External Imbalances in the Europe: Have Productivity Developments Played a Role?[*]

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Abstract

No evidence is found that gains in relative labour productivity have had a positive effect on the trade balance/GDP ratio for the 'old' EU members (excluding Germany) from 1961 through 2014. Rising relative wage rate is shown to have had strong – and negative – effects on the trade balance/GDP ratio for the EU-14, at least in the longer run. It follows that external rebalancing may be achieved through a sufficiently strong fall in the relative wage rates, without productivity changes having a role to play. This is not to claim that the EU-14 (and its members suffering trade deficits in particular) ought to attempt the devastating policy of 'internal devaluation'. A constructive alternative would be to achieve the fall in the relative wage rates through faster growth of German nominal wage rates.

JEL: F14, F41, F24

Keywords: European Union, trade imbalances, competitiveness, relative productivities, relative wages

1 Introduction

Germany's formidable external competitiveness, represented by its gigantic and persistent trade and current account surpluses, is a (widely acknowledged) source of problems troubling some of Germany's trade partners – and many of the 'old' members of the European Union in particular. The problems are especially acute for the Southern flank of the euro area where the unit labour costs have increased enormously relative to Germany's.

The coincidence of Germany's outstanding performance on both relative unit labour costs and external surpluses seems to have given rise to the idea that external surpluses can be a negatively-sloped function of unit labour cost indices. That idea underlies The Euro Plus Pact (2011) which 'prioritises fostering competitiveness and convergence' across the euro area in terms of real unit labour costs (see e.g. European Council, 2015.)

The Pact did not seem to have been uncritically received by the academic community (a quite typical judgement on the Pact's rationale can be found in e.g. Gross, 2011.) A more recent study by Gabrisch and Staehr (2014) applies Granger causality tests and vector autoregressive econometrics for 27 EU countries for the period 1995-2012. They conclude that changes in relative unit labour costs have had no discernible effect on the current account balance. Their results suggest that the measures to restrain the growth of unit labour costs may not affect the imbalances in the short term.

[*] This contribution is based on Podkaminer (2017a).

That relative unit labour costs must be of rather limited relevance for the trade balance determination can be also inferred from the abundant evidence on elasticities of trade with respect to the 'real exchange rates'. The estimates of trade elasticities tend to be statistically insignificant and/or 'wrongly' signed - and they often violate the Marshall-Lerner condition (see e.g. Podkaminer, 2015.) With relative unit labour costs clearly failing as likely determinants of external imbalances it makes sense to consider the possible roles of their two separate components: relative wages and relative labour productivities. (Remember that the unit labour cost is defined as the ratio of the wage rate and labour productivity.)

This Note is organised as follows. Section 2 shows that, contrary to common beliefs, Germany has been lagging behind the rest of EU-15 in terms of labour productivity growth. Section 3 reports negative findings concerning the role of labour productivity as a determinant of the trade balance of the EU-14 group. Section 4 considers two possible determinants of the trade balance: relative wages and relative productivities. It turns out that relative wages pass for a likely determinant, while the relative productivities still do not. Following this result, a model with the relative wage as the sole determinant of the trade balance is considered. That model turns out to possess attractive properties. Section 5 provides caveats and Section 6 the policy conclusions.

The empirical findings have some policy implications as far as the 'external rebalancing' in the EU is concerned. One policy option which the European partners of Germany have is 'internal devaluation' – that is a set of actions (including some labour market reforms) resulting in a sufficiently strong deflation in wages (and prices, in due course.) Of course, suppression of wages (and thus of domestic demand) is a bitter medicine if only because it is almost certain to provoke a recession of unforeseeable depth and length. In the first place it may help reduce the trade deficit (or even generate a trade surplus) by reducing demand for imports rather than promoting higher exports.

A more attractive alternative is believed to involve the achievement of competitiveness gains through policies promoting much faster growth of labour productivity. Of course, achievement of fast growth of labour productivity (primarily implying a fast change in the structure of production and improved quality of exportable goods and services etc) cannot be a bad idea though it is not quite clear how this could be effectively engineered. The failure of the Lisbon Agenda (and other such policy initiatives) promising a speedy structural change, quality improvements and thus advances in productivity is a case in point. Moreover, the estimates elicited (Sections 3 and 4) suggest that the productivity gains have been irrelevant (at best) as determinants of trade balances. It is rather unlikely that such gains would play a much different role in the future.

