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Labor market integration of migrants: Hidden costs and benefits in two-tier welfare states

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Discussion Paper

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LABOR MARKET INTEGRATION OF MIGRANTS: HIDDEN COSTS AND BENEFITS IN TWO-TIER WELFARE STATES

Jan König* and Christoph Skupnik*

Abstract:

We apply a monopoly trade union model and analyze employment, wage and budgetary effects of (i) an inflow of migrant workers and (ii) an increase in the labor market participation rate of migrants. Per assumption, natives and migrants solely differ with respect to the level of benefit claims in a two-tier welfare system. Furthermore, the labor effects are studied under two types of union behavior. Analyzing the *ceteris paribus* labor market effects, we identify hidden costs and benefits of intensified integration that emerge from the design of the welfare program. We support previous findings in case of an inflow of migrant workers. More interesting, though, it is shown that a larger share of migrants in the workforce increases (decreases) the employment level, if the union represents (does not represent) migrant workers.

JEL classification: F22, H53, J15, J2, J5, J61, R23

Keywords: migration, welfare state, trade union

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I. Introduction

The Eastern enlargement in 2004 and 2007 significantly increased the size of the population in the European Union. The EU grew from about 400 million by roughly 25% to about 500 million inhabitants (Eurostat, 2012). Due to the far reaching implications of an EU membership regarding cross-national labor mobility, the enlargement also induced a major expansion of the labor market. According to the European treaties, citizens of an EU member state can take up a job in another member state without a work permit. Furthermore, workers are granted full access to the welfare system after a short period of employment in the member state. In line with Sjaastad's human capital approach (1962), these political reforms reduce individual migration costs and, thereby, intensify the incentive to migrate.

Yet migration incentives are not only positively influenced by reduced costs and absolute income differentials. A high level of relative poverty in the host country also matters for the decision making of potential migrants. For the case of Poland, e.g. Stark, Micevska and Mycielski (2009) empirically show that relative poverty measured by the Gini coefficient has explanatory power for the high propensity to migrate. Fearing negative consequences of enlargement for the labor market, Germany and Austria thus applied temporary restrictions on the freedom of movement up to the maximum length of 7 years. However, the 1st of May 2011 marked the end of the period in which the EU allowed to restrict labor market access for EU-10 citizens. On the 1st of January 2014 the latest, restrictions for workers from the EU-2 (Rumania and Bulgaria) are also to be lifted in every EU-27 country.

What is a great step towards a unified Europe is at the same time a challenge for national policy makers. The opening of borders intensifies the pressure to put in place advanced mechanisms of labor market integration since collective bargaining and welfare state institutions might hamper the integration of migrant workers. Without controversy, failures in the integration process are costly to society as they lead to social exclusion, higher crime rates and/or deprivation.¹ However, the integration process of migrant workers is multidimensional and involves more than the principle of non-discrimination in the European treaties. In our paper, we concentrate on two dimensions of integration. The first dimension is the non-discrimination in national labor market institutions, e.g. in the welfare scheme, as defined in the European treaties.² The second is the integration into employment, e.g. enforced through

¹ The harsh living conditions of the Roma minority in many EU countries are just one very apparent example.

² In earlier debates, it was often argued that, in a common European labor market with mobile workers, social standards erode due to the selection principle (see Sinn, 2002). A common argument is that the integration process increases the mobility of tax bases and thus results in a decline of governmental revenues and a race to the bottom of social standards (see Wildasin, 1995). On the contrary, labor market integration can call for more welfare protection if the risk of being unemployed increases. For a discussion of social insurance schemes in the integrated Europe, see for instance Andersen (2002, 2003).

migrant quotas in a member state.³ Important determinants for the integrative capability of a system are the labor market effects of migration induced by (i) the welfare state and (ii) the behavior of the market players (trade unions, employers' associations). Despite their relevance, the interaction effects of imperfect labor markets, the welfare system and migration were ignored in the literature for a long time.⁴

However, in the last decades, a new strand of works has emerged that provides the models with more realism by introducing collective bargaining and welfare state provisions. Brecher and Choudhri (1987), for instance, model migration into a labor market that is characterized by unemployment due to legal wage floors. Consequently, their arguments go along the line that migration flows should be minimized in order to avoid immigration into unemployment. Analyzing the effects of migration in the presence of a labor union, Schmidt et al. (1994) conclude that the substitutability of low- and high-skilled labor is decisive for the question whether migration has positive economic consequences or not. A union that represents the interests of the whole domestic labor force, i.e. low- and high-skilled workers, decrease (increase) the low-skilled wage, if the labor inputs are complements (substitutes). In a situation, where the union solely concentrates on the wage and employment of low-skilled workers, migration implies a reduction of the nominal wage fostering employment.

The role of a redistributing welfare state is discussed in Razin and Sadka (1995). The authors conclude that the costs of unemployed low-skilled migrants can outweigh the benefits via the labor market if migrants cannot be perfectly excluded from participation in welfare programs. Kemnitz (2003a) examines the effects of low-skilled migration into a welfare state by modeling a PAYG pension system under an imperfect labor market. He argues that, in this case, immigration has adverse effects on employment and wages of the native low-skilled. Though, those losses are more than compensated by the gains of the high-skilled and the pensioners so that the native population clearly profits despite the labor market rigidities. In Kemnitz (2003b), the effects of migration under different policy goals, like a constant benefit transfer or a constant replacement ratio, are studied. It is shown that the impact of migration on native income crucially depends on the skill inflow and the design of the social policy.

Although our approach is in the spirit of the two lastly cited papers, the frameworks differ in central points. While in Kemnitz (2003a) the contribution rate is fixed, in our model, the rate adjusts after a parameter change given a fixed level of welfare transfers. Also, the model by Kemnitz lacks other important institutional details. First, as usual in the literature, the design of the unemployment benefit system is reduced to a unique social transfer. This does not

³ Note that the first type of integration is not determined by national governments since exclusionary national legislation is ruled out in the EU treaties, while the second type partly depends on national policies like strategies against employer-sided discrimination via minority quotas.

