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Employment effects of the EU temporary and agency workers directive in Sweden

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This paper analyses possible effects on total employment, and the distribution between agency work and regular contracts as a consequence of the Swedish implementation of the EU Temporary and Agency Workers Directive in a dual labour market Mortensen-Pissarides search model. The directive states that the basic working and employment conditions for agency workers should be equal to those for a comparable employee at the client firm, and that all parties should actively facilitate the transition from agency employment to employment directly at the client firm. Even though the results suggest a negative net effect on total employment, the implementation is shown to have a positive impact on overall welfare, and that an increased transition probability from the agency sector into regular employment would contribute even more.

JEL classification: E24, J21, J42, J48, J64, K31

Keywords: Labour law, EU directive implementation, temporary agency work, unemployment

1 Introduction

Legislation at the Swedish national level and at the European level has aimed at strengthening the position of atypical employees; such as part-time and fixed-term employees, by enforcing principles of equal treatment with regard to the wages and working conditions that apply to their co-workers on open-ended contracts. However, labour legislation and collective agreements regularly presuppose that the worker is an employee at the firm for which the actual work is carried out.

The relationship between the worker and the temporary work agency (TWA) is an employment agreement, and thereby regulated by specific labour laws and collective agreements (when applicable), whereas the partnership between the TWA and the client firm is, on the other hand, regulated by contract law. The client firm will nevertheless continuously manage the leased worker, and the worker is obliged to carry out the assigned tasks for the client firm.

The tripartite relationship between the worker, the client firm and the TWA therefore implies that some provisions that only apply between the employer and the employee do not become applicable between the client firm and a worker leased from a TWA. This has resulted in the situation that workers performing the same tasks at the same workplace could have very different working conditions and wages depending on whether they are direct hires or rented workers from a TWA (cf. Forde & Slater, 2005; Håkansson, Isaksson & Strauss-Raats, 2013). The absence of minimum wage laws and opportunities to deviate from employment norms through collective agreements may have strengthened these aspects even further (Jahn & Bentzen, 2012; Håkansson & Isidorsson, 2014).
The EU Temporary and Agency Workers Directive (2008/104/EC, hereafter referred to as “the directive”) is intended to entitle agency workers to the same wages and working conditions (including specific rules on working time, resting periods, annual leave and paid holidays etc.) as those for workers employed directly by the client firm – thereby including the agency workers in the appropriate frame of reference. The directive also emphasises the role of agency work as a stepping stone into regular employment by not only passively encouraging client firms to hire agency workers on regular contracts, but also actively prohibiting any and all measures taken to hinder such transitions.

The directive is a piece of the harmonised legislation within the European Union enforced to prevent social dumping. The directive and previously implemented similar legislation aim at removing incentives for member states to engage in a race-to-the-bottom by successively lowering the standards for workers in order to attract firms. This is meant to ultimately ensure the members of the European Union a higher standard of living and an improved quality of life. The directive was agreed upon in late 2008 and the member states were given until the end of 2011 to implement the directive into the legal framework of each member state. However, the Swedish government did not issue its proposal to the Swedish parliament until the autumn of 2012\(^2\) with the implementation being enforced as of January 1st 2013.

The Swedish implementation utilises the provision to allow exemptions from the principle of equal treatment; both through collective agreements and for TWA workers on open-ended contracts who recieve wages between assignments. However, as the first type of exemptions are only allowed as long as they still ensure the exempt workers the intended objectives of the directive (2008/104/EG: Section 5.3), this will have little impact on the modelling approach. The preparatory documents of the national implementation suggest that workers on open-ended contracts where neither the TWA nor the client firm has signed a collective agreement carry the biggest risk of non-compliant terms. For those workers, the normative effect of Swedish collective agreements is argued to nevertheless provide a sufficient level of protection. (SOU 2011:5)

This paper adds to the existing literature by examining the effects on total unemployment following the implementation of the directive in Sweden, as well as the distribution between regular employment and agency employment. The chosen method is numerical simulations based on a general equilibrium model calibrated to the Swedish economy. Previous studies have also used similar methodologies to analyse the interplay between labour market sectors in general (Krause & Lubik, 2007), and the agency sector in particular (Neugart & Storrie, 2006; Baumann et al., 2011).

The theoretical model is similar to the one outlined by Neugart & Storrie (2006), but is also based on an extension of the Mortensen-Pissarides search model with frictions utilised in the KIMOD model of the Swedish economy developed by the Swedish National Institute of Economic Research (NIER)\(^3\). The extension separates the agency sector, defined as any employment through a TWA with the purpose of being rented out to a client firm, from the regular sector, defined as any employment outside of the agency sector\(^4\).

The paper will also explore the effects of an increase in the relative search efficiency from the agency sector towards the regular labour market following the implementation, as the directive explicitly states that all parties should actively facilitate the transition of agency workers into regular employment. The model therefore allows for on-the-job search in the agency sector; implying that a vacant position in the regular sector could be filled with either an unemployed individual or an agency worker. That workers accept agency employment not only as an alternative to unemployment, but also as a way of obtaining regular employment is well established (see e.g. Tijdens et al., 2006; Spermann, 2011; Hveem, 2013).

The paper is organised as follows; the remainder of this section describes the difference between agency work and employment in the regular labour market sector. Section 2 outlines the theoretical model. Section 3 calibrates the model to the Swedish framework prior to the implementation of the directive, before exploring the effects of the implementation through the new equilibrium assumptions. The final section summarises and concludes the paper with a discussion.

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\(^3\)NIER is a government agency financed mainly through the Ministry of Finance. Their main objective is to conduct research, perform analyses of, and forecasts about the Swedish economy. The labour market part of the KIMOD model is described extensively by Lindén (2004).

\(^4\)Several other types of atypical employments directly at the client firm, regulated through 5-6 §§ in the Employment Protection Act (SFS 1980:82, cit EPA), are thereby defined as belonging to the regular sector. This is consistent with the aforementioned directives ensuring equal wages and working conditions for fixed-term and part-time employees compared to employees on open-ended contracts.
1.1 Temporary Agency Work in Sweden and the EU

Providing labour through a TWA, or even running private employment agencies or services, was largely prohibited in Sweden for a long period of time (1942-1993). The Swedish temporary agency sector has since then grown steadily (Andersson-Joona & Wadensjö, 2010; Hveem, 2013). The rationales for utilising TWAs to supply parts of the labour force has been surveyed by Tijdens et al. (2006), Andersson-Joona & Wadensjö (2010), and Spermann (2011). Some rationales relate to the possibility of screening the productivity of the worker, while other arguments relate to the associated costs of advertising, interviewing and recruiting personnel which could be feasible given an underlying long-term employment commitment, but might prove inhibitive if the expected duration of the employment is too short.

Obtaining labour through a TWA could be seen as division of labour where the TWA specialises in producing matches, and the client firm specialises in producing goods or services. However, the potentially differing incentives of the TWA and the client firm could result in differences in what the client firm would optimally want and the type of worker that will be supplied (cf. the argumentation in Walter, 2012; Westéus & Raattamaa, 2014).

The main reason put forward in the literature is nevertheless that the TWA is assumed to produce a match for a posted vacancy faster than going through traditional mediation services.

The client firms are also suggested to hedge against shocks during times of recovery by re-stocking their workforce with agency workers through a TWA, rather than risk being stuck with regularly employed workers should there be another shock to the market. (see the referenced studies in Andersson-Joona & Wadensjö, 2010; and also Forde & Slater, 2005; Jahn & Bentzen, 2012). Heywood et al. (2011) find that firms that can easily influence the effort of their workers utilise TWA workers to a lesser extent.

Similarly, Thommes & Weiland (2010) find that firms with a relatively stable demand for the produced goods utilise temporary labour to much a lesser extent than firms with higher demand volatility. The authors also find that firms that are going through large personnel restructuring make use of temporary workers to a larger extent. Salvatori (2009) also states that agency workers are sometimes viewed by the labour unions as a buffer for the core of workers with open-ended contracts and that this approach to personnel management creates a relatively high labour turnover rate. This suggests that the cost associated with the dismissal of an agency worker is arguably lower than for a worker in the regular sector.

Even though there is no readily available data on the fee charged by the TWA to the client firm, the relative wage paid to the worker has been shown to be less than one. Andersson-Joona & Wadensjö (2010 & 2012) find that there is a significant wage penalty for workers within the Swedish agency sector compared to workers on the regular market. The wage differential has also been growing over time and is persistent even when controlling for individual characteristics and certain types of jobs.

Jahn (2010) finds a negative wage difference for temporary workers in Germany (controlling for personal characteristics and individual specific fixed effects), however the gap becomes smaller with seniority within the agency sector (Jahn & Pozzoli, 2013). Böheim & Cardoso (2009) find a similar wage difference in Portugal, and so do also Forde & Slater (2005) in the U.K. (cf also. Spermann, 2011; Tijdens et al., 2006) Nienhüser & Matiaske (2006) even find that wage differences exist regardless of national statutes requiring equal treatment of agency workers.

The directive also focuses on the relative working conditions in the two sectors. Fabiano et al. (2008) find that workers employed through a TWA in Italy suffer work related injuries to a larger extent than regular employees with comparable tasks, and that they are absent from work for longer periods of time. Their quantitative analysis is complemented by a case study that also suggests substantial negative differences with regard to the working conditions. Similar findings are also reported by Tijdens et al. (2006) and Håkansson, Isaksson & Strauss-Raats (2013).