2 Contrary to common beliefs, Germany has been lagging behind the rest of EU-15 in terms of labour productivity growth: German paramount trade performance has not followed from its productivity superiority

The major problem with the productivity alternative is that in actual fact the 'old' EU has on the whole performed much *better* than Germany in terms of labour productivity growth (see Figures 1 and 2) in the long run. On labour productivity Germany has been losing out to the rest the 'old' EU secularly.[1] Germany's super-competitiveness cannot be squared with evidence on its relative productivity performance.

Fig. 1 Growth rate of relative (EU-14 over Germany) labour productivity, 1961-2014

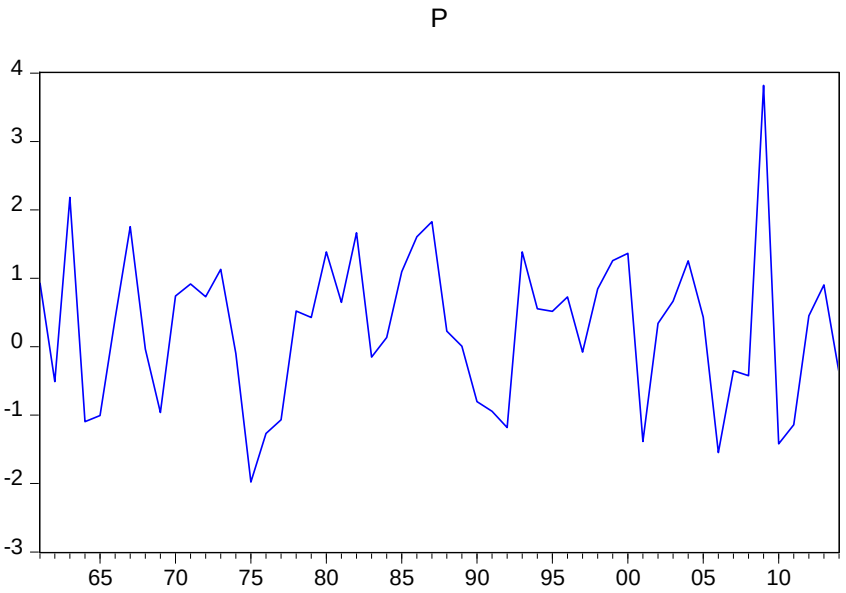
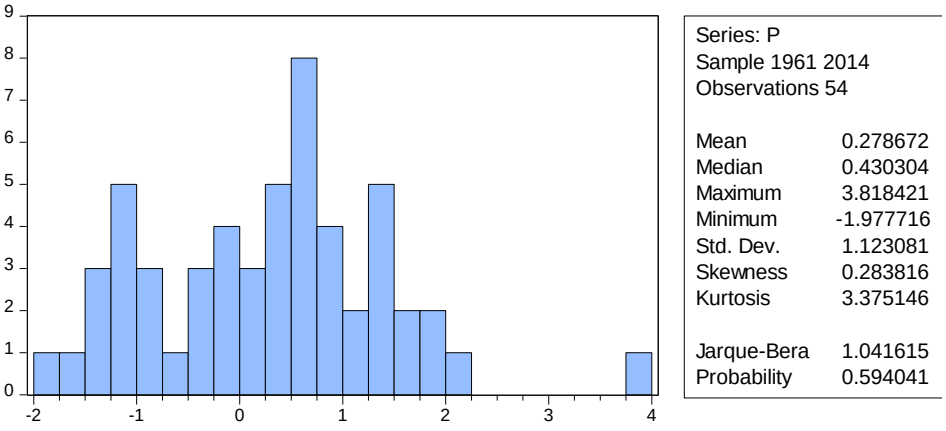


Fig. 2 Histogram and descriptive statistics for P



Is there a relationship between the rate of change of EU-14 relative labour productivity and its trade (in goods and non-factor services) balance (as GDP share) with Germany? That question is difficult to answer because AMECO reports the united Germany's trade balances starting from 1992 (while its

[1] Eurostat's AMECO database reports the indices of relative nominal unit labour costs and nominal compensation per employee for the 'old' EU member countries – both *relative* to the rest of the EU-15 (series PLCDQ and HWCDWQ respectively.) From these one calculates the indices of real labour productivity for the EU-14 *relative* to Germany. The P and W variables used here are the growth rates of relative productivity and average nominal wage respectively for the whole EU-14 area *relative* to Germany.

