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A European Minimum Wage: Implications for Poverty and Macroeconomic Imbalances

by Enrica Detragiache, Christian Ebeke, La-Bhus Fah Jirasavetakul, Koralai Kirabaeva, Davide Malacrino, Florian Misch, Hyun Woo Park, and Yu Shi

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European Department

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Abstract

A hypothetical European Minimum Wage (MW) set at 60 percent of each country's median wage would reduce in-work poverty but have limited effects on overall poverty, as many poor households do not earn a wage near MW and higher unemployment, higher prices, and a loss of social insurance benefits may erode direct benefits. Turning to competitiveness, since the MW increase to reach the European standard would be larger in euro area countries with excessive external surpluses, the associated real appreciation should help curb existing imbalances. However, a few countries with already weak external positions would experience an undesirable real appreciation.

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I. INTRODUCTION

1. Calls to introduce or raise the minimum wage (MW) have become increasingly popular in Europe and beyond. Weak wage growth in advanced countries has been widely debated and attributed to a variety of causes, including technological change, higher market power by companies, declining unionization, and globalization (see, for instance, IMF, 2017a). In the EU, the global financial crisis and sovereign crisis that followed resulted in higher unemployment, slow wage growth, and greater poverty in the affected countries. Looking forward, further progress in automation may worsen this trend, potentially fueling income inequality, concerns about social injustice, and skepticism about the benefits of technological progress and globalization. Against this background, advocates of the MW claim that a high MW helps shore up the incomes of low-skilled workers, reduce in-work poverty, and improve income distribution at the cost of small adverse employment effect.[1] Among large countries, Germany introduced a MW in 2015 and Spain, the U.K. and some U.S. states have raised their MW more aggressively in recent years, while a new statutory MW in Italy is being debated. In Central and Eastern Europe, several countries (most recently Lithuania, Bulgaria and Czech Republic) have raised their MW sharply amid strong labor demand growth (IMF, 2016).

2. Differentials in wage levels and dynamics have also attracted attention in the context of persistent macroeconomic imbalances in the euro area (EA). Large misalignments in external competitiveness within the EA have been slow to adjust in the absence of nominal exchange rate flexibility and a common fiscal policy, and as wage and prices have become less responsive to output gaps (IMF, 2012, 2019a). The IMF has called for wage restraint in countries with a weaker external position and sluggish productivity growth and faster wage growth in countries with a stronger external position to help the rebalancing process, while recognizing that governments do not directly control wages. Blanchard (2018) suggested wage negotiations at the national level to ensure that wage settlements reflect the need for rebalancing, thereby reducing reliance on the output gap-wage pressure mechanism. Against this background, changes in the MW within the EA could have implications for macroeconomic rebalancing.

3. In the EU, the idea of a harmonized European Minimum Wage (EMW) to provide an adequate standard of living to all workers has been actively debated for some time. At present, most EU countries have a national MW, but its level varies across countries, reflecting differences in cost of living and median salaries but also different social preferences or labor market conditions.[2] In 2017, the umbrella organization of the European

[1] For an overview of the large economic literature on the MW, see for instance Card and Taylor, (1995) and Neumark and Wascher (2010).

[2] The UK is not included in the analysis as it exited the EU on January 31, 2020.

(continued…)

trade unions agreed to advocate for a harmonized EU MW set at 60 percent of the national median or 50 percent of the national average wage (WSI, 2019). More recently, calls for a European MW have multiplied in the political debate[3] Though social and wage policies are generally the competency of individual member countries and not the EU (subsidiarity principle), the European Pillars of Social Rights call for "the right to fair wages that provide for a decent standard of living." In January 2020 the European Commission (EC) launched a consultation with social partners on actions to undertake within its mandate to ensure fair MWs in all EU countries. This broad initiative is not limited to statutory MWs and will not propose harmonization of MW policies and levels.[4]

4. This paper discusses how an EMW could be designed and examines its effects on poverty and macroeconomic imbalances in the EA. If EU countries decide to harmonize their MWs, the most desirable approach would be to set the MW to take into account differences in labor productivity and standards of living. Because these differences are large, harmonizing the *level* of the nominal MW across countries (absolute harmonization) would not be realistic nor desirable, as it would severely disrupt labor markets in lower wage, less advanced countries while not lifting low wages within more advanced countries. Relative harmonization, on the other hand, would anchor the MW to the overall wage level within each country, ensuring that the EMW reflects differences in economic and labor market conditions. In this note, we examine the effect of such a harmonization on poverty in the EU and external rebalancing in the EA.

5. MW harmonization to the highest level currently observed (60 percent of each country's the median wage) would benefit the working poor but the effect on the overall poverty rate would likely be small. This policy would result in sizable MW increases in some countries and no change in others. To explore its potential effects on poverty, we draw on EU micro-level survey data (EU-SILC) for 2016. First, in each country we compute the direct effect of the new MW on the earnings of poor households and the overall poverty rate ignoring behavioral responses and other macroeconomic effects. This direct effect turns out to be relatively small compared to changes in poverty rates observed in our sample in recent years: while the in-work poor gain, many poor households have only members who are not working or are self-employed, so they do not benefit directly from the higher MW. In addition, behavioral responses (such as a reduction in labor demand by employers, withdrawal of social insurance benefits, or higher avoidance) and macroeconomic effects (such as higher cost of living as MW increases are passed on to prices) would likely further

[3] In March 2019, French President Macron called for "a European MW adjusted to each country and collectively negotiated every year." In June 2019, German Chancellor Angela Merkel has advocated 'comparable minimum wages in the EU that reflect the different living standards and ensure similar working conditions.' European Commission President Ursula von der Leyen has committed to proposing 'a legal instrument to ensure that every worker in the EU has a fair minimum wage'.

[4] https://ec.europa.eu/commission/presscorner/detail/en/fs_20_51. Legal and administrative obstacles to MW harmonization are not discussed in this paper.

reduce and may even reverse the overall beneficial effect on poverty. On the other hand, the higher MW would have a more pronounced direct effect on in-work poverty (i.e., the relative poverty rate of people in work).

6. Harmonizing toward a higher MW could allow for some overall external rebalancing within the EA but may worsen imbalances in a few countries. Using a macro econometric approach for a panel of EU countries, we show that increases in the MW are robustly associated with subsequent increases in unit labor costs after controlling for other factors, suggesting that changes in the MW can affect overall cost competitiveness. Using this finding, we show that countries with an external position that is too strong (e.g., Germany, the Netherlands) would see their position weaken, helping the rebalancing process, while some countries with weak external position would experience an improvement. However, a few other countries with an external position that is already too weak (e.g., Spain, Greece, Belgium) would see their situation worsen further.

II. An EU Minimum Wage: What Might it Look Like?

7. Many EU countries have a MW but levels vary considerably. MWs range from €260 per month in Bulgaria to around €2,000 in Luxembourg in 2018.[5] In Austria, Cyprus, Denmark, Finland, Italy, and Sweden there is no statutory MW, but sectoral minimum wages are set through collective bargaining. Adjusting for differences in purchasing power, MWs remain quite heterogenous, with MWs in high-income countries such as Luxembourg, the Netherlands, Belgium, and Germany well above those in lower income countries such as Bulgaria, Romania, and Latvia. [6] These large differences reflect differences in income per capita and labor productivity, as well as different country preferences and labor market institutions.

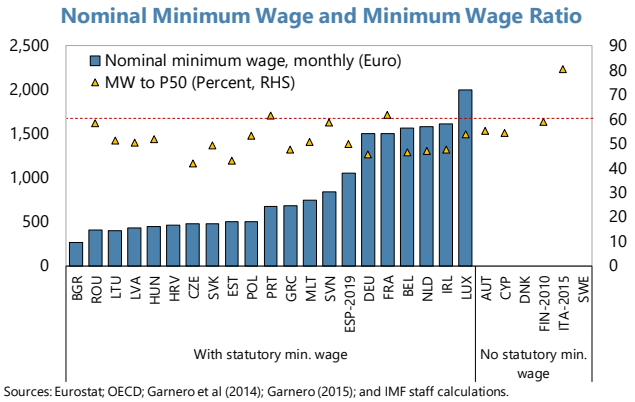
8. Harmonizing the MW to a common level (absolute harmonization) is not realistic nor desirable. While bringing MWs toward a common level across the EU is perhaps the most intuitive concept of a more harmonized MW, the large differences in existing MWs documented above as well as the heterogeneity in average wages, labor productivity, and level of development within the union suggest that such a nominal harmonization would not be desirable. For instance, harmonizing the MW to the EU mean would imply that the MW would not bind in higher-income countries while almost all workers would be affected by it in lower-income countries. Such a harmonization would also mean very large increases in minimum wages in some countries beyond their current national

[5] We report 2018 data rather than 2019 data because median wage data are not available for 2019. For Spain we report the estimated Kaitz ratio for 2019, given the substantial MW increase for that year. Table B7 in the Appendix summarizes the information about data used and the sources.

[6] Differences in social security contributions and taxation further complicate cross-country comparisons, as the MWs are typically set on a gross basis. We are ignoring such differences here because of lack of data.

medians (Bulgaria, Latvia, Lithuania or Romania). This would obviously result in undesirable disruptions in the labor markets of those countries.

9. A more promising approach is relative harmonization, i.e. setting the MW as the same percentage of a reference wage in each country. This approach ensures that the MW remains anchored to overall wage levels within each country and therefore takes into account the large differences in wages and labor productivity that exist across the region, while still ensuring that lower wages do not fall too far behind the median or average within each country.[7] The European Trade Union confederation has proposed to set the MW to either 60 percent of the median or 50 of the average wage in each EU country. This approach would therefore harmonize the so called Kaitz index across the EU.[8] As average wages are affected by extreme values, median wages provide a better point of reference especially in countries that have high wage inequality, so in what follows we will focus on Kaitz indexes using the median rather than average wage.



Sources: Eurostat; OECD; Garnero et al (2014); Garnero (2015); and IMF staff calculations.
Note: Both nominal minimum wage and the minimum wage ratio are for 2018, otherwise indicated. Estimated minimum wage ratio for countries without statutory minimum wage was taken from the literature in the sources.

10. Bringing the MW to the median wage of 60 percent would lead to an increase in the MW most EU countries. Because there is no source of standardized data for the distribution of wages, cross-country comparisons of Kaitz indexes may yield a somewhat different picture depending on the data source. With this *caveat*, OECD data for 2018 suggests that setting the MW at 60 percent of the median wage would harmonize the index to its top level in countries with a statutory MW.[9]This threshold is also close to the usual definition of "low pay" as 2/3 of the median wage. This policy change would imply no MW change in countries such as France and Portugal and a significant – though not unprecedented – increase in countries such as Czech Republic, Estonia, Germany, Belgium, the Netherlands, Ireland, Greece, Slovakia, and Spain. Thus, harmonization may need to proceed gradually to avoid disrupting labor markets in countries that are far away from the benchmark. A less

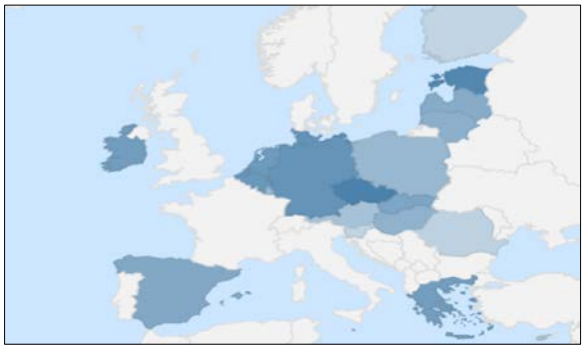
[7] Median wage is preferable measure of centrality since it less affected by top earning outliers.

[8] The Kaitz index is defined as a ratio of the minimum to the median or to the average wage.

[9] Estimates of average MWs in countries that only have collectively negotiated sectoral minima indicate that MWs are close to the 60 percent threshold in Austria, Cyprus, and Finland, and well above in Italy. No information is available for Denmark and Sweden.

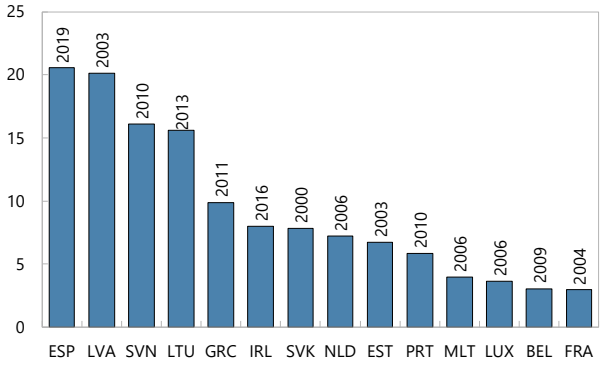
ambitious target, for instance 50 of the median wage, would limit the increase to a maximum of 8 percent but it would leave some countries well above the threshold.

Changes in Minimum Wage to Reach 60 Percent of Median Wages, Selected EU Countries
(Percent)



Sources: Eurostat; OECD; and IMF Staff Calculations.