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5TWAs were allowed through a licensing system in 1991, however private mediation of workers did not become fully available until 1993 with the amendment that the mediation agency was not allowed to charge the (prospective) worker any fee for the mediation service (SOU 2011:5; based on a provision from ILO, 1933, and implemented through The Private Employment Agencies and Temporary Labour Act; SFS 1993:440).


7The concept of wage also includes different types of non-monetary remuneration. The implied principle of equal treatment in the directive therefore also includes access to staff areas, health club memberships, paid annual leave, and other benefits.
Holst et al. (2008), Jahn & Pozzoli (2013), and Håkansson & Isidorsson (2014) even suggest that agency workers could sometimes be regarded as a type of second-tier worker since they are performing the same tasks as workers with regular employment for only a fraction of the wage. These differences for agency workers compared to workers on other types of contracts are some of the reasons why a strengthening of the position of the agency workers throughout the European Union was deemed necessary. This should also be seen in light of the preceding legislative harmonisation which had already strengthened the position for fixed-term and part-time workers.

2 Theoretical model

The theoretical model is an extension of the dynamic general equilibrium labour market section of NIER’s KIMOD model used for macroeconomic medium term forecasts. At any (discrete) point in time (t) the total labour force (N_t) is defined as either being employed in sector j or unemployed (U). The model is augmented to differentiate between employment in either the regular sector (j = E) or in the agency sector (j = A), with the relative number of workers in either state written as:

\[ u_t = \frac{U_t}{N_t} \quad e_t = \frac{E_t}{N_t} \quad a_t = \frac{A_t}{N_t} \] (1)

Employment dynamics

This model allows for on-the-job search for a regular job while employed in the agency state. A vacancy in the regular sector can therefore be filled with either an unemployed worker or an agency worker, whereas vacancies in the agency sector are assumed to only match with unemployed individuals. These dynamics follow the assumptions in Neugart & Storrie (2006) and Baumann et al. (2011), and that workers generally seek to transition from agency employment into the regular sector (Tijdens et al., 2006; Spermann, 2011; Hveem, 2013).

Matching between a vacant job in each state and a job searcher is assumed to take place according to a state specific matching function, \( X^j_t = f \left( x^j, V^j_t, S^j_t \right) = x^j \cdot \left( V^j_t \right)^\eta \cdot \left( S^j_t \right)^{1-\eta} \), where \( x^j \) is the sector specific baseline matching efficiency and \( V^j_t \) is the number of vacancies in sector j.

The search intensity function \( S^j_t \) in the regular sector becomes \( S^E_t = u_t + \delta^A \cdot a_t \) since both unemployed workers and those employed in the agency sector may apply for these jobs. The \( \delta^A \)-parameter depicts the relative search effectiveness for those employed in the agency sector relative to unemployed individuals. Similarly, the search intensity function for the agency sector becomes \( S^A_t = u_t \).

Expressing the rate at which vacancies are being filled in terms of the sector specific labour market tightness (defined as the number of vacancies per job searcher; \( \theta^j_t = V^j_t/S^j_t \)) yields:

\[ \frac{X^E_t}{V^E_t} = f \left( x^E_0, 1, \frac{1}{\theta^E_t} \right) = x^E_0 \cdot \left( \theta^E_t \right)^{\eta-1} = q \left( \theta^E_t \right) \]

\[ \frac{X^A_t}{V^A_t} = f \left( x^A_0, 1, \frac{1}{\theta^A_t} \right) = x^A_0 \cdot \left( \theta^A_t \right)^{\eta-1} = q \left( \theta^A_t \right) \]

The rate at which unemployed individuals find a new job in the regular sector and the agency sector becomes:

\[ \frac{X^E_t}{S^E_t} = f \left( x^E_0, 1, \theta^E_t \right) = x^E_0 \cdot \left( \theta^E_t \right)^\eta = \alpha \left( \theta^E_t \right) \]

\[ \frac{X^A_t}{S^A_t} = f \left( x^A_0, 1, \theta^A_t \right) = x^A_0 \cdot \left( \theta^A_t \right)^\eta = \alpha \left( \theta^A_t \right) \]
Between each time period, the labour force grows with a rate of \( n_t \); \( N_t = n_t \cdot N_{t-1} \). It is also assumed that only a proportion \( (\pi_t < 1) \) of the labour force remains into the next period, which implies that \( (1 - \pi_t) \) \( N_{t-1} \) exit either state of employment and unemployment proportionally. This makes the number of workers entering the labour market as unemployed at the beginning of each period \( (n_t - \pi_t)N_{t-1} \).

A job in either sector is hit by an exogenous shock with probability \( \lambda^j \) which renders the job unproductive and transitions the worker into unemployment. The number of unemployed workers and workers in each state of employment at any point in time can thereby be written as:

\[
U_t = \pi_t \cdot U_{t-1} + (n_t - \pi_t) N_{t-1} + \lambda^E \cdot E_t - \alpha (\theta^E_t) U_t + \lambda^A \cdot A_t - q (\theta^A_t) V^A_t \\
E_t = \pi_t \cdot E_{t-1} - \lambda^E \cdot E_t + q (\theta^E_t) V^E_t \\
A_t = \pi_t \cdot A_{t-1} - [\lambda^A + \delta^A \cdot \alpha (\theta^E_t)] A_t + q (\theta^A_t) V^A_t
\]  

The number of unemployed workers (2) are those still unemployed from the previous period that have not left the labour force in addition to the net inflow of new workers and those entering, or leaving, either type of employment. The number of workers with regular employment (3) includes those remaining from the previous period, reduced by those that have transitioned into unemployment, and increased by the number of matches to any posted vacancies.

The number of workers in the agency sector (4) is interpreted similarly but here the outflow may occur in two directions; either into regular employment or into unemployment. Inflow comes solely from the pool of unemployed workers.

The relative number of employed and unemployed workers in steady-state is solved for in Appendix A.1 by using (1) in expressions (2) through (4) together with the growth rate of the labour force.

\[
u = \frac{n}{n[1 + \lambda^E \cdot e + \lambda^A (1 - e)] - \pi} \cdot \pi \\
e = \frac{n \cdot \alpha (\theta^E) [u + \delta^A (1 - u)]}{n (1 + \lambda^E + \delta^A \cdot \alpha (\theta^E)) - \pi} \\
a = 1 - u - e
\]

The Client Firm and the TWA

The economy is assumed to consist of many identical competitive firms producing a homogenous good according to a sector specific production function, \( Y_{t,1} \), under constant returns to scale. Each job within a firm may be either vacant (\( V \)) or filled (\( F \)) by a worker from either the regular sector or the agency sector. A firm with a vacancy in the regular sector suffers a search cost \( \gamma^E \) (proportional to the wage). The position becomes filled in the next period with probability \( q (\theta^E_t) \), and remains vacant with probability \( 1 - q (\theta^E_t) \) which determines the value function of a vacancy in the regular sector:

\[
\Lambda^{V,E}_t = \frac{-\gamma^E (1 + r^c_t) W_t}{P^Y_t} + \left[ q (\theta^E_t) \right] \Lambda^{F,E}_{t+1} + \left[ 1 - q (\theta^E_t) \right] \Lambda^{V,E}_{t+1}
\]

where \( r_t \) is the producer price real interest rate defined by Lindén (2004) as \((1 + r_t) = (1 + R_t) \cdot P^Y_{t} / P^Y_{t+1}\); i.e. the nominal interest rate \( R_t \) adjusted for any changes in the relative price of the produced good, \( P^Y_t \).

A firm with a filled job in the regular sector earns the marginal product of labour, \( Y_{E,t} \), for which the firm pays the prevailing wage and an additional employer tax, \( \tau^c \).
In the upcoming period, the firm expects the worker to remain in the workforce with probability $\pi_t$. Of those workers, the firm expects to lose a certain fraction ($\lambda^{F^E}_t$) due to the job becoming unproductive as a consequence of an exogenous shock, in which case the firm is liable to pay the worker a wage-proportional severance payment; $\delta^S$.

The value for the firm of a filled job in the regular sector thereby becomes:

$$\Lambda_{t+1}^{F,E} = \left( Y_{E,t} - \left\{ \frac{(1+\pi_t)\lambda^{E^F}_t\delta^S}{F_t^E}(1+\tau_t)w_t \right\} \right) + \left[ \frac{\pi_t(1-\lambda^{E^F}_t)}{1+r_t} \right] \Lambda_{t+1}^{F,E} + \left[ \frac{1-\pi_t(1-\lambda^{E^F}_t)}{1+r_t} \right] \Lambda_{t+1}^{V,E} \quad (9)$$

The firm also has the option of opening a vacancy in the agency sector. Doing so incurs different costs and has different dynamics than in the regular sector. Each period a firm with a vacant job in the agency sector does not manage to find a matching worker, it suffers a cost ($\gamma_{FIRM}^A > 0$) proportional to the cost of renting an agency worker. The firm expects the position to become filled in the next period with probability $q(\theta^A_t)$ through which the value of a vacancy to be filled with an agency worker can be expressed as:

$$\Lambda_{t+1}^{V,A} = \frac{-\gamma_{FIRM}^A}{P_t^E} \left( \delta^{TW_A}(1+\tau_t)w_t \right) + \left[ \frac{q(\theta^A_t)}{1+r_t} \right] \Lambda_{t+1}^{F,A} + \left[ \frac{1-q(\theta^A_t)}{1+r_t} \right] \Lambda_{t+1}^{V,A} \quad (10)$$