statistics on relative wage and productivity promise to cover the whole period starting in 1960.) Besides, the changing German competitiveness vs. the EU-14 need not be reflected solely by its trade balances with the EU-14. The rising German competitiveness may be (and probably is) reflected by German exports driving out the Italian, French or British goods from third countries' markets[2]. It follows that even if the united Germany's trade balances with the EU-14 were known for the years 1960-1991, it might still make more sense to consider the *overall* trade balance/GDP ratio for the EU-14. That ratio for the EU-14, denoted as B, can easily be calculated from AMECO data for the whole period considered (see Figures 3-4.)

Fig. 3 Trade (goods and services) balance/GDP for EU-14

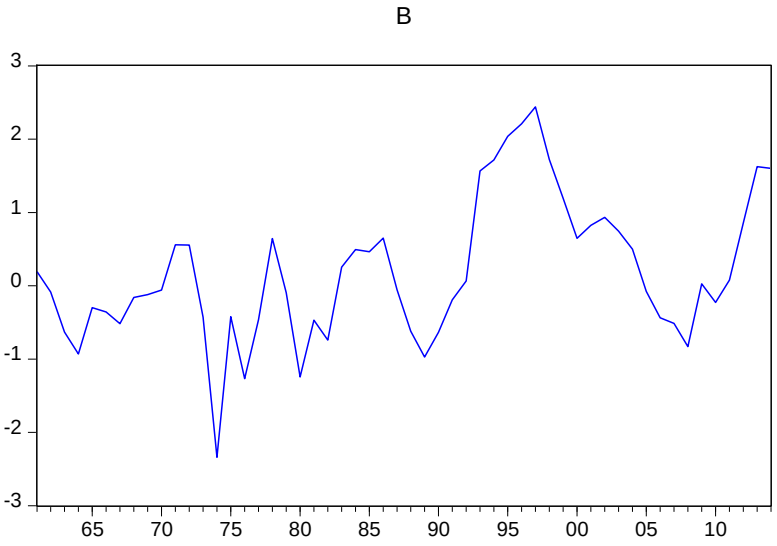
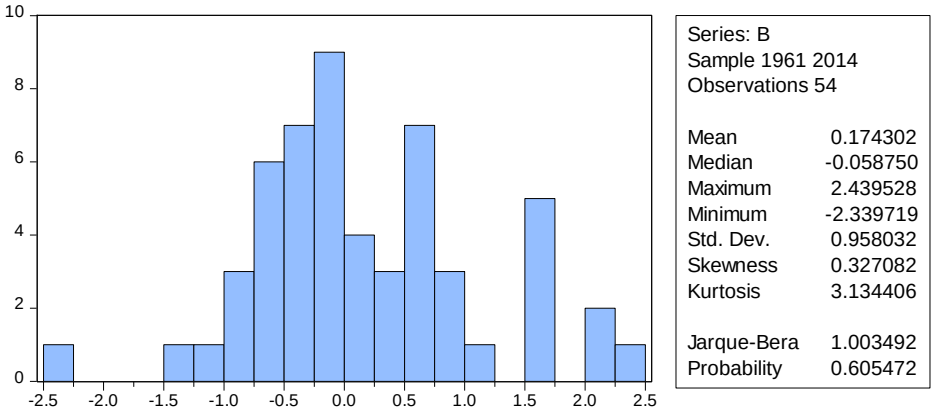


Fig. 4 Histogram and descriptive statistics for B



[2] Some evidence on German exports displacing the Southern EU ones can be found in Chen, Milesi-Ferretti and Tressel (2012.)

The overall B is not persistently negative. Average B for the whole period (1961-2014) is slightly positive and the median slightly negative. B is not persistently negative also because the EU-14 includes persistent trade *surplus* countries such as Sweden, Ireland (since 1985), Austria and the Netherlands[3]. The latter two countries have all along been tightly aligned with Germany (primarily through the fixed exchange-rate pegs and the resulting forced harmonisation of wage dynamics.)