⁴ See Berry and Soligo (1969), Rodriguez (1975), Borjas (1995), Meier and Wenig (1997) or Zimmermann (1998) who analyze welfare and labor market effects of migration in an institutional setting with perfect labor markets. The main finding in such a framework is that migration does not only increase the efficiency of allocation, but also affects the distribution of the social product. Generally speaking, domestic workers lose and capital owners benefit from an inflow of migrant workers.

match e.g. with the situation in the EU where systems with distinct levels of unemployment benefits prevail. Second, the literature pays no attention to discriminating behavior of the players in the labor market, i.e. of the unions and the employers.⁵ In our analysis, we fill this gap in the literature by implementing a two-tier unemployment benefit system in a right-to-manage bargaining model with migration. We further consider two types of union behavior. In the first scenario, the union embraces the interests of native and migrant workers, while, in the second, she exclusively incorporates the interests of the native workers. More precisely, our paper analyzes the two labor market integration strategies under differential union behavior by studying the following research questions:

- (i) What are the effects of the participation of migrant workers in a two-tier welfare system?
- (ii) What are the implications of a change in the participation rate of migrants in the workforce, e.g. through the introduction of a governmental quota?

While the first question focuses on the impact of migration on the contribution rate to the unemployment system, the second spotlights the effects of governmental intervention to avoid an underrepresentation of migrants in the labor market. The purpose of this paper is to shed light on institutional aspects of migrant labor market integration by considering the differential effects of a two-tier welfare system and union-sided discrimination in the analysis. Independent from union preferences, we support previous findings concerning the negative impact of an inflow of migrants on the equilibrium contribution rate. More interestingly, it is shown that the effects of a change in the labor market participation rate of migrants are qualitatively affected by union behavior. In a two-tier welfare system, a larger share of migrants in the workforce decreases (increases) the contribution rate if the union represents (does not represent) migrant workers, while this phenomenon is not observable in a welfare system with a unique social transfer. We thus detect hidden costs and benefits of labor market integration that are induced by the existence of different levels of benefit claims, respectively the design of the welfare program.

We proceed as follows. Section II presents the basic framework. In Section III, we analyze the labor market effects of the two dimensions of integration, while hidden costs and benefits of a two-tier welfare system are identified in section IV. Finally, we sum up in section V.

II. The model

We apply a model of a small and open economy with migration. It is abstracted from any dynamic effects, e.g. migration-induced capital inflows, endogenous skill formation or out-

⁵ In one scenario, Schmidt et al. (1994) assume that only the interests of the natives appear in the union function. Due to the modeling of an endogenous native employment quota, migrants thus indirectly affect the union calculus. However, by implementing a balanced budget of the social system and analyzing the impact of this quota in equilibrium, we widely extend the scope of the analysis.

migration of replaced native workers. In spite of its short-term, static nature, we are convinced that our simple framework best suits to analyze our research questions. We further suppose that a representative firm produces a final good by solely using labor. The technology of production is represented by a production function with constant returns to scale

$$Y = F(L) = L, \tag{1}$$

where L characterizes the quantity of deployed labor and Y the output level. We implement a decreasing product demand function $p = Y^{-\sigma}$, where $0 < \sigma < 1$ denotes the price elasticity.⁶ This specification allows the exertion of wage bargaining between the social partners.⁷ The population consists of migrant workers M and native workers N .⁸ We suppose that labor, be it supplied by natives or migrants, is homogenous and organized in a labor union. Each worker inelastically supplies one unit of labor. Concerning the firm-union-relationship, we follow the right-to-manage approach. The firm determines the employment level according to her labor demand once the gross wage has been bargained. Thus, the firm's problem is

$$\max_L \pi = p \cdot F(L) - w \cdot L, \tag{2}$$

where w denotes the gross wage. With respect to labor compensation, no discrimination takes place.⁹ Given the gross wage claim by the union, the representative firm chooses the number of employees. Solving the maximization problem (2) leads to the standard result that employment is set where the value of the marginal product equals the gross wage rate. From the first-order condition, we obtain as labor demand

⁶ For tractability reasons, we forgo the implementation of demand effects through a migration-induced increase in the number of consumers. For an empirical analysis of demand effects, see Bodvarsson, van den Berg and Lewer (2008) who study the local demand effects of the famous Mariel boat lift.

⁷ An alternative way to allow wage bargaining would be the implementation of a production function with decreasing returns to scale and a price normalized to unity. This would capture the idea that the output good is the numeraire and that a second, fixed factor such as capital or land is employed. However, in case of a production function with constant returns to scale and a normalized price, there is no room for wage bargaining since the firm earns zero profits. By using a downward sloping demand function, the final good producer faces imperfect competition similar to Dixit and Stiglitz (1977). Thus, our specification allows us to keep in mind the potential role of product market competition. Since both interpretations ensure that the firm earns positive profits and can be transformed into the same algebraic form, the results do not differ.

⁸ In line with the literature, we abstract from modeling endogenous migration decisions. Hence, M is treated as an exogenous variable and does not depend on the wage level, the unemployment rate, the level of benefits or non-economic variables like the stock of migrants or cultural proximity. For an overview of the rich literature on determinants of migration decisions, see e.g. Massey et al. (1993) and Zaiceva and Zimmermann (2008).

⁹ This restrictive assumption can be e.g. justified by laws that forbid the exclusion of workers from labor union wages, be they members or not. In Germany, for example, non-members are to be paid the same wage as union members in case of a comparable qualification level. Hence, our assumption of substitutability is not implausible.

$$L(w) = (1 - \sigma)^{1/\sigma} \cdot w^{-1/\sigma}, \quad (3)$$

which covers natives and migrants. The proportion of the employees having migrant roots is denoted by θ . It is thus a measurement of discrimination of migrants in the labor market, as it describes the selectivity of the employers with respect to the origin of the worker.¹⁰

Migrant workers are negatively discriminated against by the firm if the proportion of migrant relative to native employees is smaller than the proportion of migrants relative to natives in the economy's overall workforce. Hence, if $\theta = 0$ applies, migrants are completely excluded from the labor market and are fully negatively discriminated against on their origins. If $\theta = M/(N + M)$ holds, the proportion of employed migrants complies with the proportion of migrants in the workforce and no discrimination can be detected. If $\theta > M/(N + M)$ applies, positive discrimination in the labor market prevails.¹¹ Here, we assume that the government can directly influence the participation rate θ via legal quotas to pursuit her integration policy and to combat the underrepresentation of migrants in the workforce.