An agency worker will work at the marginal productivity in that sector for which the client firm will pay the TWA a fee that is proportional, $\delta^{TW_A}$, to the wage in the regular sector. The client firm expects a job in the agency sector to remain filled in the next period with probability $\pi_t (1 - \lambda^A_t) (1 - \delta^A \cdot \alpha (\theta^F_t))$; which is the number of agency workers who have remained in the workforce ($\pi_t$), that have not suffered an exogenous shock ($1 - \lambda^A_t$) and have not found a job in the regular sector ($1 - \delta^A \cdot \alpha (\theta^F_t)$). The value for the client firm of a filled job in the agency sector thereby becomes:

$$\Lambda_{t+1}^{F,A} = \left( Y_{A,t} - \frac{\delta^{TW_A}(1+\tau_t)w_t}{F_t^A}(1+\tau_t) \right) + \left[ \frac{\pi_t(1-\lambda^A_t)(1-\delta^A \cdot \alpha (\theta^F_t))}{1+r_t} \right] \Lambda_{t+1}^{F,A} + \left[ \frac{1-\pi_t(1-\lambda^A_t)(1-\delta^A \cdot \alpha (\theta^F_t))}{1+r_t} \right] \Lambda_{t+1}^{V,A} \quad (11)$$

Following Neugart & Storrie (2006) and Baumann et al. (2011), the steady-state value of $\delta^{TW_A}$ is determined so that the client firm becomes indifferent between hiring and renting the worker (where $w = (1+\tau)w/p^E$ is an abbreviation for the real wage paid by the firm). The rationale for this assumption is discussed more thoroughly below.

$$\delta^{TW_A} = \frac{\frac{q(\theta^A_t)}{q(\theta^E_t)} \left[ \left( Y_{A} - Y_{E} \right) + (1 + \pi \cdot \lambda^{E^F} \cdot \delta^S)w + (\pi \cdot \gamma^E) (1 - \lambda^{E^F})w \right]}{\left( \frac{q(\theta^A_t)}{q(\theta^E_t)} \frac{(1 - \lambda^A)}{\left( 1 - \delta^A \cdot \alpha (\theta^E) \right)} \right) w} \quad (12)$$

While it is the client firm that has the explicit demand for the agency worker, it will be the TWA that determines the supply (and thereby the demand from the pool of unemployed workers) given the costs and revenues of the TWA. The TWA suffers a search cost when having a vacant position in the agency sector, $\gamma_{TW_A}^A$ and the vacancy is expected to be filled with probability $q(\theta^A_t)$.

Filling a vacancy implies renting the worker to a client firm – however this does not earn the TWA any production revenues in the regular sense. The profit for the TWA comes from the difference between the fee charged to the client firm and the wage paid to the worker. The wage paid to the agency worker is expressed as a proportion, $\delta^w$, of the wage earned by a worker in the regular sector. The value of an open vacancy, and a filled job, for the TWA becomes:

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8Garibaldi & Violante (2005) find that the largest cost when downsizing the labour force is severance payments. Neugart & Storrie (2006), Baumann et al. (2011) and Baumann (2012) similarly model employment protection as a cost imposed on terminating an unproductive job. Severance payments could relate to decreased productivity during the dismissal notice period (11 § EPA), or even a (preemptive) settlement offer which at least indirectly relates to an expectation of the economic, punitive (38 § EPA) and normative damages (39 § EPA) that the employer might be liable for (cf. SOU 2012:62).

9The client firm is never liable for any severance payment when a job in the agency state is terminated because it is not the employer per definition, and any liability therefore rests with the TWA.
\[ \Lambda_{t}^{V,TWA} = -\frac{\delta_{t}^{\text{TWA}}(\delta^{\text{TWA}})_{t}(1+r_{t}^{c})w_{t}}{P_{t}^{c}} + \left[ q(\theta_{t}^{A}) \right]_{t} + \Lambda_{t+1}^{V,TWA} \]
\[ \Lambda_{t}^{E,TWA} = \frac{(\delta_{t}^{\text{TWA}} - \delta^{w})(1+r_{t}^{c})w_{t}}{P_{t}^{c}} + \left[ \pi_{t}(1-\lambda_{t}^{A})(1-\delta^{A} \cdot \alpha(\theta_{t}^{E})) \right]_{t} \Lambda_{t+1}^{E,TWA} + \left[ 1-\pi_{t}(1-\lambda_{t}^{A})(1-\delta^{A} \cdot \alpha(\theta_{t}^{E})) \right]_{t} \Lambda_{t}^{V,TWA} \]

The Worker

A worker in the regular sector earns the current wage which is subject to an income tax \( \tau_{t}^{w} \). All workers are assumed to purchase a consumption good at price \( P_{t}^{c} \), that is subject to a consumer tax, \( r_{t}^{c} \). As previously defined, any individual worker remains in the work force with probability \( \pi_{t} \). A fraction of the remaining workers, \( \lambda_{t}^{E} \), are hit by an adverse shock which transitions them into unemployment, but also awards the affected worker the wage proportional severance payment from the firm. The value function of a worker employed in the regular sector at time \( t \) becomes:

\[ \psi_{t}^{E} = \frac{(1+\pi_{t} \cdot \lambda_{t}^{E} \cdot \delta^{S})}{(1+r_{t}^{c})} \frac{P_{t}^{c}}{1+r_{t}^{c}} \]
\[ \left[ \frac{\pi_{t}(1-\lambda_{t}^{A})(1-\delta^{A} \cdot \alpha(\theta_{t}^{E}))}{1+r_{t}^{c}} \right] \psi_{t+1}^{E} + \left[ \frac{\pi_{t} \cdot \lambda_{t}^{E}}{1+r_{t}^{c}} \right] \psi_{t+1}^{U} \]

where \( r_{t}^{c} \), the consumer price real interest rate, is defined as \( 1 + r_{t}^{c} = (1 + R_{t}) \frac{1+r_{t}^{c}}{1+r_{t}^{c}} \cdot \frac{P_{t}^{c}}{P_{t+1}^{c}} \). A worker employed in the agency sector earns a wage that is proportional \( \delta^{w} \) to the wage in the regular sector. The agency worker is also subject to the same consumer and income taxes, and purchases the same consumption good for the same price as the regularly employed workers.

The agency worker also remains in the work force with the same probability, and transitions into unemployment due to an exogenous shock with the previously defined probability \( \lambda_{t}^{A} \), which in this case does not warrant a severance payment transfer to the agency worker. The agency worker is also expected to transition into regular employment with probability \( \delta^{A} \cdot \alpha(\theta_{t}^{E}) \).\(^{10}\) The value function of an agency worker thereby becomes:

\[ \psi_{t}^{A} = \frac{\delta^{w}(1+r_{t}^{c})w_{t}}{(1+r_{t}^{c})} + \left[ \frac{\pi_{t}(1-\lambda_{t}^{A})(\delta^{A} \cdot \alpha(\theta_{t}^{E}))}{1+r_{t}^{c}} \right] \psi_{t+1}^{E} + \left[ \frac{\pi_{t} \cdot \lambda_{t}^{A}}{1+r_{t}^{c}} \right] \psi_{t+1}^{U} \]

Finally, an unemployed worker earns wage-proportional unemployment benefits, \( \delta^{B} \), that are determined exogenously by the government. If the worker remains in the work force, he/she will expect to find employment in the regular sector with probability \( \alpha(\theta_{t}^{E}) \) or in the agency sector with probability \( \alpha(\theta_{t}^{A}) \). Consequently, if the worker remains in the work force in the next period he/she expects to remain unemployed with probability \( 1 - (\alpha(\theta_{t}^{E}) + \alpha(\theta_{t}^{A})) \). The value function of an unemployed worker can thereby be written as:

\[ \psi_{t}^{U} = \frac{\delta^{B}(1+r_{t}^{c})w_{t}}{(1+r_{t}^{c})} + \left[ \frac{\pi_{t} \cdot \alpha(\theta_{t}^{E})}{1+r_{t}^{c}} \right] \psi_{t+1}^{E} + \left[ \frac{\pi_{t} \cdot \alpha(\theta_{t}^{A})}{1+r_{t}^{c}} \right] \psi_{t+1}^{A} + \left[ \frac{\pi_{t}(1-\alpha(\theta_{t}^{E}) - \alpha(\theta_{t}^{A}))}{1+r_{t}^{c}} \right] \psi_{t+1}^{U} \]

\(^{10}\)As mentioned before, the TWA may not (legally) charge a prospective worker for the mediation service. An unemployed worker may therefore also not pay any sort of fee to become employed through the TWA and thereby enjoy any increased search-efficiency towards the coveted employment within the regular sector.
Wage Determination

The theoretical model in this paper assumes the same wage formation process as in Neugart & Storrie (2006) and Baumann et al. (2011) where wage negotiations are carried out between the firm and the labour union on behalf of the workers in the regular sector without any formal minimum wage limitations. This also follows the Swedish model of labour market relations and the Swedish wage setting framework where the labour unions and employer confederations negotiate collective agreements that regulate wages and working conditions. Non-union workers may also be regarded as being tied to the wage level set through the collective bargaining of the labour unions (SOU 2011:5).

That the labour union thereby also negotiates the wage level for non-members might seem counterintuitive as those workers are allowed to free-ride on the wage negotiations without paying any fees or contributing to the collective bargaining power of the labour unions. However, by making the employer pay the same wage for union members as for non-unionised workers the labour unions avoid a race-to-the-bottom where workers underbid each other for the sake of getting any wage at all.