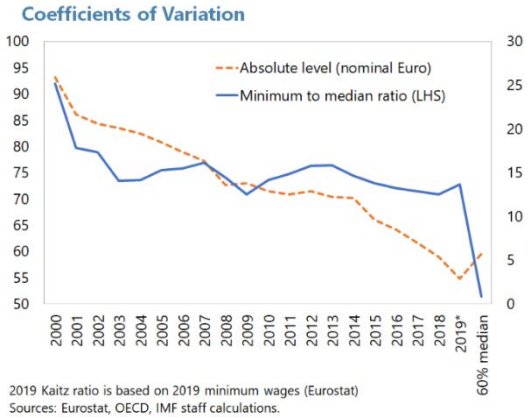
Maximum Annual Change in Kaitz Index, 1999–2019
(Kaitz index refers to the ratio of minimum wage to median wage; Percentage points)

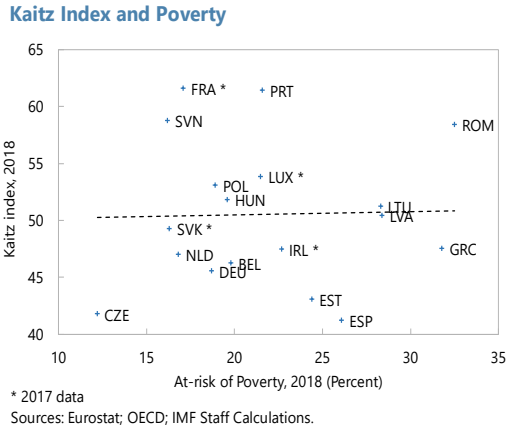


Sources: OECD statistics; IMF staff calculations.

11. Relative MW harmonization would make nominal MW levels more unequal across countries. It would effectively widen the distance between the nominal MW in relatively lower income countries (Baltics, Romania, Hungary, Czech R., Slovakia, Slovenia, Poland, Greece, Portugal) and higher income countries (Germany, Belgium, Ireland, Netherlands, Luxemburg). Thus, it may exacerbate the perception of wage inequality among EU countries. It may also reinforce incentives for low skill workers to migrate from lower to higher income EU countries. Large increases in the MW may also increase incentives to circumvent MW regulation, as countries where the MW is more binding tend to have higher rates of non-compliance, though complementary initiatives to improve monitoring and enforcement, possibly coordinated at the EU level, would help in this regard. In addition, where there are large within-country regional disparities in labor productivity, a more binding MW that is uniform within each country may weaken the labor market performance and competitiveness of the less productive regions.[10] These effects would offset part of the intended benefits of harmonization. In addition, relative MW harmonization may not reduce differences in poverty rates across the EU, as countries with low Kaitz ratios are not necessarily those with the largest share of vulnerable households. The next section examines the impact on within country relative poverty from MW harmonization.

[10] On wage setting and regional disparities, see for instance Ichino et al. (2019).





III. EFFECTS ON POVERTY

MW policies aim at ensuring that wages at the low end of the scale do not fall too far behind average income growth, thereby protecting lower income groups. But to what extent does MW policy affect poverty? Many poor households do not have members who work in dependent employment or at all, and many MW earners may not be in poor households. In this section, we explore how a hypothetical EMW might affect overall poverty and in-work poverty in the EU using household survey data.

12. Household poverty is heterogenous across EU member states. Poverty is usually defined at the level of the household using relative income thresholds. In this paper, we define a household as poor if its equivalized disposable income from all sources is below 60 percent of the median equivalized disposable household income in the same country in a given year.[11] Based on this definition, the average poverty rate in the data used for the microsimulation exercise (see below) is around 16 percent, ranging from 7 percent in Czech Republic to 22 percent in Spain. As the poverty rate is defined in relative terms, a reduction in the poverty rate makes the distribution of income more equal within each country, holding everything else equal. [12]

13. The effect of an increase in the MW on poverty is the combination of direct and indirect effects. Direct effects refer to the impact of the change in the MW on household wage earnings leaving other factors constant. Indirect effects occur because the change in the MW changes behavior (for instance, labor demand by employers) or has general equilibrium effects (for instance, changes in goods prices). In this section, we construct a microsimulation to assess the direct effects of relative MW harmonization in the EU and will briefly discuss

[11] This is in line with the recommendation by the European Council (2001). Eurostat also provides longitudinal measures of household poverty, the "at-risk-of-poverty rates." According to this measure, a household is poor if its equivalized income falls below the 60-percent threshold in 3 out of 4 consecutive years.

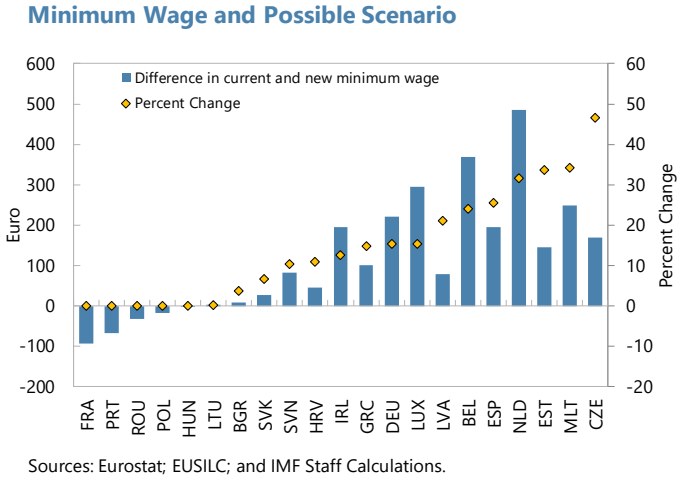
[12] In the simulations, we ignore the fact that poverty (which is defined in relative terms) might increase mechanically if the median wage changes as a result of changes in the MW. We always compute the poverty rate using the current (i.e., pre-EMW) median wage.

indirect effects, which include loss of employment, loss of purchasing power through higher prices, loss of means-tested social insurance benefits, and potential higher non-compliance with the MW regulation. As indirect effects tend to reduce the overall impact of the MW on poverty, the direct impact considered in the baseline scenario can be viewed as an upper bound. Further details about the microsimulation are in Technical Appendix A.

A. A micro-simulation of direct effects on poverty

14. The micro-simulation is based on the latest wave of the EU-SILC database, a household survey carried out by Eurostat. After data cleaning, excluding six countries that do not have a MW (so that we cannot simulate the effects of introducing the EMW as explained below) and excluding five countries that have a MW above the EMW (so that there would be no increase in the MW), the resulting dataset has around 106,814 observations from 16 EU member states. The sample size ranges from less than 4,000 observations in Malta to around 10,000 observations for Germany. The data provide rich and nationally representative household- and worker-level information on earnings and type of employment. Because the latest available round of the survey is for 2016, the data do not reflect more recent changes in MWs, which are sizable in a few countries (e.g., Spain). Using these data, we describe the *status quo* in each country in 2016 and simulate the effects of relative harmonization of the MW to 60 percent of the median (EMW).

15. Based on 2016 data, the EMW would require the largest MW increases in the Czech Republic (in percent) and the Netherlands (in nominal terms). In the Czech Republic the increase would have been almost 50 percent and in the Netherlands some 30 percent (almost 500 euro per month). In other countries including France, Hungary, Portugal, Poland, and Romania, there would have been no increases as the current MW was already at or slightly above the EMW threshold in 2016. In the simulation we omit these countries as we assume that the national MW would not decrease as a result of the introduction of the EMW.

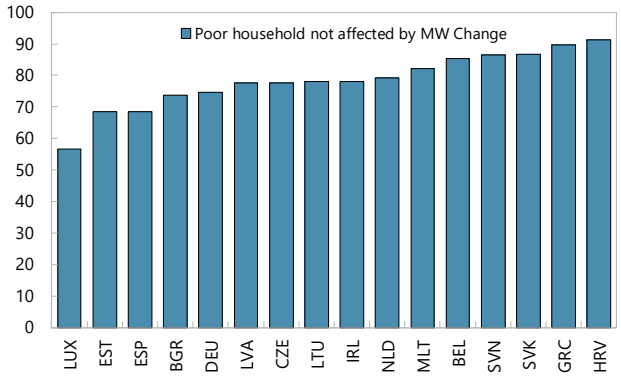


Sources: Eurostat; EUSILC; and IMF Staff Calculations.

16. The direct effects of the EMW on poverty depend crucially on household composition. Not all poor households have members working at or close to the MW, as their adult members may be pensioners (as is often the case in Greece), unemployed, or out of the labor force (as is common in Romania and Hungary). Some workers in poor households may earn a relatively high hourly wage but work only part-time or intermittently. Indeed, in our data the share of poor households without any low-wage workers ranges from a low of 56 percent in Luxembourg to a high of almost 91 percent in Croatia. Conversely, individuals

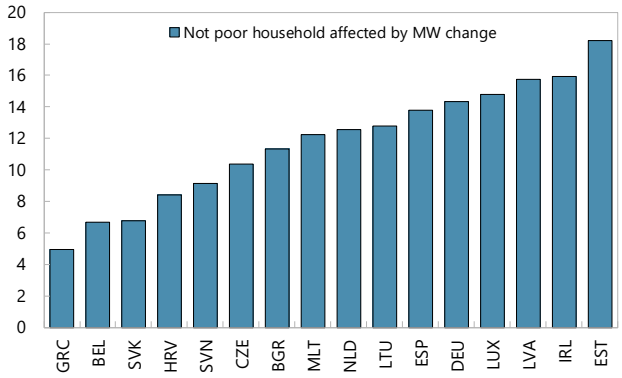
working at or close to the MW may not be in poverty, as they may be students or secondary earners in non-poor households. The share of non-poor households that would benefit from the EMW ranges from a low of about 5 percent in Greece to as high as 18 percent in Estonia.

Poor Household Not Affected by Minimum Wage Change
(Percent)



Sources: Eurostat; EUSILC; and IMF Staff Calculations.

Not Poor Household Affected by Minimum Wage Change
(Percent)



Sources: Eurostat; EUSILC; and IMF Staff Calculations.

17. A key assumption in the simulation is the effect of the EMW on wages below the current MW. The data show that there are many workers earning less than the MW. This may reflect measurement error in the data, but also exemptions to the applicability of the MW or lack of compliance. How will these workers be affected by the hypothetical EMW? Will their earnings be bid up and, if so, by how much? The introduction of an EMW may also be accompanied by broader eligibility rules or tighter enforcement, resulting in more low-wage workers being brought under MW regulation. In the simulation, we assume that the MW perimeter remains constant and workers earning less than the MW experience the same proportional wage increase as workers earning the MW. In other words, if EU harmonization results in a 10 percent increase in the MW, all workers earning the MW or less will be assumed to receive a wage increase of 10 percent.[13] This may appear somewhat optimistic but is in line with the intention of building a baseline simulation that is an upper bound of any poverty-reducing effects of the EMW.[14]

18. Another key assumption is how the EMW affects wages higher up in the wage distribution. As the MW is increased, workers earning above but close to the EMW are

[13] This assumption implies that we cannot calculate the effect of the EMW on poverty in countries that do not currently have a MW. These countries are excluded from the simulation.

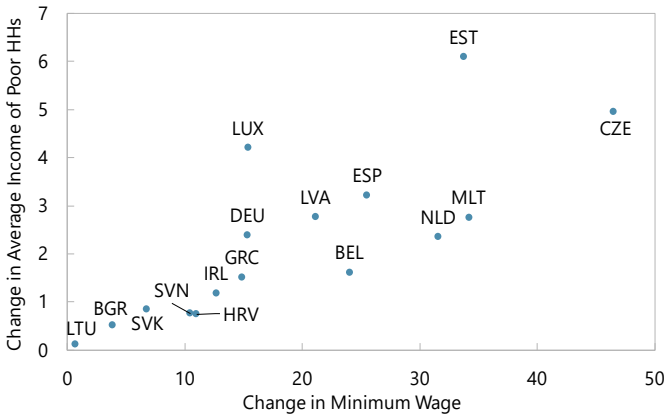
[14] If the wages of all workers earning below the MW were brought up to the new EMW level, the effect on poverty would be much stronger. However, this would necessitate additional policy changes, such as improving enforcement or closing legal loopholes. More broadly, policy changes that broaden the perimeter of applicability of the MW could have important effects on poverty. We do not examine these policies in this paper.

(continued…)

likely to demand higher wages to maintain some of the wage differentiation that existed before. To the extent that these workers are in poor households, these wage spillovers may strengthen the beneficial impact of the EMW on poverty. In the baseline scenario, we assume – somewhat arbitrarily – that the wage of workers earning up to 75 percent of the median wage is affected by the introduction of the hypothetical EMW, and that the size of this effect decreases linearly and eventually reaches zero.[15]

19. According to the baseline simulation, the direct effect of the EMW would be to lift the average income of poor households but the effect on the poverty rate would be relatively modest. The EMW would result in increases of average nominal incomes of poor households that varies across countries, reflecting differences in the increase in the MW and in household composition. The largest increase would be in Estonia, where a MW increase of 34 percent would translate into an average increase in the income of poor households of 6 percent implying an elasticity of 0.18.[16] The increase in incomes may not be sufficient to lift households above the poverty income thresholds. Indeed, the poverty rate would fall by 1.3 percentage point in Estonia and less in the remaining countries, with an average reduction of 0.5 percentage points. To put these numbers in perspective, in the chart below we compare them with the range of the changes in poverty rates observed in the years around the Global Financial Crisis (GFC). Relative to this range, the decrease in poverty would be the largest in Estonia, whereas it would be relatively low in Greece. The decline in poverty in each country is not strongly correlated with the size of the increase in the minimum wage but it positively correlated with the share of primary earners who earn the MW.