3 Labour productivity has been a very poor (even negative) determinant of the trade balance of the EU-14 ('old' EU ex-Germany) group

As P seems stationary (which is also confirmed by the breakpoint unit root tests) and B seems I(1) – and thus non-stationary – it is quite clear that the presence of a long-term relationship between the two items may seem rather unlikely.
The *index* (or level) of EU-14 relative productivity is of course I(1), thus non-stationary. It is tempting to seek co-integration (that is the presence of a long-run relationship) between B and the productivity index. However, the Autoregressive Distributed Lags 'Bounds' models (Pesaran et al., 2001) regressing B on the productivity level produce unexpected results. The productivity level enters the co-integrating (long-run) equation with a negative sign. Moreover, the short-term impact on B of a rising productivity level also turns out to be negative. These results do not seem to make much sense. Fortunately both impacts are rather tiny and, in addition, highly insignificant in statistical terms. It is safe to conclude that the impacts in question do not really matter. Relating the increase in B (that is D(B)) to P through Ordinary Least Squares is of course legitimate – but similarly unsuccessful.

The ARDL approach formally confirms the absence of a long-run relationship between P and B. While the bounds F-statistics value for the ARDL model with unrestricted constant is 5.5 (and thus rejects the null hypothesis of 'no long-run relationship' at 5% significance), the second critical bounds statistics (the t-statistics) equals -2.463 and thus cannot reject the null – even at 10% significance.[4]

The ARDL model attempting to relate B to P delivers a problematic co-integrating and long-run forms (see Table 1.) The long-run regression coefficient for P appears to be also negative – and also statistically insignificant. All lagged D(P) variables, reflecting short-term dynamics of the system, enter the equation for D(B) with negative signs. If anything, there is some evidence that improvements in relative labour productivity *lower* the trade balance/GDP ratio. Of course, this evidence is not sufficiently strong in statistical terms to be accepted.

[3] Without the trade surpluses of these four countries the whole EU-14 would have run huge trade surpluses from 2000 through 2012.
[4] The bounds used for qualification of null applied here come from Pesaran et al. (2001.) These bounds are asymptotic. As shown by Narayan (2005), for finite samples (such as ours), the critical bounds are more restrictive.

Table 1 Cointegrating and Long Run Forms

Dependent Variable: D(B)

Selected Model: ARDL(4, 4)

Date: 02/07/16 Time: 16:27

Sample: 1961 2014

Included observations: 50

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(B(-1))	0.042590	0.129553	0.328742	0.7442
D(B(-2))	0.216689	0.126741	1.709699	0.0955
D(B(-3))	0.323996	0.133544	2.426132	0.0201
D(P)	-0.086382	0.072810	-1.186400	0.2428
D(P(-1))	-0.001951	0.083795	-0.023280	0.9815
D(P(-2))	-0.081319	0.079606	-1.021516	0.3135
D(P(-3))	-0.124924	0.066248	-1.885697	0.0670
D(M)	-1.248868	1.057379	-1.181098	0.2449
D(M2)	-3.387309	0.834528	-4.058952	0.0002
C	0.167220	0.086262	1.938522	0.0600
CointEq(-1)	-0.248563	0.084602	-2.938014	0.0056

Cointeq = B - (-0.6835*P -0.4487*M -8.4323*M2)

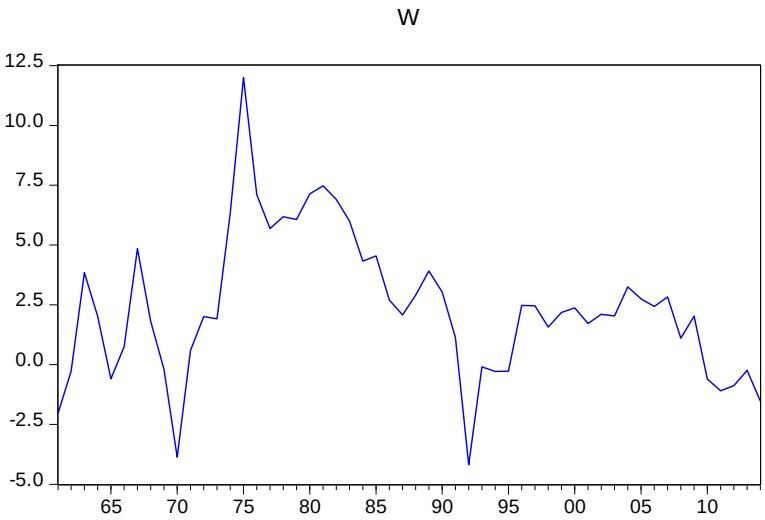
Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
P	-0.683488	0.898496	-0.760702	0.4515
M	-0.448651	0.710440	-0.631512	0.5315
M2	-8.432343	3.804966	-2.216142	0.0327