It also removes the possibility of employers paying non-members a higher wage in order to influence workers to not join a labour union, or even influence existing members to quit. Furthermore, NIER (2011) suggests that having one sector establishing an accepted norm lowers the baseline unemployment rate, and also lowers the risk of other sectors using strategies that are non-optimal in the long run in order to obtain short-term gains.

Both the firm and the labour union determine the profit from a successful negotiation and the cost of not reaching an agreement and split the rent according to each party's relative bargaining strength, $\beta$. A successful agreement results in the job becoming filled by a worker in the regular sector. The fall-back option for the firm is to keep the position vacant and continue to search for a worker, whereas the fall-back for the worker is to remain unemployed and obtain unemployment benefits instead of the negotiated wage. The wage is thereby determined by maximising the weighted Nash product, $\Omega_t$, with regard to the wage:

$$\max_{\{W_t\}} \Omega_t = [\psi_t^E - \psi_t^U]^{\beta} \left[ \Lambda_t^{F,E} - \Lambda_t^{V,E} \right]^{1-\beta}$$

(18)

The negotiated wage, along with the demand for workers in the regular sector and the agency sector, determines the labour market tightness in the two sectors – which in turn determines the relative number of workers in each sector via expressions (5) through (7).

3 Equilibrium analysis

Previous studies utilising similar models that distinguish between employment in the regular sector and the agency sector have made the assumption that TWAs may unilaterally determine the agency worker's proportional wage parameter, $\delta^w$, and the mark-up charged by the TWA to supply an agency worker in the agency sector, $\delta^{TWA}$ (Neugart & Storrie, 2006; Baumann et al., 2011). The TWA is assumed to determine the wage paid to the agency worker so that the worker becomes indifferent to accepting agency employment or remaining unemployed; $\psi^A = \psi^U$, under the additional assumption that a worker will always accept an offer of (agency) employment over unemployment.

This assumption is justified by the relatively marginal position of the agency worker in the labour force and the low degree of unionisation within the sector (see Neugart & Storrie, 2006, referencing Storrie, 2002, and Dolado et al., 2000. Cf. also Forde & Slater, 2005). Holst et al. (2008) even suggest that agency workers are not seen as equal members by the labour unions. Håkansson & Isidorsson (2014) argues that union representation in the Swedish agency sector could be weaker than in the regular sector due to the composition of the temporary agency workforce (see Andersson-Joona & Wadensjö, 2008; Westëus & Lindgren, 2014).

---

11 In the Swedish framework (for most types of employment) it is more reasonable to attribute the bargaining power to the existence of labour unions rather than to the individual prospective worker. Any individual worker would have a negligible amount of bargaining power – especially given the assumed homogenous skills, homogenous tasks, lack of on-the-job training, and the existence of available substitute workers (Cahuc et al., 2006). For an extensive overview, interpretation and importance of the relative bargaining parameter, and the need to closely motivate the use of the Nash bargaining solution, see Binmore et al. (1986).

12 Appendix A.3 (before the legislation implementation) and Appendix A.4 (following the implementation) includes a complete derivation of the wage, both within and outside of steady state.
Sweden has a regressive unemployment benefit system; the size of the unemployment benefit is determined in relation to the previous wage, but also capped at a certain threshold. It also becomes successively lower with time, and rejecting a reasonable job-offer could potentially disqualify the worker from any subsequent unemployment benefits, which also justifies the $\psi^A = \psi^E$ simplification. This is therefore taken as the optimal strategy for the TWA prior to the implementation of the directive (the PRE-model).

The main aim of the directive is to raise the position of the agency worker to that of a worker employed in the regular sector with regard to the real wage (incl. working conditions etc.). The directive thereby restricts the compensation from the TWA to a level where the worker (at least) becomes indifferent to work in the regular sector and in the agency sector; $\psi^A \geq \psi^E$. The optimal choice for the TWA becomes to pay the least amount that fulfils this weak inequality, i.e. determining $\delta^w$ so that $\psi^A = \psi^E$. This becomes the central component of the POST-model following the implementation.

The directive also explicitly aims to facilitate the transition from agency work into regular employment by prohibiting any measures to hinder such transitions, either directly or indirectly, by the client firm or the TWA. The second part of the analysis will therefore be concerned with evaluating the effects on employment and overall welfare from an increase in the relative search efficiency parameter $\delta^A$ following the implementation.

The PRE-Model

The steady-state result from (18) gives the wage setting curve (WS) for the regular sector in wage/tightness space:

$$ w = \frac{\beta \cdot Y_E^E}{(1 + \pi \cdot \lambda^E \cdot \delta^S) - \pi \cdot \beta \cdot \gamma^E \cdot \theta^E} $$

(19)

Assuming that vacancies will be opened until all additional profits have been exhausted ($\Lambda^{V,E} = \Lambda^{V,A} = 0$), and rewriting the steady-state expression for the value of a filled job in the regular sector (9) in terms of the real wage yields the labour demand ($LD$) curve in wage/tightness space. The intersection of the $WS$-curve and the $LD$-curve gives the equilibrium regular sector labour market tightness:

$$ \theta^E = \frac{(1 - \beta)}{\beta} \cdot \frac{(1 + \pi \cdot \lambda^E \cdot \delta^S)}{\pi \cdot \gamma^E} - \frac{(1 + r) - \pi (1 - \lambda^E)}{\pi \cdot q(\theta^E)} $$

(20)

The proportion of the wage paid to the agency worker by the TWA is determined such that $\psi^A = \psi^U$:

$$ \delta^w = \frac{\delta^E \left[ (1 + r^E) - \pi \left( (1 - \lambda^E) - \delta^A \cdot \alpha^A (\theta^E) (1 - \lambda^A) \right) \right]}{(1 + r^E) - \pi \left[ (1 - \alpha^A (\theta^E) (1 - \lambda^A) \right]} + \frac{\pi \cdot \alpha^A (\theta^E) (1 + \pi \cdot \lambda^E \cdot \delta^S) (1 - \delta^A (1 - \lambda^A))}{(1 + r^E) - \pi (1 - \alpha^A (\theta^E) - \lambda^E)} $$

(21)

$\delta^w$ is thus a function of both the labour market tightness in the regular sector and the unemployment benefits. Following Neugart & Storrie (2006) and Baumann et al. (2011) the TWAs’ demand for workers is determined by (13) and (14) conditional on that $\Lambda^{V,TWA} = 0$. The demand for agency workers is shown to be a function of the tightness in the regular market (see Appendix A.3):

$$ q(\theta^A) = \gamma^A_TWA \cdot \delta^{TWA} \left[ \pi \left( (1 - \lambda^A) \left( 1 - \delta^A \cdot \alpha (\theta^E) \right) - (1 + r) \right) \right] $$

(22)

The POST-Model

The wage setting expression in the POST-model (23) solves similar to (19), with the difference that the expression now also contains $\theta^A$:

$$ w = \frac{\beta \cdot Y_E^E}{(1 + \pi \cdot \lambda^E \cdot \delta^S) - \pi \cdot \beta \cdot \gamma^E \left( \theta^E + \frac{\alpha(\theta^A)}{q(\theta^E)} \right)} $$

(23)

13The wage setting curve is upward sloping, whereas the demand for labour is downward sloping, in wage/tightness space.
The expression for $\delta^{TWA}$ is the same as in (12), this is also true for the firms’ demand for regular sector workers ($LD$) and the TWAs’ demand for workers (22). The relative wage paid to the agency worker following the implementation is now determined so that a worker values the agency sector equal to the regular sector ($\psi^A = \psi^E$). The agency workers’ proportional wage-parameter expression thereby becomes:

$$\delta^w = \frac{(1 + \pi \cdot \lambda^E \cdot \delta^S) - \pi \left(\lambda^E - \lambda^A\right) \left(1 + \pi \cdot \lambda^E \cdot \delta^S - \delta^H\right)}{(1 + \pi) - \pi \left(1 - \alpha \theta^E - \alpha \theta^A - \lambda^E\right)}$$

(24)

The PRE-model will solve sequentially given the set of calibration values for the exogenous variables, whereas the labour market tightness in the two states of the POST-model have to be solved simultaneously (since the expression for the equilibrium value of $\theta^E$ now also includes $\theta^A$). The wage proportional parameters $\delta^w$ and $\delta^{TWA}$ may be solved in sequence thereafter.

### 3.1 Results and Numerical Example

The PRE-model is initially calibrated with empirically relevant figures which are thereafter transferred into the POST-model to show the impact of the legislation implementation. There are three different taxes in the model. Both the wage tax ($\tau^w$) and employer tax ($\tau^e$) are calibrated at thirty percent (average levels in 2011) whereas the consumer tax ($\tau^c$) is set at the VAT-tax level of twenty-five percent. The relative price level between consumer and producer prices is determined so that the real wage paid by the firm equals the real wage obtained by the worker.

Similarly, the producer and consumer real interest rates will be set at the same level. The unemployment benefit-parameter follow the argumentation on the regressive benefit system and corresponds to half the wage rate. The workers relative bargaining power corresponds to the surveyed quantitative results in Lindén (1995). The model does not contain any effort-related transition probability or tenure increasing productivity, and it is therefore assumed that there are no differences in the productivity between the two sectors. The relative search efficiency parameter from the agency sector follows the empirical findings of Hveem (2013, cf. also Anderson & Wadensjö, 2004).

