**Complementary text, figures, tables and appendices to the article:**

**Economic Growth and Real Exchange Rate Misalignments in the European Union**

**by Judit Krekó and Gábor Oblath**

[***Text: section 5***](#_5._THE_EFFECT)

[***Table 1***](#_Table)

[***Figures 3, 4, 5 and 6***](#_Figures:)

[***Appendix***](#_Appendix)

# 5. THE EFFECT OF MISALIGNMENTS BASED ON THE RELATIONSHIP BETWEEN WAGE AND PRODUCTIVITY LEVELS: AN EXTENSION

The indicators of relative price misalignments, estimated in Section 3, can rightly be considered as reflections of RER misalignments, since the relative price level of GDP and the internal relative price of services to goods are alternative expressions of the real exchange rate. As an extension to, and a robustness-check of, our findings concerning the relationship between RER misalignments and economic growth (discussed in Section 4), in the present section we analyse the misalignment – growth relationship in light of misalignments of relative wage levels from relative productivity levels. The concept of wages in our analysis corresponds to the national accounts: *compensation of employees* (gross wages and salaries plus employers’ social contributions). This implies that we consider wages as gross labour costs, rather than net labour income.

The concept of relative “wage misalignment” is analogous to, but not identical with, relative price (i.e., RER-) misalignment. The relationship between the level of wages and productivity is unaffected by the RER, since the two items can be compared either as nominal magnitudes, expressed in euro (producer nominal wage vs. nominal productivity), or both may be deflated by the relative price level of GDP (producer real wage vs. real productivity). What we are interested in is (i) whether misalignments of wages and prices show a similar pattern; if so, (ii) whether the correspondence between misalignments and growth, based on wages and productivity show a similar pattern to the one based on RER and income (productivity) levels.

*Figure 7:* *The relationship between the log of (a) the GDP relative price level (b) the internal relative price of services to goods and per capita GDP; (c) relative producer real wages and relative productivity based on the number of persons; (d) hours worked in the EU; pooled cross section data, 1999*–*2016*

*(a) (b)*



*(c) (d)*



*Notes*: PL15\_GDP: the price level of GDP, RP\_S\_G: the relative price of services to goods; VLC15\_GDP: per capita GDP; COMP15\_E: compensation per employee; VLW15\_GDP: GDP per employed persons; COMP15\_H: compensation per hours worked; VLH15\_GDP: GDP per hours worked. All variables are based on PPS (of the GDP) and measured relative to the average of the EU15.

*Sources*: Eurostat and AMECO database.

The visual observation of *Figure 7*, displaying the relationships based on pooled cross-section data, clearly suggests that the association between wages and productivity [panels (c) and (d)] is somewhat closer than those based on relative prices and real incomes [panels (a) and (b)].

The relationship between productivity and wages can be interpreted on the basis of the number persons (employed for productivity and employees for wages, *Figure 7c*), or hours worked by persons employed and employees, respectively (*Figure 7d*).

The level of producer *nominal wage* per employee and per worked hours, respectively, in country *i*, relative to the EU average (in log):

-

where denotes compensation of employees expressed in euros,

 (the number of employees), or (hours worked by employees) in a given year.

Producer *real wage* per employee and per hours worked, respectively, in country *i* relative to the EU average:

-

Relative per hour or per worker (real) productivity in country in country *i*, relative to the EU average:

-

where =, i.e., productivity measured by the number of persons employed and hours worked, respectively;

is the nominal GDP expressed in euros, and

is total employment (including self-employed), or the number of hours worked, respectively.

We estimate the following DOLS equations for the producer real wage:

The LHS of the above equation is the numerator, while the RHS (excluding the dynamic terms) is the denominator of the indicator of “adjusted wage share” (i.e., adjusted for the ratio of employed persons to the number of employees, or for the hours worked by persons employed to employees).

While the wage share (often referred to as the “real” ULC) *is not*, the actual (“nominal”) ULC *is* a RER-indicator, since the latter involves a comparison between nominal wages (affected by the exchange rate) and real productivity. Comparing the evolution of the ULC over time between countries certainly makes sense, as it shows developments in an important aspect of cost-competitiveness. However, it makes little sense to compare nominal wages (in euro) to real productivity (in PPS) across countries at significantly different levels of development, since (i) it simply reproduces what we already know (price and nominal wage levels increase along with the level of development); (ii) it does not reveal anything about the level of cost-competitiveness of countries at considerably different levels of development.

Turning to the results of our estimations, the long-term relationship between PPP-based relative producer wages and relative productivity is even stronger than between RER indicators and the level of relative development, suggesting a very close relationship between wages and productivity within the EU. The coefficient is close to, but slightly above, unity in the specifications that contain only year dummies, implying that one percent higher relative productivity is accompanied by somewhat more than one percent higher relative wage level for the EU as a whole (see *Table* 11). The long-term parameter is lower, but the relationship is also very strong in the fixed effect specifications that identify the parameter only from within-variation.

Actually, the concept of “wage misalignment”, as quantified by the residuals of the above equation, can loosely be interpreted as a lower/higher adjusted wage share than the one that corresponds to the level of productivity. The results of the specifications with only time effects, indicating that the elasticity of wages is higher than unity and the constant is significantly negative, implies that the wage share tends to increase with the level of productivity. This partially helps in understanding why, in spite of the high explanatory power of productivity regarding wage differentials, large, even 10-20 percentage point differences can be observed in adjusted labour shares across countries.[[1]](#footnote-1)

