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The European Refugee Crisis and the Natural Rate of Output*

Abstract

The European Commission follows a harmonized approach for calculating structural (potential) output for EU member states that takes into account labor as an important ingredient. This paper shows how the recent huge migrants inflow to Europe affects trend output. Due to the fact that the immigrants immediately increase the working population but effectively do not enter the labor market, we illustrate that the potential output is potentially upward biased without any corrections. Taking Germany as an example, we find that the average medium-term potential growth rate is lower if the migration flow is modeled adequately compared to results based on the unadjusted European Commission procedure.

Keywords: migration, refugee crisis, natural rate of output, filtering, EU-commission

JEL Classification: F22, J11, J61

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1 Introduction

Potential growth and output gap are important tools for assessing the cyclical position of the economy and its productive capacity. In particular in the fiscal surveillance process emanating from the Stability and Growth Pact both concepts have become essential ingredients.

Although potential output is economically important it is an unobservable size. For its estimate in European economic policy context, the European Commissions production function method is decisive. A key determinant, which enters into the estimate, is the population development. The latter is also affected by migration flows. Currently, the structure of immigration to Europe has changed significantly, more than a million migrants and refugees crossed into Europe in 2015. Table 1 reports the number of asylum applications for selected countries. For instance, in 2015 nearly 480 000 asylum applications were made in Germany – more than twice as many as in 2014. Until August 2016 the number of asylum applicants even increased up to 540 000. While in previous years the number has increased considerably from the most affected sovereign debt crisis countries in southern Europe, as well as Romania and Bulgaria, the recent high net immigration figures were recorded by refugee migration from Syria, Afghanistan, Eritrea, Iran, Iraq, Nigeria and Pakistan. Looking at the EU in total the figures show that the output calculation for the EU as an entity might also be affected by this large inflow.

Table 1: Asylum applicants in the European Union and in selected countries

	2013	2014	2015	2016[a]
European Union (28)	431,090	626,960	1,322,825	834,660
Austria	17,500	28,035	88,160	28,675
Belgium	21,030	22,710	44,660	12,220
France	66,265	64,310	76,165	46,710
Germany	126,705	202,645	476,510	536,095
Hungary	18,895	42,775	177,135	25,755
Italy	26,620	64,625	84,085	61,080
Netherlands	13,060	24,495	44,970	12,705
Sweden	54,270	81,180	162,450	19,860
United Kingdom	30,585	32,785	40,160	22,970

[a] Data for 2016 covers January to August.
Source: Eurostat, data status: September 2016.

This structural shock has an impact on the potential effects of immigration on economic growth. After their registration, migrants are directly increasing the level population and, hence, will have noticeable positive effects to the potential GDP growth if the European Commission approach for calculation of potential growth is quickly adopted without any corrections to the data. However, the number of refugees that enter the labor market is limited, because it takes on average about 10 years until refugees have the same employment rate as domestic population and other immigrants (IAB, 2015). Brücker and Jahn (2011) show that the wage and employment effects of immigration heavily depend on the skill structure of the immigrant workforce. Thus, the actual effects are likely to be weaker at least in the short and medium term than reported by results based on the pure method of the European Commission. Although there is a growing literature concerning the causes and motivations of migration, no study analyzes the effects of potential growth.[1]

Therefore, this paper connects two economic problems: The recent refugee crisis in Europe and the natural rate of output. Although they seem to be connected obviously in the first place, we show how the huge inflow of immigrants affects the calculation of the natural rate of output. In this paper, we propose a way how to obtain a natural rate of output corrected for the large inflow of immigrants. We illustrate our approach with an example for Germany, which was the most targeted country in Europe by the majority of refugees in 2015. We find that although the number of refugees had been large, the effects for potential growth are only minor.

[1] De Haas (2010) gives an overview of theories on migration and development.

2 Calculation of the natural rate of output by the European Commission

According to the approach of the European Commission the estimation of potential output is based on an aggregate Cobb-Douglas production function with labor L, capital K and technical progress SR (Solow Residual):[2]

$$Y = L^{0.65} K^{0.35} SR. \tag{1}$$

The elasticities are given by the European Commission and are constant in time. Hence, trend output ($YPOT$) is calculated using the trend of labor (LP), capital (K) and trend of the Solow residual (SRT). The potential labor input (LP) is given by

$$LP = (POPW \cdot PARTS \cdot (1 - NAWRU)) \cdot HOURST, \tag{2}$$

where $POPW$ refers to the population in working age (15 to 74 years). $PARTS$ is the trend of the ratio of the labor force to population in working age. In pursuing this approach, the past participation rate is determined by the actual volume of work L. This procedure takes directly into account the movements of commuter balance, hence, a transition from the national concept ($POPW$) to domestic concept (L) takes place. $NAWRU$ refers to the structural unemployment rate, i.e. the labor market equilibrium where no wage and price pressures are emanating. Finally, the trend of hours worked per employee is represented by $HOURST$.

