Discussion of "Should Germany Have Built a New Wall?"*

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The paper studies the macroeconomic and distributional effects of the 2015-2018 immigration wave in Germany using a calibrated overlapping generations model with a realistic pension system. The paper's main finding is that the immigration wave led to moderate welfare losses of low-skilled native workers, while medium- and high-skilled native workers gained as immigrants lower natives' required contributions to the German pension system. Overall, the welfare gains are large enough to compensate the low-skilled workers for their losses.

The paper's main contribution is to analyze the welfare effects of immigration through the lens of a rich quantitative macro model in general equilibrium. This approach allows the authors to estimate the welfare effects both in the short run and in the very long term, and to isolate the channels contributing to these effects.

The paper's results raise two related questions: first, how large are the standard errors around the estimated welfare gains? Second, how applicable are the findings from the paper to migration waves more generally? We here comment on both questions and expand on the

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sensitivity analyses performed in Section 7 of the paper. To guide the discussion we introduce a stylized framework which encompasses, in reduced form, the main forces through which migrants may affect the welfare of natives. We next describe the model and how it maps to the more general framework in the paper. We then analyze how robust the findings of the paper are, through the lens of our framework, to changes in the values of various parameters.

A Stylized Framework

Consider a perfectly competitive firm which produces output via a nested CES production function. We simplify with respect to the model presented in the paper by considering only two skill levels (low and high) and two types of workers (native and foreign). The upper-level nest of the production function aggregates an input produced with low-skilled labor, Y_L, and an input produced with high-skilled labor, Y_H, according to

$$Y = \left[Y_L^{1-\eta} + Y_H^{1-\eta}\right]^{\frac{\rho}{1-\eta}},$$

where η is the elasticity of substitution and ρ is a returns-to-scale parameter. At the lower-level nest, the two inputs each combine native and foreign workers of a given skill level according to

$$Y_L = \left[X_{L,n}^{1-\theta} + X_{L,f}^{1-\theta}\right]^{\frac{1}{1-\theta}}$$
$$Y_H = \left[X_{H,n}^{1-\theta} + X_{H,f}^{1-\theta}\right]^{\frac{1}{1-\theta}},$$

where $X_{L,n}$ and $X_{L,h}$ are efficiency units of low- and high-skilled native workers, respectively, while $X_{L,f}$ and $X_{H,f}$ are the same for foreigners. We index by $j \in \{L, H\}$ the skill level of a worker and by $k \in \{n, f\}$ the worker's origin, and denote by $N_{j,k}$ the total population of group (j, k). We assume that for exogenous reasons only a fraction $\psi_{j,k} \in [0, 1]$ of the workers of group (j, k) is working. We will use this parameter to capture the share of workers of type (j, k) in retirement. The efficiency units $X_{j,k}$ are the product of the mass of the population

of type (j,k), $N_{j,k}$, multiplied by the share of the group that is working, $\psi_{j,k}$, and the relative productivity of this group of workers, $\gamma_{j,k}$, i.e., $X_{j,k} = \psi_{j,k}\gamma_{j,k}N_{j,k}$.

A lump sum tax T is levied on each active worker and is used to finance a government-provided consumption good G distributed to each worker irrespective of their work status. We assume that the government budget must balance, which implies

$$T = \underbrace{G}_{\text{Transfer}} \underbrace{\frac{N_{L,n} + N_{H,n} + N_{L,f} + N_{H,f}}{\psi_{L,n}N_{L,n} + \psi_{H,n}N_{H,n} + \psi_{L,f}N_{L,f} + \psi_{H,f}N_{H,f}}}_{\equiv \delta, \text{ Dependency Ratio}}.$$

Labor income is shared equally among all individuals within a group. As a result, consumption for an individual in group (j,k) is given by

$$C_{j,k} = \psi_{j,k}\left(\gamma_{j,k}W_{j,k} - T\right) + G$$

where $W_{j,k}$ is the wage per efficiency unit of a given labor type.