MW Increase and Poor Household Income
(Percent change)

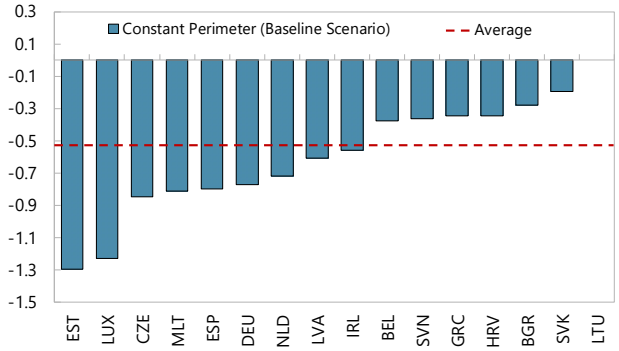


Sources: Eurostat; EUSILC; and IMF Staff Calculations.

[15] In the next section we examine how changes in the MW affect average wages.

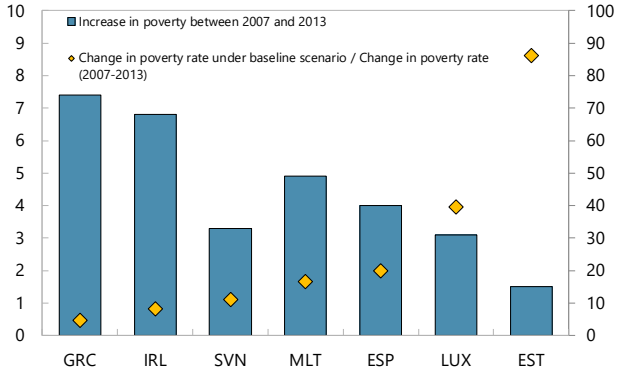
[16] The average elasticity of poor households' income to the increase in the minimum wage across all countries is smaller at 0.12. The results suggest that Belgium has the smallest elasticity (0.07), whereas Luxembourg has the largest elasticity (0.27).

Changes in Poverty Rate
(Percentage points)



Sources: Eurostat; EUSILC; and IMF Staff Calculations.
Note: Both scenarios included wage spillovers up to 75% of median wage.

EMW Effects and 2007–13 Changes in Poverty Rate
(Percentage points)



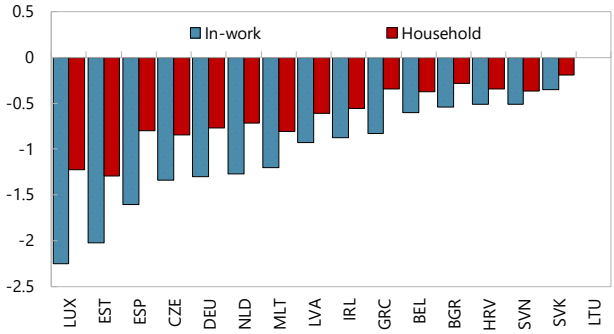
Sources: Eurostat; EUSILC; and IMF Staff Calculations.

20. The EMW would reduce in-work poverty more sharply than overall poverty. While the MW may not be the ideal instrument to address poverty in general, it may be more effective in limiting poverty among individuals who work. In-work poverty is defined as the fraction of individuals working full time in dependent employment living in poor households. The level of in-work poverty varies across European countries, from merely 4 percent in Czech Republic to 15 percent in Luxembourg. Not surprisingly, the EMW would lower household poverty more in countries with high levels of in-work poverty. For instance, in Spain the decline in in-work poverty in the baseline microsimulation is twice as large as the decline in overall poverty.

B. Indirect effects

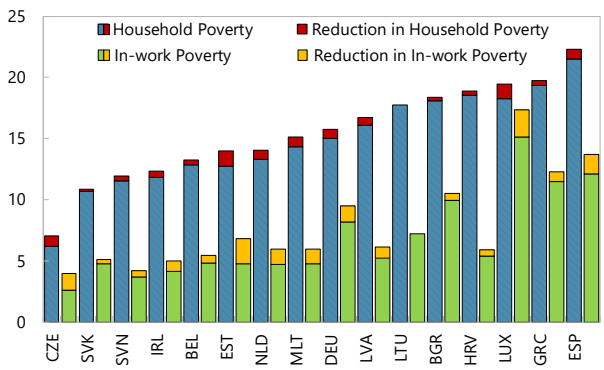
21. The dis-employment effects of a higher MW would curb the positive direct effect on poverty. While several studies argue that MW increases do not have major adverse employment effects, the question remains open in the academic literature, especially in the case of large MW changes. The magnitude of the elasticity of employment with respect to changes in the MW is crucial in assessing the ultimate effect on poverty: if workers lose their

Minimum Wage and Reduction in Poverty
(Percent)



Sources: Eurostat; EUSILC; and IMF Staff Calculations.
Note: Minimum wage increased to 60 percent of median wage.
Counterfactual poverty rates are computed based on the constant perimeter scenario.

Household and In-work Poverty Reduction
(Percent of total number of workers)



Sources: Eurostat; EUSILC; IMF Staff Calculations.

jobs or experience a reduction in hours worked because of the higher MW, then they may become poor or not exit poverty, possibly undermining the improvement in the poverty rate from the direct effect of the EMW.

22. Accounting for dis-employment effects in our simulations is fraught with uncertainty. The employment elasticity may differ between the short and long term, across workers of different age and across countries. In addition, the elasticity itself may be a function of the magnitude of the increase in the MW (CBO, 2019) and vary based on the structure of the labor market. Studies using data from individual EU countries may therefore not necessarily be representative of other EU countries.[17] As an illustration of the potential impact of loss of employment on poverty, we conduct a simulation using 0.25 as the employment elasticity (i.e., a 10 percent increase in the minimum wage leads to a 2.5 percent higher probability of becoming unemployed for workers whose wage increases when the EMW is introduced) which is the median value short-term elasticity in the U.S. literature as reported by CBO (2019).[18] In our sample, using this employment elasticity, the average decline in poverty shrinks substantially, from 0.5 in our baseline scenario to 0.1 percentage points. In addition, the simulation suggests that the higher MW would actually increase the poverty rate in some countries (the Czech Republic, Malta, Lithuania, and the Netherlands). However, other employment elasticities could substantially change these results, and unemployment benefits or other social insurance benefits targeted to those workers who might lose their jobs could partially mitigate the effects on their household income.

23. A higher MW may increase prices, thus reducing the gains in real income and purchasing power of the higher nominal MW. To "pay" for the MW, firms must accept lower profits, find ways to increase productivity, economize on other costs, or raise prices, thus passing on the cost to consumers. In the latter case, if poor households disproportionately purchase the goods and services produced by sectors that make more intensive use of MW workers (e.g., fast food meals in the U.S.), then the beneficial effects of the higher MW on poverty may be eroded (MaCurdy, 2015). Quantifying this effect is extremely difficult and requires very detailed data on both households and firms, and we do not attempt it in this paper. A recent study on Hungary (Harasztosi and Lindner, 2019) finds that some 75 percent of the cost of the MW was passed on to consumers while 25 percent

[17] Examples of studies examining the employment effects of minimum wages include Ahlfeldt et al. (2018) (Germany), Heemskerk et al. (2018) (Romania), and Harasztosi and Lindner (2019) (Hungary). The estimated elasticities vary across countries (between 0 and 0.5), possibly reflecting heterogenous characteristics ranging from labor market institutions to the level of corporate profitability.

[18] CBO (2019) surveys 11 recent U.S.-focused papers that estimate employment elasticities for all directly affected workers. Insofar as adverse employment effects could depend on the MW level, the US estimates could be on the lower end of equivalent elasticities in European countries, Harasztosi and Lindner (2019) find an employment elasticity for Hungary that is similar in order of magnitude to the short-term median value that CBO (2019) reports. The CBO median estimated elasticity for the longer term is 1.5, substantially above the short-term elasticity, and one order of magnitude above the 0.15 estimate for Hungary by Harasztosi and Lindner (2019).

was absorbed by lower profits, with the pass-through to prices stronger in sectors more sheltered from competition, such as nontraded services (see also Draca, Machin, and Van Reenen, 2011). More generally, IMF (2019c) documents that the general pass-through from wages to prices has slowed down in Europe in recent years, particularly in sectors more exposed to international competition, suggesting that wage increases (including possibly those from higher MWs) may be absorbed through other cost reduction or declines in profits, thus preserving real income gains for workers.

24. A higher MW may cause some poor households to lose means-tested social insurance benefits, further eroding the direct effect on poverty. As for price effects, a quantification of this indirect effect, which depends on the complex details of social insurance programs in each country, is beyond the scope of this paper, but its impact could be substantial as many EU countries have comprehensive means-tested social insurance systems. On the other hand, reducing reliance on social insurance benefits by raising the earnings of low-income workers may be a desirable policy goals in and of itself and would help the fiscal accounts.

25. Finally, a higher MW may increase non-compliance or the use of legal loopholes, resulting in a reduced MW perimeter. Empirical evidence suggests that as the MW becomes more binding employers increasingly find ways to avoid the regulation (Carpio and Pabon, 2017). This may be done by overreporting wage payments or underreporting hours worked, or simply employing workers informally. An increase in informality or contract work would hurt workers as they would lose the broad benefits and protections of a regular work contract in addition to receiving a lower wage. As the MW becomes more binding, countries need to strengthen monitoring and enforcement to avoid a rise in circumvention.

26. Given that increasing the MW has relatively limited effects on poverty, the merits of alternative instruments could be explored. These include measures that increase access to better-paid jobs and expand human capital such as job training and life-long learning programs, as well as well-targeted social benefits for the most vulnerable households. Providing in-work tax credits is another fiscal policy tool that supports the incomes of the working-poor while simultaneously incentivizing employment. However, like the MW, such a scheme does not support incomes of poor households that are outside of the labor force, and employers may capture some of the benefits associated with tax credits (see IMF, 2017b, for details).

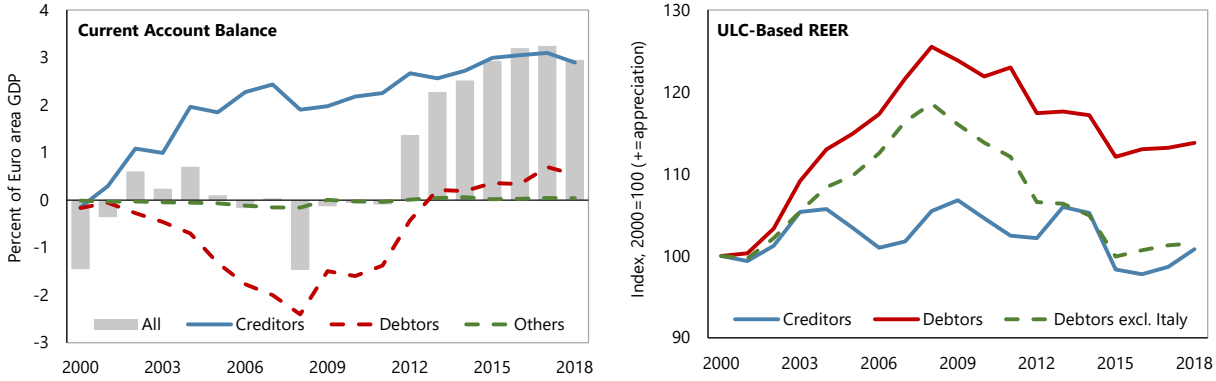
IV. Effects on Rebalancing within the Euro Area

While the primary purpose of an EMW would not be to address long-standing intra euro area macroeconomic imbalances, the policy, by affecting labor costs differentially, would likely have an effect on those imbalances. In this section we explore how a hypothetical EMW may change relative unit labor costs, real exchange rates, and current account balances within the euro area.

A. External imbalances within the euro area have been long-lasting

27. The persistence of sizable external sector imbalances within the euro area has been widely acknowledged and is often attributed to a lack of policy instruments within the monetary union.19 Within the monetary union, real exchange rate adjustment cannot occur through changes in the nominal exchange rate but must rely on differential price movements, which may be slow to take place, especially in a low-inflation environment. In addition, the absence of a common or coordinated fiscal policy makes it difficult to swiftly restore external sector balances through that instrument. Since the introduction of the euro, two groups of countries have emerged: those with persistently-elevated net positive international investment positions (creditors) and those with net negative positions (debtors). After the global financial crisis, debtor countries turned their current account deficits into surpluses, often through a painful process of deleveraging by households, corporations, and the public sector, accompanied with high structural unemployment and low wage growth. In contrast, creditor countries saw their external position strengthen further, reflecting limited wage and unit labor cost pressures and relatively weak domestic demand. Thus, the rebalancing process has been asymmetric and has relied more on demand compression than relative price adjustment. All in all, while intra-euro area imbalances have declined, they remain large and the bloc posts a sizeable surplus vis-à-vis the rest of the world (IMF, 2019a).

