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Disintegration versus divergence: The EMU Experience

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Abstract

The Euro was introduced with the expectation that business cycles in the member countries would become synchronized and real incomes would converge. Developments so far have gone in the opposite direction. Compared to 2002, and especially since the European sovereign debt crisis of 2011/12, the euro area has experienced increasingly divergent business cycles, and living standards across the member countries have drifted apart. By exploring the link between business cycle synchronization and real income convergence we find that 1) even with strongly synchronized business cycles, real income convergence is not guaranteed; and that 2) without strong business cycle synchronization, the chances for real income convergence are even smaller.
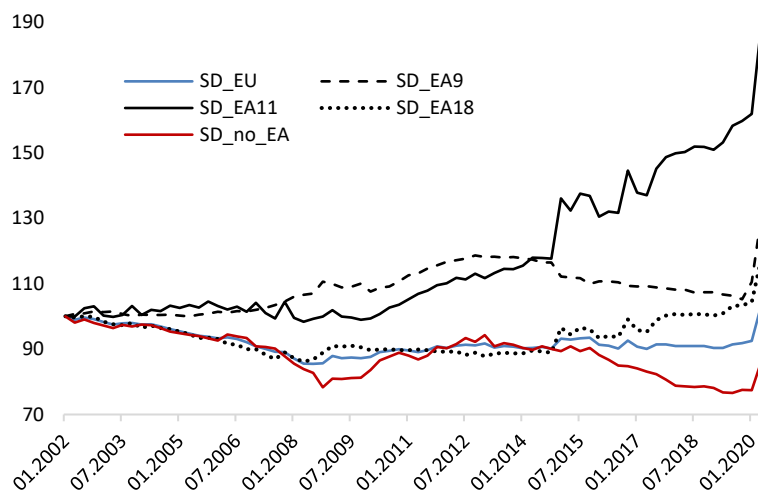
Zusammenfassung

Der Euro wurde in der Erwartung eingeführt, dass sich die Konjunkturzyklen in den Mitgliedsländern synchronisieren und die Realeinkommen konvergieren. Die bisherige Entwicklung ging in die entgegengesetzte Richtung. Im Vergleich zu 2002 und insbesondere seit der europäischen Staatsschuldenkrise 2011/12 hat die Eurozone zunehmend divergierende Konjunkturzyklen erlebt, und der Lebensstandard in den Mitgliedsländern hat sich auseinanderentwickelt. Bei der Untersuchung des Zusammenhangs zwischen der Synchronisation der Konjunkturzyklen und der Konvergenz der Realeinkommen stellen wir fest, dass 1) selbst bei stark synchronisierten Konjunkturzyklen die Konvergenz der Realeinkommen nicht garantiert ist; und dass 2) ohne eine starke Synchronisation der Konjunkturzyklen die Chancen für eine Konvergenz der Realeinkommen noch geringer sind.

1. Introduction

Real divergence within the European Monetary Union (EMU) has been increasing despite the political efforts to contain it (Duarte 2020). The income gap between the poorest and the richest EMU members (as measured by real GDP per capita) reached its highest point with the coronavirus pandemic in 2020 (Fig. 1). For the original EMU members (without Luxembourg) the standard deviation of real per capita GDP has almost doubled since the introduction of the Euro. Without Greece and Ireland (EA9), the increase in divergence has been less dramatic but it is still 30 percent above the 2002 level. The divergence in real per capita income of the EU countries that are not part of EMU decreased after 2002 and, despite the rise in 2020Q2, it is still 14% below the 2002 level.

Figure 1: Standard Deviation of GDP per Capita relative to the EU average.