Further, we model a utilitarian utility function to describe the preferences of the labor union. The individual utility is linear in net income.¹² By introducing parameter γ , we account for union-sided discrimination. In case of $\gamma = 0$, the trade union represents all workers in the economy, be they migrants or natives. In contrast, if $\gamma = 1$ holds, only the native workers are considered in the trade union's utility function. As our model describes an imperfect labor market, not all potential workers in the economy are employed.

Describing the design of many European welfare states, we consider a system that consists of two tiers, a contribution-based unemployment insurance and a basic income support payment.¹³ Thus, the exogenous unemployment remuneration scheme depends on the working history. In our setting, b_1 denotes the classical unemployment benefit which is granted to the short-term unemployed. As usual, this payment is conditional on a minimum number of contribution years. In contrast, the social assistance b_2 is paid to long-term unemployed, independent of the number of contribution years. Furthermore, $b_1 \geq b_2$ holds. In contrast to reality, in our framework, the proportion of native long-term to short-term unemployed is

¹⁰ Here, we limit the analysis of employer-sided discrimination on the hiring practice. Certainly, one could think of other sources of employer-sided discrimination like differences in the payment schemes or disadvantages in working conditions.

¹¹ Using data of the IZA Expert Opinion Survey, Kahanec et al. (2011) provide empirical evidence for employer-sided discrimination in the European Union.

¹² Of course, the limitation on this specific type of objective function is discussable. The idea behind our approach is a labor union which represents the whole supply of risk-neutral workers. As stated by Booth (1995), this formulation occurs if the wage setting behavior results in unemployment for union members. Since this is an often used specification in the literature, we also follow this approach.

¹³ For an overview concerning the system in several OECD countries, see Atkinson and Micklewright (1991, p. 1688/1689). In the article, it is pointed out that "the theoretical literature on unemployment benefit largely ignores important institutional features of actual social security schemes". According to the authors, one should consider that the "UI (unemployment insurance) benefit is paid for a limited duration, and the rate of benefit may decline over time". An exemption is e.g. Kreiner and Whitta-Jacobsen (2002) who consider a limited duration of unemployment benefits in a trade union model.

modeled as a constant.¹⁴ Hence, ϕ describes the fraction of native short-term unemployed and $(1-\phi)$ the fraction of native long-term unemployed. In order to facilitate interpretation, we define

$$b = \phi \cdot b_1 + (1-\phi) \cdot b_2 \quad (4)$$

as the benefit claim of the “average” native unemployed. Due to shorter working biographies, migrants are not supposed to concede claims for the benefit level b_1 .¹⁵

Modeling the wage formation, we build on the monopoly union model going back on the work of Dunlop (1944).¹⁶ Furthermore, we assume that the union is small and does not internalize the effects of its wage setting behavior on the government’s tax rate determination.¹⁷ Hence, the calculus is described by the following maximization problem:

$$\max_w U = (1-\theta\gamma)(1-t)w \cdot L + [N - (1-\theta)L] \cdot [\phi \cdot b_1 + (1-\phi) \cdot b_2] + (1-\gamma)(M - \theta L) \cdot b_2 \quad (5)$$

whereby t characterizes the contribution rate of the unemployment benefit scheme. The contribution respective tax rate is set by the government and levied as a proportional tax on the gross wage w . From the first-order condition of the union’s calculus, we obtain as net wage rate

$$\bar{w} = (1-t) \cdot w = (1-\sigma)^{-1} \cdot (1-\theta \cdot \gamma)^{-1} \cdot \left[1 + (1-\gamma) \cdot \theta \cdot \frac{b_2}{b} - \theta \right] \cdot b. \quad (6)$$

This standard result shows that the wage rate consists of the outside option plus a mark-up. The corresponding level of employment is given by

¹⁴ Keeping the model simple, we ignore the work history by dividing the native workforce exogenously in long- and short-term unemployed workers. Empirically, it is shown that the fraction of long-term unemployed increases with the level of the overall unemployment rate in the economy. However, in order to reduce model complexity, we assume a fixed fraction independent from the level of unemployment.

¹⁵ Obviously, this is a simplifying assumption as many migrants have sufficient working records in the host country to claim the higher unemployment benefit. However, on average, it is reasonable to suppose that migrants have shorter periods of contribution than natives. This justifies our assumption of lower, average claims on the welfare state.

¹⁶ Although the monopoly union characterizes the wage formation process in a highly simplified manner, we rely on this special case of the Nash bargaining model. Thus, our setup is not only simple and tractable but also delivers results which are qualitatively not different from more complex bargaining modelling (see Oswald, 1985). Following Holmlund (1989, p. 20), in this case, “one might invoke Occam’s razor and dispense with the more general model as one with excess baggage”. Consequently, we restrict our analysis on the special monopoly union case.

¹⁷ This simplification is in line with the literature. See e.g. Schmidt et al. (1994), Fuest and Thum (2000) or Kemnitz (2003a, b).

$$L = (1 - \sigma)^{\frac{2}{\sigma}} \cdot (1 - \theta \cdot \gamma)^{\frac{1}{\sigma}} \cdot \left[1 + (1 - \gamma) \cdot \theta \cdot \frac{b_2}{b} - \theta \right]^{\frac{1}{\sigma}} \cdot b^{-\frac{1}{\sigma}} \cdot (1 - t)^{\frac{1}{\sigma}}. \quad (7)$$

Since our framework allows us to distinguish between a discriminating ($\gamma = 1$) and a non-discriminating ($\gamma = 0$) labor union, we focus on the effects of migrant labor market integration under these two extreme cases.

i) non-discriminating trade union, i.e. $\gamma = 0$

In this case, the net wage is simplified to

$$\bar{w}|_{\gamma=0} = (1 - \sigma)^{-1} \cdot \left[1 - \theta \cdot \left(1 - \frac{b_2}{b} \right) \right] \cdot b.$$

