Introduction

On the first of January 2012 the Swedish government reduced the value added tax, VAT, for restaurant services from 25% to 12%. The main reason for this action was to increase the employment rate in Sweden by making it more profitable for employers to new-hire, - youth in particular (Regeringen, 2011-09-12, p.3).

In comparison to other European countries, the restaurant sector in Sweden is relatively small. Prior to the VAT decrease, the sector stood for approximately 2% of the total labour force in Sweden as a whole and employed around 93,000 people (SOU, 2011, p.29).

The VAT rate on restaurant services in Europe averages 15%, i.e. prior to the first of January 2012 the VAT in Sweden was 10% higher than the average rate in Europe. After the reduction, however, the Swedish tax rate joins the lower averages in EU and is now in magnitude with the Portuguese VAT rate (Hortlund, 2008, p.12).

The restaurant sector is a sector where many adolescents, women and immigrants work and it is also characterized as being a sector with many part time and seasonal jobs. It is also typical for the restaurant sector that many people start their professional career in it, and it can therefore serve as a gate into the labour market via a threshold effect (Hortlund, 2008, p.10).

The decision to reduce the VAT on restaurant services is in line with the optimal tax theorem. According to the theorem, a sector with high elasticity should be taxed less than a sector with low elasticity. This is because the production in a sector with high elasticity is more likely to change into informal production or home production than the production in a sector with a lower elasticity (Rosen&Gayer, 2010, p.356).

The restaurant sector is often described as being relatively elastic since if people feel that it is too expensive to dine out, they can easily cook at home instead. Given the high elasticity in the restaurant sector, reducing the VAT is assumed to increase the employment in the restaurant sector (Hortlund, 2008, p.14).

There is, however, a risk of externalities when reducing the VAT rate. Externalities are affecting other similar sectors such as the retail sector that now may experience a cost disadvantage. However, in the case of Sweden it is possible that the restaurants already suffered from such a cost disadvantage. Prior to the restaurant VAT reduction from 25% to 12%, the restaurant VAT was 13% higher than the rate on food, something that could instead increase the efficiency in the restaurant sector. There is also a risk for

rent seeking when other sectors that are not affected of the reduced VAT also want their VAT to decrease (Hortlund, 2008, p.17).

Employment in the restaurant sector is assumed to increase when the demand for restaurant visits augments owing to prices decreasing by the reduction in VAT. A study on Finland, which cut their VAT for the restaurant sector in July 2010 from 22% to 13%, shows that prices in the restaurant sector generally decreased by 2% (Harju&Kosonen, 2011, p.1).

In a survey performed in Sweden, restaurants owners were asked how they would react if the general payroll tax would be reduced from 32% to 10%, which corresponds to the VAT cut. The restaurant owners were asked whether or not they would consider hiring new workers if the general payroll tax became lower. If the restaurant owners that participated were representative and if everyone that answered “yes” or “yes maybe” to the survey would hire one new worker, this would lead to between 12,000 and 24,000 new jobs (Hortlund, 2008, p.30).

It is unclear what the effect of the cut in VAT for restaurant services will be, but according to economic theory it will lead to an increase in the number of employees in the restaurant sector. This thesis will attempt to give some answers on how the reduced VAT on restaurants in Sweden has affected the employment rate.

At present time no data exist over the number of employed in the restaurant sector in 2012. However, aggregated employment statistics are available for all regions in Sweden. To examine the subject, a panel data analysis is performed, where the dependent variable is the aggregated county employment rate. The regions will be divided into different groups depending on the number of total employed inhabitants working in the restaurant sector. For example, one group containing regions with an employment rate in the restaurant sector above 2.9%, another group that cover the interval 2.9%-2.5% and a third group with the regions displaying an employment rate in the restaurant sector less than 2.5%. A dummy variable will then sort out the effect for the respective groups in the period that followed the VAT reduction, i.e. the four quarters of 2012. The study tests whether the unemployment rate decreases in regions with a large restaurant sector, and if we find such an association it indicates that the VAT has an effect on the number of employees in the restaurant sector.

In section 2 a general background about the function of VAT and how it is performed in Sweden and Europe will be presented. Section 3 will present VAT theory

and some earlier research on the VAT reduction in the restaurant sector. Section 4 will provide the data and the empirical method. In section 5 an analysis will be presented and in section 6 the thesis will be concluded.