From the first-order conditions of the firm's problem, we obtain the equilibrium wages per efficiency unit

$$W_{j,k} = \rho\left(\frac{X_{j,k}}{Y_j}\right)^{-\theta}\left(\frac{Y_j}{Y}\right)^{-\eta}Y^{-(1-\eta)\left(\frac{1-\rho}{\rho}\right)}$$

and using this expression and government budget balance we obtain consumption for a given type of individual

$$C_{j,k} = \psi_{j,k}\left(\rho\gamma_{j,k}\left(\frac{X_{j,k}}{Y_j}\right)^{-\theta}\left(\frac{Y_j}{Y}\right)^{-\eta}Y^{-(1-\eta)\left(\frac{1-\rho}{\rho}\right)} - \delta G\right) + G.$$

This simple framework has five channels, governed by five key parameters, through which the arrival of immigrants affects native workers. These channels capture the main forces of the general framework in the paper.[1] First, the parameters $\psi_{j,f}$ govern the extent to

[1] The only mechanism absent in our simple framework is that the arrival of migrants increases government

which foreigners enter the labor force. If migrants are relatively more likely to work (for example because they are relatively young), they have relatively high values of $\psi_{j,f}$, which lowers the dependency ratio δ. As a result, the tax required to balance the government budget falls, which increases the consumption of natives. Second, η controls the elasticity of substitution between skills. An inflow of low-skilled migrants makes low-skilled labor more abundant, which lowers the consumption of this group of workers. Third, the parameter θ governs the elasticity of substitution between natives and foreigners within a given skill group. An inflow of low-skilled foreigners makes low-skilled natives relatively more scarce, which increases consumption of low-skilled natives. Fourth, the parameter ρ controls the returns to scale in the model. If $\rho < 1$, there are aggregate decreasing returns to scale in production, which leads to congestion as more workers arrive, lowering per-capita output. Alternatively, if agglomeration forces dominate, ρ could be larger than 1. Finally, the ratio $N_{H,f}/N_{L,f}$ governs the share of immigrants that are low-skilled. If a larger share of the newly arriving immigrants is low-skilled, low-skilled natives are more negatively impacted. Moreover, output per capita is lower since a larger share of the new workers is relatively less productive.

Effect of Parameter Values on Welfare Estimates

We parametrize the model, using similar parameter values as in the main text where possible, and study how the consumption of natives is affected by the different parameter choices to shed light on the sensitivity of the paper's findings.

Our framework and calibration are stylized and used to provide intuition for the main model mechanisms. In the baseline, we set $\theta = 13.22$ and $\eta = 3.05$ as in the main text, and we choose $\rho = 1$.[2] We calibrate the baseline population $N_{j,k}$ to match the share of foreigners in Germany at year-end 2014, which was 8.7%, and distribute the population

expenditures. It would be straightforward to introduce this mechanism via an increase in T that does not lead to a corresponding increase in G.

[2]Our model does not have capital, hence the closed economy case, in the short run, would map into $\rho < 1$. We will consider several values for ρ, both above and below 1.

to low- and high-skilled based on the skill distribution in Table 3 of the main paper for natives and foreigners from the rest of the world.[3] This calibration yields $N_{L,n} = .400$, $N_{H,n} = .512$, $N_{L,f} = .043$, and $N_{H,f} = .044$. We set the labor force participation parameters $\psi_{H,n} = \psi_{L,n} = 0.60$ to match the labor force participation rate in Germany in 2015. In our benchmark calibration, we assume that natives and migrants have identical ψ. We fix G to be equal to 20% of aggregate GDP. In practice, the value of G is irrelevant for the qualitative patterns in our results, which are our main focus. We then normalize $\gamma_{H,n} = 1$ and estimate $\gamma_{L,n}$, $\gamma_{H,f}$, and $\gamma_{L,f}$ to approximately match the wage gaps across groups from Figure 16 in the paper: $\frac{\gamma_{L,n}W_{L,n}}{\gamma_{H,n}W_{H,n}} = 68\%$, $\frac{\gamma_{H,f}W_{H,f}}{\gamma_{H,n}W_{H,n}} = 68\%$, and $\frac{\gamma_{L,f}W_{L,f}}{\gamma_{L,n}W_{L,n}} = 83\%$.

Equipped with our calibrated model, we compute the effect of an inflow of 2 million migrants, as in the 2015-2016 wave. As a baseline, we assume that one sixth of the new immigrants are high-skilled, which is half the share of high-skilled in the native population. This calibration is consistent with the idea that most immigrants were relatively unskilled. However, Table 3 in the main paper highlights that in fact the share of asylum seekers with a university degree exceeds the share of high-skilled native workers. We assume that these skills might not be immediately transferable to the German labor market, for example because they are not recognized by the government, and will analyze the sensitivity of our results to this parameter.