Previous studies have assumed that the advantage of the TWA lies in the baseline matching parameter. This paper assumes that the advantage rather lies in a lower search cost for the TWA. This assumption is based on the fact that the TWA focuses solely on producing matches (e.g. specialised recruitment channels and a register of prospective job searchers) and does not have to divert any production resources when matching a vacancy to a worker. Recruiting a worker in the regular sector is assumed to be the result of a steady increase in demand that warrants a long-term commitment which lowers the average recruitment cost. The need for additional agency workers is conversely determined on a short-term basis where similar recruitment costs might prove inhibitive due to the short expected period of employment (Jahn & Bentzen, 2012).

<table>
<thead>
<tr>
<th>Monthly Calibration Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival probability</td>
</tr>
<tr>
<td>Population growth</td>
</tr>
<tr>
<td>Interest rate</td>
</tr>
<tr>
<td>Worker’s share of the profit</td>
</tr>
<tr>
<td>Employer’s tax and wage tax</td>
</tr>
<tr>
<td>Consumer tax</td>
</tr>
<tr>
<td>Severance payments</td>
</tr>
<tr>
<td>Unemployment benefits</td>
</tr>
<tr>
<td>Matching elasticity</td>
</tr>
</tbody>
</table>
The exogenous shock rates are set so that the average duration of a job in the agency sector is only four months, while being much longer in the regular sector\(^{14}\)(cf. Forde & Slater, 2005). Severance payments are set equal to three months wages in the event of the worker being dismissed (cf. SOU 2012:62). The severance payment is not only made up of the purely monetary transfer that the employer could be obliged to pay the worker, but could also include other aspects such as lowered productivity during the dismissal notice period when a worker might not perform at the full productivity level.

The calibration values for the PRE-model coincide well with the empirical situation in Sweden. Unemployment levels in Sweden have varied between six and nine percent since 2001, and have remained stable at around eight percent since 2011. Official statistics suggest that the Swedish agency sector employed just below one and a half percent in 2012\(^{15}\).

However, a steady-state size for the agency sector of about two percent is not unreasonable since the sector is still growing. Transferring the baseline calibration values for the PRE-model into the POST-model will show the impact on unemployment and employment in either of the two sectors as a result of the implementation of the directive, ceteris paribus\(^{16}\).

The implementation of the directive will increase the average wage level through two effects; indirectly through the increase in the \(\delta_w\)-parameter, but also more directly due to agency employment becoming an alternative to regular employment, rather than an alternative to unemployment. The latter effect is the (slope-increasing) feedback between the agency sector and the regular sector that constitutes the difference in wage expression (23) relative to (19).

The increased slope of the \(WS\) curve, together with that the regular-sector labour demand expression does not change, implies that unemployment will rise as fewer individuals become employed in the regular sector. The increased number of unemployed workers will also reduce labour market tightness in both sectors as there are now more job seekers. The results are shown in Table 3.2.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|}
\hline
 & \(e\) & \(\Delta e\) & \(a\) & \(\Delta a\) & \(u\) & \(\Delta u\) \\
\hline
PRE-model & 90.00 % & 1.99 % & 8.01 % & & & \\
POST-model & 88.60 % & (-) & 2.11 % & (+) & 9.29 % & (+) \\
\hline
\end{tabular}
\caption{Table 3.2
Results}
\end{table}

The increased wage level will also reduce the value of a filled regular position for the firm, which also reduces the price the TWA is able to charge since the mark-up \(\delta_{TWA}\) is determined such that \(\Lambda_{F,E} = \Lambda_{F,A}\). This decrease in the price for supplying a worker together with the increase in the compensation paid to the agency worker reduces the rent of the TWA substantially. It is therefore an interesting result that the size of the agency sector is actually increasing.

The TWA will nevertheless still make some rent due to their cost advantages. This result is therefore mainly due to the lowered labour market tightness in the regular sector which also lowers the transition rate into the regular sector from the agency sector. The TWA is still willing to supply basically the same number of workers even after the implementation of the directive.

\(^{14}\)I claim that it is likely that the contracts in the agency sector constitute several sequential (short duration) assignments in order to achieve the sought-after flexibility. Even though OECD data suggests that the regular sector average employment duration is even longer (~10-12 years), the figures here allow for significantly longer durations than in Neugart & Storrie (2006) and Baumann et al. (2011).

\(^{15}\)Andersson-Joona & Wadensjö (2010) suggests that the official statistics could underestimate the full scope of the sector by not capturing e.g. seasonal variations etc.

\(^{16}\)There are two (real) roots that will satisfy (18) when \(\eta = 0.5\). However, the quantitative figures will only differ slightly and the qualitative results of either solution for \(\theta^E\) are robust (w.r.t. all endogenous variables). The POST-model also has multiple solutions, but only one will fulfill the additional restrictions; being real valued, having \(\delta_{TWA} > \delta_w \geq 1\) (to compensate for the difference in \(\lambda^j\)) and \(Y_j' \geq w > 0\).
3.2 Welfare analysis

While the key feature of the directive is to remove any wage differentials between agency workers and those employed directly by the firm, it also explicitly aims to facilitate the transition from agency work into regular employment. This section simulates the effects of an increase in the relative search efficiency parameter of a worker in the agency sector relative to that of an unemployed worker. The net effects on welfare are measured by a utilitarian welfare function that sums the weighted value functions for the firm, the TWA and the worker.

\[ Z = (\Lambda^{F,E} + \psi^E) e + (\Lambda^{F,A} + \Lambda^{F,TWA} + \psi^A) a + (\psi^U) u \] (25)

Estimating and normalising the utilitarian welfare to the level prior to the implementation provides a baseline to compare any welfare changes following the implementation. This pre-implementation baseline is shown as the black dashed line in Figure 3.1, whereas the continuous line represents the welfare following the implementation. The grey dotted line is a reference level for the initial standardised welfare measure.

Previous studies applying equilibrium conditions similar to the situation prior to the implementation have shown that (utilitarian) welfare is increasing with the search-efficiency between the agency- and regular labour market over the same interval (Neugart & Storrie, 2006). Figure 3.1 shows that welfare is increasing both as a direct consequence of the implementation, but also when simulating an increase in the relative search-efficiency – and that the welfare increase is of similar relative magnitude as prior to the implementation.

![Figure 3.1](image)

The preceding section has shown that unemployment will increase following the implementation. The increased wage rate also lowers the value of a filled job for both the firm and the TWA respectively. The TWA is not able to exert the same rent as prior to the implementation. The welfare increasing effect following the implementation is therefore mainly driven by the increase in welfare for the employed workers in both sectors (and the agency sector in particular). Both employment and welfare will increase even further if the directive also manages to increase the relative search-efficiency from the agency sector, as can be seen in Table 3.3.

<table>
<thead>
<tr>
<th>Table 3.3</th>
<th>Employment and relative search efficiency, $\delta^A$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\delta^A$</td>
<td>90%</td>
</tr>
<tr>
<td>Unemployment</td>
<td>9.32%</td>
</tr>
<tr>
<td>Employment (E)</td>
<td>88.57%</td>
</tr>
<tr>
<td>Employment (A)</td>
<td>2.11%</td>
</tr>
</tbody>
</table>
Increasing the relative search efficiency will increase the overall probability that the firm will fill a vacant position in the regular sector, with the associated positive effect of a shorter average duration of a vacancy. This will increase the number of workers employed in the regular sector while also having an increasing effect on the wage rate. This is because the increased search efficiency will have the same effect as if there were more job-seekers for each vacant job.

The TWA will experience that the average duration of an assignment becomes shorter since increasing the relative search efficiency will increase the outflow from the agency sector. The relative compensation paid by the TWA to the worker will decrease since the worker does not need to be compensated to the same extent to fulfil the equilibrium condition $\psi^A = \psi^E$. The TWA is at the same time also able to charge a higher mark-up for supplying the worker and the TWA will thereby be able to exert an even higher rent per worker.

4 Summary and Discussion

The objective of this paper has been to theoretically analyse the impact on overall employment and the relative size of the temporary agency sector following the Swedish implementation of the EU Temporary and Agency Workers Directive, and its implied principle of equal treatment with regard to the (real) wage. The chosen general equilibrium model provides a powerful framework for analysing economic systems with complex relations and feedback effects. While the situation prior to the implementation (the PRE-model) can be solved sequentially, the model of the situation following the legislation (the POST-model) must be solved as a system of equations.

The complexity and non-linearity of the model both prior to, and following the implementation, suggest that the effects must be interpreted conditional on the specific level of the exogenous variables. This further implies that the selection of the calibration values is paramount. Calibration of the model with relevant empirical values will quantify the results by providing a numerical example on the equilibrium, or at the very least suggest the relevant size and direction of the effects. The approach both allows for estimation of the impact of changes in the exogenous variables, as well as an examination of the (conditional) dynamics of the model.

The previously implemented directives (guaranteeing other types of flexible or atypical workers equal treatment and wages) are included in the model by assuming that all workers other than agency workers are a part of the regular labour market. However, including other atypical workers into the regular sector will also increase the exogenous shock rate. This is the motivation for the separation rate calibration value being set slightly higher than suggested by OECD data on the duration of open-ended contracts. This also makes the client firm unable to obtain short term labour in any other way than through a TWA, which thereby also allows the TWA to unilaterally determine the mark-up.

Although there is no readily available data on the mark-up charged by the TWA, the strong growth of the agency sector suggests that the TWA is able to exert significant rent. The rent in the theoretical model following the implementation of the equal wages regime is a consequence of the TWA’s lower average recruitment costs and limited severance liability, whereas any empirical rent could be attributed to a low degree of competition (Andersson-Joona & Wadensjö, 2010).