2. The value added tax (VAT)

The VAT is an important income to government and the VAT is estimated to constitute 16.7% of the total tax revenue in Sweden. There is a standardised VAT rate of 25% in Sweden; however, some merchandise is spared with a lower VAT of 12% or 6%. Imposing a lower VAT on certain goods and services makes it possible for the government to increase some consumption and to prevent distortions. The VAT rate of 12% is applied on for example food and hotel rooms and the 6% VAT rate applies on for example books, newspapers and entertainment such as cinema and theatre tickets. The restaurant sector was prior to the first of January 2012 imposed with the highest tax rate of 25%; however, the sector has enjoyed lower taxation rates in Sweden historically. In 1969 when the VAT system first was introduced in Sweden, the service sector, that was the restaurant sector including alcohol, was taxed at a lower rate (SOU, 2011, pp. 20-26).

It was decided that the general VAT rate should be set to 11.1%. This rate was based on the earlier sales tax of 4.17%, a sales tax that was abolished in 1948 and then reintroduced in 1960 (Aronsson & Walker, 1997, p.224).

In 1991 the government decided that Sweden should have a uniform VAT system which lead to the VAT rate in the service sector being imposed the same rate as all other sectors. As early as in 1992 the VAT on the service sector and other leisure related activities, was reduced again due to arguments that the higher VAT had harmed the business. A year later in 1993 the VAT was raised from 18% to 21% as a means to harmonise the Swedish VAT system (SOU, 2011, p.27).

It is often argued that it would be preferable to have the same VAT rate on all goods and services. If all goods and services were imposed the same VAT, the bureaucracy involved in deciding in which group a certain service or good should be included in would be avoided (Assarsson, 2006, p.128).

The Swedish VAT system is today based upon the European Councils directive dating from 2006 stating that the member countries should work for a standardised

VAT system within the union. The objective with a common VAT system within the union is to prevent distortions and to encourage competition across borders. Due to this, Sweden had to increase the VAT on the service sector when entering the European Union in 1995 because at this point it was not permitted for a member country to impose a lower VAT rate on the service sector. The directive from 2006 states that no country is allowed to apply a standard VAT below 15%. Two countries apply this minimum standard VAT rate - Luxembourg and Cyprus. There is no upper limit for the VAT, but the member countries have taken upon themselves not to increase the gap (today 10%) between the lowest and the highest applied VAT within the union. Sweden, Denmark and Hungary apply the highest VAT at 25%, so as long as the lowest VAT rate is 15% the upper limit will indirectly be 25%. Some countries were allowed to apply a reduced VAT on restaurants but Sweden was not one of those, therefore the VAT was increased to 25% when Sweden joined the EU. However, in 2003 the European Commission initiated the work to make it possible to apply a reduced VAT on restaurant services, which they gave the independent organisation Copenhagen Economics instructions to investigate. This led to the European Commissions directive in 2009 allowing the member countries to apply a reduced VAT on restaurant services. Prior to 2009 Greece, Spain, Ireland, Italy, Cyprus, Luxembourg, the Netherlands, Austria, Poland, Portugal and Slovenia were all allowed to apply a lower VAT on restaurant services. After 2009 Belgium, Finland and France decided to lower their VAT and then Sweden followed. Thus, today 15 of the 27 member countries in the EU impose a lower VAT rate on restaurant services (SOU, 2011, pp.23-25).

The restaurant sector in Sweden employs around 93,000 people, which is almost 2% of the total number of employed Swedes. Many of the employed in the restaurant sector are adolescents; almost 35% of those working in restaurant services are young people, the corresponding number for the whole Swedish economy is 10% (SOU, 2011, p.29).

In the Swedish economy as a whole there is also a large difference in the unemployment rate among workers with different educational levels. Those with a lower educational level are unemployed to a larger extent than those with a higher educational level. A reason for this may be that the Swedish minimum wages are relatively high in comparison with other EU countries. Even if it does not exist any minimum wages in Sweden, the unions are quite powerful and negotiate for their

respective sectors. In a comparison with the retail sector it is possible to discern that the negotiated wage in the restaurant sector is higher than the wage in the retail sector. In an attempt to decrease the unemployment rate in Sweden, the government lowered the general payroll tax for young people, and others having difficulties in entering the labour market, in 2007 and 2008 (SOU, 2011, pp.30-31).