The net wage negatively depends on the labor market participation of migrants, i.e. a *ceteris paribus* increase in the participation rate θ decreases the net wage. The same holds for the gross wage claim since, at this stage, the contribution rate is given.¹⁸ Explained is this counterintuitive result by the fact that fewer natives in the employed workforce increase the marginal costs of a higher gross wage. Due to this increasing effect on the union's marginal costs, a larger labor market participation rate of migrants induces a less aggressive wage setting. Alternatively, one may argue that more migrants in the employed workforce reduce the opportunity costs of the outside option offered by the welfare state. A *ceteris paribus* increase of employment causes smaller costs for the union since the migrant workers only lose the amount of the lower unemployment benefit b_2 and not b by taking up a job. The terms of the trade-off of employment level L and gross wage w changes in favor of employment. Formally, our argument is described in the FOC from equation (5):

$$(1 - t) \cdot L = -L_w \cdot [(1 - t) \cdot w - b] - \theta \cdot L_w \cdot [b - b_2].$$

The LHS of this equation characterizes the union's marginal revenue of a gross wage increase. Each employed worker receives the share of $(1 - t)$ from a one-unit increase in the gross wage. Given that, in the FOC, marginal benefits equal marginal costs, the RHS expresses the associated marginal costs of an increase in the gross wage. These costs consist of the net income loss of workers with average benefit claim b that do not find a job due to the higher wage level (first term). But in addition, a second term on the RHS is observable. This term describes the additional income loss of the migrant workers that become unemployed. As their benefit claims are lower, the difference $(b - b_2)$ multiplied by the

¹⁸ Affecting the tax rate, a change in the rate θ additionally strengthens or weakens this effect via the balanced budget. We demonstrate this logic in detail at a later stage.

proportion of migrants in the workforce is added to the income loss of the union. The equation above thus shows that the utility loss for the non-discriminating union increases in the employment participation rate of migrants. This is the underlying reason for a less aggressive wage setting as a result of a larger θ . In addition, the wage equation shows that the strength of the wage-moderating effect depends on the ratio of b and b_2 . Hence, there is room for political decision-making to strengthen or weaken the employees' income losses.

ii) discriminating trade union, i.e. $\gamma = 1$

If the trade union only represents the native workforce, the net wage reduces to

$$\bar{w}|_{\gamma=1} = (1 - \sigma)^{-1} \cdot b.$$

This is the standard result in a monopoly wage setting. In the case of the discriminating trade union, the gross wage claim does not react on an increase in θ . Since the trade union does not incorporate the interests of the migrants, the outside option of the migrants is irrelevant for the maximization. Here too, an alternative interpretation can be given. Under the assumption of a constant fraction of native employees, the calculus is reduced to a wage surplus maximization for this fraction. To be more precise: even if the fraction of the employed natives decreases, there is no change in the marginal costs or revenues of the union. Analogue to case (i), the FOC from equation (5) clarifies the argumentation. For a discriminating union, it is given by

$$(1 - \theta) \cdot (1 - t) \cdot L = -(1 - \theta) \cdot L_w \cdot [(1 - t) \cdot w - b].$$

Again, the LHS of the equation describes the union's marginal revenue of a gross wage increase by one unit. However, here, the union does not represent migrant workers. So, in contrast to (i), the marginal gain applies to the native share of the employed workforce, i.e. $(1 - \theta) \cdot L$. The RHS characterizes the associated marginal costs of an increased gross wage for natives. Since $-(1 - \theta) \cdot L_w$ describes the number of additional natives not finding a job, the union's utility loss (RHS) coincides with the income loss of those natives, i.e. the income differential $(1 - t) \cdot w - b$ weighted by the number of unemployed natives. Since the union's calculus is equivalent to a surplus maximization, the share of migrant employees does not affect marginal costs. Hence, an increase in the participation rate θ has no impact on the discriminating union's wage setting behavior. Considering the two types of union behavior, we can summarize as

Proposition 1:

The net wage under a discriminating union is larger than under a non-discriminating union. A larger labor market participation rate of migrants increases this wedge as it

- a) induces a lower net wage if the union represents all workers and
- b) does not affect the net wage if the union only represents the natives.

A special feature of our framework should be noted. Under the extreme assumption that migrants are excluded from the labor market ($\theta = 0$), the net wages do not differ under the two types of trade union behavior. This results from the fact that the scenario is equivalent to a wage surplus maximization, where the income of migrants is fixed by the social payment in case of a non-discriminating union. The same holds true if the extreme case $b = b_2$ applies, since here the union calculus is also reduced to a maximization of the wage surplus.

Completing the basic model, we introduce a government that provides the social security system. Transfers are financed by a tax rate t set such that the aggregate contributions to the system equal the costs of unemployment benefits. Then, the equilibrium tax rate fulfills

$$t \cdot w \cdot L = [N - (1 - \theta) \cdot L] \cdot b + (M - \theta \cdot L) \cdot b_2. \quad (8)$$

Analogue to net wage and employment level, equation (8) collapses to the same term for the two types of union behavior under the assumption of $\theta = 0$ or $b = b_2$.¹⁹ Using conditional equation (8) as a starting point, we conduct a comparative statics analysis. In doing so, we are able to isolate the labor market effects of changes in the integration parameters M and θ under the two types of trade union behavior.

III. Labor market effects of integration

In the following section, we concentrate on the labor market effects of intensified migrant worker integration in equilibrium. Sticking to the main research questions, we focus on the two dimensions of integration and analyze (i) the effects of an inflow of migrant workers and (ii) the implications of a larger labor market participation rate of migrants. We already learned that labor market integration affects the gross wage claim of the union. In addition, equation (8) states that it also influences the number and distribution of benefit recipients. In the next step, we simplify our framework with respect to the trade union type and discuss the *ceteris paribus* labor market effects in detail.

III.1. Integration with a discriminating trade union

With the simplification $\gamma = 1$, gross wage and corresponding employment are

¹⁹ See the appendix for a version of the budget equation where it is substituted for the wage equation (6) and the corresponding employment decision (7).

$$w|_{\gamma=1} = \frac{b}{(1-t) \cdot (1-\sigma)} \text{ and } L|_{\gamma=1} = \left(\frac{b}{1-t} \right)^{-1/\sigma} \cdot (1-\sigma)^{2/\sigma}.$$

Substituting for both in the governmental budget constraint (8), we obtain the balancing contribution rate as

$$(1-\sigma)^{-1} \cdot t \cdot (1-t)^{\frac{1-\sigma}{\sigma}} + \lambda \cdot (1-t)^{\frac{1}{\sigma}} = (1-\sigma)^{\frac{2}{\sigma}} \cdot b^{\frac{1}{\sigma}} \cdot \left(N + \frac{b_2}{b} \cdot M \right), \quad (9)$$

where $\lambda = 1 - \theta \cdot \left(1 - \frac{b_2}{b} \right) \in (0; 1)$.