Given that both TWAs and the client firm are subject to the same regulatory framework regarding dismissals, then the client firm should arguably be better suited to hedge against any liabilities by a more accurate forecast of their demand for labour (through a better knowledge of the market). The TWAs on the other hand could (potentially) more easily reassign their workers and thereby circumvent any severance liabilities (although not explicitly modelled here, this could also impact the type of worker that the TWA will choose to supply, cf. Walter, 2012).

Baumann et al. (2011) also show that the TWA is willing to supply fewer workers if its severance liabilities approaches that of the client firm. The competitive factor of the TWAs would then become its superior matching efficiency rather than a maintained limited severance liability. It has nevertheless been suggested that labour unions act more leniently towards TWAs in order to protect the core of organised employees in the regular sector (Salvatori, 2009; Håkansson & Isidorsson, 2014; cf. also Thommes & Weiland, 2010; Jahn & Bentzen, 2012).
That allowing exemptions from the principle of equal treatment was in part requested by the Swedish labour unions (SOU 2011:5) is arguably also somewhat indicative of this view. Provided that the proposed lenient attitude from the labour unions stems from a relatively low number of union members in the agency sector, it is possible that the limited liability assumption becomes less applicable if the sectors union density rate increases.

In the framework describing the dynamics prior to the implementation of the directive, both the equilibrium wage level and the labour market tightness become independent of the relative transition probability. Any increase in the relative transition probability parameter thereby allows the TWA to charge a higher price for supplying the agency worker while simultaneously lowering the relative compensation paid to the worker.

This keeps the worker valuation of being employed in the agency sector constant when the probability of being matched towards a regular sector employment in the upcoming period increases. This effect is still present in the post-implementation framework, although becomes mitigated by the feedback between the labour market tightness in the two sectors.

The demand for agency workers is dependent on the tightness in the regular sector, both prior to and following the implementation of the legislation. An increase in the probability of filling a vacancy in the regular sector will at the same time decrease the probability that a vacancy is filled in the agency sector. This coincides well with that the agency sector is utilised to a higher extent when it is more difficult to secure a job in the regular sector; e.g. when there is a higher degree of uncertainty in the market for the produced goods (cf. Forde & Slater, 2005; Salvatori, 2009; Thommes & Weiland, 2010; Jahn & Bentzen, 2012).

The results suggest that the relative number of agency workers will stay basically the same. This implies that even though the relative compensation paid to the agency worker will increase, the TWA will still supply basically the same amount of labour (cf. the referenced literature in Thommes & Weiland, 2010, regarding the implementation of an equal treatment legislation in Germany. See also Jahn & Bentzen, 2012).

The model thereby also captures that the firms will still retain a buffer of agency workers to be able to adjust the workforce if there is a lower demand for the produced goods. We may also conclude that the agency sector, as expected, also show significantly shorter durations for vacant positions compared to the regular sector – both prior to and following the implementation.

The qualitative results suggest that the implementation of the directive will increase the overall wage level, which in turn will reduce the total number of employed individuals, as the agency sector becomes included in the wage negotiations in a more explicit way than prior to the implementation. The directive has nevertheless been shown to be (utilitarian) welfare increasing, and thereby Kaldor-Hicks efficient, over the relevant range of calibration values. While all workers will experience a welfare increase through the wage effect, the highest increase in welfare will be enjoyed by those in the agency sector.

The level of compliance constitute the crucial condition for whether the compensation to the TWA worker is allowed to approach that of the worker in the regular sector (cf. Nienhüser & Matiaske, 2006; Jahn, 2010). The preparatory documents underlying the implementation states that making exemptions to the principle of equal treatment is supported by both the employer confederations and the labour unions (SOU 2011:5) which could constitute a potential problem as the enforcement mainly rests on the labour market parties.

Objective monitoring of the compliance thereby becomes especially important as the self-interest of these groups could potentially interfere with the intended purpose of strengthening the position of the temporary agency workers (cf. Spermann, 2011; Håkansson & Isidorsson, 2014 see also the discussion regarding collective agreements in Jahn & Bentzen, 2012, and that firms with local works councils utilise agency workers to a larger extent than other firms; Thommes & Weiland, 2010).

The implementation of the directive could help to remove any stigma associated with temporary agency work by ensuring similar working and employment conditions, and also facilitating the transition of agency workers into direct employment at the client firm (cf. Forde & Slater, 2005). Unfortunately, the TWAs only have weak incentives to aid in such transitions. Their optimal strategy is rather to increase the duration of each contract with the client firm in order to obtain more rent for each supplied worker.

This is arguably most easily accomplished by impeding the worker’s transition from the agency sector to the regular sector (cf. Westéus & Raattamaa, 2014). It is therefore important for future research to not only monitor the relative wage rate, but also the transition rate from agency employment into regular employment (i.e. the stepping-stone effect).
References


Appendix

A.1 The relative number of workers in each sector

Expression (2) is reproduced below to provide the general solution concept.

\[ U_t = \pi_t \cdot U_{t-1} + (n_t - \pi_t) N_{t-1} + \lambda^E \cdot E_t - \alpha (\theta^E) U_t + \lambda^A \cdot A_t - q (\theta^A_t) V_t^A \]

Divide the expression above by \( N_t = n_t \cdot N_{t-1} \) to get the relative ratios of worker unemployment, and rewrite these according to (1).

\[ u_t = \frac{\pi_t}{n_t} \cdot u_{t-1} + \frac{1 - \pi_t}{n_t} + \lambda^E \cdot c_t + \lambda^A \cdot a_t - \alpha (\theta^E) u_t - q (\theta^A_t) v^A_t \]

In steady-state both the relative and absolute number of unemployed workers will be constant; \( U_t = U_{t-1} = U \) and \( u_t = u_{t-1} = u \), implying that all time indexes may be removed. We may also rewrite \( q (\theta^A_t) v^A_t = \alpha (\theta^A_t) u \) since agency sector vacancies are filled at the same rate as workers leave unemployment for work in the agency sector. We may also substitute \( a = 1 - e - u \) according to (7).

\[ u = \frac{\pi}{n} \cdot u + \left( 1 - \frac{\pi}{n} \right) + \lambda^E \cdot e + \lambda^A \cdot (1 - e - u) - \alpha (\theta^E) u - \alpha (\theta^A) u \]

Finally, collect all \( u \)-terms.

\[ u = \frac{n \left[ 1 + \lambda^E \cdot e + \lambda^A (1 - e) \right] - \pi}{n \left[ 1 + \lambda^A + \alpha (\theta^E) + \alpha (\theta^A) \right] - \pi} \]

The relative number of workers in the regular sector (6) is solved for in the same way, but the flow of workers into the sector is rewritten as \( q (\theta^E_t) v^E_t = \alpha (\theta^E_t) u + \delta^A \cdot \alpha (\theta^E_t) a = \alpha (\theta^E_t) u + \delta^A \cdot \alpha (\theta^E_t) (1 - e - u) \) in order to capture the inflow of workers from both unemployment and employment in the agency sector.

A.2 The optimal mark-up charged by the TWA, \( \delta^{TW_A} \)

Following Neugart & Storrie (2006) and Baumann et al. (2011), the optimal mark-up charged by the TWA is obtained by determining the mark-up so that the client firm values renting a worker through the TWA equal to employing the worker directly. Equations (8) to (11) for the firm are reproduced here for convenience.

\[ \Lambda_{t, E}^{V,E} = \frac{-\gamma^E (1 + \tau^E)}{P^Y_t} W_t \left[ q (\theta^E_t) \right] \Lambda_{t+1}^{F,E} + \left[ \frac{1 - q (\theta^E_t)}{1 + r_t} \right] \Lambda_{t+1}^{V,E} \]

\[ \Lambda_{t, E}^{F,E} = Y_{E,t} \left[ 1 + \pi \cdot \Lambda^E \cdot \delta^S \right] (1 + \tau^E_t) W_t \left[ \frac{\pi_t (1 - \Lambda^E)}{1 + r_t} \right] \Lambda_{t+1}^{F,E} + \left[ \frac{1 - \pi_t (1 - \Lambda^E)}{1 + r_t} \right] \Lambda_{t+1}^{V,E} \]

\[ \Lambda_{t, A}^{V,A} = \frac{-\gamma^{A, TWA} (1 + \tau^E_t) W_t}{P^Y_t} \left[ q (\theta^A_t) \right] \Lambda_{t+1}^{F,A} + \left[ \frac{1 - q (\theta^A_t)}{1 + r_t} \right] \Lambda_{t+1}^{V,A} \]

\[ \Lambda_{t, A}^{F,A} = Y_{A,t} \left[ \frac{\delta^{TW_A} (1 + \tau^E_t) W_t}{P^Y_t} \right] \left[ \frac{\pi_t (1 - \Lambda^A \cdot (1 - \delta^A \cdot \alpha (\theta^E_t)))}{1 + r_t} \right] \Lambda_{t+1}^{F,A} + \left[ \frac{1 - \pi_t (1 - \Lambda^A \cdot (1 - \delta^A \cdot \alpha (\theta^E_t)))}{1 + r_t} \right] \Lambda_{t+1}^{V,A} \]
The firm will open new vacancies until the value of an additional vacancy is zero, \( \Lambda_{t+1}^{E} = \Lambda_{t+1}^{V} = 0 \) which also implies that \( \Lambda_{t+1}^{E} = \Lambda_{t+1}^{V} = 0 \). Rewriting and solving (8) and (10) for the value of a filled position in the upcoming period yields:

\[
0 = \frac{-\gamma^{E}(1+\tau^{w})}{P_t^{Y}} W_t + \frac{q(\theta_{E}^{t})}{1+r_{t}} \Lambda_{t+1}^{E} \quad \Rightarrow \quad \Lambda_{t+1}^{E} = \frac{1+r_{t}}{q(\theta_{E}^{t})} \cdot \frac{\gamma^{E}(1+\tau^{w})}{P_t^{Y}} W_t
\]

\[
0 = \frac{-\gamma_{FIRM}^{E}(\delta^{TWA})(1+\tau^{w})}{P_t^{Y}} W_t + \frac{q(\theta_{E}^{t})}{1+r_{t}} \Lambda_{t+1}^{F.A} \quad \Rightarrow \quad \Lambda_{t+1}^{F.A} = \frac{1+r_{t}}{q(\theta_{E}^{t})} \cdot \frac{\gamma_{FIRM}^{E}(\delta^{TWA})(1+\tau^{w})}{P_t^{Y}} W_t
\]