The Swedish VAT reduction on restaurants was estimated to create almost 6,000 new jobs; of which 3,500 new full time jobs in the long run. This will cost the taxpayers 5.4 billion Swedish kronor for 2012, and subsequently 4.6 billion Swedish kronor per year henceforth. The financing ratio is assumed to be 20% in positive employment effects and lowered unemployment benefits (Budgetproposition, 2011, pp. 269-273).

Prior to the VAT rate being reduced in Sweden in January 2012, it was more profitable to be in the food business, in which take away services are included, because the VAT in this sector was only 12%, compared to the VAT in the restaurant sector that had a VAT rate on 25%. It could therefore be argued that there was a distortion on the Swedish market giving the restaurant services a disadvantage compared to similar sectors. Given this it may be argued that the VAT reduction performed by the Swedish government was a way to obtain a similar VAT rate for related sectors (Hortlund, 2008, p.39).

There are several advantages with a uniform VAT system, as for example the improvement of efficiency in providing a less bureaucratic administration and the reduction in risk for tax fraud (Bye, Strøm & Åvitsland, 2012, p.3).

Even if it can be beneficial with a uniform VAT on all goods and services in theory, it may harm the economic welfare. This owing to different goods and services having different elasticities leading to different sensitivity for taxation. By imposing different tax on different sectors, the government is able to minimize the excess burden (Copenhagen Economics, 2007, p.8).

Despite that, the EU has in general a positive attitude to a uniform VAT system within the union, which may be one of the reason that an increasing number of member states get permission from the European Commission to reduce their VAT on certain consumption goods (Copenhagen Economics, 2007, p.9).

According to economic theory there will be full pass-through to the price of a VAT cut. If the VAT is reduced by 10%, the price will also decrease by 10% over time. However, to allow for full pass-through of the VAT to the consumer the sector needs to

be competitive and the price elasticity needs to be relatively high (Harju&Kosonen, 2011, p.4).

To avoid welfare losses there has historically been a consensus in the economic literature for a uniform VAT. However, in present-day Europe many different VAT rates exist creating a patchwork of different VAT rates; Ireland has for example 2,500 different VAT rates (Copenhagen Economic, 2007, p.13).

A reduced VAT on certain services can stop people from producing this activity themselves and instead purchase it on the market. Doing so, they can spend allot more time on their ordinary job, which will lead to an increase in tax revenue for the government. A lower VAT rate may also lead consumers to buy their services on the legitimate market instead of on the informal market (Copenhagen Economics, 2007, p. 23).

3. Theory and Earlier Research

3.2 Theory

A Value Added Tax, VAT, is a consumption tax paid in all stages of the production. However, if the VAT is an indirect tax, the whole tax amount is conveyed to the consumer in the final stage (Rosen & Gayer, 2010, p.486). Even if everyone in production should pay VAT, the VAT is pushed forward to the final consumer by an increase in price in every stage (SOU, 2011, p.19).

It is often argued that the best tax system is a uniform tax system. However, one of the most applied tax regimes is the optimal tax theorem. The theorem originates in 1927 when the economist Frank Ramsey could demonstrate that a uniform tax rate on commodities is not the most efficient tax system. He could show that there was a reverse relationship between demand elasticities and tax rates. A commodity having an inelastic or low elastic demand can be imposed with a higher tax rate. Simultaneously, a commodity with high demand elasticity can be imposed with a lower tax rate (Slemrod, 1990, p.159).

There is a risk that production in a sector with high demand elasticity moves out to the black economy or into the homes, if the sector is taxed too heavily. The decision to

reduce the VAT on restaurant services is in line with the optimal tax theorem. (Rosen & Gayer, 2010, p.356).

The restaurant sector is often described to be relatively elastic, because if people experience eating out to be too expensive, they can easily cook at home instead. Given the high elasticity in the restaurant sector, reducing the VAT is assumed to increase employment in that sector, since this will raise the productivity in the sector when the demand for dining out increases (Hortlund, 2008, p.14).

However, there is a risk for different distortions with the optimal tax theorem. Distortions can occur when other similar sectors could be affected, like the retail sector, for instance, that now may get a cost disadvantage. In the case of Sweden it is, however, possible that the restaurants already had a cost disadvantage historically. Before the restaurant VAT reduction from 25 % to 12 %, the restaurant VAT was 13 % higher than on food, that also include take away food, which might have been a disadvantage for the restaurant sector. Therefore it may be argued that the VAT reduction instead has removed a distortion from the market and this could instead increase the efficiency in the restaurant sector. Another risk that occurs when the government applies different tax rates on different sectors is that there is a risk for rent seeking. Rent seeking arises when other sectors that are not affected by the reduced VAT also want their VAT rate to be reduced (Hortlund, 2008, p.17).