Euro Area Current Account Balance and ULC-Based Real Effective Exchange Rate



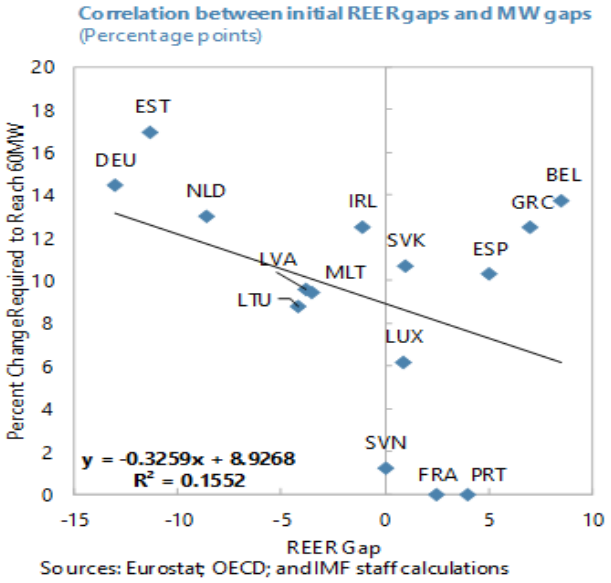
Source: Box 1.3, IMF 2019 External Sector Report.
Note: Creditor countries include Austria, Belgium, Finland, Germany, and the Netherlands. Debtors include Greece, France, Ireland, Italy, Portugal, and Spain.

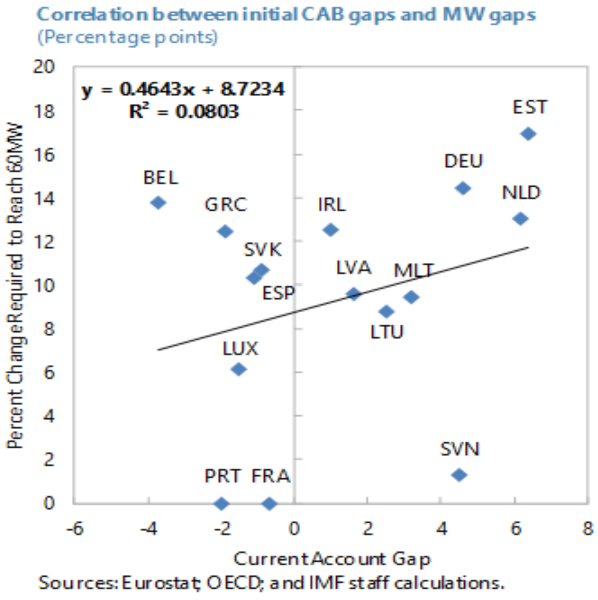
28. Stronger wage growth could speed up external adjustment in surplus countries while reducing the burden on deficit countries. In large creditor countries, wages and ULC started to accelerate in the last couple of years as output and unemployment gaps closed and became positive, but the pace of adjustment has been modest and the effect on CA surpluses limited so far. Against this backdrop, the IMF has repeatedly called for a healthy rebalancing in the euro area as a two-way street: countries with large external surpluses should allow

[19] For example, see ECB (2012), Pierluigi and Sondermann (2018), IMF (2012, 2019).

wage competitiveness to adjust and domestic demand to strengthen including via higher wage growth while deficit countries should pursue reforms that help contain labor cost while boosting labor productivity.[20] How might an EMW affect this process? In a nutshell, if larger MW increases translate in downward adjustments in external competitiveness in countries with an external position that is too strong and vice versa, then the EMW might help reduce imbalances within the EA. The next section explores this question (additional details are in Technical Appendix B).

29. Countries with the largest gap to a minimum wage of 60 percent of the median wage tend to have large CA gaps and an undervalued REER. Current account and REER gaps are taken from IMF's External Sector Report (ESR), which assesses gaps from "levels consistent with long-term fundamentals and desirable policy settings."[21] For the current account, a positive (negative) gap corresponds to an external position that is too strong (weak). For the REER, a positive (negative) gap indicates that the REER is overvalued (undervalued). The minimum wage gaps to the hypothetical EMW are computed based on the latest available data, so they differ somewhat from those used in the micro-simulation, which referred to 2016.[22] Based on these data and on the latest ESR assessment, Germany, for example, would need to increase its Kaitz





[20] For example, see IMF 2019 AIV reports for Germany, Netherlands, Portugal and Greece.

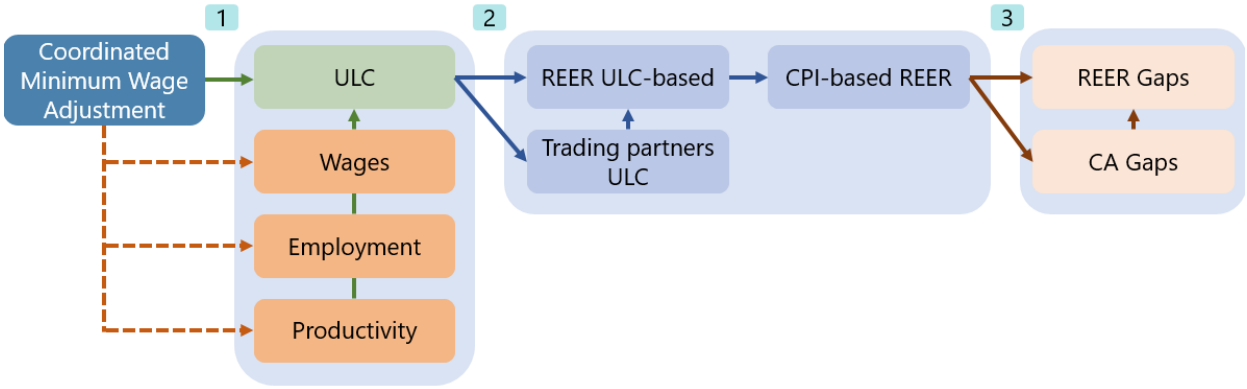
[21] The methodology to assess gaps combines model outputs and staff country team judgement. For more details on the External Balance Assessment (EBA) model, see Cubeddu et al (2019).

[22] Throughout this section, the main data source for the Kaitz ratio is the OECD, which publishes the ratio until 2018, with a few exceptions. Given the large minimum wage increase in Spain in 2019, we estimate its latest Kaitz ratio using information from the country team. For Malta, we compute the comparable minimum wage ratio series using information from Eurostat. For a few countries where there is no statutory minimum wage, we compute an equivalent ratio from sectoral minima combining information by country teams and from Garnero (2015) for Italy, and Garnero et al. (2014) for Austria, Finland, and Cyprus.

ratio by 14½ percentage points, while its CA gap is assessed at 4½ percent. On the other hand, some countries that are already at or above the 60 percent threshold (France and Portugal) and hence would see no MW change are among the countries that need to strengthen their external position.

Interactions between minimum wages, competitiveness, and rebalancing: a simple framework

30. To explore the effects of minimum wages on intra-euro area imbalances we proceed in three steps. First, using panel data and a reduced-form local-projections empirical model we seek to establish how past changes in the minimum wage in EA countries affected average wages, unit labor costs, and real exchange rates (REERs) in the short and medium run. Second, using the coefficients estimated in the first step, we compute the hypothetical changes in competitiveness (ULC-based REERs and CPI-based REERs) within the EA in a scenario in which all countries raise their current minimum wage to 60



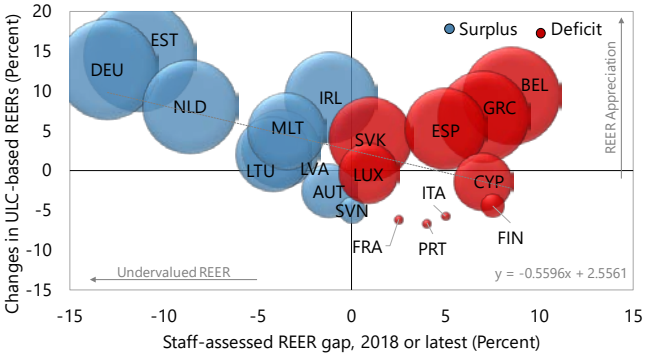
percent of the median wage. Movements in competitiveness reflect both changes in the country's own labor costs and changes in the labor costs of EA trading partners. In the third step, we map changes in competitiveness into changes in current account balances.

An EU minimum wage may help reduce large external surpluses, but may create new imbalances or worsen existing ones in a few countries

31. Regression results show that higher minimum wages lead to significantly higher labor costs in the short and medium term. The local projection estimates show that higher minimum wages tend to be associated with rising ULCs and the impact mainly comes from higher average wages (rather than lower productivity) in the short run. The rise in the minimum wage is also associated with a commensurate appreciation of various REER measures of external competitiveness (ULC-based REER, CPI-based REER).

32. The coordinated minimum wage increases would help adjust competitiveness in countries with an excessively strong external position, while for countries that need to gain competitiveness the picture is mixed.[23] For the former group, the REER appreciation is the result of relatively larger MW gaps to the 60 percent threshold (i.e. own countries' contributions), despite somewhat low shares of trade within the EA (41 percent of their total trade). The implied medium-term cumulative REER appreciations in surplus countries is around 5 percent on average (or between 1-2 standard deviations of the observed medium-term historical changes in the REER). Among countries that need to depreciate the REER, some would benefit from higher minimum wages in their EA trading partners (France, Italy, Portugal) whereas others would experience a further deterioration in external competitiveness because their own MW would need to rise (Spain, Greece and Belgium). The loss in competitiveness appears particularly sizeable for Belgium, at around 2 standard deviations of its past REER changes.

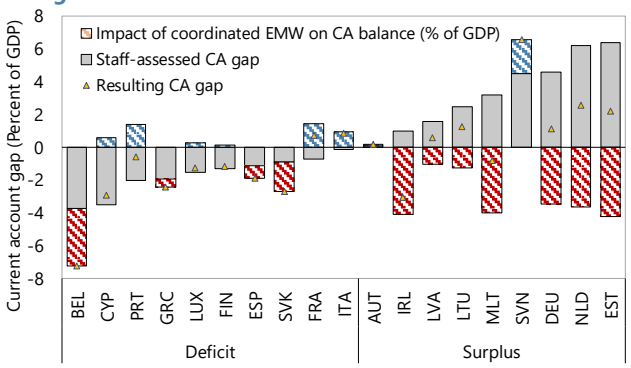
Estimated Medium-term Impacts of Coordinated Minimum Wages on ULC-based Real Effective Exchange Rates



Sources: IMF Staff Calculations.
Note: Changes in ULC-based REERs are cumulative impacts over five years. Bubble size indicates own country's contribution to REER adjustment. Staff-assessed REER gap is based on country team's estimate.

33. The EMW would result in *some* rebalancing of external positions within the EA, primarily driven by adjustments in key surplus countries, but with a worsening position in several deficit countries.[24] In line with the changes in REERs outlined above, for most surplus countries CA gaps would be substantially lowered, particularly in Germany, the Netherlands, and Estonia. The magnitude of these medium-term cumulative CA adjustments, of around 2 percentage points of GDP on average, is in line with past experience (or between 1 and 2 standard deviations of medium-term changes in the current account). Meanwhile, the coordinated minimum

Estimated Medium-term Impacts of Coordinated Minimum Wages on Current Account



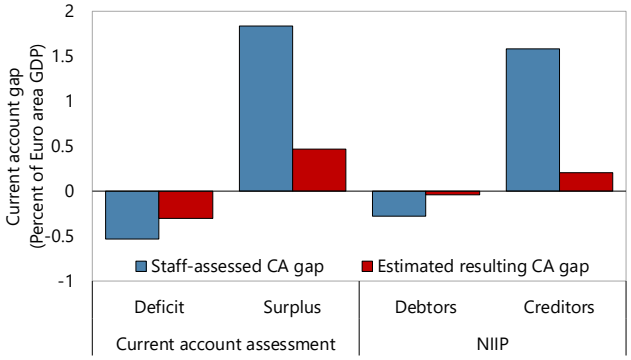
Sources: IMF Staff Calculations.
Note: Changes in ULC-based REERs are cumulative impacts over five years. Staff-assessed CA gap is based on country team's estimate.

[23] These results are robust to various alterations of the framework, including allowing for the heterogeneity in wage CPI inflation passthrough, or using global value chain (GVC) trade weights in REER decompositions (see Technical Appendix B).

[24] CA-REER elasticities are country-specific and taken from staff's External Sector Assessment in IMF country reports and/or the IMF External Sector Report (IMF, 2019a). This choice is crucial as the degree of responsiveness of the current account to fluctuations in the REER clearly depends on several country-specific factors.

wage policy could help reduce the negative current account gap for only a few deficit countries (Cyprus, Portugal, France, and Italy), some of which are already above the 60 percent threshold. However, among the deficit countries, Spain, Belgium, and Greece have relatively large negative current account gaps, while their minimum wages are currently nearly 50 percent of the median wage. Therefore, the EMW would worsen their external position further, according to the simulation. Also, both Slovakia and Ireland (two countries with minor imbalances) would experience a deterioration of their external position. All in all, about 85 percent of the rebalancing would come from adjustments by the surplus countries or net creditor countries.

Coordinated Minimum Wages and External Imbalances



Sources: IMF Staff Calculations.
Note: Estimated resulting CA gaps are cumulative impacts over five years. Staff-assessed CA gap is based on country team's estimate.