Substituting these expressions for a filled position in each respective sector with their equivalence in (9) and (11) yields:

\[
\Lambda_{t}^{F.E} = \psi_{E,t}^{j} - \frac{1+\pi \cdot \lambda_{E}^{t} \cdot \delta^{S}}{P_t^{Y}} (1+\tau_{E}^{w}) W_t + \left[ \frac{\pi_{t}(1-\lambda_{E}^{t})}{1+r_{t}} \right] \left[ \frac{1+r_{t}}{q(\theta_{E}^{t})} \cdot \frac{\gamma^{E}(1+\tau_{E}^{w})}{P_t^{Y}} W_t \right]
\]

\[
\Lambda_{t}^{F.A} = \psi_{A,t}^{j} - \frac{\delta^{TWA}(1+\tau_{E}^{w})}{P_t^{Y}} W_t + \left[ \frac{\pi_{t}(1-\lambda_{A}^{t})(1-\delta^{A} \cdot \alpha(\theta_{E}^{t}))}{1+r_{t}} \right] \left[ \frac{1+r_{t}}{q(\theta_{E}^{t})} \cdot \frac{\gamma_{FIRM}^{E}(\delta^{TWA})(1+\tau^{w})}{P_t^{Y}} W_t \right]
\]

Setting these two expressions equal to each other, abbreviating the real wage \((1+r_{t})W_{t}/P_t^{Y} = w_{t}\), and solving for the mark-up parameter yields:

\[
\delta^{TWA} = \frac{q(\theta_{E}^{t})}{q(\theta_{E}^{t}) \cdot w_{t}} \cdot \frac{\left( \psi_{E,t}^{j} - \psi_{E,t}^{j} \right) + w_{t} (1+\pi \cdot \lambda_{E}^{t} \cdot \delta^{S}) - w_{t} (1-\lambda_{E}^{t}) (\pi_{t} \cdot \gamma^{E})}{\left( 1-\lambda_{A}^{t} \right) (\pi_{t} \cdot \gamma_{FIRM}^{E})} (1-\delta \cdot \alpha(\theta_{E}^{t}))
\]

(26)

### A.3 The PRE-Model

#### 1. Agency Worker Relative Wage

The TWA will determine \( \delta^{w} \) in such a way that the worker values being employed in the agency sector equal to being unemployed; \( \psi_{t}^{A} = \psi_{t+1}^{U} \). The expressions for the worker valuation of either state are reproduced from (15), (16) and (17) respectively.

\[
\psi_{t}^{E} = \frac{(1+\pi \cdot \lambda_{E}^{t} \cdot \delta^{S})}{(1-\tau_{E}^{w})} (1+\tau_{E}^{w}) W_t + \left[ \frac{\pi_{t}(1-\lambda_{E}^{t})}{1+r_{t}} \right] \psi_{t+1}^{E} + \left[ \frac{\pi_{t} \cdot \lambda_{E}^{t}}{1+r_{t}} \right] \psi_{t+1}^{U}
\]

\[
\psi_{t}^{A} = \frac{\delta^{w}(1-\tau_{E}^{w})}{(1-\tau_{E}^{w})} W_t + \left[ \frac{\pi_{t}(1-\lambda_{A}^{t})(1-\delta^{A} \cdot \alpha(\theta_{E}^{t}))}{1+r_{t}} \right] \psi_{t+1}^{E} + \left[ \frac{\pi_{t} \cdot \alpha(\theta_{E}^{t})}{1+r_{t}} \right] \psi_{t+1}^{U}
\]

\[
\psi_{t}^{U} = \frac{\delta^{w}(1-\tau_{E}^{w})}{(1-\tau_{E}^{w})} W_t + \left[ \frac{\pi_{t} \cdot \alpha(\theta_{E}^{t})}{1+r_{t}} \right] \psi_{t+1}^{E} + \left[ \frac{\pi_{t} \cdot \alpha(\theta_{E}^{t})}{1+r_{t}} \right] \psi_{t+1}^{U} + \ldots
\]

Setting the two last expressions equal to each other under the steady-state condition that \( \psi_{t}^{j} = \psi_{t+1}^{j} = \psi_{t}^{j} \), and substituting all \( \psi_{t}^{E} \)-terms for the steady-state version of (17) yields the following when solving for the \( \delta^{w} \)-parameter:

\[
\delta^{w} = \frac{\delta^{w}(1+r_{t}) \cdot \pi \left( (1-\lambda_{E}^{t}) \cdot \delta^{A} \cdot \alpha(\theta_{E}^{t}) (1-\lambda_{A}^{t}) \right)}{(1+r_{t}) \cdot \pi \left( (1-\alpha(\theta_{E}^{t}) \cdot \lambda_{E}^{t}) \right) + \pi_{t} \cdot \alpha(\theta_{E}^{t}) \cdot (1-\lambda_{A}^{t})}
\]
2. Wage Setting (WS)

The wage is determined through the Nash-product in (18):

\[
\max_{W_t} \Omega = \left[ \psi_t^E - \psi_t^U \right]^{\beta} \left[ \Lambda_t^{F,E} - \Lambda_t^{V,E} \right]^{1-\beta}
\]

The first term within brackets is obtained by subtracting (15) from (17) under the assumption that the worker values \( \psi_t^i = \psi_t^U \) as determined in the preceding section. The second term is similarly obtained by subtracting (9) from (8). Collecting terms yields:

\[
\psi_t^{E,i} - \psi_t^U = \frac{[1+\pi_t \cdot \lambda^E \cdot \delta^S - \delta^B]}{[1 + \pi_t \cdot \lambda^E \cdot \delta^S]} \cdot \frac{(1 - \tau_t^w)}{(1 + \tau_t^E)} \cdot \frac{P_t^Y}{P_t^c} \cdot \left( \Lambda_t^{F,E} - \Lambda_t^{V,E} \right)
\]

(27)

Setting the F.O.C. from (18) equal to zero (for an optimum, where the expressions within brackets have been substituted with (27) and (28) respectively) may be written as (29) after collecting terms and simplifying the expression.

\[
\psi_t^E - \psi_t^U = \frac{\beta}{1-\beta} \cdot \frac{[1+\pi_t \cdot \lambda^E \cdot \delta^S - \delta^B]}{[1 + \pi_t \cdot \lambda^E \cdot \delta^S]} \cdot \frac{(1 - \tau_t^w)}{(1 + \tau_t^E)} \cdot \frac{P_t^Y}{P_t^c} \cdot \left( \Lambda_t^{F,E} - \Lambda_t^{V,E} \right)
\]

(29)

Substitute the L.H. side of (26) with the R.H. side of (28). Also substitute the expression for \( \psi_t^{E,i} - \psi_t^U \) in (27) with the second-period equivalence of (29) and collect terms to get \( \Lambda_t^{F,E} - \Lambda_t^{V,E} \) on the L.H. side.

\[
\Lambda_t^{F,E} - \Lambda_t^{V,E} = \frac{1-\beta}{\beta} \cdot \frac{[1+\pi_t \cdot \lambda^E \cdot \delta^S - \delta^B]}{[1 + \pi_t \cdot \lambda^E \cdot \delta^S]} \cdot \frac{1 - \tau_t^w}{(1 + \tau_t^E)} \cdot \frac{P_t^c}{P_t^c} \cdot \left( \Lambda_t^{F,E} - \Lambda_t^{V,E} \right)
\]

(28)

Following Lindén (2004) the expression may be simplified further by defining the change in the tax wedge between the employers tax and the wage tax as \( 1 - \tau_{t+1} \), and also the ratio between the consumer real interest rate and the firm real interest rate, \( 1+r_{t+1}/1+r_t \), to get rid of the relative price levels and consumer taxes. We also make use of the short-hand notation for the real-wage paid by the firm, \( w_t \) from (26):

\[
1 - \tau_{t+1} = \frac{(1+r_{t+1}^c) / (1+r_{t+1}^w)}{(1+r_{t+1}^c) / (1+r_{t+1}^w)}
\]

\[
\frac{1 + r_{t+1}^c}{1 + r_t} = \frac{1 - \tau_t^c}{(1 + \tau_t^c)} \cdot \frac{P_t^c}{P_t^c} \cdot \frac{P_{t+1}^Y}{P_{t+1}^t}
\]

\[
w_t = \frac{(1 + \tau_t^c) W_t}{P_t^t}
\]