The number of new jobs that could be expected thanks to the VAT cut in Sweden is much dependent on the price elasticity. If the price elasticity is -1, the demand will increase with 1% if the price decreases with 1%. There are many different estimations on the price elasticity for the restaurant sector in Sweden. In an estimation from 1998 the elasticity for this particular sector is estimated to be -1 (Assarsson, 1998, p.28). In a later estimation the price elasticity for the restaurant sector in Sweden is estimated to be -0.43 (Assarsson, 2004, p.13). Overall existing estimations of the price elasticity of the restaurant sector spans from -0.4 to -1.9. The literature therefore often uses an average of all the different estimation adding up to a price elasticity of -1.2 (Hortlund, 2010, p.19).

The expected effect of the VAT cut in Sweden was that the productivity in the restaurant sector would increase and that the structural unemployment would decrease. The expectations are built upon the assumption that the whole magnitude of the VAT reduction would favour the consumers.

If the prices decrease, the demand will increase, which will lead to higher productivity and the possibility for more people to be employed. For the VAT cut to affect the number of employed in the sector the sector has to be labour intensive. Studies have showed that a labour intense sector like hairdressers for instance, hired new workers corresponding to 90% of their gain of the VAT cut, meanwhile a more capital intense sector like electricity production only hired new personnel amounting to 50% of the corresponding gain due to the VAT cut. However, it is necessary that the VAT reduction is permanent; a temporary VAT cut would not provide any incentives for the owners to employ new staff (Copenhagen Economics, 2007, p.11).

A VAT cut costs the government money in terms of a decrease in tax revenue, something that strain the fiscal budget. The government must therefore finance the VAT cut in some way if they want to avoid a budget deficit. Increasing the VAT rate in some other sector would do this. A way to neutralize the effect of the VAT reduction in one sector is to increase the VAT in another sector. This is done by reducing the VAT in a sector with relatively high price elasticity and increasing it in a sector with relatively inelastic price elasticity. Nevertheless, there is no indication that this procedure can maintain the increased employment that arises due to the VAT cut (Copenhagen Economics, 2007, p.12).

When lowering a VAT rate it can lead to consequences in neighbouring countries. However, there is no great concern for a reduced VAT causing any problem for the internal market in for example the EU, except for some goods and services such as restaurant services. A lowered VAT rate for restaurant services can attract consumers from neighbouring countries to locate their vacation or weekend there instead of in their home country, something which would affect the home countries' economy (Copenhagen Economics, 2007, pp.17-19).

Cooking is something that most people can and will do themselves if they experience that it is too expensive in the restaurants. Therefore, a reduced VAT on restaurant services may increase the productivity in the sector because it may increase the demand for restaurant services. The restaurant sector is also a sector employing many low-skilled workers. The unemployment rate for low-skilled jobs has been shown to be more structural than the unemployment rate for high-skilled workers. Therefore the structural unemployment rate may decrease if the VAT is reduced in a sector like the restaurant sector for instance. Increasing the VAT on sectors with high-skilled labour

force could help maintain budget neutrality. However, there is no proof that a reduced VAT on specific sectors is a more advantageous and effective way to decrease structural unemployment than certain subsidies to specific activities, even though subsidies may not be credible as a permanent solution (Copenhagen Economics, 2007, p.22).

If the VAT rate is reduced, the tax wedge will also decrease. The tax wedge is how much time the consumer has to work to afford to buy one hour of a certain service. If the tax wedge is small, it is likely that the consumer will buy the service on the market instead of doing it herself. However, if the tax wedge is large the consumer may produce the service herself or buy it on the black market. If the tax wedge is large initially, it may be profitable to lower the VAT on services. Sweden and its Nordic neighbours together with Belgium were the EU countries having the highest tax wedge in 2007 and therefore would be able to decrease the VAT for example restaurant services (Copenhagen Economics, 2007, pp.23-26).