As stated in our first research question, we are interested in the *ceteris paribus* consequences of an inflow of workers from abroad. Hence, we derive the total differential with respect to the stock of migrant workers in the economy and obtain

$$\frac{dt}{dM} \Big|_{\gamma=1} = \frac{(1-\sigma)^{-\frac{2}{\sigma}} \cdot b^{\frac{1}{\sigma}} \cdot \frac{b_2}{b}}{(1-t)^{\frac{1-\sigma}{\sigma}} \cdot \left[\frac{1}{1-\sigma} - \frac{t}{\sigma \cdot (1-t)} - \frac{\lambda}{\sigma} \right]} > 0. \quad (10)$$

As the union does not consider the economy-wide labor supply in its decision on the wage level, an influx of migrants does neither change the gross wage nor the employment via the channel of the optimizing union. However, migration has an effect on employment and wages via the budgetary channel. An increase in the number of recipients of benefits increases the budgetary costs and has to be countervailed by an increase in the contribution rate. Since λ has the value 1 as an upper bound, the denominator is always positive if $(2\sigma - 1)/\sigma > t$.²⁰

From now on, we assume that this condition is always met. The corresponding effects on the equilibrium employment and wage levels are thus given by

$$\frac{dw}{dM} \Big|_{\gamma=1} = \underbrace{\frac{\partial w}{\partial t} \Big|_{\gamma=1}}_{+} \cdot \underbrace{\frac{dt}{dM}}_{+} > 0 \text{ and } \frac{dL}{dM} \Big|_{\gamma=1} = \underbrace{\frac{\partial L}{\partial t} \Big|_{\gamma=1}}_{-} \cdot \underbrace{\frac{dt}{dM}}_{+} < 0.$$

²⁰

The definition of this restrictive condition is necessary as the government does not follow an optimal taxation strategy by e.g. maximizing the tax revenue. In fact, the tax rate is set such that the budget is balanced no matter whether it is Laffer efficient or not. By applying this condition, we make sure that the government always chooses a tax rate-revenue combination on the upward sloping side of the Laffer curve. Note that for all positive values of the tax rate, this assumption implies the condition $1/2 < \sigma < 1$ to hold. Thus, per assumption, the wage elasticity of labor demand is not too elastic in our model.

For the analysis of our second research question, we can also rely on equation (9). By building the total differential with respect to θ and t , we obtain the *ceteris paribus* tax effect of a change in the migrant worker participation rate. It is described by

$$\left. \frac{dt}{d\theta} \right|_{\gamma=1} = \frac{(1-t) \cdot \left(1 - \frac{b_2}{b}\right)}{\left[\frac{1}{1-\sigma} - \frac{t}{\sigma \cdot (1-t)} - \frac{\lambda}{\sigma} \right]} > 0. \quad (11)$$

Expression (11) gives us several interesting insights. Firstly, in case of an unemployment benefit system with a single compensation level, i.e. $b = b_2$, the labor market participation rate of migrants does not affect the contribution rate. Thus, if natives and migrants do not differ with respect to the welfare transfer, an increase in the fraction of employed migrants does not affect the equilibrium value of the bargained gross wage. Secondly, in case of a two-tier welfare system, i.e. $b > b_2$, a larger workforce participation of migrants increases the contribution rate.²¹

Our finding can be explained as follows. We know that the labor union does not consider the interests of the migrants so that the net wage does not change with an increase in the participation rate θ . This is because the discriminating trade union exactly counterbalances the change in the tax rate by adjusting the gross wage. An increase in the proportion of employed migrants leads to higher costs for the welfare state, since the replaced native workers have, on average, higher benefit claims. Due to increasing unemployment expenditures, the government has to adapt the tax rate, i.e. the rate increases. Algebraically, the changes of equilibrium gross wage and employment are illustrated by

$$\left. \frac{dw}{d\theta} \right|_{\gamma=1} = \underbrace{\frac{\partial w}{\partial t}}_{+} \cdot \underbrace{\frac{dt}{d\theta}}_{+} > 0 \quad \text{and} \quad \left. \frac{dL}{d\theta} \right|_{\gamma=1} = \underbrace{\frac{\partial L}{\partial t}}_{-} \cdot \underbrace{\frac{dt}{d\theta}}_{+} < 0.$$

As further shown in the tax rate equation (10) and (11), the strength of the effects depends on the wedge between b_2 and b . The summarization of our observations leads to

Proposition 2:

Under the assumption of a discriminating union, it follows that both, an inflow of migrant workers and an increase in the labor market participation rate, is accompanied by an increase in the contribution rate t .

²¹ As in the argumentation above, this holds at least under a sufficiently inelastic labor demand, i.e. $(2\sigma - 1)/\sigma > t$.

The budgetary effect of a migrant inflow is well known and shown in earlier studies.²² However, to our knowledge, we are the first who address the effect of an increase in the employment participation rate of migrants in a social security system. Furthermore, our model allows us to distinguish the effects under different welfare schemes as shown at a later stage.

III.2. Integration with a non-discriminating trade union

Supposed that the trade union incorporates the interests of the native and migrant workforce ($\gamma = 0$), the wage rate and the corresponding employment level are given by

$$w|_{\gamma=0} = \frac{b \cdot \lambda}{(1-t) \cdot (1-\sigma)} \text{ and } L|_{\gamma=0} = \left(\frac{b \cdot \lambda}{1-t} \right)^{-1/\sigma} \cdot (1-\sigma)^{2/\sigma}.$$

Again, we insert the two expressions into the conditional equation (8) to determine the equilibrium contribution rate. This rate is implicitly given by

$$(1-\sigma)^{-1} \cdot t \cdot (1-t)^{\frac{1-\sigma}{\sigma}} + (1-t)^{\frac{1}{\sigma}} = \lambda^{\frac{1-\sigma}{\sigma}} \cdot (1-\sigma)^{\frac{2}{\sigma}} \cdot b^{\frac{1}{\sigma}} \cdot \left(N + \frac{b_2}{b} \cdot M \right). \quad (12)$$