We compute the percentage change of aggregate native consumption caused by the migration wave, defined as $\bar{C}_n \equiv N_{H,n}C_{H,n} + N_{L,n}C_{L,n}$. In our setup, consumption is a proxy for welfare. We also compute consumption for the low- and high-skilled natives separately. We then repeat this exercise varying one-by-one the five key parameters of interest: the share of migrants working (ψ_f), the elasticity of substitution between high and low skilled (η), the elasticity of substitution between natives and foreigners (θ), the aggregate returns to scale (ρ), and the share of *new* migrants that are high-skilled ($N_{H,f}/N_{L,f}$). Figure 1 plots the change in welfare relative to the case with no migration as we vary each parameter around

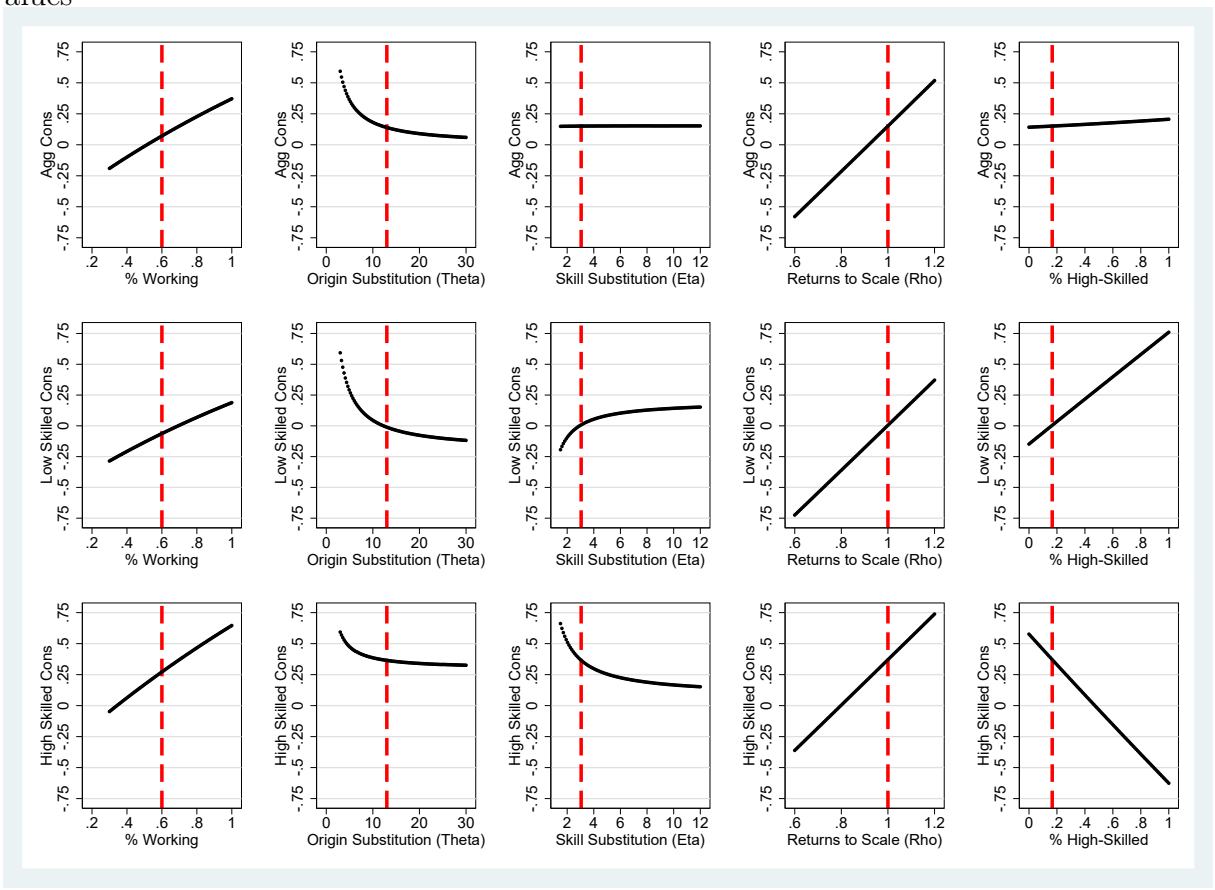
[3] We assign medium-skilled workers equally to the low-skilled and the high-skilled category.

its benchmark value. The three rows show the effects on aggregate native consumption, the consumption of low-skilled natives, and the consumption of high-skilled natives, respectively, as we vary our five parameters of interest. Our model provides a similar starting point as the paper under our benchmark calibration, indicated by the red vertical lines: low-skilled individuals experience welfare losses while high-skilled individuals gain, and these gains more than offset the losses.