It is more likely that a VAT reduction would decrease the structural unemployment if the country were characterised by high unemployment benefits, high replacement rates and high minimum wages. This will lead to a situation where the unemployment rate is more rigid for low-skilled workers than for high-skilled workers. If this is not the case, there is a risk that job creation made in the sector with the lowered VAT will cause unemployment in a similar sector not having experienced any VAT reduction. The five countries in EU with the highest market rigidities are Portugal, France, Germany, Sweden and Finland. If the replacement rates are high, close to 90%, it is more likely that the VAT cut will affect the structural unemployment than if it is for example 60% (Copenhagen Economics, 2007, p.27).

If there is no effect on the structural unemployment, there is instead a risk of the VAT reduction leading to wage inflation. However, it is more likely that the VAT cut affect the structural unemployment if the sector consists of a high degree of low-skilled workers and the sector not being exposed to foreign competition (Copenhagen Economics, 2007, p.28).

A way of increasing the employment rate in the sector is to increase the demand for restaurant visits in the wake of the reduction in VAT. A study on Finland, having reduced their VAT for the restaurant sector in July 2010 from 22% to 13%, shows that the prices in the restaurant sector in general decreased with 2% (Harju&Kosonen, 2011, p.1).

3.2 Earlier Research

The VAT in Finland was reduced from 22% to 13% in July 2010, and there has been studies examining how this affected the prices. The prices decreased on average with 2.1%, however, if the reduction would have full pass-through to the final consumers, the price would have fallen by 7.4% (Harju & Kosonen, 2011, p.12).

On the first of July 2009, France reduced their VAT for restaurants from 19.6% to 5.5%. Prior to that date, the restaurant sector was imposed the general VAT at 19.6%, while take away services were taxed with the lower VAT rate of 5.5%. The purpose with the VAT reduction was partly to eliminate the distortion between take away and restaurant services, but this could have been made by increasing the VAT on take away services or to impose a medium VAT level on both sectors. However, the intention with the reduction of VAT on restaurant services to the same low level as take away services was also to increase employment in the restaurant sector. Prices were assumed to decrease by 7.5% for full pass-through, but one year after the VAT reduction they have only decreased by 2.5%. During 2010, employment in the France restaurant sector increased by 30,000 workers. However, the French economy as whole has started to recover from the financial crisis, but if the restaurant sector had followed the same trend as other sectors in France, the increase in employment without the VAT reduction would have been 10,000 (HOUEL, 2010, pp.1-4).

There has also been a study examining a similar case, namely how the Italian economy would be affected if the VAT rate for hotel and restaurants would be reduced from 10% to 5%. The study especially examines how the tourism in Italy would be affected, and conclude that the hotel nights would increase by 3.15% and total tourism consumption would increase by 4.4% (Manente & Zanette, 2010, pp. 421-422).

4. Data and Empirical Method

4.1 Data

There exist no data for 2012 on how many employed there are in the restaurant sector in Sweden. However, the assumed increase in employment due to the VAT reduction for

restaurant services should also be observed in the total employment number, and employment data is available for year the 2012. Therefore the total employment will be used as the dependent variable and it will be compared to changes depending on how large the restaurant sector is. To be able to examine if there has been any difference in employment due to the VAT reduction, regions in Sweden will be divided into different groups depending on the size of the restaurant sector. Average income will also be added to the regression to capture economic fluctuation over time. Data over average income does not exist for 2012 at present time, however, it is likely to assume that the average income will have a lagged effect on employment, and therefore this variable will be lagged one year. The data has been downloaded from Statistics Sweden, SCB.

The Swedish regions, län, have been used for this examination. Statistics for the employment as well as the population in Sweden as a whole has been obtained for every region and quarter starting from the second quarter of 2005 to the fourth quarter of 2012. Data on the average income has been obtained starting from the second quarter of 2005 to the fourth quarter of 2011. Data for the employment in the restaurant sector for each region has been obtained from the first quarter of 2008 to the fourth quarter of 2011. The regions have then been divided into three different groups depending on how large the restaurant sector is in the region; that is, how many being employed in the sector compared to the total employment in the region. Regions with a restaurant sector employing more than 2.9% of the employed inhabitants formed one group, as did those with an employment rate in the restaurant sector of 2.5% to 2.9% and those with less than 2.5% formed the final group. This classification lead to the first group containing six regions characterised by having a much higher employment rate in the restaurant sector than the other Swedish regions. These six regions are Stockholm, Gotland, Västra Götaland, Dalarna, Jämtland and Norrbotten. The main idea is to see if there have been differences in the employment trends, after the change in VAT, between these groups that can be associated to the size of the restaurant sector. The group combination for all the three groups is shown in Table 1 below.