Analogue to section III.1, we demonstrate the effect of an inflow of migrant workers. Hence, we differentiate (12) with respect to the migrant stock M and the contribution rate t and obtain

$$\frac{dt}{dM}\Big|_{\gamma=0} = \frac{\lambda^{\frac{1-\sigma}{\sigma}} \cdot (1-\sigma)^{\frac{2}{\sigma}} \cdot b^{\frac{1}{\sigma}} \cdot \frac{b_2}{b}}{(1-t)^{\frac{1-\sigma}{\sigma}} \cdot \left[\frac{1}{1-\sigma} - \frac{t}{\sigma \cdot (1-t)} - \frac{1}{\sigma} \right]} > 0. \quad (13)$$

Compared to the findings in the previous section, an inflow of migrant workers does not have qualitatively different effects on the labor market variables. An increase in the number of recipients induces a larger contribution rate in equilibrium. Nonetheless, the effects differ in size. Accordingly, the same is true if we look at changes of the gross wage and the employment level, i.e.

$$\frac{dw}{dM}\Big|_{\gamma=0} = \underbrace{\frac{\partial w}{\partial t}}_{+} \cdot \underbrace{\frac{dt}{dM}}_{+} > 0 \text{ and } \frac{dL}{dM}\Big|_{\gamma=0} = \underbrace{\frac{\partial L}{\partial t}}_{-} \cdot \underbrace{\frac{dt}{dM}}_{+} < 0.$$

²² See Kemnitz (2003b) or Facchini and Mayda (2009), who conclude that, given a constant benefit policy, the contribution rate in an unemployment insurance system increases if immigrants are on average less skilled than natives.

Now, we differentiate equation (12) with respect to θ and t to study our second research question under a non-discriminating union regime. As tax effect of a larger participation rate of migrant workers in equilibrium, we derive

$$\left. \frac{dt}{d\theta} \right|_{\gamma=0} = - \frac{(1-\sigma)^{\frac{2-\sigma}{\sigma}} \cdot \lambda^{\frac{1-2\sigma}{\sigma}} \cdot \left(1 - \frac{b_2}{b}\right) \cdot b^{\frac{1}{\sigma}} \cdot \left(N + \frac{b_2}{b} \cdot M\right)}{(1-t)^{\frac{1-\sigma}{\sigma}} \cdot \left[\frac{1}{1-\sigma} - \frac{t}{\sigma \cdot (1-t)} - \frac{1}{\sigma} \right]} < 0. \quad (14)$$

In contrast to section III.1 and, on the first view, counterintuitive, the tax effect of a larger rate θ is negative if $b > b_2$ holds. This result is driven by two countervailing effects. The first working channel is intuitive. As natives claim, on average, higher benefits, the replacement of native through migrant workers corresponds with higher costs for the welfare state. This logic of negative budgetary repercussions is equivalent to the scenario in III.1 and results, *ceteris paribus*, in an increasing equilibrium tax rate. However, the second working channel via the union's net wage moderation is not so obvious. As stated in Proposition 1, a larger workforce participation rate of migrants induces a less aggressive wage setting for a given tax rate and thus leads to a reduced net and gross wage. Since the labor demand curve is downward sloping with respect to the gross wage, the reduced wage level creates a labor-augmenting incentive resulting in additional hiring. In result, fewer workers participate in the welfare system so that less expenditure occurs. The contribution rate decreases.

In our framework, an increased participation rate of migrants has a negative effect on the tax rate. Hence, we can conclude that the wage-moderating effect more than offsets the cost of replacement effect. Finally, we calculate the effects on gross wage and employment level

$$\left. \frac{dw}{d\theta} \right|_{\gamma=0} = \underbrace{\left. \frac{\partial w}{\partial t} \right|_{\gamma=0}}_{+} \cdot \underbrace{\left. \frac{dt}{d\theta} \right|_{\gamma=0}}_{-} < 0 \quad \text{and} \quad \left. \frac{dL}{d\theta} \right|_{\gamma=0} = \underbrace{\left. \frac{\partial L}{\partial t} \right|_{\gamma=0}}_{-} \cdot \underbrace{\left. \frac{dt}{d\theta} \right|_{\gamma=0}}_{-} > 0.$$

We sum up our findings as

Proposition 3:

Under the assumption of a non-discriminating union, it follows that

- a) *an inflow of migrant workers increases the contribution rate t*
- b) *an increase in the labor market participation rate of migrants reduces the contribution rate t .*

In contrast to the case of a discriminating union, the integration strategies now have different effects. While the effect of a migrant inflow qualitatively equals the former, a change in the

participation rate leads to an opposite effect. This phenomenon is explained by a second working channel in the union's calculus that implies wage moderation and a larger employment level. In result, the burden of taxation is borne by a larger number of employed workers, which offsets the pressure on the expenditure side. Thus, with respect to the impact of a national integration strategy, the union behavior seems to be a decisive variable. In order to define a reference case for the analysis of the differential effects in a two-tier system, the next section is devoted to the special case where the welfare system is described by a unique benefit level.

III.3. Special case: Effects of integration in a system with a unique benefit level

In the previous two sections, we have shown the differential effect of trade union behavior on the labor market effects of integration if the benefit levels are different, i.e. $b_1 > b_2$. Now, we focus on the special case where $b_1 = b_2$ holds. We define this case as the reference for later comparisons, since it is the standard case analyzed in the literature on labor market effects of migration.²³ Given a unique benefit level, the *ceteris paribus* effects of a change in M and θ are

$$\left. \frac{dt}{dM} \right|_{\gamma=0}^{b_1=b_2} = \left. \frac{dt}{dM} \right|_{\gamma=1}^{b_1=b_2} = \frac{(1-\sigma)^{-\frac{2}{\sigma}} \cdot b^{\frac{1}{\sigma}}}{(1-t)^{\frac{1-\sigma}{\sigma}} \cdot \left[\frac{1}{1-\sigma} - \frac{t}{\sigma \cdot (1-t)} - \frac{1}{\sigma} \right]} > 0$$

and

$$\left. \frac{dt}{d\theta} \right|_{\gamma=1}^{b_1=b_2} = \left. \frac{dt}{d\theta} \right|_{\gamma=0}^{b_1=b_2} = 0.$$

Interesting to notice is the fact that, in this special case, the union behavior does not have a differential effect on the outcomes. Furthermore, we observe that a change in the labor market participation rate of migrants is tax rate neutral while an inflow of migrant workers has an increasing effect on the contribution rate. After the discussion of the aggregate effects of migrant labor market integration, we disentangle them in the following chapter and isolate the costs and benefits of a two-tier welfare system.