Source: Flossbach von Storch Research Institute, Global Economic Monitor, national statistical offices, Macrobond.
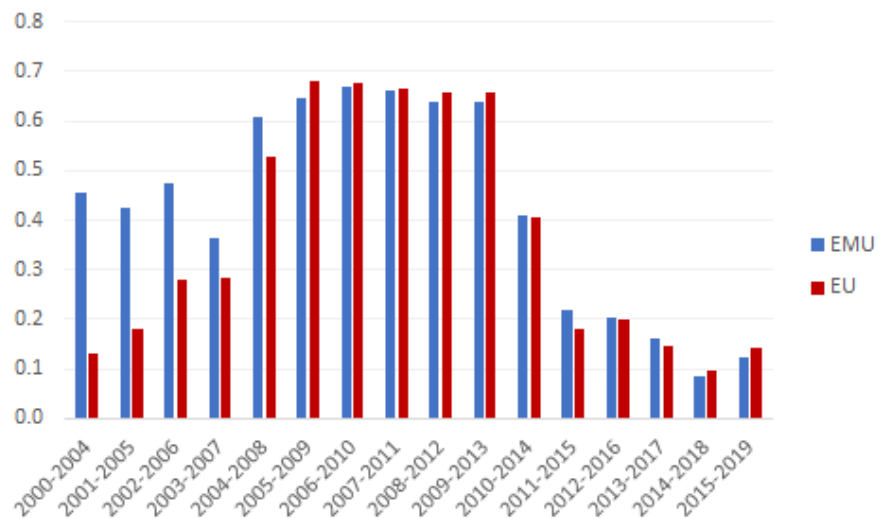Note: SD_EU includes the 28 EU member countries plus UK. SD_EA9 includes the initial members of the EMU excluding Greece, Ireland and Luxembourg. SD_EA11 adds Greece and Ireland. SD_EA18 adds the further member countries.

Based on the analysis of correlation coefficients for different economic series, Gehringer et al. (2020) found a progressive real disintegration of business cycles in the euro area, i.e. real economic developments within the EMU became less synchronized. Looking at real GDP growth, for instance, the correlation coefficients between the growth rates of each country and the population-weighted average growth rates of the remaining EMU members (calculated on a rolling yearly basis for a time span of 20 quarters) have clearly shown a diminishing tendency on average for the EMU countries since the

European debt crisis in 2011/2012. Moreover, business cycle synchronization deteriorated in the euro area over this period at least as much as in the EU. However, given that the euro area was significantly more integrated than the EU in the first years of the currency union (with higher correlation coefficients), the sharp deterioration within the euro area in the wake of the European debt crisis seems more significant than the developments in the EU as a whole (Fig. 2)

Figure 2: Correlation coefficients for real GDP – averages for the EMU and EU members.

Source: Flossbach von Storch Research Institute, Macrobond.

Both divergence in living standards (real income) and in growth dynamics within the euro area defy earlier expectations. The common currency was deemed to contribute to stronger trade linkages (due to the elimination of exchange rate uncertainty), more synchronized business cycles and, as a final goal, to convergence in living standards (Mody 2018, Franks et al. 2018). Indeed, synchronization of business cycles and income convergence remained at the center of the narrative that eventually led to the establishment of EMU.

We argue that whereas a minimum degree of economic integration is necessary for a smooth functioning of a monetary union, it is by no means a sufficient condition for real income convergence. For EMU we argue that even if the member countries would have shown perfectly synchronized business cycles at the beginning of the currency area (which they did not), there would have been little reason to expect automatic convergence in living standards. Instead, low synchronization seems to have militated against real income convergence as monetary policy could not respond effectively to adverse asymmetric shocks.

2. Is there a link between economic integration and convergence?

Economic convergence is a long-run process by which the living standards in poorer and richer countries – as measured in terms of per capita income – move towards a common level over time as poorer countries catch up to richer countries.[1] At least three mechanisms can drive such a catch-up process (Thirlwall and Pacheco-López, 2017):

1) Poor countries tend to absorb higher technological standards from richer countries and thus take advantage of their backwardness.

2) Related to this, diminishing returns to capital imply that rich countries with relative abundance of capital per capita will exhibit lower marginal productivity of capital than poor countries.

3) The shift of resources from lower productivity sectors (e.g. agriculture) to higher productivity sectors (manufacturing or services) is larger in poorer than in richer countries.

Economic integration, in contrast, refers to the fluctuation of economic activity over shorter cycles and means that economies show a higher degree of synchronization of business cycles.[2] Stronger synchronization of business cycles could contribute to real convergence if it increased average growth rates more in poorer than in richer countries. Convergence, however, can also take place with fully desynchronized business cycles as long as average growth rates in poorer countries are higher than in richer countries.