Table 11: The long-term relationship between relative wages (in PPS) and relative productivity (in PPS) based on number of employees (1) and number of hours worked (2)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (1) | (2) | (3)  | (4) |
|  | No country fixed effect | Country fixed effect |
| Dep. var | log\_ | log\_ | log\_ | log\_ |
|  |  |  |  |  |
| log\_vlw15\_gdp | 1.032\*\*\* |  | 0.864\*\*\* |  |
|  | (0.016) |  | (0.081) |  |
| log\_vlh15\_gdp |  | 1.094\*\*\* |  | 0.859\*\*\* |
|  |  | (0.013) |  | (0.091) |
| Constant | -0.189\*\*\* | -0.476\*\*\* | 0.512 | 0.489 |
|  | (0.073) | (0.060) | (0.341) | (0.378) |
|  |  |  |  |  |
| Observations | 586 | 564 | 586 | 564 |
| R-squared | 0.950 | 0.965 | 0.894 | 0.874 |
| Year FE | YES | YES | YES | YES |

*Notes*: Clustered standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

In the next step, we look at the relationship between wage misalignment and growth, by applying our growth equation presented in Section 4. The connection between the two is ambiguous a priori: neither the sign of the relationship, nor the direction of causality is straightforward. First, the labour share is expected to exhibit a countercyclical pattern: as wages and employment are less flexible than profits, demand shocks are reflected in changes in profits to a higher extent. That is, one can expect a negative contemporaneous correlation between wage misalignment and GDP growth in the short term.

Second, wage misalignments might have an ambiguous effect on GDP growth. On the one hand, the wage level is an important component of international cost competitiveness: if wages lag behind productivity, the resulting increase in capital revenues might translate into an improvement in price competitiveness, involving higher market shares and net exports. Alternatively, higher profits can boost private investments, but any combination of the two outcomes definitely support growth. Due to these channels, wage misalignments with an opposite sign (wages exceeding productivity) are expected to have a negative effect on growth. On the other hand, as proponents of the notion of “secular stagnation” (e.g. Summers 2015) claim, a higher capital share is accompanied by higher inequality, involving a higher share of income of those having a lower propensity to consume. Eventually, this lowers domestic demand, and hence, growth. Another negative potential effect of inequality may work through human capital: a decline in the labour share leads to a reduction in human capital accumulation in credit constrained households, lowering the growth potential of the whole economy (Atkinson 2015).

Keeping these considerations in mind, we estimate the association between wage misalignment and growth by applying the same specifications as in estimations of the link between real exchange rate misalignment and growth. The results are summarized in *Table 12,* suggesting that the association between estimated wage misalignments and economic growth is similar to the one observed in the case of RER misalignments. The coefficients are significantly negative with both measures of wage misalignment (based on per hour and per worker): “overvalued” wages are associated with lower growth and vice versa.

As wages are usually fixed in the beginning of the year, a country specific, contemporaneous unexpected decline in growth may increase wage misalignment, resulting in an upward-biased estimation. However, the coefficient of lagged wage misalignment, which does not suffer from this bias, is also significantly negative, even after controlling for lagged GDP growth; the system GMM also yields a significantly negative parameter. All in all, our results regarding the effects of wage misalignments on economic growth are broadly in line with the expected outcome implied by the impact of misalignments on competitiveness and investments.[[2]](#footnote-2)

Table 12: Growth regressions with wage misalignments (based on number of employees)

Dependent variable: annual growth rate of GDP per capita volume (qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, lagged dependent var |
| L.dlog\_qc\_gdp | 0.413\*\*\* |  | 0.186\*\*\* | 0.421\*\*\* |  |  | 0.200\*\*\* |  |
|  | (0.042) |  | (0.067) | (0.042) |  |  | (0.066) |  |
| misal | -0.042\*\*\* | -0.144\*\*\* | -0.067\* |  |  | -0.122\*\*\* | -0.033 |  |
|  | (0.013) | (0.033) | (0.035) |  |  | (0.037) | (0.037) |  |
| L.misal |  |  |  | -0.022\*\* | -0.042\*\*\* |  |  | -0.034\*\* |
|  |  |  |  | (0.009) | -0.015 |  |  | (0.017) |
| log\_vlc15\_gdp\_i5 | -0.016\*\*\* | -0.048\*\*\* | -0.020\*\* | -0.017\*\*\* | -0.027\*\*\* | -0.030\*\*\* | -0.018\* | -0.022\*\*\* |
|  | (0.002) | (0.008) | (0.008) | (0.002) | (0.004) | (0.010) | (0.010) | (0.005) |
| inv\_gdp | 0.028 | 0.222\*\*\* | 0.232\*\*\* | 0.032 | 0.137\*\* | 0.225\*\* | 0.238\*\*\* | 0.140\*\*\* |
|  | (0.036) | (0.078) | (0.066) | (0.032) | (0.053) | (0.081) | (0.060) | (0.053) |
| infl | -0.007\*\*\* | -0.008\*\*\* | -0.063 | -0.007\*\*\* | -0.007\*\*\* | -0.008\*\*\* | -0.093\*\* | -0.007\*\*\* |
|  | (0.002) | (0.002) | (0.043) | (0.002) | (0.003) | (0.003) | (0.042) | (0.003) |
| gov\_def | -0.096\*\* | -0.159\*\* | -0.487\*\*\* | -0.094\*\* | -0.166\*\*\* | -0.168\*\*\* | -0.500\*\*\* | -0.165\*\*\* |
|  | (0.037) | (0.059) | (0.149) | (0.037) | (0.044) | (0.057) | (0.149) | (0.043) |
| free | 0.014 | -0.044 | -0.107\* | 0.023 | 0.032 | -0.034 | -0.101 | 0.034 |
|  | (0.022) | (0.080) | (0.059) | (0.021) | (0.037) | (0.080) | (0.064) | (0.037) |
| Constant | 0.083\*\*\* | 0.214\*\*\* | 0.145\*\*\* | 0.081\*\*\* | 0.100\*\*\* | 0.135\*\* | 0.131\*\*\* | 0.079\*\*\* |
|  | (0.015) | (0.056) | (0.039) | (0.016) | (0.023) | (0.057) | (0.047) | (0.023) |
|  |  |  |  |  |  |  |  |  |
| Observations | 535 | 560 | 509 | 534 | 559 | 560 | 509 | 559 |
| *Notes*: Clustered standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. |