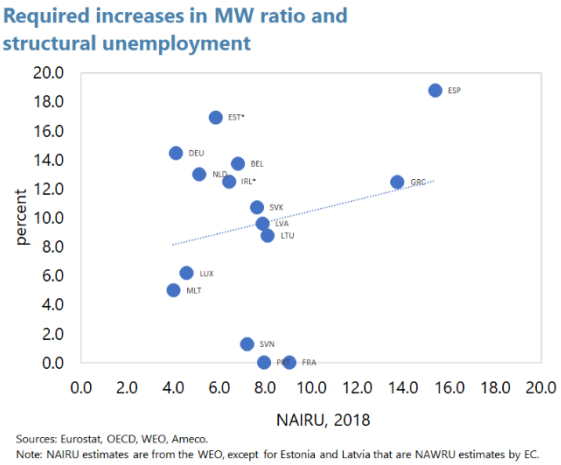
B. Notes of caution

34. This empirical framework has several limitations, which suggest that the results should be taken with caution. The impact of a change in the minimum wage on average labor costs is estimated with a reduced-form regression, which always gives rise to questions about omitted variables, potential endogeneity bias, and robustness. [25] While we address these concerns in various ways, we acknowledge that they cannot be fully dispelled. In addition, the link between changes in relative ULCs and CA imbalances relies on elasticities also derived from reduced-form estimates. As such, they may fail to capture important general equilibrium effects that only a full model simulation can deal with. In addition, we ignore changes in wages and ULCs in non-EA EU trading partners, even though in some of these countries wages would change as a result of MW harmonization. The impact of these changes on EA-trading partner REERs depends on changes in the nominal exchange rate and

[25] In the regression specifications we control for cyclical conditions (with the output gap, labor force participation rate, inflation, and growth expectations) and for structural characteristics of countries which should determine the degree of cost-competitiveness of a country (the degree of trade openness, the share of the industrial sector, or the timing of euro adoption). To address the endogeneity bias, we use instrumental variables and choose as instruments political variables that should be strongly correlated with the likelihood of an increase in minimum wages but not with ULCs dynamics. These variables are: the largest government party orientation (left, center, or right), the number of years left in current executive term, and the vote share of largest government party. Our identification strategy assumes that there is no a priori reason for these political variables to directly determine ULCs, but they have an important effect on the likelihood of an increase in the MW ratio. We have tested the robustness of our findings to alternative specifications and methods. For example, to address the bias arising from the denominator in the Kaitz index, we have replaced the Kaitz index in the regressions with the nominal wage variable in euros. In another robustness check, we include the size of the low-pay sector as an interaction term. The results are robust to these changes in the main specification, see Technical Appendix B for details.

would therefore require a more sophisticated analytical framework. Despite these limitations, we believe that the exercise provides useful insights.

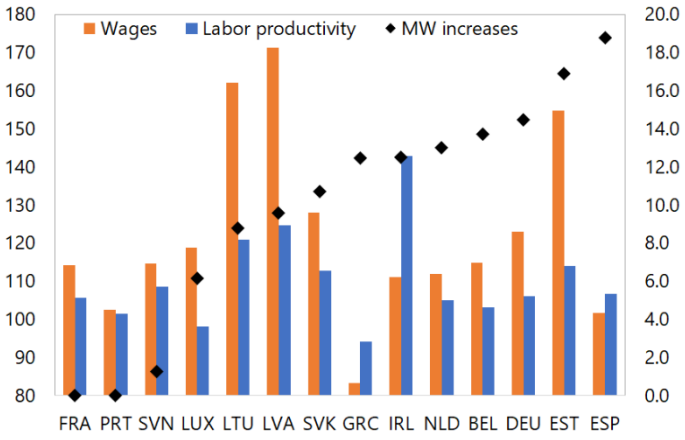
35. The simulations may not fully account for the risk of reduced MW compliance ex post and other factors. The estimated empirical relationship between MW changes and ULC changes should in principle take into account changes in MW compliance. However, possible non-linearities may mean that the large minimum wage increases required to reach the EMW threshold in a few countries might affect compliance more strongly than past MW changes would suggest, implying a smaller effect of the MW on ULCs, competitiveness, and rebalancing. Where structural unemployment is high (Greece and Spain), compliance with a higher MW may be difficult as many workers might accept sub-minimum wages to find a job. In addition, the simulation may underestimate the impact of introducing a statutory MW in countries without one but where sectoral minima are relatively high. In these countries, the statutory MW may not raise the wage of workers under the sectoral minima but may raise wages for workers outside these sectors. This effect is not reflected in the simulations. The simulations also do not reflect the effect on competitiveness of MW increases in non-euro area EU trading partners.



36. The simulations may overestimate the wage-inflation pass-through and hence the effect of relative wage movement on the real exchange rate. On the one hand, a generalized MW increase across the EU might be expected to generate a positive inflation shock. On the other hand, as discussed in the first section, wage and price inflation in Europe have been diverging in recent years, which has translated into diverging price- vs. ULC-based REER movements. The pass-through is likely to be lower for surplus countries which tend to have a higher corporate profit share (Boranova et al, 2019, and IMF, 2019c). The coefficients used in the simulations to convert ULC-based REER changes into CPI-based REER changes are based on historical data and thus may overestimate the pass-through in the current environment. If this is the case, then changes in relative ULCs would not translate in the changes in relative prices needed to bring about the "expenditure switching" necessary to adjust the CA. On the other hand, the simulations do not take into account effects on aggregate savings and investment that do not occur through the real exchange rate. For instance, a higher MW that is not passed through to prices would likely redistributes income toward lower income households, which would reduce aggregate savings and the CA. At the same time, lower corporate profits may result in lower investment, which would tend to increase the CA surplus.

37. Our regressions find a negative association between MW increases and labor productivity in the EA in the medium term. The impact on labor productivity in the short-run is not statistically significant, in line with some findings in the literature (Draca et al, 2011, Bossler et al, 2018, and Caliendo et al, 2018) but it is negative and significant in the medium run, contrary to predictions by the efficiency wage theory and capital-labor substitution channel. This implies that a part of the ULC strengthening in surplus countries in the simulations reflects weaker labor productivity rather than higher wages. One possible explanation may be that, in deficit countries, higher labor costs compress firms' profit margins and ultimately depress investment and hence, aggregate labor productivity (Garcia-Macia, 2020 and IMF, 2018). A compression in the wage structure may also reduce incentives for workers to upgrade skills, and thus negatively affect labor productivity. Further, overly stringent employment protection in Europe, while limiting dis-employment effects, may have an adverse impact on productivity (Duval and Loungani, 2019). Thus, the external adjustment may also be accompanied by lower productivity and long-term output in surplus countries. This issue needs to be investigated further.

Required Increases in MW Ratio and Cumulative Wage and Productivity Changes from 2010 to 2018 (2010=100)



Sources: Eurostat; OECD; and IMF staff calculations.

38. MW harmonization may help EA imbalances at the present juncture but may be an obstacle to future macroeconomic adjustments. Going forward, differences in economic developments and asymmetric shocks may produce new and different imbalances within the EA which will require again asymmetric adjustment in CA balances and realignments in competitiveness. If the MW can influence overall wages, fixing the MW at a common harmonized ratio may preempt using the MW to affect overall wage developments in the future. While this may discourage EA countries from engaging in "competitive devaluations" inside the monetary union by keeping wages deliberately low through a low MW, it would also constrain the use of MW policy to adjust cost competitiveness to asymmetric future shocks. Alternatively, labor cost realignments inside a monetary union could be enhanced through national wage negotiations (Blanchard, 2018). More generally, external rebalancing can be achieved through other policies, such as fiscal policy, pension reforms (to affect household savings), innovation policies (to foster domestic investment), and others. Policies to boost labor productivity growth in deficit countries would also help close competitiveness gaps.

V. CONCLUSIONS

39. This paper seeks to contribute to the policy debate on an EMW by analyzing the effects on poverty and intra-EA imbalances of setting a common MW at 60 percent of the national median in every EU country. This policy would bring the MW (relative to the median wage) to the upper range currently observed in the EU and is close to the commonly-used definition of low pay.

40. First, we have considered the effects of the hypothetical EMW on poverty, as the primary intent of MW wage policy is to boost lower incomes. The analysis, conducted through a simulation using household survey data for 2016, suggests that an EMW would have lifted incomes of many low-wage workers, thus reducing in-work poverty, and reduced poverty rates in several EU countries, but the effect on overall would have been quantitatively modest despite sizable increases in the MW in some countries. This is because many poor households in the EU do not have members working at or below the MW. Rather, poverty reflects inactivity or low activity (because of unemployment, retirement, disability, intermittent work, or retirement) or work in self-employment. Thus, policies that expand employment and access to regular jobs as well as measures to boost social safety nets may be more effective to address poverty than higher MWs. If we focus on poverty rates among individuals who work, however, the MW is more effective. But even in this case policies that directly target low-income workers, such as in-work subsidies, would be better targeted and avoid possible adverse effects on employment (including through a reduction in hours worked) and higher prices, though they would involve a fiscal cost (Burkhauser, 2015). Significantly higher MWs can also worsen non-compliance or increase the use of legal loopholes unless they are accompanied by stronger anti-avoidance measures.

41. The second part of the paper has examined how the hypothetical harmonization of the MW may affect labor costs, real exchange rates, and external imbalances within the EA. Such imbalances, after building up since the beginning of the monetary union, have been difficult to unwind, with sizable surpluses remaining in a few countries. Using aggregate data for EA countries, we find that changes in the MW ratio appear to have significant and persistent effects on labor cost competitiveness and real exchange rates. In addition, convergence to the hypothetical common EMW would appreciate the real exchange rate in countries with an excessively strong external position, as these countries would need to increase their MW substantially. This would help reduce their large external surpluses. A few other countries with a weak external position would benefit from rising labor costs in trading partners even though their own MW would not need to change. However, a few countries with weak external positions would see their imbalances deepen because of higher labor costs and worse competitiveness. Thus, although there is some degree of alignment between external imbalances and MW differentials within the EA, such alignment is imperfect.

42. The analysis raises the question of whether the MW, alongside other policies that influence wage dynamics, might be a useful policy tool to foster balance of payments

adjustments inside monetary unions. In the absence of nominal exchange rate adjustment, countries with excessive surpluses would need to accelerate wage growth to achieve real exchange rate appreciation while countries with weak external positions would need to do the opposite. Moving MWs differentially may contribute to this process and thus lead to faster adjustment of imbalances, but it may conflict with other social or economic objectives, and the tradeoffs involved would need to be carefully considered.

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APPENDIX A: EFFECTS OF HARMONIZING MINIMUM WAGES RATIOS ON POVERTY

This appendix provides additional details about the simulations of the effects of the hypothetical EMW on poverty. For the simulations, w0e use data on minimum wages provided by Eurostat and household data from the 2018 wave of the EU-SILC survey, including monthly wages for employees.

To compute the changes in household poverty, we perform the following exercise. First, we compute the share of households in poverty in each country in 2016. A household is defined to be in poverty if its overall income is below the 60 percent of the median household income in the country in year 2016. Then, we change the monthly wage of every employee in the household to reflect changes in wages as per rules described below. Then, we recompute the household income starting from the simulated monthly wage of each employee in the household. Finally, we check whether, given the new income, the household would still be below 60 percent of the original median household income. The reduction in poverty reported in the main text is the percentage of households that exit poverty as a result of the policy change.

Since only annual labor income is reported in the SILC data base, we compute monthly wages using the methodology of Brandolini et al. (2011).[1] The annual gross labor income ($gross\ income_i$, EU-SILC variable *PY010G*) is divided by full time equivalent months. The measure of full time equivalent months is built by summing the number of months worked full time ($\#months_{FT,i}$, *PL073*), and the number of weeks worked part-time ($\#months_{PT_i}$, *PL074*) scaled by a scalar. The scalar is the ratio between the median number of hours worked in the week prior to the interview (*PL060*) by full-time workers in a year-country-sex group $g(i)$ to which individual i belongs ($hours_{med,FT,g(i)}$) and the number of hours worked by part-time workers in the same group ($hours_{med,PT,g(i)}$). The medians are computed in each cell using cross sectional person weights (*PB040*). In sum:

$$wage_{FTE,i} = \frac{gross\ income_i}{\#months_{FT,i} + \frac{hours_{med,FT,g(i)}}{hours_{med,PT,g(i)}} \#months_{PT_i}}$$

[1] Brandolini, Andrea, Alfonso Rosolia, and Roberto Torrini. "The distribution of employees' labour earnings in the European Union: Data, concepts and first results." ECINEQ WP 198 (2011).