The calculation of the capital K until the end of the short-term forecast period is based on the capital stock in the previous period less depreciation and new investment I:

$$K_t = I_t + (1 - dep)K_{t-1}, \tag{3}$$

The ex-post depreciation rate dep can be determined by $dep = (I_t - (K_t - K_{t-1})/K_{t-1})$. For the forecast periods this rate is considered to be constant. The Solow residual (SR) can be calculated given gross domestic product (Y) and the production factors (L, K).

The forecasting period consists of a short-term period (the current year t and the next period t+1) and the medium-term period until t+5. All variables, except K, are forecasted until the end of the short-term period. For obtaining the trend components filter methods are employed. For determining the trend of the Solow residual (SRT) and the NAWRU the European Commission provides unique filter tools. For SRT a structural model is used that combines allocation of trend and cycle with survey data on capacity utilization. A structural model is also employed for the filtering of the

[2] See Havik *et al.* (2014) for detailed exposition of the approach.

unemployment rate where information about the nominal GDP, terms-of trade, etc. are included. Both filters provide estimates until the end of the medium-term forecasting period. The other variables, e.g. hours and participation rate, are forecasted until the end of the medium-term projection period using univariate time series models. Then a Hodrick-Prescott (HP) filter is used to obtained its potential counterparts ($HOURST$ and $PARTS$).

3 Controlling for migration

As outlined above the migration inflow immediately affects the size of population and, hence, is increasing the potential labor volume. However, the increase of the potential output is potentially upward biased. This is mainly due to several reasons: First, each person (migrant or domestic) is assumed to be similarly, but there are legal objections. The whole registration asylum process takes time. Thus, many immigrants might not be directly available for the labor market. Second, even if the immigrants enter the labor market immediately their participation rate and level of education is different from the established workers. One of the main hindrances is the language barrier which needs to be solved to be successful on the labor market. Furthermore, we have to distinguish between migrants, who choose to resettle to another country and refugees, who has been forced to flee their home country. While the first are expected to stay longer the latter might return to their country in the next years.

In order to control for immigration in the calculation of the potential labor output we propose to treat the non-refugees and refugees differently. The total population comprises both refugees (ref) and non-refugees (non-ref) together $POPW = POPW_{non-ref} + POPW_{ref}$, where $POPW_{non-ref}$ comprises the domestic population and net migration from other than refugees countries. For both categories we adjust the calculation and filtering of the unemployment rate ($NAWRU$) and the participation rate ($PARTS$). The filtering of the hours-worked ($HOURST$) remains unaffected because there is currently no reliable information on that issue.

For the differentiation of the labor force one needs to make some assumption about the development of the variables under consideration. In general, no specific assumptions are made for non-refugees; both the unemployment rate and participation rate are extrapolated over the forecasting period using univariate time-series models. Subsequently a HP filter is applied to receive the trend series. We suggest to replace the structural filter with the HP filter as it is prohibitive to calculate and forecast all variables necessary to run the filter only for the non-immigrants.

Concerning the unemployment rate and participation rate of the refugees one has to make assumptions about their labor market entrance. This might be a rather non-

standard process, as the standard univariate forecasting models are not suitable due to the lack of data. The labor market integration is particularly driven by institutional settings and political decisions: How fast is the legal asylum process? When are immigrants allowed to work? Are there any (state-financed) education trainings, especially for learning the language? Are there any legal exceptions implemented to foster the labor market integration?

Suppose that there is a labor market scenario for refugees over the projection period. We propose to calculate a weighted $NAWRU$ and $PARTS$ given by

$$\begin{aligned} NAWRU_{total} &= (1-\omega)NAWRU_{non-ref} + \omega U_{ref} \\ PARTS_{total} &= (1-\phi)PARTS_{non-ref} + \phi PART_{ref} \end{aligned}$$

where subscript $non-ref$ labels the non-refugees and ref the refugees variables, respectively. The parameters ω and ϕ denote the weighting parameters. They represent the share of refugee labor force to total labor force and the relative share of refugees to total population, respectively.

It is important to note the subtle differences in both categories: For the non-refugees we use the already (HP) filtered variables, whereas for the immigrants we employ the actual and forecasted values. Thus we interpret the refugee variables as structural. There are two reasons for doing this. First, we do not have any (exogenous) information concerning structural path for these variables. Second, the time period under consideration is just too short to apply an appropriate filter to the data. The results would heavily depend on the chosen filter, which would be in any case very sensitive to any new additional data point.

4 A case study for Germany

The annual data set covers the period from 1970 to 2017 with short-term forecasts for the years 2016 and 2017 published by the Joint Forecast of German Research Institutes in April 2016 (Projektgruppe Gemeinschaftsdiagnose, 2016). For population projection we refer to the 13^{th} coordinated population projection (variant G1-L1-W1) by the German statistical office. However, this projection relies on the population level at the end of 2013, and does not reflect the recent development of net migration adequately. For instance, in the variant G1-L1-W1 it is assumed that the net balance for migration amount to 500 000 people in the years 2014 and 2015. In fact, due to a high inflow of refugees total net migration has been higher by 50 000 in 2014, or even exceed by 614 000 people the numbers of G1-L1-W1 in 2015. Therefore, the migration balance has been adjusted respectively to the current development in our data set. While for the years