²³ See Schmidt et al. (1994), Kemnitz (2003b), and Razin and Sadka (1995, 2000), for instance.

IV. Hidden costs and benefits in a two-tier system

In the last section, we have shown that the interplay of a two-tier welfare system and the union behavior has implications for the economic evaluation concerning the labor market effects of the integration of migrant workers. Below, we summarize the major effects of the two dimensions of labor market integration ($dM > 0$ and $d\theta > 0$) in the two-tier system and compare them with the special case of a unique benefit level. This allows us to isolate hidden costs and benefits that emerge from the design of the welfare system. In doing so, we compare the direction and the size of the impact on the contribution rate which defines the effects on the labor market outcome. Costs and benefits are defined as changes of the employment level since this is a common indicator for successful policy reforms.²⁴ Hence, a parameter change induces costs if it has a decreasing effect on the employment level, while it induces benefits if it has an increasing effect on the employment level. Costs and benefits are denoted as hidden if they do not emerge in the reference case ($b_1 = b_2$) that prevails in the literature.

IV.1. Hidden costs and benefits of a larger migrant stock

Table 1 gives an overview of the labor market effects emerging from an increase in the migrant stock under the different scenarios.

welfare system	trade union behavior	change in labor market outcome			
		dt	dw	dL	$d\bar{w}$
two-tier system: $b_1 > b_2$	discriminating: $\gamma = 1$	+	+	-	0
	non-discriminating: $\gamma = 0$	+	+	-	0
special case: $b_1 = b_2$	discriminating: $\gamma = 1$	+	+	-	0
	non-discriminating: $\gamma = 0$	+	+	-	0

Table 1: Labor market effects of a change in the migrant stock ($dM > 0$) in different scenarios

In case of a two-tier welfare system, i.e. $b_1 > b_2$, an inflow of migrant workers results in an increase in the equilibrium contribution rate. Additional workers in the economy induce higher welfare expenditures, since the monopoly trade union does not consider the overall supply of workers in its calculus. Therefore, an inflow of migrant workers increases the number of benefit recipients. Consequently, the equilibrium contribution rate increases and the union (be it discriminating or non-discriminating) upwardly adjusts the gross wage claim.

²⁴ One might say that this definition of costs and benefits is too narrow since it does not account for the shift of the distribution of the social product via the wage mechanism. However, in our model, a higher employment level corresponds with an increase in the economy's output that gives room for compensating redistribution. Accordingly, we argue that an output increase describes a potential Pareto improvement in a Kaldor-Hicks sense and is thus beneficial.

Furthermore, the employment level is reduced due to the larger gross wage. In contrast, the net wage remains unchanged as the trade union sets a gross wage that exactly offsets the increase in contribution rate t .

In the special case where $b_1 = b_2$ applies, the effects of an inflow of migrant workers do not differ qualitatively from the effects in a two-tier system, because the logic of the labor market effects is equivalent. However, if we compare the size of the effects for given union behavior, we see that in a welfare program with a unique benefit level the impact of additional transfer recipients is larger. Thus, in the case with a unique benefit level, the distortion effect of the contribution rate increases. In other words, the two-tier welfare system induces hidden benefits in terms of higher employment. Based on this finding, we can formulate

Proposition 4:

For given union behavior, a two-tier system creates hidden benefits in case of an inflow of migrants compared to a system with a unique benefit level.

Our setup also allows an alternative interpretation. Let us assume that the union behavior is the changing variable. As pointed out, in a welfare system with a unique transfer, the trade union behavior does not imply differential effects on the contribution rate since the effects are exactly the same under both trade union regimes (see III.3). In contrast, comparing the changes in a two-tier-system, we find that the effects differ in terms of size. Thus, although trade union behavior does not change the direction of the effects, it induces hidden benefits or costs depending on the parameter constellation in the system.

IV.2. Hidden costs and benefits of a larger labor market participation rate

Table 2 summarizes the effects of an increase in the labor market participation rate of migrant workers. It contrasts the effects in a two-tier system to the effects in a system with a unique benefit level.

welfare system	trade union behavior	change in labor market outcome			
		dt	dw	dL	$d\bar{w}$
two-tier system: $b_1 > b_2$	discriminating: $\gamma = 1$	+	+	-	0
	non-discriminating: $\gamma = 0$	-	-	+	-
special case: $b_1 = b_2$	discriminating: $\gamma = 1$	0	0	0	0
	non-discriminating: $\gamma = 0$	0	0	0	0

Table 2: Effects of a change in the migrant participation rate ($d\theta > 0$) in different scenarios

If the unemployment payment system consists of two tiers, the equilibrium tax rate increases after a positive change in the participation rate θ in case of a discriminating union (first row).

The replacement of natives that have on average larger benefit claims than migrants induces an increase in welfare expenditures. Naturally, these larger expenditures are accommodated by an upward adjustment of the contribution rate t . As the labor union exclusively represents the native workers, i.e. θ is not part of the wage function, she does not counterbalance the larger contribution rate t with wage moderation. Rather, the union responds with an increase in the gross wage claim leading to a decreasing employment level in equilibrium. Thus, compared to a unique transfer system (third row), hidden costs of migrant labor market integration in form of job losses emerge in the two-tier system. Further, the net wage does not change, since the discriminating union exactly offsets the increase in t by adjusting the gross wage claim.