4 Relative wage (EU-14 group vs. Germany) passes for a likely (negative) determinant of the trade balance for Germany's European partners

W, the rate of growth of the nominal wage rate for the EU-14 relative to Germany, appears to be non-stationary (see Figure 5.) That impression is confirmed formally by the unit roots test (also allowing for the possible presence of a breakpoint.) D(W) is confirmed as stationary.[5]

Fig. 5 Growth rate of the wage rate for EU-14 relative to Germany, 1961-2014



ARDL with B as the dependent variable and both P and W as explanatory variables (plus the relevant time-dummy variables) produce the testing statistics that reject the null hypothesis of 'no long-run relationship exists' at 1% and 2.5% significance levels. For the ARDL model with unrestricted constant the F-statistics equals 6.862 and the t-statistics equals -3.9747. (The 1% critical bound for the former statistics is 6.36 while the 2.5% bound for the latter statistics is -3.80.) Even if the finite-sample critical bounds for the case considered might be less 'permissive', there is little doubt that allowing, additionally, for W proves more productive. Other usual tests applied to that ARDL model (on residuals and estimates' stability) are also passed satisfactorily. Thus it makes sense to have a look at that model's co-integrating and long-run forms (see Table 2.)

The co-integrating form indicates that *increases* in P and W (both lagged one year) do not really matter as far as D(B) is concerned. What matters for the short-term dynamics is the error-correction term (the cointEq(-1) term in the last row in the upper panel in Table 2.) That term enters the equation

[5] The index (or level) of EU-14 wage rates relative to Germany is I(2.) As such it cannot be included among the explanatory variables in ARDL ('Bounds') models.

for D(B) with a proper (negative) sign, is rather large in absolute terms (suggesting fast correction) – and is highly significant statistically.

Both coefficients in the long-run form which is tying up B with P and W appear quite large and negative. This makes sense with respect to the W variable: in the long run a lower trade balance should be associated with a falling relative wage rate. However, the negative association between the productivity growth rate and the trade balance is not consistent with common sense. On the other hand, the long-run coefficient for P is not statistically significant. A possible conclusion to all that may be that the improvements in productivity have not mattered, during the 53 years considered, as far as the EU-14 trade balance/GDP ratio is concerned, either in the long run, or in the short.

Table 2

ARDL Co-integrating and Long-Run Form

Dependent Variable: D(B)

Selected Model: ARDL(1, 0, 1)
Date: 02/07/16 Time: 16:24
Sample: 1961 2014
Included observations: 53

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(P)	-0.004414	0.050547	-0.087323	0.9308
D(W)	0.009125	0.037113	0.245877	0.8069
D(M)	-1.598760	0.935795	-1.708451	0.0943
D(M2)	-3.437690	0.673784	-5.102062	0.0000
C	0.389627	0.112455	3.464750	0.0012
CointEq(-1)	-0.324549	0.078795	-4.118890	0.0002

Cointeq = B - (-0.1875*P -0.2220*W -1.3578*M -7.0229*M2)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
P	-0.187458	0.221421	-0.846615	0.4016
W	-0.222050	0.077132	-2.878843	0.0060
M	-1.357823	0.520684	-2.607768	0.0122
M2	-7.022914	2.321507	-3.025153	0.0041

The previous conclusion suggests dropping the productivity variable from the list of the determinants

of the trade balance[6]. One determinant that may be worth retaining, at this stage, is the wage variable W.

An ARDL model relating B to W (and two time-dummy variables) has excellent 'bounds' statistics. The F-statistics is 12.74 (much in excess of 7.84 sufficient for 1% significance); the t-statistics is -4.98 (much less than -3.22 which is sufficient for 1% significance.) Other usual tests (on residuals and parameter stability) are passed with flying colours. Thus, the existence of a long-run relationship between B and W is highly probable. The corresponding co-integration and long-run coefficients are in Table 3, the ARDL model itself in the Appendix 1.