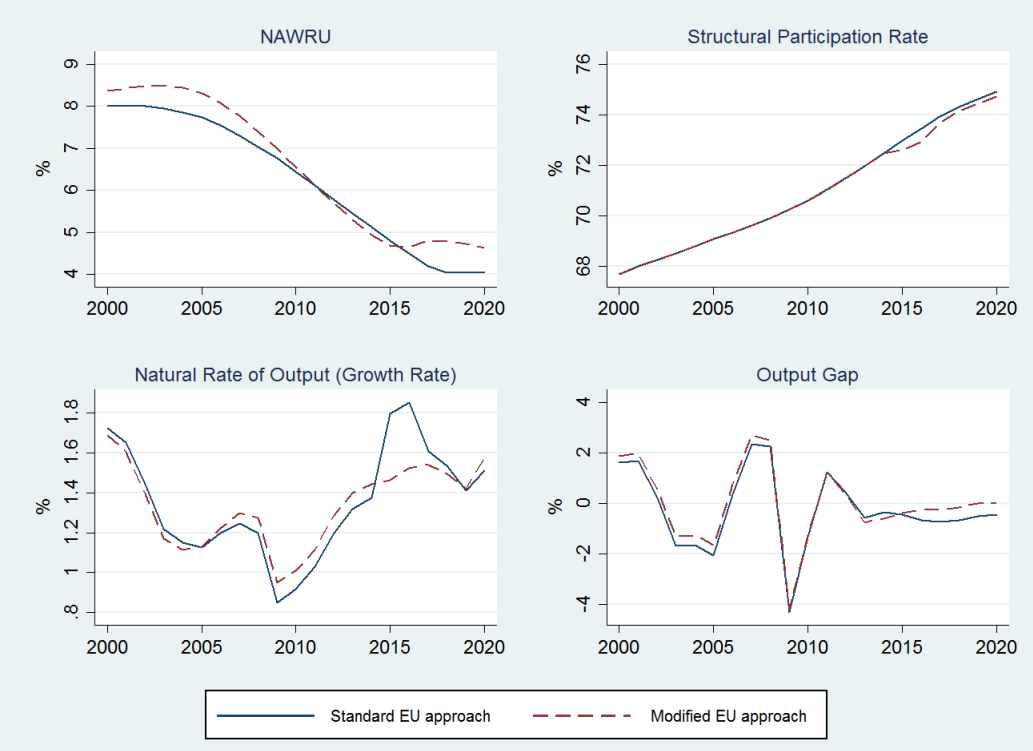
2016 and 2017 in the 13th coordinated population projection net migration of 350 000 and 300 000 people are assumed, we expect that net migration is nearly 400 000 people in 2016 and 230 000 in 2017.[3] After 2018, net migration is expected to decrease slightly so that in 2020 the expected value of 150 000 people corresponds to the value of the 13th coordinated population projection. Due to the legal regulations only a part of the asylum seekers will have access to the labor market. Given previous years data, we assume that about 75% of the refugees are in working age in the forecast period and hence, taking into account a job entry rate of 20% we can determine the number of refugee labor force and the corresponding participation rate. By fixing the number of unemployed refugees gives us the corresponding unemployment rate. For the non-refugees category, we apply univariate time-series models and forecast until 2018 both for participation rate and unemployment rate. HP-Filters are applied to receive the corresponding structural time series. Using the particular weights ω and ϕ, we aggregate the corresponding elements for refugees and non-refugees to the total rates.

In addition we apply the "pure" procedure by the EU-Commission,[4] i.e. where we only consider the total population in working age. The NAWRU is determined for the whole labor force. According to the EU-approach it is assumed that the NAWRU will decrease in t+3 with the 50% of the growth rate of t+2 and then remains constant until t+5. Both approaches make use of the EU-method to determine Solow trend. Figure 1 shows the differences between the two approaches. The total NAWRU is about 1pp lower and the participation rate is slightly higher using the EU-approach in the medium-term. The effects are especially obvious in the years 2015 and 2016, where the numbers of refugees are particularly high, with potential growth of 1.8% using the EU-approach compared to 1.5% using the modified approach. Given different trend output levels simultaneously affects the output gap. Hence, the higher trend GDP using the EU-approach implies that the corresponding output gap is negative and even deviates from the equilibrium. In contrast, although the output gap is also negative for the modified procedure, there is clear tendency that real and potential output are equal in the medium term.

[3] This is based on the assumption that in the 2016 about 500 000 and in 2017 about 300 000 people will request asylum in Germany.

[4] Note, that we do not refer to the European Commission projections for potential output, as we are using more detailed data for Germany from the German Statistical Office.

Figure 1: Comparison of EU-approach and modified approach



5 Conclusion

While the EU-approach calls for equal treatment for all EUs member states and the importance of unbiased estimates of the past and future evolution of potential growth, we have shown for the case of Germany that the "standard" approach will overestimate the effects of migration flows. We account for the large refugee inflow by adjusting the structural unemployment and participation rate. Accordingly the results might have an impact on policy decisions, in particular with reference to the government expenditures.

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