# Table

Table 1: A selective overview of estimates of RERs consistent with the level of development and the relationship between RER-misalignment and economic growth

|  |  |  |
| --- | --- | --- |
|  | The level of the RER consistent with the level of development | Effect of misalignment |
| Author | Sample  | Method | Results  | Method  | Results  |
| Kravis –Lipsey (1983) | 34 developed and developing countries | Cross sectional regressions | High elasticity (0,6-0,9) for price level, somewhat lower (0,5-0,6) for internal relative price | - |  |
| Fischer (2007) | Euro area | Panel, fixed effect, single equation | Elasticity of 0.5-0.6 for a one percent shock to relative productivity on relative price levels | - | - |
| Galstyan –Lane (2009) | 1980-2004, OECD countries | Panel DOLS, country and time fixed effects, single equation | High elasticity, 0.75-1.1, gov. consumption increases, gov. investment decreases RER | - | - |
| Andersson et al. (2009) | Euro area countries | VECM | High elasticity, close to 1 in most countries |  |  |
| Aguirre –Calderon (2005) | 1965-1993; 60 developed and developing countries | Panel DOLS, country and time fixed effects, single eq. | High elasticity | Panelsystem GMM  | Undervaluation accelerates, overvaluation decelerates growth |
| Rodrik (2008) | 1950-2004, 188 developed and developing countries | Panel, time effect | Elasticity of 0.24 | panel, 5 year averages, time and co fixed effect | Undervaluation accelerates growth but only in developing countries |
| MacDonald –Vierra (2010) | 1980-2004, 90 developed and developing countries | Panel, fixed and random effect | Elasticity of 0.31; insignificant with controls | Panel, GMM  | Undervaluation accelerates, overvaluation decelerates growth, effect is stronger for developing and emerging countries |
| Bereau et al. (2012)  | 1980-2007, advanced and developing countries (cca 25) | Panel fixed effect, pooled mean group estimator | Variables are cointregrated, all the three variables are significant | Nonlinear panel | Undervaluation accelerates, overvaluation decelerates growth, effect increases with the size  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Bhalla (2012) | 130 countries, 1950-2011 | Multiple  | Elasticity of 0.3-0.4 | Multiple | Undervaluation accelerates, overvaluation decelerates growth, result is robust to specification and the method |
| Mbaye (2013) | 72 countries, 1970-2008 | Multiple  | Low elasticity, 0.16 | Multiple | Undervaluation accelerates, overvaluation decelerates growth through the TFP channel |
| Razmi et al. (2012) | 153 countries, 1960-2004 | Multiple | Elasticity of 0.24 | Multiple | Undervaluation accelerates, overvaluation decelerates growth through the investment channel |
| Habib et al (2017) | 150 countries, 1970-2010 | Panel | Elasticity of 0.24-0.27 | Panel, based on IV  | Undervaluation accelerates, overvaluation decelerates growth in developing countries, the effect is stronger with pegged ER |
| Berg – Miao (2010) | 181 countries 1950-2004 | Multiple | Elasticity of 0.23 | Multiple | Undervaluation accelerates, overvaluation decelerates growth, but identification problems |

# Figures:

Figure 3: The relationship between the price level of GDP and per capita real GDP in 146 countries (upper chart) and in 25 EU countries (lower chart) relative to the US in 2014



*Source*: Own calculations based on PWT.9.0 (2017).

Figure 4: The relationship between the residuals for EU-countries of the regressions based on the broad sample and the sample consisting of EU-25



*Notes*: RES\_25 and RES\_146, respectively, denote the residuals of the regressions illustrated in the lower and upper pane of *Figure 3* for the 25 EU-countries.

*Figure 5: Mean changes in the price level of GDP (horizontal axis) vs. mean changes in the real effective exchange rate (REER) index based on GDP deflators: 1995-2016*



*Source:* Own calculations based on PWT.9.0 (2017).

Figure 6: The coefficient of GDP per capita on the relative price level in yearly cross-country regressions and panel regressions

*Notes*: β denotes the estimated long-term parameter of relative price level (log\_pl\_gdp) on per capita GDP (log\_vlc15\_gdp); CI: confidence interval.

*Source*: Own calculations based on Eurostat.

# Appendix

Estimation results with alternative fixed effect specifications

*Table A1: Growth regressions: alternative fixed effect specifications*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | GDP price level |  |  | Internal relative price |
|   |  | Misal estimated with country fixed effect |  | Misal estimated with country fixed effect |
|   | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, lagged dependent var |
| L.dlog\_qc\_gdp | 0.424\*\*\* |  | 0.232\*\*\* | 0.429\*\*\* |  |  | 0.242\*\*\* |  |
|  | (0.042) |  | (0.074) | (0.041) |  |  | (0.069) |  |
| misal | -0.022\*\*\* | -0.063\*\* | -0.035\*\* |  |  | -0.037 | -0.014 |  |
|  | (0.007) | (0.029) | (0.016) |  |  | (0.031) | (0.037) |  |
| L.misal |  |  |  | -0.009 | -0.015 |  |  | -0.014 |
|  |  |  |  | (0.006) | (0.011) |  |  | (0.028) |
| log\_vlc15\_gdp\_i5 | -0.019\*\*\* | -0.053\*\*\* | -0.031\*\*\* | -0.019\*\*\* | -0.030\*\*\* | -0.037\*\*\* | -0.030\*\*\* | -0.030\*\*\* |
|  | (0.003) | (0.013) | (0.008) | (0.003) | (0.005) | (0.009) | (0.008) | (0.005) |
| inv\_gdp | 0.015 | 0.219\*\* | 0.212\*\*\* | 0.030 | 0.132\*\*\* | 0.222\*\* | 0.216\*\*\* | 0.144\*\*\* |
|  | (0.031) | (0.088) | (0.067) | (0.031) | (0.051) | (0.087) | (0.061) | (0.048) |
| infl | -0.007\*\*\* | -0.007\*\* | -0.057 | -0.007\*\*\* | -0.007\*\*\* | -0.007\*\* | -0.064\* | -0.007\*\*\* |
|  | (0.002) | (0.003) | (0.038) | (0.002) | (0.003) | (0.003) | (0.038) | (0.003) |
| gov\_def | -0.122\*\*\* | -0.207\*\*\* | -0.436\*\*\* | -0.105\*\*\* | -0.182\*\*\* | -0.208\*\*\* | -0.423\*\*\* | -0.168\*\*\* |
|  | (0.035) | (0.059) | (0.141) | (0.036) | (0.040) | (0.058) | (0.150) | (0.041) |
| free | 0.043\* | -0.010 | -0.016 | 0.037 | 0.060 | -0.003 | -0.031 | 0.055 |
|  | (0.021) | (0.079) | (0.075) | (0.022) | (0.037) | (0.076) | (0.067) | (0.036) |
| Constant | 0.084\*\*\* | 0.220\*\*\* | 0.132\*\*\* | 0.080\*\*\* | 0.100\*\*\* | 0.149\*\*\* | 0.138\*\*\* | 0.098\*\*\* |
|  | (0.014) | (0.062) | (0.048) | (0.015) | (0.021) | (0.043) | (0.046) | (0.021) |
| Observations | 538 | 564 | 511 | 538 | 564 | 563 | 510 | 564 |
| R-squared | 0.681 | 0.602 |  | 0.675 |  | 0.593 |  |  |