Table 3
Co-integrating and Long-Run Form
Dependent Variable: D(B)

Selected Model: ARDL(4, 5)
Date: 02/09/16 Time: 14:41
Sample: 1961 2014
Included observations: 49

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(B(-1))	0.253379	0.135104	1.875433	0.0689
D(B(-2))	0.294992	0.137478	2.145739	0.0387
D(B(-3))	0.265583	0.133757	1.985558	0.0547
D(W)	0.033841	0.044446	0.761398	0.4514
D(W(-1))	0.061142	0.057653	1.060510	0.2960
D(W(-2))	0.065934	0.048292	1.365328	0.1806
D(W(-3))	0.089406	0.041258	2.166990	0.0369
D(W(-4))	0.060925	0.040428	1.507002	0.1405
D(M)	-1.353155	1.033279	-1.309573	0.1986
D(M2)	-3.558074	0.745066	-4.775517	0.0000
C	0.581139	0.155404	3.739526	0.0006
CointEq(-1)	-0.508496	0.124259	-4.092237	0.0002

Cointeq = B - (-0.2466*W -1.1638*M -5.3044*M2)

[6] It is often assumed that 'wage developments relative to productivity', or unit labour costs, are really decisive for determination of the trade balance. If that was the case the long run regression coefficient for productivity would have been positive (while it appears to be negative) and significant (it is not) and equal to (minus) the long run coefficient for the wage variable (which is not the case either.)

Long-Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
W	-0.246601	0.060346	-4.086421	0.0002
M	-1.163821	0.356477	-3.264781	0.0024
M2	-5.304440	1.348115	-3.934709	0.0004

The long-run coefficient for W is properly signed and highly significant in statistical terms. However, the lagged *changes* in W are really inconsequential for the short-run dynamics which is largely determined by the error-correction adjustments.

5 Caveats

The validity of conclusions suggested by the econometric models reported above hinge – to a substantial degree – on the quality of the underlying data. The data, available from Eurostat's AMECO database, may in fact be of imperfect quality. However, no better source of data on the items considered seems to exist at present. The working assumption adopted here is that the AMECO data properly reflect the developments bearing on the reported productivity indices (including, inter alia, ongoing qualitative upgrading of the goods produced or the changes in the sectoral composition of output.)

The global (and European) economic scenes have been changing since 1960 (e.g. with respect to the prevailing international trading arrangement, exchange rate regimes, incidence of 'oil price shocks' etc.) Modelling has attempted to allow for eventual 'structural breaks' by introducing 'time dummy variables'. The time dummy for the 'Bretton Woods' years (1960-1973) proves significant. Other time dummies, including for the years 1992-2014 – i.e. the period following the German unification – prove redundant. Quite unexpectedly, the dummy for the 'annus horribilis' (2009) has also proved superfluous (unlike the highly significant and influential time dummy for 1974, the year of the first 'oil price shock'.)

As the preferred model (see Table 3 and the Appendix 1) passes the customary *stability* tests (CUSUM etc), with 'flying colours', it may be reasonable to assume that the impacts of the ('structurally') changing economic environments have been reflected with a satisfactory precision.

Another issue that may need a comment is about the analysis being 'dichotomic' – i.e. distinguishing Germany and rest of the 'old' EU. The treatment of the EU-14 as a single entity characterised by three

aggregates (P, B, W) may seem odd, given the fact that the members of the group have differed on many counts, often radically[7].

It is obviously possible to build models for individual EU countries – with country-specific variables P, B and W. However, lumping together all 'old' EU countries excluding Germany makes sense because of the decisive role which the German wage policies seem to have played in destabilising the entire EU (see e.g. Bibow, 2013, 2005 or Laski and Podkaminer, 2011.) Working with aggregates for the EU-14 naturally says a lot about the group's well-defined counterpart – Germany. Working with the data for individual countries (let us say Italy) does not lead to clear-cut policy conclusions because in that case Italy's counterpart, defined as 'the rest of the EU-15', would include Germany as well as all other EU-15 member states.

6 Policy conclusions

There is no evidence that gains in relative labour productivity have had a positive effect on the trade balance/GDP ratio for the EU-14. Actually, the effects of improving productivity are highly uncertain – at least as far as the trade balance goes. Still, productivity gains can have positive trade effects for some members of the EU-14 group. Besides, achieving productivity improvements remains a worthy task on other grounds.