Table 1

Group 1	Group 2	Group 3
Stockholm	Östergötland	Uppsala
Gotland	Kalmar	Södermanland
Västra Götaland	Skåne	Jönköping
Dalarna	Halland	Kronoberg
Jämtland	Värmland	Blekinge
Norrbottn	Örebro	Västmanland
	Gävleborg	Västernorrland
		Västerbotten

4.2 Empirical Method

The approach being used to examine the effect of the VAT reduction on the employment in Swedish regions is a type of difference-in-difference method. In an ordinary difference-in-difference method, a treatment group that is exposed for “treatment” is compared with a non-treatment group that is not exposed for a certain “treatment”. The groups are being observed during two time periods, before and after “treatment”. In this case all groups are being exposed by the treatment, however, the difference in the size of the restaurant sector makes the effect of the VAT reduction to differ.

The difference-in-difference method is commonly used in economic research in the case of a natural experiment. A natural experiment arises when there is some policy change that affects some groups and leaves other unaffected, or if implementation occurs on different occasion depending on the location (Verbeek, 2012, p.381).

Aggregate county data is used and a fixed effect panel data model. This will make it possible to separate a variation in one region or a group of regions, from the others (Verbeek, 2012, p.373).

The panel data regression is performed as a fixed effect model. In this approach an individual specific intercept is added that is constant over time. This fixed effect capture all unobserved individual variations that are fixed over time (Verbeek, 2012, p.374).

It is also appropriate to use a fixed effect model if the sample is not random, which it is not in this case when the sample contains all the regions in Sweden. Based on econometric theory of the samples’ characteristic, the fixed effect model is the most appropriate in this analysis.

With the difference-in-difference approach the model can be written as:

$$emp_{it} = \alpha_i + \mu_t + \delta_1 r1_{it} + \delta_2 r2_{it} + \delta_3 r3_{it} + \beta inc_{it-1} + \mu_{it} \quad (1)$$

Where $r1_{it} = 1$ if the region has a restaurant sector that employs more than 2.9% of the total employed in the region for the period after the fourth quarter 2011, and 0 otherwise. The dummy variable $r2=1$ if the region has an employment rate in the restaurant sector between 2.5% and 2.9% for the period after the fourth quarter 2011, and 0 otherwise. The last dummy variable $r3=1$ if the employment rate in the sector is lower than 2.5% for the period after the fourth quarter 2011, and 0 otherwise. The variable inc is the log average income for each region. The intercept variable α_i , is the county intercept that is constant over time and different between counties. The variable μ_t is the time specific fixed effect, and μ_{it} is the error term that is independent and identically distributed, (IID) (Verbeek, 2012, p.380).

If we would consider the case that there were only two time periods, then $r_{i1} = 0$ for all individuals and $r_{i2} = 1$ for some of the regions.

The difference-in-difference estimate does first take the difference in time and then the difference between the two groups. The first difference handles unobserved individual fixed effects that are constant over time. The second difference takes care of the difference between the two groups. It is necessary that the time specific variable μ_t is assumed to be the same for all individuals (Verbeek, 2012, p.380).

This model requires that the error term μ_{it} is uncorrelated over individuals and time and that all the correlation between is captured by α_i . However, the presence of autocorrelation in the error term does affect the efficiency of the model. The way that this problem will be taken into account is by applying an alternative variant of the Newey-West robust standard errors, in this case, cluster robust covariance matrix (Verbeek, 2012, 390).

5. Analysis

The regression of the panel data model displays the result shown in Table 2 below. The three groups that were grouped based on how large share of the total employed workers that worked in the restaurant sector all shows a negative coefficient. This is not unlikely because the Swedish economy has been downward sloping the past years due to the

global financial crisis. Notably, however, the group with the highest employment rate in the restaurant sector has a less negative coefficient than the other groups having a minor employment rate in the restaurant sector. The first group has a coefficient on -0.0007, while the other two groups show a coefficient on -0.0009. The interpretation of this result could be that regions with a higher employment rate in the restaurant sector have seen a 0.02% less decrease of the employment. Thus, regions having a larger share of their inhabitants in the restaurant sector should theoretically show a smaller decrease due to the VAT reduction in comparison with other regions. All of the three groups in Model 1 are significant on a ten per cent level, but the inc variable is insignificant.