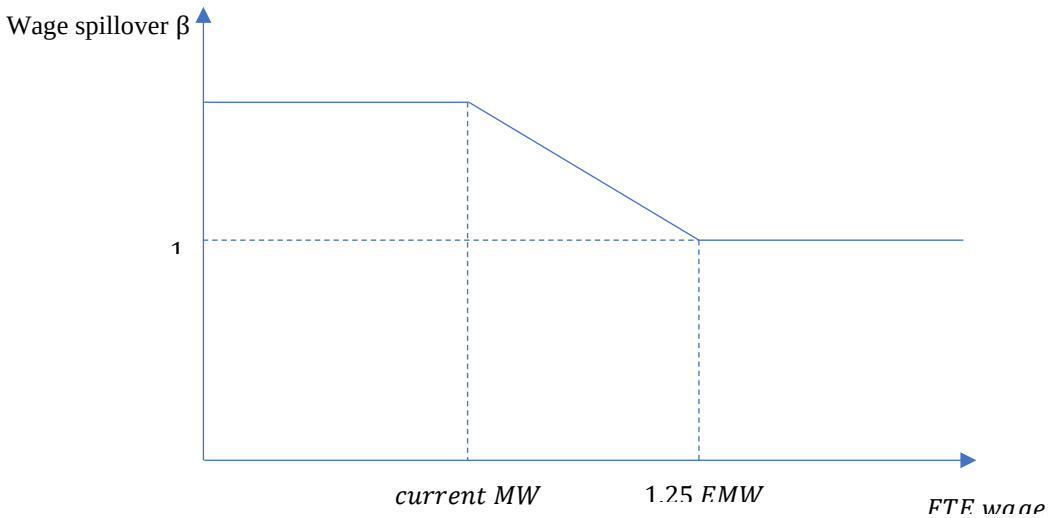
The measure is computed only for employees, excluding self-employed workers. In the simulations, only wages for employees are considered, while the wages of self-employed workers are assumed to remain unchanged. Employees and self-employed are defined based on the EU-SILC variable *PL031*. Consistently, the figures regarding in-work poverty only pertain full-time employees.

In the simulations, the key assumption is that the wages of workers earning less than the MW are assumed to rise in the same proportion as the MW. In addition, we assume that the change in the MW would spill over to all wages in the range between the current MW and 75 percent of the median wage (or equivalently 1.25 times the EMW). The spillover parameter β is defined as follows:

$$New\ wage = \beta \times FTE\ wage,$$

$$\beta = \begin{cases} \dfrac{EMW\ (60\%\ Med.wage)}{current\ MW\ (cur.MW)} & ,FTE\ < cur.MW \\ 1 + \dfrac{1}{cur.MW}\dfrac{EMW - cur.MW}{1.25\ EMW - cur.MW} \times (1.25\ EMW - FTE), & cur.MW \leq FTE\ < 1.25\ EMW \\ 1 & ,FTE\ wage \geq 125\%\ EMW \end{cases}$$

The following diagram illustrates the wage spillover parameter β as a function of FTE wage:



Finally, in the simulation that includes disemployment effects from the higher MW, we follow the median estimate in the literature by assuming a plausible labor demand elasticity of 0.25

(i.e., a 10 percent increase in the minimum wage would lead to a 2.5 percent higher probability of becoming unemployed). This number comes from the median estimate in the CBO report "The Effects on employment and Family Income of Increasing the Federal Minimum Wage" (July, 2019), table A-2. Since all workers earning less than 1.25 percent of the MW experience a wage increase in our simulation, all workers in this group experience a higher incidence of unemployment. If a worker is drawn in unemployment (this happens with probabilty 0.25*[percent increase in minimum wage]), we assign to that worker a wage of 0, and recompute the household income as explained above. We finally recompute the share of households is in poverty and obtained a new change in poverty under this scenario.

APPENDIX B: EFFECTS OF HARMONIZING MINIMUM WAGES RATIOS ON REBALANCING WITHIN THE EURO AREA

This Appendix provides details of the analysis of the effects of harmonizing MW ratios on macroeconomic rebalancing in the euro area. We discuss in-depth the various empirical choices made and their associated advantages and limitations. We also present several robustness tests of the key results.

A. The Impact of a Change in the Minimum Wage on ULCs: Regression Analysis

The starting point of the analysis is that harmonization of MW ratios in the EU would affect external rebalancing in the euro area primarily via its impacts on intra-euro area relative ULCs. These changes in intra-euro area competitiveness would then translate in changes in internal trade balances. Accordingly, the first step of the analysis is to estimate empirically a robust relationship between ULCs and changes in minimum wages.

In attempting to estimate the impact of a change in the MW on ULC two main issues need to be addressed. First, the horizon of interest is the medium-term, since workers and firms adjust to the new regime of higher statutory minimum wages only gradually over time. We will therefore resort to the local projection technique of Jorda (2005) which provides robust dynamic effects (impulse response) to exogenous shocks. We focus on the 5th-year impact of changes in the MW on ULCs. Second, we need to address concerns of joint endogeneity, since changes in the minimum wage are likely not orthogonal to current labor costs and other economic developments.

A local projection model to identify the effect of minimum wage on ULCs

The empirical model takes the following form:

$$y_{t+h,i} - y_{t-1,i} = \alpha_{h,i} + \gamma_{h,t} + \theta_h log\left(\frac{MW}{Med}\right)_{it} + X'_{it}\Gamma_{\mathrm{h}} + \epsilon_{t+h,i} \quad (3)$$

where *y* denotes the log of ULCs in country *i* at year *t+h*, *h* = 0, 1, …., 5, We control for country and year fixed effects to account for the effects of unobservable factors at the country and time levels. The matrix *X* contains the control variables included in the regression, in addition to the

lagged value of the ULCs[1]. We control for cyclical conditions (with the output gap, labor force participation rate, inflation, and growth expectations) to control for the effects of the business cycle. We also control for structural characteristics of countries such as the degree of trade openness, the share of the industrial sector, or the timing of euro adoption which should determine the degree of cost-competitiveness of a country. For example, more open countries with a large share of manufacturing sector will tend to have more contained labor costs and higher productivity growth. The panel is composed of euro area countries for which statutory or estimated minimum wage ratios are available. The sample period is 2000-18. The data sources are listed in Table B5.

The coefficient of interest is θ_h, which measures the cumulative response of the ULCs in year t+h to changes in the MW ratio in year t.

If the Kaitz index is exogenous to the ULC conditional on the control variables, then the coefficients θ_h provide an unbiased impulse response over time. However, decisions to make the MW more binding may be influenced by macroeconomic developments not fully captured by the control variables. The sign of the bias is not clear a priori: for instance, a decline in ULC and the labor share in some key sectors, possibly reflecting more market power by firms, may make governments more willing to raise the MW for fairness considerations. On the other hand, a very tight labor market could both increase ULC and weaken political resistance to a higher MW, resulting in an upward bias.

To address the endogeneity bias, we use instrumental variables and choose as instruments political variables that should be strongly correlated with the likelihood of an increase in minimum wages but not with ULCs dynamics. These variables are: the largest government party orientation (left, center, or right), the number of years left in current executive term, and the vote share of largest government party. Our identification strategy assumes that there is no a priori reason for these political variables to directly determine ULCs, but they have an important effect on the likelihood of an increase in the MW ratio.

The results of the OLS and IV estimation are presented in Table B1. The coefficients of the Kaitz index in the IV regressions are considerably larger than the OLS ones especially in the

[1] A standard practice in empirical papers using the local projection method (Jorda, 2005; Owyang et al., 2013; Auerbach and Gorodnichenko, 2017).

short run, suggesting that IVs are removing downward bias in the estimation. The full set of results is presented in Table B6 at the end of this Appendix.

Table B1: Cumulative log deviations in ULCs, relative to year -1 (before the MW shock).

	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
OLS with country-specific time trends						
Kaitz index, in log	0.00367	0.0474	0.146***	0.215***	0.239***	0.131**
	(0.141)	(1.172)	(2.747)	(3.374)	(3.705)	(2.141)
Observations	261	244	229	214	198	183
OLS with country and year fixed effects						
Kaitz index, in log	0.0287	0.0969*	0.231***	0.402***	0.515***	0.470***
	(0.839)	(1.809)	(3.348)	(5.030)	(6.310)	(5.693)
Observations	261	244	229	214	198	183
Instrumental variable estimates with country-specific time trends						
First-stage regressions: Kaitz index, in log						
Political orientation dummy (*Center*)			-0.057***			
			(3.30)			
Political orientation dummy (*Right*)			-0.012			
			(-1.09)			
Number of years left in legislature			0.005			
			(1.46)			
Vote share of government party			0.001			
			(1.12)			
Two-year lagged Kaitz index			0.653***			
			(12.06)			
F-stat of the first-stage			30.71			
Second-stage regressions: ULCs						
	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
Kaitz index, in log	0.112**	0.295***	0.498***	0.552***	0.407***	0.200**
	(2.461)	(4.415)	(5.593)	(5.152)	(3.899)	(2.068)
Over-identification test: *P*-value	0.655	0.394	0.658	0.333	0.849	0.339
Observations	211	211	198	185	173	162
Instrumental variable estimates with country and time fixed effects						
First-stage regressions: Kaitz index, in log						
Political orientation dummy (*Center*)			-0.048**			
			(-2.40)			
Political orientation dummy (*Right*)			0.001			
			(0.09)			
Number of years left in legislature			0.005*			
			(1.79)			
Vote share of government party			-0.001			
			(-0.73)			

Two-year lagged Kaitz index			0.555***			
			(7.84)			
F-stat of the first-stage			13.35			
	Second-stage regressions: ULCs					
	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
Kaitz index, in log	0.178**	0.516***	0.850***	0.962***	0.779***	0.496***
	(2.492)	(4.484)	(5.480)	(5.644)	(4.749)	(2.779)
Over-identification test: *P*-value	0.655	0.394	0.658	0.333	0.849	0.339
Observations	210	210	198	185	173	162

Notes: Models include the full set of country and year fixed effects, or country-specific time trends, lagged dependent variables, labor force participation rate, output gap, trade openness, industrial share, inflation, euro entry, and expectations of future growth. The Kaitz index is instrumented by its two-year lag and by political factors: the vote share of the ruling party, the political orientation (center, right, left) of the ruling party, and the proximity of a general election.

B. Transmission channels: The main channel is the average compensation of employees

To unpack the main channels through which the minimum wage raises ULCs over time, we replicate the baseline regression using each component of the ULC (compensation per employees and labor productivity) as the dependent variable. Finally, we also look at the impact of the minimum wage on overall employment using the same framework. In the compensation of employee regression, we have controlled for labor productivity growth.

Our results are shown in Table B2. The results indicate that the main channel through which an increase in the minimum wage leads to higher ULCs down the road is the effect on the average wage (employees' compensation), while the effects on labor productivity are small and statistically significant only in the medium-term in some specifications.[1]

[1] The results are similar when we add employment protection as to the list of control variables.

Table B2: Cumulative log deviations in the medium term, relative to year -1 (before the MW shock). Instrumental variable estimates.

	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
			ULCs			
Kaitz index, in log	0.178**	0.516***	0.850***	0.962***	0.779***	0.496***
	(2.492)	(4.484)	(5.480)	(5.644)	(4.749)	(2.779)
Observations	210	210	198	185	173	162
			Compensation of employees			
Kaitz index, in log	0.137**	0.525***	0.744***	0.666***	0.427**	0.399**
	(2.134)	(4.243)	(4.321)	(3.695)	(2.359)	(2.017)
Observations	210	210	198	185	173	162
			Labor productivity			
Kaitz index, in log	-0.0554	-0.196	-0.130	-0.198	-0.404*	-0.448*
	(-0.399)	(-1.180)	(-0.631)	(-0.883)	(-1.668)	(-1.851)
Observations	122	122	122	122	122	122
			Total employment			
Kaitz index, in log	-0.0466	-0.0977	-0.0858	-0.135	-0.291*	-0.454**
	(-1.172)	(-1.646)	(-1.065)	(-1.131)	(-1.882)	(-2.556)
Observations	210	210	198	185	173	162

Notes: Models include the full set of country and year fixed effects, lagged dependent variables, output gap, trade openness, industrial share, the GDP deflator, labor force participation rate, euro entry, and expectations of future growth. The Kaitz index is instrumented by its two-year lag and by political factors: the vote share of the ruling party, the political orientation (center, right, left) of the ruling party, and the proximity of a general election.

Alternative measure of minimum wage ratio and results

While it is standard in the literature to use the Kaitz index when assessing the impact of the minimum wages on macroeconomic variables using panel data, the variation in the Kaitz index may not only reflect changes in the numerator (the minimum wage) but also changes in the denominator (i.e. the median wage). The latter are more likely to be jointly endogenous with the ULC and hence bias the coefficient. While IV estimation should in principle deal with this possible bias, we have also re-estimated all the regressions replacing the Kaitz index by its numerator (the level of the minimum wage in log euro terms).[2] This adjustment ensures that

[2] However, this approach does not take into account that the macroeconomic impact of a change in the MW likely depends on how binding it is, i.e. how it compares with the "typical" wage. Using the Kaitz index as the variable of

(continued…)

only changes in the minimum wages (in nominal terms) are driving the variability of the variable of interest. The results appear broadly robust (Table B3). This holds for ULC regressions and for most of the transmission channels.

Table B3: Cumulative log deviations in the medium term, relative to year -1 (before the MW shock). Instrumental variable estimates.

	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
			ULCs			
Minimum wage (level), in log	0.100***	0.207***	0.396***	0.438***	0.251***	-0.00747
	(3.251)	(4.557)	(6.083)	(5.301)	(2.746)	(-0.0768)
Observations	217	217	205	192	180	169

Notes: Models include the full set of country and year fixed effects, lagged dependent variables, output gap, trade openness, industrial share, the GDP deflator, labor force participation rate, euro entry, and expectations of future growth. The log level of the minimum wage (in euro terms) is instrumented by its two-year lag and by political factors: the vote share of the ruling party, the political orientation (center, right, left) of the ruling party, and the proximity of a general election.