This allows us to simplify the above expression to:

\[
\Lambda_t^{F,E,i} - \Lambda_t^{V,E} = \frac{1-\beta}{\beta} \cdot \frac{[1+\pi_t \cdot \lambda^E \cdot \delta^S]}{[1 + \pi_t \cdot \lambda^E \cdot \delta^S]} \cdot \frac{1 - \tau_t^w}{1 + \pi_t \cdot \lambda^E \cdot \delta^S} \cdot \frac{1 - \tau_t^w}{1 + \pi_t \cdot \lambda^E \cdot \delta^S} \cdot \frac{1 - \tau_t^w}{1 + \pi_t \cdot \lambda^E \cdot \delta^S}
\]

(28)

Substituting the L.H. side with the expression from (28), and collecting terms with \( \Lambda_t^{F,E,i} - \Lambda_t^{V,E} \) yields:
\[
Y_{E,t} = \left[ \frac{1+\tau_t \delta^S}{\beta} - \gamma^E \right] w_t = \frac{q(\theta^E_t^t)(1-\pi_t^t \delta^S_\tau - \pi_t^t (1-\lambda^E_t^t \delta^S_\tau))}{1+\tau_t^t} \cdot \left( \Lambda^E_{F,t+1} - \Lambda^E_{V,t+1} \right)
\]

Finally, applying the free-entry condition (firms will open vacancies until the value of an additional vacancy is zero, \( \Lambda^E_{F,t+1} = \Lambda^E_{V,t+1} = 0 \), which gives an expression for \( \Lambda^E_{t+1} \) through (9)) and solving for the wage outside of steady-state yields:

\[
w_t = \frac{\beta \cdot Y'_E}{1+\pi^t (\lambda^E \cdot \delta^S - \beta \cdot \gamma^E \cdot \theta^E) + \delta^S_\tau (1+r) - \pi^t (1-\lambda^E)}
\]

In steady-state, the change in the tax-wedge will be constant \((1 - \tau_{t+1} = 1 \rightarrow \tau_{t+1} = 0)\), which gives us the wage-setting curve (WS) in wage/tightness-space for the PRE-model:

\[
w = \frac{\beta \cdot Y'_E}{1+\pi^t (\lambda^E \cdot \delta^S - \beta \cdot \gamma^E \cdot \theta^E)}
\]

### 3. Labour Demand (LD) and Sector Tightness

The labour demand curve on the regular labour market is solved for by defining steady-state versions of (8) and (9). This is done by using the free-entry condition \( \Lambda^E_{t+1} = \Lambda^E_{V,t+1} = 0 \) and that \( \Lambda^E_{F,E} = \Lambda^E_{t+1} = \Lambda^E_{F,E} \) in steady-state. Simplify further by using the short-hand notation for the real-wage.

\[
0 = -\gamma^E \cdot w + \frac{q(\theta^E)}{1+r^t} \Lambda^E_{F,E} \Rightarrow \Lambda^E_{F,E} = \frac{\gamma^E \cdot w(1+r)}{q(\theta^E) + \gamma^E \cdot (1+r) - \pi^t (1-\lambda^E)}
\]

\[
\Lambda^F_{E} = Y'_E - \left[ 1+\pi^t \cdot \lambda^E \cdot \delta^S \right] w + \left[ \frac{\pi(1-\lambda^E)}{1+r} \right] \Lambda^E_{F,E} \Rightarrow \Lambda^E_{F,E} = \frac{(1+r) \left[ \frac{1+\pi^t \lambda^E \delta^S - \pi^t (1-\lambda^E)}{1+r} \right] w - Y'_E}{\pi^t (1-\lambda^E)}
\]

Setting these two expressions equal and solving for the real wage yields the labour demand curve (LD) for the regular sector:

\[
w = \frac{\frac{\theta_t^E Y'_E}{q(\theta^E) + \gamma^E (1+r) - \pi^t (1-\lambda^E)}}{1+\pi^t (\lambda^E \cdot \delta^S - \beta \cdot \gamma^E \cdot \theta^E)} = \frac{Y'_E}{1+\pi^t (\lambda^E \cdot \delta^S - \beta \cdot \gamma^E \cdot \theta^E)}
\]

The equilibrium wage and labour market tightness in the regular sector is obtained by setting WS = LD and solving for the value(s) of \( \theta^E \) that fulfills the equality.

\[
\beta \cdot Y'_E = \frac{\theta_t^E}{1+\pi^t (\lambda^E \cdot \delta^S - \beta \cdot \gamma^E \cdot \theta^E)}
\]

\[
\theta^E = \frac{(1 - \beta)}{\beta} \cdot \frac{\left( 1+\pi^t \cdot \lambda^E \cdot \delta^S \right) - (1+r) - \pi^t (1-\lambda^E)}{q(\theta^E) \cdot \pi^t}
\]

The labour market tightness in the agency sector, \( \theta^A \), solves similarly by defining the corresponding steady-state expressions for the TWA.

\[
\Lambda^F_{TWA} = \frac{\gamma^A w TWA - \delta^w TWA \cdot w + \frac{q(\theta^A)}{1+r^t} \Lambda^F_{TWA}}{q(\theta^A)} \Rightarrow \Lambda^F_{TWA} = (\delta^w TWA - \delta^w) w + \left[ \frac{\pi(1-\lambda^A)(1-\delta^A \cdot \alpha(\theta^A))}{1+r} \right] \Lambda^F_{TWA}
\]

\[
\Lambda^F_{TWA} = \frac{(1+r) (\delta^w TWA - \delta^w) w + \frac{\pi(1-\lambda^A)(1-\delta^A \cdot \alpha(\theta^A))}{1+r}}{(1+r) - \pi^t (1-\lambda^E) (1-\delta^A \cdot \alpha(\theta^A))}
\]
Labour Demand

The wage is solved for in the same way as in the PRE-model with the exception that the worker valuation expressions for either state are stated in (15), (16) and (17), and will not be reproduced here. The \( \delta^w \)-parameter is solved for in the same manner as in the PRE-model and becomes:

\[
\delta^w = (1 + \pi \cdot \lambda^E \cdot \delta^S) - \frac{\pi (\lambda^E - \lambda^A) (1 + \pi \cdot \lambda^E \cdot \delta^S - \delta^E)}{(1 + r^c) - \pi (1 - \alpha (\theta^E) - \alpha (\theta^A) - \lambda^E)}
\]

Wage Setting (WS)

The wage is solved for in the same way as in the PRE-model with the exception that the worker valuation from being employed in the agency sector is not equal to being unemployed, but rather set so that \( \psi^A_t = \psi^E_t \). This changes (26) to read:

\[
\psi^E_{1,t} - \psi^U_{1,t} = \left[1 + \pi_t \lambda_t^E \frac{\delta^S - \delta^E}{(1 + \tau_t)}W_t^i + \pi_t \left[1 - (\lambda^E + \alpha (\theta^E) + \alpha (\theta^A))\right]\right] (\psi^E_{t+1} - \psi^U_{t+1})
\]

The WS-curve is solved for in the same manner as in the PRE-model (appendix section A.3.2) above which yields the following expression for the WS-curve in wage/tightness-space:

\[
w_t = \frac{\beta \cdot Y_t^E}{(1 + \pi \cdot \lambda_t^E \cdot \delta^S) - \pi \cdot \beta \cdot \gamma_t^E (1 - \tau_{t+1})} - \frac{\pi \cdot \beta \cdot \gamma_t^E (1 - \tau_{t+1})}{q(\theta^E)} (\theta^E + \alpha (\theta^A) + \alpha (\theta^A))
\]

In steady-state, the change in the wage tax rate is constant, \( (1 - \tau_{t+1}) = 1 \Rightarrow \tau_{t+1} = 0 \), and the expression for the WS-curve in wage/tightness-space becomes:

\[
w = \frac{\beta \cdot Y_t^E}{(1 + \pi \cdot \lambda^E \cdot \delta^S) - \pi \cdot \beta \cdot \gamma^E (\theta^E + \alpha (\theta^A) + \alpha (\theta^A))}
\]

Labour Demand (LD) and Sector Tightness

The expression for the steady-state demand for labour in the regular sector (LD) is unaffected by the implementation of the directive and is consequently the same as in the PRE-model.

\[
w = \frac{Y_t^E}{[1 + \pi \cdot \lambda^E \cdot \delta^S] + \frac{\beta_t}{q(\theta^E)} [(1 + r) - \pi (1 - \lambda^E)]}
\]

The labour market tightness in the regular sector is solved for by setting WS = LD and simplifying:

\[
\theta^E = \frac{(1 - \beta) \cdot \frac{1 + \pi \cdot \lambda^E \cdot \delta^S}{\pi \cdot \gamma^E} - (1 + r) - \pi (1 - \lambda^E - \alpha (\theta^A))}{q(\theta^E) \pi}
\]
The labour market tightness in the agency sector is determined in the same manner as in the PRE-model:

\[ q(\theta^A) = \frac{\gamma_{TW,A} \cdot \delta_{TW,A}}{\delta w - \delta_{TW,A}} \left[ \pi \left( 1 - \lambda^A \right) \left( 1 - \delta^A \cdot \alpha(\theta^E) \right) - (1 + r) \right] \]

Substitute \( \delta_w \) and \( \delta_{TW,A} \) with expressions (24) and (12) respectively and solve the expression. However, since \( \theta^A = f(\theta^E) \) and \( \theta^E = g(\theta^A) \) the two parameters are to be solved for simultaneously.