The figure shows that some of the parameters are relevant for aggregate native consumption, while others mostly matter only for the wage inequality within natives. Specifically, aggregate gains/losses are primarily sensitive to: i) changes in the share of migrants working (the dependency ratio); ii) the elasticity of substitution between natives and foreigners (captured by θ); and iii) aggregate returns to scale. On the other hand, the elasticity of substitution between low- and high-skilled and the share of new migrants that are high-skilled almost exclusively affect the relative gains of high- and low-skilled natives, but have only negligible effects on aggregate consumption. The figure thus provides guidance on what combinations of parameter values would generate aggregate consumption gains but small consumption losses for low-skilled natives, as in the paper.

In view of these results, we next discuss how confident we are on the generalizability of the paper's findings. The first column of Figure 1 presents the analysis for the share of immigrants that are working (ψ_f). In the German migration episode, the vast majority of immigrants are young, between the ages of 20 to 40. This age profile is particularly advantageous for the host country since migrants spend many years in the workforce, contributing to pension payments and taxes, which benefits natives as well. However, as the global population ages and fertility is declining (UN (2017)), future cohort of migrants are possibly older, which may lower the welfare gains. As the share of working migrants falls below about half, the change in the overall welfare of natives becomes negative because the dependency ratio increases, which forces the government to raise taxes to finance its expenditures. For low-skilled workers, the slope of the relationship between consumption and the share of working

Figure 1: Sensitivity of Aggregate Consumption and Consumption Inequality to Parameter Values



Notes: The figure plots the percentage change in consumption caused by the inflow of migrants as a function of the five primitive parameters of interest. The first row plots percentage changes in aggregate native consumption: $\frac{\Delta \bar{C}_n}{C_n} * 100$. The second row plots changes in low skilled native consumption: $\frac{\Delta C_{L,n}}{C_{L,n}} * 100$. The third row plots changes in high skilled native consumption: $\frac{\Delta C_{H,n}}{C_{H,n}} * 100$. The red vertical line highlights the benchmark parameter values.

migrants is shallower than for high-skilled workers because when fewer immigrants enter the labor market the wages of low-skilled natives are less adversely affected.

The second and third column of Figure 1 analyze the effects of changing the elasticities of substitution between the different groups. The authors pick a value of the elasticity of substitution between workers of different skills equal to $\eta = 3.05$, which is similar to previous estimates on German data (D'Amuri, Ottaviano, and Peri (2010)), but higher than previous estimates for the United States (e.g., Borjas (2003), Borjas and Katz (2007)). They estimate the elasticity of substitution between natives and foreigners to be $\theta = 13.22$, which

is at the lower end of most estimates in the literature (D'Amuri, Ottaviano, and Peri (2010), Ottaviano and Peri (2012)). Aydemir and Borjas (2007) and Borjas, Grogger, and Hanson (2012) estimate an effectively infinite elasticity of substitution between foreigners and natives. Our analysis highlights that these parameter values are somewhat favorable for finding small negative welfare effects on low-skilled natives together with positive aggregate welfare effects. The argument is similar to Card (2009): on the one hand, a low elasticity of substitution between natives and foreigners, θ, concentrates the wage effects of migration on the immigrants themselves. The second column of Figure 1 shows that a higher elasticity of substitution between natives and foreigners would both increase the losses to low-skilled natives and reduce the aggregate gains. Indeed, as shown in Table 4 of the main paper, if natives and foreigners were perfectly substitutible the welfare losses to low-skilled natives would roughly triple relative to the benchmark calibration. On the other hand, a high elasticity of substitution across skills, η, implies that the labor market entry of relatively low-skilled migrants dissipates broadly across skill groups, which weakens the adverse consequences for low-skilled natives. The third column highlights that lowering the elasticity of substitution between skills would increase the losses of low-skilled natives. However, varying this parameter does not significantly affect aggregate consumption since losses by low-skilled natives are offset by gains of high-skilled workers.

The fourth column of Figure 1 examines the effects of returns to scale. If the production technology exhibits decreasing returns to scale, for example because additional migrants cause congestion (e.g., due to a fixed capital stock), then the overall consumption gains from migration and the gains for each group of workers are smaller. On the other hand, increasing returns to scale, for example because of additional innovation by the migrants, would translate into larger gains.