Alternative identification strategy: The impact of the minimum wages on ULCs depends on the size of the low-pay job sector

Thus far, we have relied on an identification strategy which was based on the effect of political factors in driving the likelihood of observing increases in the minimum wage. In this sub-section, as an alternative test of whether the relationship between ULC and the Kaitz index is driven by joint endogeneity or by the effect of changes in the MW on labor costs, we test whether the effect of the minimum wages on ULC is stronger depending on the size of the low-pay sector. If the relationship is driven mainly by joint endogeneity, we should find no such non-linearity and vice versa. To perform this test, we have amended equation 3 as follows:

$$y_{t+h,i} - y_{t-1,i} = \alpha_{h,i} + \gamma_{h,t} + [\theta_{1h} + \theta_{2h} Low\ Pay_{i.}]\ log\left(\frac{MW}{Med}\right)_{it} + X'_{it}\Gamma_h + \epsilon_{t+h,i} \quad (4)$$

where *y* is the log of ULCs. Low Pay is the share of workers earning low wages (less than 65 percent of the median wages), and is averaged over the sample, due to limited data availability by country (OECD data). Our key hypothesis is that θ_{2h}>0, i.e. that a higher MW has a disproportionally-higher effect on the ULC when the low-pay sector is large. The results are

interest addresses this issue. It also takes into account country-specific characteristics of the labor market that are reflected in the median wage.

shown in Table B4 and suggest that the medium-term impact of the MW on ULC tends to be stronger in countries where the low-wage sector is relatively large.

Table B4: Cumulative log deviations in ULCs, relative to year -1 (before the MW shock). OLS with specific effects.

	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
			OLS with country-specific trends			
Kaitz index, in log	-0.00856	0.00831	0.0629	0.156**	0.180***	0.151**
	(-0.319)	(0.211)	(1.263)	(2.510)	(2.758)	(2.302)
(log Kaitz) * Low Pay	-0.000387	0.00165	0.00738***	0.00891***	0.0123***	0.00755**
(*Low pay is time invariant*)	(-0.345)	(0.998)	(3.362)	(3.016)	(3.766)	(2.154)
Observations	273	256	241	226	210	195
			OLS with country and year fixed effects			
Kaitz index, in log	0.0564	0.139*	0.248**	0.320***	0.261**	0.209*
	(1.280)	(1.930)	(2.590)	(2.812)	(2.205)	(1.705)
(log Kaitz) * Low Pay	-0.00536	-0.00748	-0.00295	0.0135	0.0399***	0.0397***
(*Low pay is time invariant*)	(-0.996)	(-0.873)	(-0.263)	(1.017)	(2.913)	(2.827)
Observations	261	244	229	214	198	183

Notes: Models include the full set of country and year fixed effects, lagged dependent variables, output gap, trade openness, industrial share, the GDP deflator, labor force participation rate, euro entry, and expectations of future growth. The variable Low Pay is the average of the incidence of low pay in each country over the sample period. As the average is time invariant, the additive term in this variable is fully absorbed by country specific effects.

C. Rebalancing in the Euro Area: Simulation Exercises

The starting point is a canonical decomposition of changes in the real effective exchange rate (REER) into changes in relative unit labor costs and changes in effective exchange rates. We assume that a harmonization of minimum wage ratios would affect external rebalancing in the euro area via its impacts on relative ULCs, holding constant changes in nominal effective exchange rate among euro area countries.

$$\ln REER_{i,t} = \ln e_{i,t} + \ln P_{i,t} - \sum_j w_j \cdot \left(\ln e_{j,t} + \ln P_{j,t}\right) \quad (1)$$

$$\Delta \ln REER_{i,t} = \left\{\underbrace{\Delta \ln e_{i,t} - \Delta \ln e^*_{i,t}}_{=0}\right\} + \left\{\underbrace{\Delta \ln P_{i,t}}_{own\ contribution} - \underbrace{\Delta \ln P^*_{i,t}}_{trading\ partners'\ contribution}\right\} \quad (2)$$

where *i* indexes countries, *t* indexes years, *j* indexes trading partners, *e* is the exchange rate in USD per local currency unit (LCU), *P* is the relevant price measure (here *ULC*), * indicates the variable is the weighted average of trading partners, and *w* is the weight on a given trading partner. The harmonization of minimum wage ratios in the euro area would therefore affect the external sector competitiveness of a country through the effect that an increase in domestic minimum wage will exert on the country's ULC, relative to the parallel increases in ULCs in other euro area trading partners

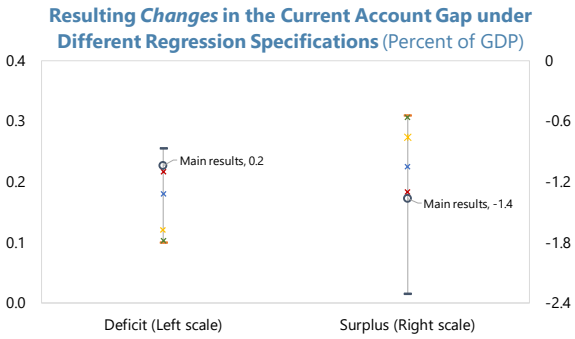
As explain in the main text, to assess how a hypothetical EMW might affect external rebalancing within the EA, we use the estimated regression coefficient in the baseline specification presented in the section above (the IV specification with country and time fixed effects) and to compute the medium-term change in ULC for each EA country. Using this calculation and ignoring possible changes in the external exchange rate and in ULCs of non-EA trading partners, we compute the change in the REER of each country. This change reflects three elements: each country's change in ULC, the change in ULCs of each country's EA trading partners, and the trading shares of EA trading partners. The change in the REER is then translated into a change in the CA using a reduced-form trade elasticity from the IMF ESR exercise. The baseline results show that harmonizing the minimum wage at 60 percent of the national median wage would reduce the negative current account gaps of EA countries with a weak external position by around 0.1-0.3 percentage points of GDP in the medium term, while the CA gap f countries with a strong external position would be reduced by a larger amount, ranging from 0.6 to 2 percentage points of GDP. To put this in perspective, according to the latest IMF assessment (the 2019 ESR or the latest country report, whichever is latest), the CA

gap is estimated to be between -0.5 and 1.8 percent of GDP for deficit and surplus EA countries, respectively.[3]

In addition to the baseline results, we therefore conduct robustness checks of the CA rebalancing effects using (i) different ULCs-minimum wage regression specifications; (ii) dynamic rebalancing results; (iii) an alternative measure of external competitiveness; (iv) an alternative trading weight variable for relative competitiveness analysis; and (v) a harmonization of the minimum wage ratio at alternative targets.

Using alternative regression specifications and identification strategies

The rebalancing results are robust to different ULCs-minimum wage regression specifications and identification strategies described in the earlier section, with the baseline results being within the range of alternative estimates. Country-specific rebalancing results under various regression specification are also broadly in line with the baseline results. It is important to note that some of the robustness check results are rather extreme and should be interpreted with caution. For instance, for the regressions with the interaction term between the Kaitz index and the incidence of low pay and country- and time-fixed effects, the simulated rebalancing results would turn some of the positive CA gap into negative gaps.



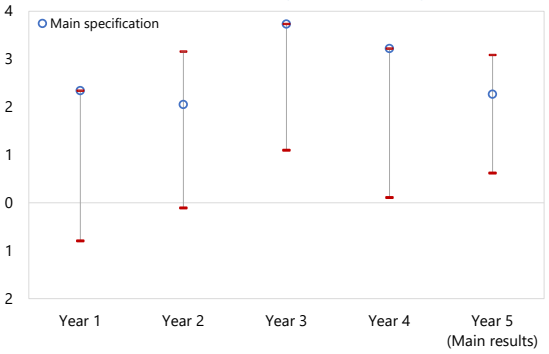
Sources: IMF Staff Calculations.
Note: Estimated resulting changes in CA balances are cumulative impacts over five years. Latest staff-assessed CA gaps are around -0.5 and 1.8 percent of GDP for deficit and surplus EA countries, respectively.

Dynamic impacts

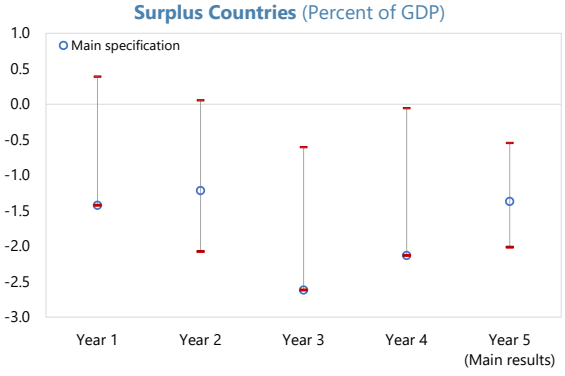
While the discussion of the rebalancing focuses mainly on the impacts in the medium term, we have also investigated the dynamics deriving from the local projection regression results for the near term. The rebalancing impacts are more evident for both deficit and surplus EA countries at year 3 and after. For the near term (year 1 and 2), while the rebalancing effects are significant in the main regression specification, they are relatively close to zero in some other regression specifications. It is important to also note that the rebalancing impacts seem to peak at year 3 and taper off over time.

[3] As in the main text, countries are classified into the deficit and surplus groups, based on the calculated CA gaps from the 2019 ESR or the latest country report (whichever is latest), which assesses CA gaps from "levels consistent with long-term fundamentals and desirable policy settings. The presented gaps for the deficit and surplus countries are the *GDP-weighted average* of CA gaps of countries in the respective group.

Resulting *Changes* in the Current Account Gap Over Time - Deficit Countries (Percent of GDP)



Resulting *Changes* in the Current Account Gap Over Time - Surplus Countries (Percent of GDP)



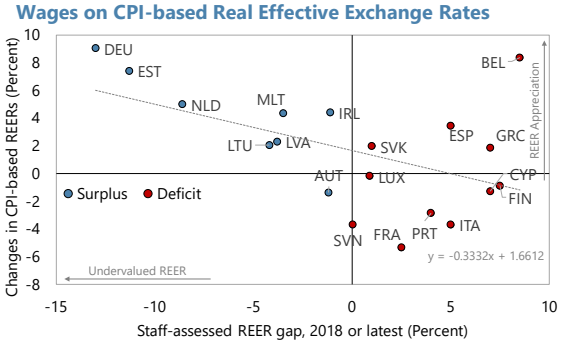
Sources: IMF Staff Calculations.

Note: Estimated resulting changes in CA balances are cumulative impacts over five years. Latest staff-assessed CA gaps are around -0.5 and 1.8 percent of GDP for deficit and surplus EA countries, respectively.

CPI-based real effective exchange rate

A country's external competitiveness can be measured by various real effective exchange rate (REER) measures, including both the ULC-based REERs (presented in the main text) and the CPI-based REERs. We check how wage competitiveness translates into price competitiveness by: *first*, estimating a country-specific relationship between ULCs and CPI; *second*, apply this coefficient to the simulated change in ULCs; and *third*, recalculated the REERs from the simulated change in CPI. The resulting change in a country's external competitiveness is robust to this alternative REER measure. By harmonizing the minimum wage towards 60 percent of the national median wage, the surplus countries are expected to have their CPI-based REERs appreciate. Some deficit countries – such as France, Portugal, and Italy – will have their CPI-based REERs depreciate, but mainly because of higher CPI in their trading partners. Meanwhile, other deficit countries – such as Spain, Greece, Slovakia, and Belgium – will have worsening competitiveness as in the main results.

Estimated Medium-term Impacts of Coordinated Minimum Wages on CPI-based Real Effective Exchange Rates

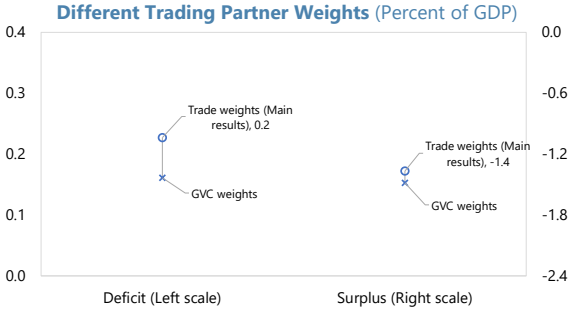


Sources: IMF Staff Calculations.
Note: Changes in CPI REERs are cumulative impacts over five years. Staff-assessed REER gap is based on country team's estimate.

Global value chain weights

For the simulated (gross output) REERs in the main text, trading partners' unit prices are weighted by bilateral trade weights (from the IMF's Research Department). In the robustness

Resulting *Changes* in the Current Account Gap under Different Trading Partner Weights (Percent of GDP)

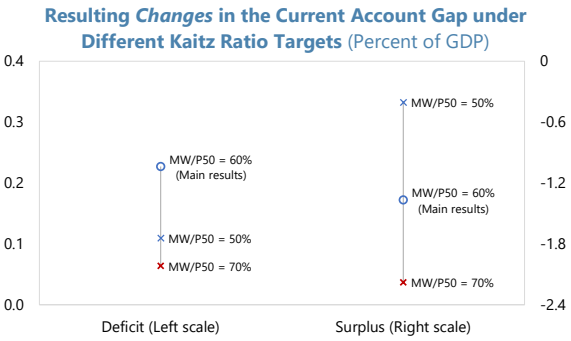


Sources: IMF Staff Calculations.
Note: Estimated resulting changes in CA balances are cumulative impacts over five years. Latest staff-assessed CA gaps are around -0.5 and 1.8 percent of GDP for deficit and surplus EA countries, respectively.

check, we test the concept of value-added REERs by assigning global value chain (GVC) weights to a country's trading partners, which reflect the extent of trade in value added (Huidrom et al, 2019). The rebalancing results are robust to using global value chain weights, with the impact being slightly smaller for deficit EA countries, and a little larger for surplus EA countries.