In contrast and, at first sight, surprising, the second row shows that a larger employment rate of migrants has a decreasing effect on the contribution rate t , if the union also embraces the interests of the migrant workers ($\gamma = 0$). As in the case before, the substitution of native workers increases welfare costs which has an increasing effect on t . But here, the employment participation rate θ negatively enters the gross wage function. Hence, an increase in the participation rate also results in a more defensive gross wage setting by the union. The underlying logic is that the union's opportunity costs of additional employment decrease as the proportion of migrants among the hired workers increases. In other words, the outside option set by the welfare system is less attractive for migrant than for native workers, so that a change in θ has an impact on the union's calculus. In sum, the gross wage claim of the union decreases which has a labor-augmenting effect. Compared to a unique transfer system (fourth row), an increase in the proportion of migrant workers in the workforce thus creates hidden benefits in a two-tier system under the regime of a non-discriminating union. However, without compensating measurements, these benefits come along with income losses for the workers due to a reduced net wage. Given a two-tier welfare system, the union creates hidden benefits in terms of higher employment if she behaves non-discriminating.

In case of a system with a unique level of benefits (third and fourth row), an increase in the labor market participation rate of migrants is tax rate neutral and the labor market outcomes in equilibrium do not change. The reason is that natives and migrants have the same claims in the welfare system so that a substitution of workers has no effect on the benefit costs. Consequently, no labor market effects emerge from the different union behavior under a unique welfare payment structure. In summary, we find the interesting result that, depending on the union behavior, a two-tier system induces hidden costs or benefits which stands in contrast to the implications of Section IV.1. We summarize our main findings as

Proposition 5:

Compared to a system with a unique benefit level, a larger labor market participation rate of migrants induces

(a) *hidden benefits under the assumption of a non-discriminating union and*
(b) *hidden costs under the assumption of a discriminating union*
in a two-tier system.

Comparing the results of the two subsections gives us several insights with respect to the impact of labor market integration. Firstly, the design of the welfare system has no qualitative effects in case of integration understood as the participation of additional workers in the social security system. However, in a two-tier-system, there are hidden benefits due to a reduction in the migration-induced change of the contribution rate. In contrast, we show that for given union behavior, the design of the welfare state makes a difference in case of integration understood as an increase in the labor market participation rate of migrants. We observe qualitative changes of the integration effects depending on the welfare design. Additionally, we demonstrate that in a two-tier welfare state, the union behavior creates cost or benefits. Since the existent literature often simplifies the welfare modeling or ignores different union behavior, this feature is the central value added of our paper.

V. Conclusion

The freedom of movement and the non-discrimination of EU citizens in the welfare system reduce individual migration costs and intensify *ceteris paribus* the incentives to migrate in the EU-27. According to theory, these incentives should result in increasing migration flows to attractive host countries. For national policy makers, this poses a challenge since problems with efficiency-distorting collective bargaining agreements and/or welfare system structures aggravate in a common European labor market with open borders. Arguably, the EU legislation increases the pressure to design integration-friendly labor markets. The integrative capability of a local labor market can be analyzed with respect to two dimensions: (i) the ability to integrate an inflow of migrant workers and (ii) the ability to bring migrant workers that already live in the country into employment.

In general, the economic literature extensively discusses the labor market effects of migration. However, the applied models are very stylized in nature and often do not reflect the institutional design of the welfare system or the trade union behavior. We contribute to the literature by introducing two institutional features that have been neglected in the analysis. Firstly, we consider a two-tier unemployment benefit system that is an essential element of many EU welfare states. Secondly, we consider discrimination of migrant workers by the players in the wage bargaining process, i.e. the trade unions and the employers. Considering two dimensions of an integrative labor market, we formulate the following research questions: What are the labor market effects of (i) an inflow of migrant workers and (ii) an increase in the labor market participation rate of migrants, e.g. after the introduction of a governmental

quota? Applying a simple monopoly trade union model, we study the effects on wage, employment and tax level in equilibrium and find interesting new insights.

We show that, in a two-tier welfare system with a non-discriminating union, an inflow of migrant workers increases the contribution rate to the unemployment system and reduces the employment level. Furthermore, the gross wage increases while the net wage remains constant. In sharp contrast, an increase in the labor market participation rate of migrants leads to a lower gross and net wage, a reduction in the contribution rate and an increase in the employment level. In case of a discriminating union, an inflow of migrant workers results in an increase in the contribution rate and a decrease in the employment level. The net wage is unchanged while the gross wage increases. Under this regime, a larger participation rate of migrant workers has an increasing effect on the contribution rate and a decreasing effect on the employment in equilibrium. It induces an increase in the gross wage and a constancy of the net wage.

Comparing the general setup with a system characterized by a unique benefit level, we identify hidden costs and benefits of integration in the two-tier system. The size of the negative effect of an inflow of migrant workers on the employment level is reduced through the positive wedge between b_1 and b_2 . Thus, hidden benefits of a two-tier system emerge. More interesting though, we show that in case of a unique benefit level, an increase in the participation rate of migrant workers is employment neutral while it increases employment in case of a non-discriminating union and decreases employment in case of a discriminating union in a two-tier system. Trade union behavior qualitatively influences the labor market effects of integration. A non-discriminating behavior in a two-tier system creates hidden benefits while a discriminating behavior induces hidden costs.

An important issue should be noted. Our results are based on a static framework. In a dynamic model, migrants will - if they work for a minimum number of contributing years - be entitled to the higher unemployment benefit. Thus, our model is a short-run analysis and a first step to evaluate the impact of migration in a two-tier welfare system. Consequently, further research should focus on the convergence of migrants' work histories. Additionally, different skill types in the host country as well as in the migrant inflow and endogenous human capital formation could be considered.

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Appendix

Substituting for the gross wage equation (6) and the corresponding employment level (7) in the budget equation (8), we obtain:

$$\left\{ (1-\sigma)^{-1} \cdot (1-\theta \cdot \gamma)^{-1} \cdot t \cdot (1-t)^{-1} \cdot \left[1 + (1-\gamma) \cdot \theta \cdot \frac{b_2}{b} - \theta \right] + \left[1 - \theta \cdot \left(1 - \frac{b_2}{b} \right) \right] \right\} \cdot \left[1 + (1-\gamma) \cdot \theta \cdot \frac{b_2}{b} - \theta \right]^{-\frac{1}{\sigma}} \cdot (1-\sigma)^{\frac{2}{\sigma}} \cdot (1-\theta \cdot \gamma)^{\frac{1}{\sigma}} \cdot b^{-\frac{1}{\sigma}} \cdot (1-t)^{\frac{1}{\sigma}} = N + \frac{b_2}{b} \cdot M$$

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