Clustered standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Table A2: Estimates of asymmetric effects of misalignment: fixed exchange rate countries, alternative fixed effect specifications*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | GDP price level |  |  | Internal relative price |
|   |  | Misal estimated with country fixed effect |  | Misal estimated with country fixed effect |
|   | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, lagged dependent var |
| misal |  | 0.025 | 0.054 |  |  | 0.041 | 0.073 |  |
|  |  | (0.026) | (0.035) |  |  | (0.058) | (0.057) |  |
| fixer |  | -0.006 | -0.006 |  |  | -0.006 | -0.007 |  |
|  |  | (0.005) | (0.005) |  |  | (0.005) | (0.004) |  |
| misal\*fixer |  | -0.163\*\*\* | -0.185\*\*\* |  |  | -0.127\* | -0.129 |  |
|  |  | (0.052) | (0.062) |  |  | (0.063) | (0.081) |  |
| L.misal | 0.015 |  |  | 0.040\*\* | 0.006 |  |  | -0.022 |
|  | (0.011) |  |  | (0.018) | (0.015) |  |  | (0.040) |
| L.fixer | -0.005 |  |  | -0.003 | -0.004 |  |  | -0.003 |
|  | (0.003) |  |  | (0.003) | (0.003) |  |  | (0.003) |
| L.misal\*l.fixer | -0.079\*\*\* |  |  | -0.167\*\*\* | -0.066\*\*\* |  |  | -0.104 |
|  | (0.020) |  |  | (0.049) | (0.023) |  |  | (0.078) |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 564 | 563 | 510 | 564 | 509 | 521 | 493 | 509 |
| R-squared |  | 0.615 |  |  |  | 0.637 |  |  |

Clustered standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Table A3: Testing for nonlinearity: alternative fixed effect specifications*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | GDP price level |  |  | Internal relative price |
|   |  | Misal estimated with country fixed effect |  | Misal estimated with country fixed effect |
|   | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, lagged dependent var |
| undervalued |  | 0.002 | -0.013\*\*\* |   |  | 0.004 | 0.002 |  |
|   |  | (0.004) | (0.005) |   |  | (0.004) | (0.004) |  |
| umisal |  | -0.130 | -0.575\*\*\* |   |  | -0.050 | -0.128 |  |
|   |  | (0.154) | (0.183) |   |  | (0.205) | (0.210) |  |
| o\_misal |  | 0.014 | -0.072 |   |  | 0.086 | 0.023 |  |
|   |  | (0.116) | (0.163) |   |  | (0.216) | (0.199) |  |
| misal\_sq\_u |  | 1.591 | 4.963\*\*\* |   |  | 1.979 | 1.750 |  |
|   |  | (1.274) | (1.440) |   |  | (1.689) | (2.255) |  |
| misal\_sq\_o |  | -0.592 | -0.299 |   |  | -2.333 | -0.283 |  |
|   |  | (0.547) | (0.976) |   |  | (2.030) | (1.791) |  |
| L.under | -0.008 |  |  | 0.005 | -0.002 |  |  | 0.001 |
|   | (0.006) |  |  | (0.005) | (0.004) |  |  | (0.003) |
| L.u\_misal | -0.191\*\*\* |  |  | 0.038 | -0.066 |  |  | -0.054 |
|   | (0.051) |  |  | (0.139) | (0.048) |  |  | (0.161) |
| L.o\_misal | -0.043 |  |  | -0.016 | -0.068 |  |  | -0.359\* |
|   | (0.055) |  |  | (0.131) | (0.073) |  |  | (0.198) |
| L.misal\_sq\_u | 0.613\*\*\* |  |  | -0.152 | 0.119 |  |  | 0.846 |
|   | (0.134) |  |  | (1.014) | (0.117) |  |  | (1.516) |
| L.misal\_sq\_o | 0.083 |  |  | 0.201 | 0.330\* |  |  | 3.219 |
|   | (0.121) |  |  | (0.978) | (0.182) |  |  | (2.628) |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 564 | 563 | 510 | 564 | 509 | 521 | 493 | 509 |
| R-squared |   | 0.601 |   |   |  | 0.641 |  |  |