Table 2

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Group 1	-0.0007*	-0.0007*	-0.0005	-0.0006	-0.0007*
Group 2	-0.0009*	-0.0008*	-0.0009	-0.0009*	-0.0008*
Group 3	-0.0009*	-0.0008	-0.0009	-0.0009*	-0.0008
inc	0.0194	0.0195	0.0206	0.0222	0.0194
N	567	567	567	567	567
R ²	0.2757	0.2642	0.2876	0.2817	0.2644

Significance level: ***=1% **=5% *=10%

Models based on other group constructions were also tested. Model 2 has a first group containing regions with an employment rate in the restaurant sector above 2.7%, a second group with the interval of 2.7% - 2.4% and a third group with the regions with less than 2.4%. In Model 3 the first group with the highest employment rate in the restaurant sector, contains regions with an employment rate above 3.5%. The regions in the second group have an employment rate in the interval of 3.5% to 2.5%, and the third contains regions with an employment rate below 2.5%. Model 4 has a group composition where the first group contains regions with an employment rate above 3.0%, the second group covers the regions in the interval 3.0% - 2.4% and the final group contains those regions with an employment rate less than 2.4%. In the final regression, Model 5, the first group contains those regions that have more than 2.7% of the total employment in the restaurant sector, and the second group covers the interval 2.7% - 2.3%, the final group contains those regions with less than 2.3%.

In Model 2 and Model 5, it is only the first and the second group that are significant on a ten per cent level. The third group and the inc variable are insignificant. In Model 4, the second and the third group are significant on a ten per cent significance level and the first group and the inc variable are insignificant. In Model 3 none of the variables are significant.

The reason why the model is so sensitive for changes in the group composition is probably because there are so few observations. For example in Model 3 where the first group contains regions with an employment rate in the restaurant sector above 3.5%, there are only three groups in this model.

Thus, in Model 1 it is possible to conclude that regions with a higher employment rate in the restaurant sector experience a lower decrease in the total employment rate during a recession.

If we calculate how many that is employed on average in the regions during a quarter 2012, we get a number of 221,766.7 workers. If we multiply this by 0.0002, it gives us the number 44.4. That would mean that on average 44 workers per quarter would be employed in these regions with high employment rate in the restaurant sector owing to the VAT reduction.

Even if the other models are not significant, it is possible to conclude that the difference between the first and the two other groups varies between 0.01% and 0.04%. Translated into jobs this would be between 22 and 89 work opportunities per quarter.

The R^2 values is relatively small, which is not that unusual in a panel data model, however, the risk maintains that there may be some variable missing that can help explaining the model.

6. Conclusion

The Swedish VAT rate was reduced on the first of January 2012 with the purpose of lowering the unemployment rate. According to theory, Sweden has the characteristic needed for a for a VAT reduction to generate a positive effect on the employment rate. Those characteristics are high unemployment benefits, high replacement rates and high minimum wages. The restaurant sector in Sweden is characterised by being an industry employing low-skilled workers and with a relatively high price elasticity, which are good conditions for a VAT reduction to make a difference. According to the optimal tax

theorem goods and services with high price elasticity should be taxed less intensive than those with low price elasticity.

Finland and France are two other European countries that have reduced the VAT for restaurant services. Studies from these countries shows that there is a downward effect on prices and unemployment rates due to the VAT reduction.

A fixed effect panel data analysis was performed to evaluate if there has been any changes in the Swedish employment rate due to the VAT reduction in 2012. Data over the employment rate in the restaurant sector is not available for 2012. However, the change in employment rate in the restaurant sector will be visible in the data over total employment rate. Thus the total employment rate has been used as the dependent variable and correlated against groups of Swedish regions. The groups are classified depending on how large share of total employees that are working in the restaurant sector.

It is clear that the first group that contains regions with an employment rate in the restaurant sector above 2.9% has been less affected by the recession than the other two groups that contain regions in the interval 2.5% - 2.9% and less than 2.5%. The difference between the first and the two other groups is 0.02%, which corresponds to 44 jobs on average per quarter for each region.

Thus, it is clear that regions with a high employment rate in the restaurant sector, has been less affected by the recession. It is likely that this is an effect of the VAT reduction. However, it is still too early to determine that this is the only reason. It is also unclear whether the effect will be larger or smaller and if the effect will persist in the long run.

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