Rising relative wage rate is shown to have had strong – and negative – effects on the trade balance/GDP ratio for the EU-14, at least in the longer run. It is correct to expect such effects in individual members of the group – in particular in countries that have the tendency to run high and persistent trade deficits[8]. It follows that external rebalancing should be achieved through a sufficiently strong fall in the relative wage rates.

This is not to claim that the EU-14 (and its members suffering trade deficits) ought to attempt a policy of 'internal devaluation'. A constructive alternative would be to achieve a fall in the relative wage rates through faster growth of *German* nominal wage rates. Faster growth in German wage rate can be expected to reduce the price-competitiveness of German products, thus resulting in a slowdown of growth of German exports and a faster growth of its imports. However, the mere price effect of stronger wages (and unit labour costs) would probably be insufficient to narrow the existing trade imbalances significantly. However, a stronger growth in the wage rates should be expected to positively affect the macro aggregates: the (secularly stagnant) German wage bill, its household

[7] Working with aggregates taken across EU-14 does not seem much more problematic than working with aggregates for Germany (which consists of *Laender* as diverse as Bavaria and Mecklenburg-Vorpommern, a part of the erstwhile GDR.)

[8] ARDL models relating the trade deficits of Italy, Spain, Greece and Portugal to the changes in their respective labor productivity indices *relative to the rest of EU-15* all produce negative (and statistically insignificant) regression coefficients for the productivity change. The regression coefficients for changes in the wage rates relative to the rest of EU-15 are negative in the ARDL models for Greece, Italy and Portugal and positive (though small and statistically insignificant) for Spain.

income and consumer demand – including the demand for exportable goods and services (and imported goods and services.) The income effects of rising wage rates may be more important than the price effects (as recently suggested by e.g. Schröder, 2015.)

Whether the alternative of inducing faster growth of wages in Germany is practicable is another matter. But it can be argued that without that alternative being followed the European Union will remain a stagnant area plagued by recurrent crises caused by imbalanced trade between its Member States (Laski and Podkaminer, 2011, 2012; Podkaminer, 2015.)

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Appendix: GDP growth and exchange rates: poor determinants of the trade balance

In 'standard economics' the GDP growth (or growth differentials) and the exchange rates are important determinants of the trade balance. But it is not quite correct to expect that e.g. higher growth tends to lower the trade balance (through higher imports.) Growth itself may be 'export-led' – in which case higher growth would be associated with higher – not lower – trade balances.

The problematic role of 'exchange rates', however defined, as a factor behind the trade balance is not uncontroversial either. The literature abounds with empirical contributions which quite often yield rather sceptical conclusions concerning the exchange rate as a factor behind the trade balances. Observe though that our W variable considered in Section 4 (the change in the relative nominal wage rate) provides some measures of the exchange rate movements (especially for the countries sharing the same currency.) It is no misuse of language to talk of 'internal devaluation' – meaning cuts in nominal wage rates.

The model with B as a function of the GDP growth rate and the Real Effective Exchange Rate for the EU-14 (the latter unit labour cost-based, relative to Germany) does not produce convincing results. It suggests that (a) REER behaves 'perversely': devaluation is expected to lower the trade balance; (b) faster GDP growth is likely to lower the trade balance – but infinitesimally so – and that effect is highly uncertain (see the table below.)

Co-integrating and Long-Run Form

Dependent Variable: D(B)

Selected Model: ARDL(4, 0, 1)

Date: 09/13/16 Time: 13:29

Sample: 1961 2014

Included observations: 50

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(B(-1))	0.224765	0.134950	1.665542	0.1034
D(B(-2))	0.163378	0.104421	1.564615	0.1254
D(B(-3))	0.212234	0.110868	1.914295	0.0626
D(E)	0.015629	0.020499	0.762427	0.4502
D(G)	-0.164625	0.049724	-3.310776	0.0019
D(M2)	-2.653424	0.373030	-7.113171	0.0000
CointEq(-1)	-0.302670	0.077444	-3.908216	0.0003

Cointeq = B - (0.0638*E -0.1951*G -6.0837*M2 -5.2493)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
E	0.063755	0.027851	2.289166	0.0273
G	-0.195138	0.142441	-1.369959	0.1782
M2	-6.083699	2.151831	-2.827219	0.0072
C	-5.249274	2.771023	-1.894345	0.0652

Remark: G is the GDP growth rate for EU-14; E is the REER for EU-14.