Alternative minimum wage ratio targets

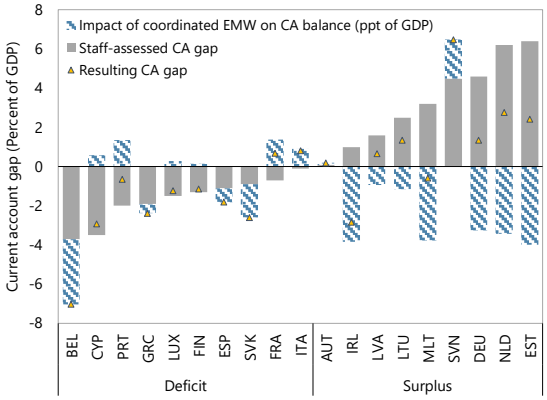
While the main text focuses on the impacts of harmonizing the minimum wage towards 60 percent of the national median wage, we also examine rebalancing results of alternative targets – namely setting a common minimum wage at 50 and 70 percent of the national median wage. With a substantial number of both deficit and surplus EA countries having their minimum wage level already above 50 percent of the median wage, the rebalancing impacts are likely smaller under this less ambitious target with only 0.1 and 0.4 percentage points lower in the current account gap of deficit and surplus EA countries, respectively. Meanwhile, setting a coordinated minimum wage at 70 percent of the national median wage will yield only a 0.05 percentage-point-of-GDP reduction of the current account gap of the deficit countries as many of them will have to significantly increase their minimum wage. Surplus EA countries also currently have their minimum wage below 70 percent of the median wage, and hence moving towards this threshold would close their positive current account gap and even bring surplus countries into a small negative current account gap.



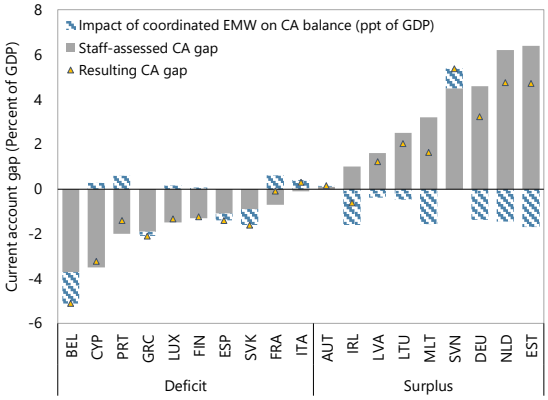
Sources: IMF Staff Calculations.
Note: Estimated resulting changes in CA balances are cumulative impacts over five years. Latest staff-assessed CA gaps are around -0.5 and 1.8 percent of GDP for deficit and surplus EA countries, respectively.

Figure B1: Country-specific Rebalancing Results under Alternative Regression Specifications

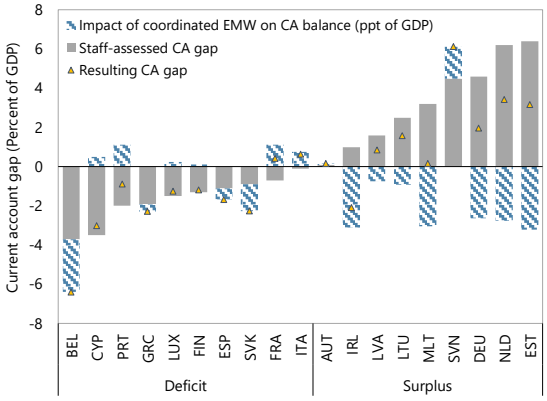
OLS with country and time fixed effects



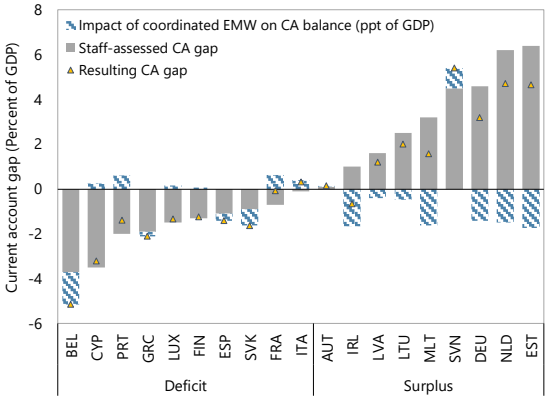
OLS with country-specific time trends



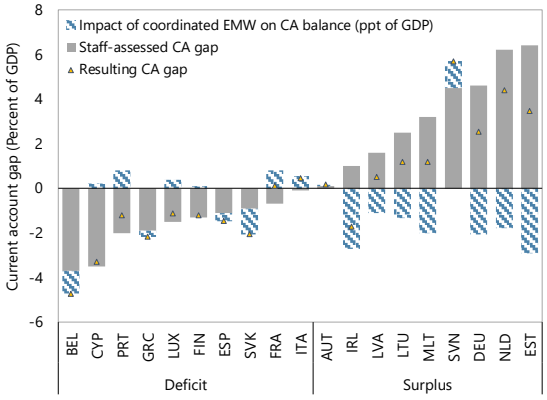
OLS with country and time fixed effects, and country-specific time trends



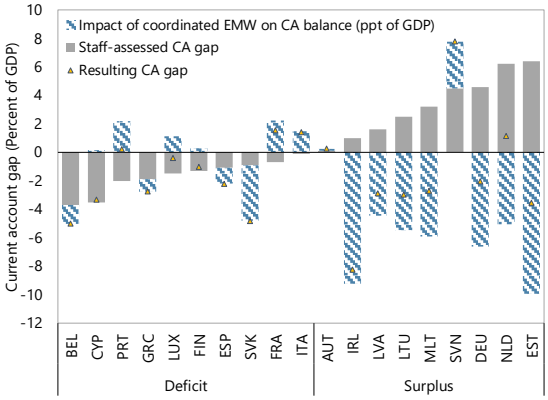
IV with country-specific time trend



OLS and interaction with low-pay incidence, with country specific time trend



OLS and interaction with low-pay incidence, with country and time fixed effects



Source: IMF Staff Calculation.
Note: Main results shown in the main text are the IV regression with country and time fixed effects.

Table B6: Cumulative log deviations in ULCs, relative to year -1 (before the MW shock).

	Year 0	Year 1	Year 2	Year3	Year 4	Year 5
	Instrumental variable estimates with country and time fixed effects					
Kaitz index, log	0.178**	0.516***	0.850***	0.962***	0.779***	0.496***
	(2.492)	(4.484)	(5.480)	(5.644)	(4.749)	(2.779)
1-year lag ULCs, log	0.240***	0.112	-0.152	-0.508***	-0.758***	-0.793***
	(3.132)	(0.907)	(-0.961)	(-2.937)	(-4.886)	(-5.008)
2-year lag ULCs, log	-0.309***	-0.283**	-0.188	0.00412	0.216	0.262
	(-4.032)	(-2.287)	(-1.169)	(0.0238)	(1.369)	(1.572)
Output gap	0.00216*	0.00511**	0.00685**	0.00701**	0.00625**	0.00376
	(1.688)	(2.478)	(2.533)	(2.490)	(2.416)	(1.360)
Share of industrial sector, lagged	1.104***	2.469***	3.864***	4.468***	3.874***	2.776***
	(3.182)	(4.409)	(5.102)	(5.523)	(5.186)	(3.584)
CPI inflation, lagged	-1.97e-06	0.00201	0.00141	-0.000778	-0.00100	0.00149
	(-0.00137)	(0.866)	(0.456)	(-0.236)	(-0.319)	(0.464)
Trade openness	1.96e-05	0.000276	0.000586*	0.000938***	0.00101***	0.000721*
	(0.134)	(1.168)	(1.820)	(2.722)	(3.030)	(1.958)
Labor force participation rate	0.00161	0.00332	0.00317	0.00322	0.00389	0.00473
	(0.958)	(1.226)	(0.860)	(0.813)	(1.065)	(1.177)
Growth forecast, 5 years ahead	0.0189	0.0286	0.00292	-0.0104	-0.0242	-0.0384
	(1.583)	(1.479)	(0.112)	(-0.387)	(-1.021)	(-1.606)
Growth forecast, 4 years ahead	-0.0380**	-0.0583**	-0.0258	0.00249	0.0222	0.0385
	(-2.215)	(-2.109)	(-0.711)	(0.0686)	(0.702)	(1.207)
Growth forecast, 3 years ahead	-0.000371	-0.000451	0.0102	0.00983	-0.00573	-0.0118
	(-0.0252)	(-0.0190)	(0.331)	(0.314)	(-0.211)	(-0.429)
Growth forecast, 2 years ahead	0.0226***	0.0287**	0.00624	-0.00847	0.00828	0.00677
	(2.609)	(2.051)	(0.345)	(-0.468)	(0.527)	(0.429)
Growth forecast, 1 year ahead	-0.0154***	-0.00462	0.0133	0.0206*	0.00951	0.00512
	(-3.031)	(-0.563)	(1.267)	(1.946)	(1.038)	(0.559)
Growth forecast, contemporaneous	0.00862***	0.00987**	0.00584	2.04e-05	-4.77e-05	0.00341
	(3.110)	(2.207)	(1.013)	(0.00352)	(-0.00928)	(0.653)
Observations	210	210	198	185	173	162

Notes: Models include the full set of country and year fixed effects. The Kaitz index is instrumented by its two-year lag and by political factors: the vote share of the ruling party, the political orientation (center, right, left) of the ruling party, and the proximity of a general election.

Table B7: Kaitz Index Data and Sources

		Estimates of Kaitz Index			
		Poverty analysis		Rebalancing anaylisis	
Austria	AUT			55.1	IMF staff estimates for 2018 1/
Belgium	BEL	48.4	EUSILC (2016)*	46.3	OECD (2018)
Bulgaria	BGR	57.8	EUSILC (2016)		
Croatia	HRV	54.1	EUSILC (2016)		
Cyprus	CYP			54.3	IMF staff estimates for 2018 2/
Czechia	CZE	41.0	EUSILC (2016)	41.8	OECD (2018)
Denmark	DNK				
Estonia	EST	44.9	EUSILC (2016)	43.1	OECD (2018)
Finland	FIN			59.0	IMF staff estimates for 2018 3/
France	FRA	64.0	EUSILC (2016)	61.6	OECD (2018)
Germany	DEU	52.0	EUSILC (2016)	45.6	OECD (2018)
Greece	GRC	52.2	EUSILC (2016)	47.5	OECD (2018)
Hungary	HUN	60.5	EUSILC (2016)	51.8	OECD (2018)
Ireland	IRL	53.2	EUSILC (2016)	47.5	OECD (2018)
Italy	ITA			80.5	Garnero, 2017 (2015) 4/
Latvia	LVA	49.5	EUSILC (2016)	50.4	OECD (2018)
Lithuania	LTU	59.6	EUSILC (2016)	51.2	OECD (2018)
Luxembourg	LUX	52.0	EUSILC (2016)	53.8	OECD (2018)
Malta	MLT	44.7	EUSILC (2016)	50.5	IMF staff estimates for 2018 5/
Netherlands	NLD	45.6	EUSILC (2016)	47.0	OECD (2018)
Poland	POL	62.5	EUSILC (2016)	53.1	OECD (2018)
Portugal	PRT	67.3	EUSILC (2016)	61.4	OECD (2018)
Romania	ROU	67.9	EUSILC (2016)	58.4	OECD (2018)
Slovakia	SVK	56.2	EUSILC (2016)	49.3	OECD (2018)
Slovenia	SVN	54.3	EUSILC (2016)	58.7	OECD (2018)
Spain	ESP	47.8	EUSILC (2016)	49.7	IMF staff estimates for 2019
Sweden	SWE				

* Note EUSILC 2016 is the publication made in 2017

1/ For AUT, 2018 wage ratio is estimated based on 2010 estimates from the literature (http://ftp.iza.org/dp8419.pdf), by letting the minimum wage over this period (2010-18) grow with the standard negotiated wage rate from OeNB. The median wage over this period is assumed to be growing at the same rate as the average wage (OECD).

2/ For CYP, 2018 wage ratio is estimated based on 2009 estimates from the literature (http://ftp.iza.org/dp8419.pdf), by letting the minimum wage over this period (2009-18) grow at the rate of sectoral minimum wage growth. The median wage over this period is assumed to be growing at the same rate as the average wage (OECD).

3/ For FIN, 2018 wage ratio is estimated based on 2010 estimates from the literature (http://ftp.iza.org/dp8419.pdf).

4/ For ITA, we use the estimate from Garnero, 2017 (http://ftp.iza.org/dp10511.pdf), the latest data is 2015.

5/ For MLT, 2018 wage ratio is estimated by extrapolating using correlation between OECD and Eurotat's Kaitz ratio.