Clustered standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Table A4: Estimates for asymmetric effect on CEEU countries, alternative fixed effect specifications*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | GDP price level |  |  | Internal relative price |
|   |  | Misal estimated with country fixed effect |  | Misal estimated with country fixed effect |
|   | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| misal |  | -0.096\* | 0.002 |  |  | -0.041 | 0.096\*\* |  |
|  |  | (0.049) | (0.058) |  |  | (0.043) | (0.043) |  |
| ceeu |  |  | -0.005 |  |  |  | -0.007 |  |
|  |  |  | (0.006) |  |  |  | (0.005) |  |
| misalceeu |  | 0.096 | -0.027 |  |  | 0.029 | -0.170\*\*\* |  |
|  |  | (0.061) | (0.071) |  |  | (0.066) | (0.066) |  |
| L.misal | -0.035\*\* |  |  | -0.086\*\* | -0.028 |  |  | -0.042 |
|  | (0.014) |  |  | (0.041) | (0.020) |  |  | (0.035) |
| L.ceeu | -0.000 |  |  | -0.000 | -0.009 |  |  | -0.004 |
|  | (0.005) |  |  | (0.006) | (0.007) |  |  | (0.006) |
| L.misalceeu | 0.039\* |  |  | 0.119\*\* | -0.001 |  |  | -0.055 |
|  | (0.021) |  |  | (0.052) | (0.031) |  |  | (0.069) |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 564 | 563 | 510 | 564 | 509 | 521 | 493 | 509 |
| R-squared |  | 0.599 |  |  |  | 0.630 |  |  |

Clustered standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Estimation results: growth regressions with per capita GDP based misalignments

*Table A5: The effect of misalignment: GDP price level*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| L.dlog\_qc\_gdp | 0.432\*\*\* |  | 0.236\*\*\* | 0.437\*\*\* |  |  | 0.242\*\*\* |  |
|  | (0.042) |  | (0.076) | (0.041) |  |  | (0.070) |  |
| misal | -0.015 | -0.042 | -0.008 |  |  | -0.016 | -0.009 |  |
|  | (0.009) | (0.031) | (0.016) |  |  | (0.032) | (0.036) |  |
| L.misal |  |  |  | 0.011 | 0.014 |  |  | 0.026 |
|  |  |  |  | (0.008) | (0.013) |  |  | (0.026) |
| log\_vlc15\_gdp\_i5 | -0.019\*\*\* | -0.048\*\*\* | -0.030\*\*\* | -0.017\*\*\* | -0.029\*\*\* | -0.036\*\*\* | -0.030\*\*\* | -0.029\*\*\* |
|  | (0.003) | (0.013) | (0.008) | (0.003) | (0.005) | (0.009) | (0.008) | (0.005) |
| inv\_gdp | 0.018 | 0.198\*\* | 0.219\*\*\* | 0.052 | 0.166\*\*\* | 0.220\*\* | 0.211\*\*\* | 0.154\*\*\* |
|  | (0.031) | (0.086) | (0.059) | (0.031) | (0.050) | (0.084) | (0.063) | (0.047) |
| infl | -0.007\*\*\* | -0.007\*\* | -0.082\*\* | -0.006\*\*\* | -0.006\*\* | -0.006\*\* | -0.089\*\* | -0.005\*\* |
|  | (0.002) | (0.003) | (0.039) | (0.002) | (0.003) | (0.003) | (0.041) | (0.002) |
| gov\_def | -0.102\*\*\* | -0.198\*\*\* | -0.424\*\*\* | -0.086\*\* | -0.163\*\*\* | -0.205\*\*\* | -0.431\*\*\* | -0.167\*\*\* |
|  | (0.036) | (0.061) | (0.150) | (0.035) | (0.040) | (0.060) | (0.153) | (0.042) |
| free | 0.033 | -0.012 | -0.039 | 0.032 | 0.052 | -0.005 | -0.044 | 0.053 |
|  | (0.020) | (0.075) | (0.072) | (0.023) | (0.037) | (0.072) | (0.065) | (0.035) |
| Constant | 0.086\*\*\* | 0.203\*\*\* | 0.141\*\*\* | 0.072\*\*\* | 0.089\*\*\* | 0.146\*\*\* | 0.146\*\*\* | 0.092\*\*\* |
|  | (0.017) | (0.061) | (0.049) | (0.018) | (0.023) | (0.043) | (0.046) | (0.022) |
| Observations | 538 | 564 | 511 | 538 | 564 | 563 | 510 | 564 |
| R-squared | 0.676 | 0.593 |  | 0.675 |  | 0.589 |  |  |

Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

*Table A6: The effect of misalignment: internal relative price*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| L.dlog\_qc\_gdp | 0.411\*\*\* |  | 0.241\*\*\* | 0.414\*\*\* |  |  | 0.225\*\*\* |  |
|  | (0.049) |  | (0.080) | (0.046) |  |  | (0.074) |  |
| misal | -0.016\*\* | -0.067\* | -0.009 |  |  | -0.020 | -0.010 |  |
|  | (0.007) | (0.035) | (0.021) |  |  | (0.038) | (0.041) |  |
| L.misal |  |  |  | -0.004 | -0.005 |  |  | -0.062\* |
|  |  |  |  | (0.006) | (0.012) |  |  | (0.035) |
| log\_vlc15\_gdp\_i5 | -0.019\*\*\* | -0.065\*\*\* | -0.027\*\*\* | -0.025\*\*\* | -0.038\*\*\* | -0.046\*\*\* | -0.031\*\*\* | -0.037\*\*\* |
|  | (0.003) | (0.014) | (0.008) | (0.003) | (0.005) | (0.014) | (0.009) | (0.005) |
| inv\_gdp | 0.054\* | 0.253\*\*\* | 0.224\*\*\* | 0.048\* | 0.158\*\*\* | 0.279\*\*\* | 0.230\*\*\* | 0.129\*\*\* |
|  | (0.031) | (0.081) | (0.066) | (0.027) | (0.049) | (0.083) | (0.069) | (0.039) |
| infl | -0.035 | -0.082\* | -0.116\* | -0.063 | -0.074\*\* | -0.096\*\* | -0.115\*\* | -0.065\*\* |
|  | (0.032) | (0.041) | (0.062) | (0.044) | (0.029) | (0.038) | (0.053) | (0.033) |
| gov\_def | -0.075\*\* | -0.142\* | -0.418\*\*\* | -0.085\*\* | -0.153\*\*\* | -0.178\*\* | -0.422\*\*\* | -0.119\*\*\* |
|  | (0.036) | (0.080) | (0.134) | (0.036) | (0.044) | (0.072) | (0.147) | (0.043) |
| free | 0.030 | -0.047 | -0.067 | 0.037\* | 0.053 | -0.026 | -0.046 | 0.068\* |
|  | (0.023) | (0.086) | (0.075) | (0.021) | (0.036) | (0.082) | (0.069) | (0.035) |
| Constant | 0.083\*\*\* | 0.288\*\*\* | 0.146\*\*\* | 0.110\*\*\* | 0.136\*\*\* | 0.194\*\*\* | 0.150\*\*\* | 0.126\*\*\* |
|  | (0.016) | (0.080) | (0.048) | (0.016) | (0.021) | (0.061) | (0.045) | (0.022) |
| Observations | 508 | 522 | 494 | 495 | 509 | 521 | 493 | 509 |
| R-squared | 0.694 | 0.635 |  | 0.725 |  | 0.630 |  |  |

Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

*Table A7: Estimates of asymmetric effects of misalignment-level: fixed exchange rate countries, GDP price level*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| misal | 0.011 | -0.009 | 0.032\*\* |  |  | 0.041 | 0.058 |  |
|  | (0.010) | (0.021) | (0.014) |  |  | (0.025) | (0.038) |  |
| fixer | -0.003\* | -0.009\* | -0.009\* |  |  | -0.006 | -0.007 |  |
|  | (0.002) | (0.005) | (0.005) |  |  | (0.005) | (0.005) |  |
| misalfix | -0.060\*\*\* | -0.104\*\*\* | -0.113\*\*\* |  |  | -0.179\*\*\* | -0.195\*\*\* |  |
|  | (0.016) | (0.024) | (0.026) |  |  | (0.047) | (0.066) |  |
| L.misal |  |  |  | 0.029\*\* | 0.042\*\*\* |  |  | 0.056\*\* |
|  |  |  |  | (0.011) | (0.011) |  |  | (0.023) |
| L.fixer |  |  |  | -0.003 | -0.005 |  |  | -0.003 |
|  |  |  |  | (0.002) | (0.003) |  |  | (0.003) |
| L.misalfix |  |  |  | -0.051\*\*\* | -0.087\*\*\* |  |  | -0.115\*\* |
|  |  |  |  | (0.015) | (0.016) |  |  | (0.046) |
| Observations | 538 | 564 | 511 | 538 | 564 | 563 | 510 | 564 |
| R-squared | 0.686 | 0.617 |  | 0.682 |  | 0.614 |  |  |

Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

*Table A8: Estimates of asymmetric effects of misalignment-level: fixed exchange rate countries, internal relative price*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| misal | 0.002 | -0.027 | 0.016 |  |  | 0.033 | 0.044 |  |
|  | (0.013) | (0.032) | (0.025) |  |  | (0.058) | (0.055) |  |
| fixer | -0.004\* | -0.010\* | -0.010\* |  |  | -0.007 | -0.008\* |  |
|  | (0.002) | (0.005) | (0.006) |  |  | (0.005) | (0.005) |  |
| misalfix | -0.037 | -0.082\*\*\* | -0.065\* |  |  | -0.103 | -0.097 |  |
|  | (0.022) | (0.021) | (0.035) |  |  | (0.064) | (0.081) |  |
| L.misal |  |  |  | 0.004 | 0.008 |  |  | -0.038 |
|  |  |  |  | (0.012) | (0.017) |  |  | (0.037) |
| L.fixer |  |  |  | -0.002 | -0.004 |  |  | -0.003 |
|  |  |  |  | (0.002) | (0.003) |  |  | (0.003) |
| L.misalfix |  |  |  | -0.016 | -0.044\* |  |  | -0.045 |
|  |  |  |  | (0.018) | (0.026) |  |  | (0.071) |
| Observations | 508 | 522 | 494 | 495 | 509 | 521 | 493 | 509 |
| R-squared | 0.698 | 0.645 |  | 0.726 |  | 0.635 |  |  |

Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

*Table A9: Testing for nonlinear effects, GDP price level*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| under | 0.001 | 0.005 | 0.013\* |  |  | -0.002 | -0.013\*\* |  |
|   | (0.005) | (0.005) | (0.007) |  |  | (0.004) | (0.006) |  |
| u\_misal | -0.076\*\*\* | -0.063 | -0.046 |  |  | 0.012 | -0.334\*\* |  |
|   | (0.018) | (0.044) | (0.057) |  |  | (0.131) | (0.141) |  |
| o\_misal | 0.053 | -0.017 | 0.153\*\* |  |  | -0.154 | -0.226 |  |
|   | (0.056) | (0.068) | (0.071) |  |  | (0.110) | (0.174) |  |
| misal\_sq\_u | 0.265\*\*\* | 0.250\*\*\* | 0.183 |  |  | 0.665 | 3.153\*\*\* |  |
|   | (0.044) | (0.065) | (0.155) |  |  | (0.745) | (1.147) |  |
| misal\_sq\_o | -0.384\* | -0.285 | -0.566\*\* |  |  | 0.294 | 0.599 |  |
|   | (0.202) | (0.245) | (0.289) |  |  | (0.609) | (0.905) |  |
| L.under |  |  |  | 0.004 | 0.004 |  |  | -0.006\* |
|   |  |  |  | (0.006) | (0.005) |  |  | (0.004) |
| L.u\_misal |  |  |  | -0.023 | -0.009 |  |  | -0.079 |
|   |  |  |  | (0.041) | (0.039) |  |  | (0.087) |
| L.o\_misal |  |  |  | 0.055 | 0.047 |  |  | -0.109 |
|   |  |  |  | (0.067) | (0.058) |  |  | (0.091) |
| L.misal\_sq\_u |  |  |  | 0.122 | 0.128\* |  |  | 0.651\*\* |
|   |  |  |  | (0.081) | (0.066) |  |  | (0.328) |
| L.misal\_sq\_o |  |  |  | -0.098 | -0.102 |  |  | 0.744 |
|   |  |  |  | (0.256) | (0.200) |  |  | (0.652) |
| Observations | 538 | 564 | 511 | 538 | 564 | 563 | 510 | 564 |
| R-squared | 0.684 | 0.609 |  | 0.678 |  | 0.602 |  |  |
| Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1  |