Finally, the fifth column investigates the effects of changing the skill distribution of migrants. Bauder (2005) shows for a specific migration episode in Germany that migrants are often excluded from well-paying occupations because their foreign credentials are frequently

not recognized. We find that raising the share of high-skilled immigrants increases the welfare gains of the low-skilled. At the same time, aggregate consumption increases only slightly as the share of high-skilled migrants rises because the wage gains of low-skilled natives are largely offset by the wage declines of high-skilled natives caused by the additional competition by high-skilled foreigners. However, since high-skilled foreigners are more productive, taxes fall by more when the immigrants are high-skilled.

Other Mechanisms

While the paper focuses on the wage effects and carefully models the pension system, several other possible mechanisms by which migration could effect welfare are not in the model. First, the paper is silent on potential knowledge spillovers and agglomeration economies – captured in our simple framework by ρ – which may result from the large influx of labor. Increased innovation or new business formation are likely to increase ρ and therefore the welfare benefits of migration relative to the baseline found in the paper.

Second, the paper also does not discuss the political economy aspects of migration, and in particular the fact that future policies may be shaped by the migration wave and by the migrants themselves. Alesina, Miano, and Stantcheva (2019) show that the arrival of immigrants influences natives' voting behavior and their desire for redistribution. In Germany, migration has led to the rise of a far right party, which favors policies that protect traditional blue-collar jobs and seeks to reverse globalization. These mechanisms could either raise or lower the aggregate welfare consequences as estimated.

Finally, increasing social diversity could have an impact on individuals' utility through their implicit preferences and biases. For example, Heise and Porzio (2019) show based on data from Germany that East German workers are more attracted to counties that already host many East German workers, and more generally that workers have a preference to live in their home region. Increasing social diversity could therefore lead to a utility cost, although at the same time diversity could also provide benefits, for example by exposing individuals'

to a richer cultural life or to new varieties of goods.

Conclusion

The paper greatly improves our understanding of the aggregate and distributional impact of migration waves by studying them through the lens of a rich framework with a carefully specified pension system. Nevertheless, the aggregate welfare estimates can only be a first approximation to the true benefits and costs. The main challenges are two: i) many results depend on primitive parameters whose values are still debated in the literature; ii) migration waves affect the economy through a plethora of channels, many of which are necessarily absent from the model. As a result, we think that the results of this paper should be taken as a useful starting point, on which future work in this area will build.

References

Alesina, A., A. Miano, and S. Stantcheva (2019): "Immigration and Redistribution," NBER Working Paper No. 24733.

Aydemir, A., and G. J. Borjas (2007): "Cross-Country Variation in the Impact of International Migration: Canada, Mexico, and the United States," *Journal of the European Economic Association*, 5(4), 663–708.

Bauder, H. (2005): "Institutional Capital and Labour Devaluation: The Non-Recognition of Foreign Credentials in Germany," *European Journal of Economics and Economic Policies*, 2(1), 75–93.

Borjas, G. J. (2003): "The Labor Demand Curve is Downward Sloping: Reexamining the Impact of Immigration on the Labor Market," *Quarterly Journal of Economics*, 118(4), 1335–1374.

Borjas, G. J., J. Grogger, and G. H. Hanson (2012): "Comment: On Estimating Elasticities of Substitution," *Journal of the European Economic Association*, 10(1), 198–210.

Borjas, G. J., and L. F. Katz (2007): "The Evolution of the Mexican-Born Workforce in the United States," in *Mexican Immigration to the United States*, ed. by G. J. Borjas. University of Chicago Press.

Card, D. (2009): "Immigration and Inequality," *American Economic Review*, 99(2), 1–21.

D'Amuri, F., G. I. P. Ottaviano, and G. Peri (2010): "The Labor Market Impact of Immigration in Western Germany in the 1990s," *European Economic Review*, 54(4), 550–570.

Heise, S., and T. Porzio (2019): "Spatial Wage Gaps in Frictional Labor Markets," CEPR Discussion Paper No. DP14197.

Ottaviano, G. I. P., and G. Peri (2012): "Rethinking the Effect of Immigration on Wages," *Journal of the European Economic Association*, 10(1), 152–197.

UN (2017): "World Population Prospects: The 2017 Revision," https://esa.un.org/unpd/wpp/Download/Standard/Population/.