*Table A10: Testing for nonlinear effects, internal price level*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| under | 0.002 | -0.002 | 0.005 |  |  | -0.001 | 0.003 |  |
|   | (0.005) | (0.007) | (0.007) |  |  | (0.004) | (0.007) |  |
| u\_misal | -0.032 | -0.112 | 0.048 |  |  | -0.122 | -0.130 |  |
|   | (0.042) | (0.069) | (0.055) |  |  | (0.175) | (0.161) |  |
| o\_misal | 0.014 | -0.063 | -0.066 |  |  | -0.136 | -0.078 |  |
|   | (0.072) | (0.106) | (0.108) |  |  | (0.216) | (0.360) |  |
| misal\_sq\_u | 0.032 | 0.139 | -0.216 |  |  | 2.204 | 1.257 |  |
|   | (0.100) | (0.164) | (0.146) |  |  | (1.369) | (1.444) |  |
| misal\_sq\_o | 0.000 | 0.006 | 0.363 |  |  | 0.133 | 1.835 |  |
|   | (0.223) | (0.236) | (0.305) |  |  | (2.543) | (3.772) |  |
| L.under |  |  |  | -0.003 | -0.003 |  |  | -0.003 |
|   |  |  |  | (0.004) | (0.005) |  |  | (0.004) |
| L.u\_misal |  |  |  | -0.031 | -0.041 |  |  | -0.228 |
|   |  |  |  | (0.032) | (0.038) |  |  | (0.160) |
| L.o\_misal |  |  |  | -0.039 | -0.041 |  |  | -0.487\* |
|   |  |  |  | (0.054) | (0.079) |  |  | (0.255) |
| L.misal\_sq\_u |  |  |  | 0.051 | 0.077 |  |  | 1.838 |
|   |  |  |  | (0.090) | (0.101) |  |  | (1.445) |
| L.misal\_sq\_o |  |  |  | 0.196 | 0.264 |  |  | 6.248\* |
|   |  |  |  | (0.202) | (0.240) |  |  | (3.327) |
| Observations | 508 | 522 | 494 | 495 | 509 | 521 | 493 | 509 |
| R-squared | 0.695 | 0.635 |  | 0.727 |  | 0.638 |  |  |
| Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1  |

*Table A11: Estimates for asymmetric effect on CEEU countries, GDP price level*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | Misal estimated without country fixed effect | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dep var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| misal | -0.028\*\* | -0.073\* | -0.030 |  |  | -0.070 | 0.004 |  |
|  | (0.012) | (0.038) | (0.034) |  |  | (0.045) | (0.067) |  |
| ceeu | 0.000 |  | -0.009 |  |  |  | -0.005 |  |
|  | (0.003) |  | (0.007) |  |  |  | (0.006) |  |
| misalceeu | 0.022 | 0.050 | 0.013 |  |  | 0.086 | -0.032 |  |
|  | (0.017) | (0.054) | (0.038) |  |  | (0.063) | (0.082) |  |
| L.misal |  |  |  | -0.015 | -0.023 |  |  | -0.050 |
|  |  |  |  | (0.009) | (0.014) |  |  | (0.031) |
| L.ceeu |  |  |  | 0.006 | 0.004 |  |  | -0.001 |
|  |  |  |  | (0.004) | (0.006) |  |  | (0.006) |
| L.misalceeu |  |  |  | 0.047\*\*\* | 0.067\*\*\* |  |  | 0.122\*\*\* |
|  |  |  |  | (0.015) | (0.019) |  |  | (0.047) |
| Observations | 538 | 564 | 511 | 538 | 564 | 563 | 510 | 564 |
| R-squared | 0.678 | 0.595 |  | 0.681 |  | 0.594 |  |  |

Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

*Table A12: Estimates for asymmetric effect on CEEU countries, internal relative price*

Dependent variable: annual growth rate of GDP per capita volume (dlog\_qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dependent var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| misal | 0.407\*\*\* |  | 0.264\*\*\* | 0.413\*\*\* |  |  | 0.247\*\*\* |  |
|  | (0.050) |  | (0.071) | (0.045) |  |  | (0.067) |  |
| ceeu | -0.014 | -0.018 | 0.003 |  |  | -0.002 | 0.080\* |  |
|  | (0.011) | (0.043) | (0.031) |  |  | (0.045) | (0.043) |  |
| misalceeu | -0.004 |  | -0.013\* |  |  |  | -0.008 |  |
|  | (0.004) |  | (0.007) |  |  |  | (0.005) |  |
| L.misal | -0.010 | -0.101 | -0.041 |  |  | -0.034 | -0.185\*\*\* |  |
|  | (0.016) | (0.063) | (0.046) |  |  | (0.067) | (0.066) |  |
| L.ceeu |  |  |  | -0.010 | -0.007 |  |  | -0.021 |
|  |  |  |  | (0.008) | (0.017) |  |  | (0.034) |
| L.misalceeu |  |  |  | -0.001 | -0.008 |  |  | -0.001 |
|  |  |  |  | (0.004) | (0.007) |  |  | (0.005) |
| Observations | 508 | 522 | 494 | 495 | 509 | 521 | 493 | 509 |
| R-squared | 0.694 | 0.641 |  | 0.726 |  | 0.630 |  |  |

Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

Table A 13: Summary statistics for misalignment for fixed and floating exchange rate countries

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Obs | Mean | Std.dev | Min | Max |
|  | Floating exchange rate |
| mis\_rp\_vlw | 209 | -0.03 | 0.16 | -0.44 | 0.40 |
| mis\_pl\_vlw | 263 | 0.00 | 0.17 | -0.44 | 0.42 |
|  | Fixed exchange rate |
| mis\_rp\_vlw | 327 | -0.01 | 0.11 | -0.36 | 0.17 |
| mis\_pl\_vlw | 329 | 0.01 | 0.12 | -0.28 | 0.36 |

Table A 14: Average level of development and RER indicators in CEEU and non-CEEU countries, EU15=100

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | non CEEU  |  CEEU | non CEEU | CEEU |
|   | VLC15\_GDP | VLW15\_GDP | PL15\_GDP | VLC15\_GDP | VLW15\_GDP | PL15\_GDP | RP\_SG | RP\_SG |
|  1995-2016 | 98 | 98 | 97 | 51 | 54 | 52 | 96 | 56 |
| 1995 | 94 | 94 | 95 | 39 | 39 | 44 | 94 | 49 |
| 2008 | 100 | 100 | 99 | 58 | 60 | 62 | 96 | 60 |
| 2016 | 97 | 97 | 98 | 64 | 66 | 59 | 95 | 59 |

Notations: vlc15\_gdp: per capita GDP measured on current PPP, EU15==100, vlw15\_gdp: per employed person GDP measured on current PPP, EU15==100, PL\_GDP: Price level of GDP measured on current PPP, EU15=100; RP\_S\_g: relative price of services to goods, EU15=100.

*Table A15: Growth effect of (employment based) wage misalignment in CEEU and non-CEEU countries*

Dependent variable: annual growth rate of GDP per capita volume (qc\_gdp)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|   | Misal estimated without country fixed effect |  |  | Misal estimated with country fixed effect |
|   | Lagged dependent var. | Fixed effect | System GMM | Lagged misal, lagged dep var | Lagged misal, fixed effect | Fixed effect | System GMM | Lagged misal, fixed effect |
| misal | -0.043\*\*\* | -0.195\*\*\* | -0.106\*\*\* |  |  | -0.157\*\*\* | -0.072\*\* |  |
|  | (0.015) | (0.051) | (0.037) |  |  | (0.048) | (0.032) |  |
| ceeu | 0.000 |  | -0.007 |  |  |  | -0.009\* |  |
|  | (0.004) |  | (0.006) |  |  |  | (0.005) |  |
| misalceeu | 0.002 | 0.067 | 0.044 |  |  | 0.046 | 0.024 |  |
|  | (0.023) | (0.074) | (0.041) |  |  | (0.066) | (0.035) |  |
| L.misal |  |  |  | -0.025\*\* | -0.048\*\*\* |  |  | -0.036\*\*\* |
|  |  |  |  | (0.009) | (0.016) |  |  | (0.014) |
| L.ceeu |  |  |  | 0.001 | -0.003 |  |  | -0.003 |
|  |  |  |  | (0.003) | (0.006) |  |  | (0.006) |
| L.misalceeu |  |  |  | 0.005 | 0.008 |  |  | 0.002 |
|  |  |  |  | (0.017) | (0.028) |  |  | (0.027) |
| Coontrols | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 535 | 560 | 509 | 534 | 559 | 560 | 509 | 559 |
| R-squared | 0.684 | 0.626 |  | 0.676 |  | 0.611 |  |  |

Clustered standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \*p<0.1

*A16: Classification of countries by exchange rate regimes*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Flexible | Fix |  |  | Flexible | Fix |
| AT | 1995-96 | 1997-2016 |  | IE | 1995-1997 | 1998-2016 |
| BE | 1995-96 | 1997-2016 |  | IT | 1995-96 | 1997-2016 |
| BG | 1995-98 | 1999-2016 |  | LT | 1995-2001 | 2002-2016 |
| CY | 1995-2006 | 2007-2016 |  | LV | 1995-2006 | 2007-2016 |
| CZ | 1995-2016 | . |  | MT | 1995-2003 | 2004-2016 |
| DE | 1995-96 | 1997-2016 |  | NL | 1995-1997 | 1998-2016 |
| DK | 1995-99 | 2000-2016 |  | PL | 1995-2016 | . |
| EE | 1995-96 | 1997-2016 |  | PT | 1995-1997 | 1998-2016 |
| EL | 1995-2000 | 2001-2016 |  | RO | 1995-2016 | . |
| ES | 1995-96 | 1997-2016 |  | SE | 1995-2016 | . |
| FI | 1995-98 | 1999-2016 |  | SI | 1995-2004 | 2004-2016 |
| FR | 1995-98 | 1999-2016 |  | SK | 1995-2008 | 2009-2016 |
| HR | 1995-2016 | . |  | UK | 1995-2016 | . |
| HU | 1995-2016 | . |  |  |  |  |

1. An important reason for the positive relationship between cross-country wage shares and levels of productivity is the fact that the relative price of consumption to GDP is positively related to the level of productivity (see Kónya et al. 2018). Differences in cross-country wage levels tend to reflect not only differentials in productivity, but also those in the relative price of consumption, which is closely associated with the relative price of services to goods – a major theme of our analyses presented in the previous sections of our study. The fixed effect specifications yield somewhat lower elasticities, below unity. However, in the 20-year horizon the within variation is less apparent, so fixed effect specifications cannot fully capture the long-term, cross-country relationship. [↑](#footnote-ref-1)
2. The significantly negative relationship in the short term does not rule out that the long-term relationship is different. For example, Charpe et al. (2019), using wavelet analysis, find a negative effect of labour share on growth in the short run, but a positive effect in the long (beyond 32 years) horizon. [↑](#footnote-ref-2)