The following example shows that convergence and integration do not need to come together. We assume two countries (X and Y) whose GDP is given as:

$$x_t = d_x + x_{t-1} + e_t,$$

$$y = d_y + y_{t-1} + u_t.$$

Where x_t and y_t denote (natural logarithms of) GDP of X and Y in period t, with x_{t-1} and y_{t-1} indicating values in the preceding period. We additionally assume that e_t and u_t are independent and identically distributed (iid) random variables (i.e. error terms) and that d_x, d_y are constant drift parameters. This type of series is called "random walk with drift", where the value at

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[1] The standard method for testing the convergence hypothesis is to do a simple correlation across countries between the rate of growth per capita income and the initial level of per capita income. If the relation is significantly negative, per capita income is growing faster in the poorer countries.

[2] With economic integration we refer to the business cycle synchronization, leaving aside other aspects of the integration process. We use the terms economic integration and synchronization interchangeably.

each point in time (t) is equal to the value in the previous period plus a shock (e_t or u_t) and a drift parameter. The constant drift parameter generates a trend in the underlying series.

We can reformulate the equations above to obtain the growth rates of the series:

$$\Delta x_t = d_x + e_t,$$
$$\Delta y_t = d_y + u_t.$$

where Δx_t and Δy_t are the first log-differences of GDP and therefore an approximation of GDP growth rates. Whether the growth rates are synchronized or not and whether the level series converge or not depends on the properties of the shocks and the differences between the drift parameters. Synchronization takes place if the shocks (e_t and u_t) are sufficiently correlated, but convergence can only happen if the growth rate of the poorer country is on average larger than the growth rate of the richer country. The average of the growth rates, however, is independent of the shocks and therefore independent of the co-movement of the growth rates. [3] In other words, if e_t and u_t are correlated, the growth rates of x_t are correlated, but the cyclical co-movement of GDP does not compensate for different trends resulting from the different drift parameters.

As an example, we assume country X as the initially poor one (with the initial value $x_0 = 50$) and country Y as the initially rich one ($y_0 = 100$). As explained above, convergence will depend on the average of the growth rates, which in this example is equal to each drift parameter. We assume, for instance, drift parameters $d_X = 0.5$ and $d_Y = 0.1$. Therefore, the average growth of x (the poor country) will be higher than that of y (the rich country) and we can expect convergence. Since e_t and u_t are uncorrelated by assumption, the growth rates are uncorrelated (no synchronization).
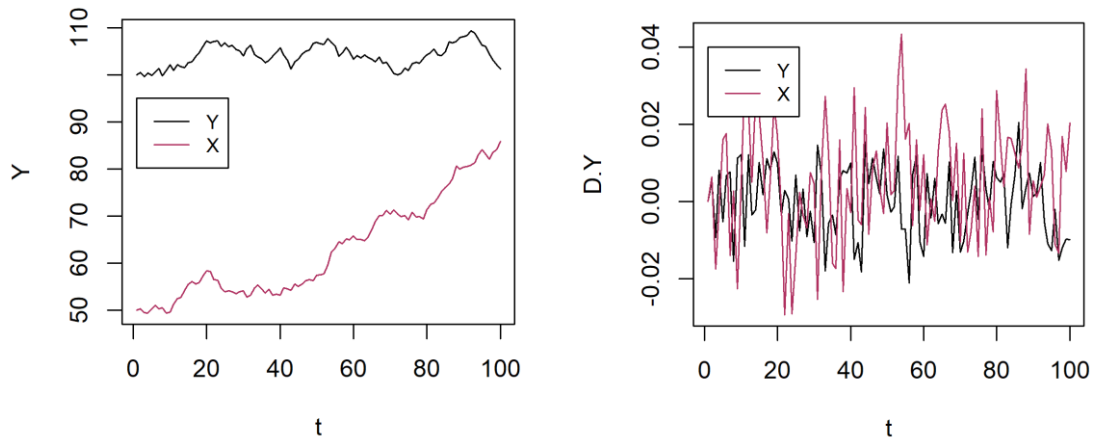
Figure 1 shows the levels and the growth equations for the two countries of our example assuming 100 time periods. For the independent shocks (e_t and u_t) we generate a series of normally distributed random numbers for each. The gap between x_t and y_t closes from 50 units at the beginning to 20 units after 100 periods. The empirical correlation of the growth rates over the whole period is, however, close to zero (-0.05). Over time, taking subsets of 20 periods, the rolling correlation of the growth rates fluctuates around zero,

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[3] The mean of the growth rate is its expected value. Since the expected value of a random shock is zero, and the expected value of a constant is the constant itself, the expected value of each growth rate is equal to the drift parameter. Since the shocks do not play a role in defining the average growth rates, whether the shocks are correlated and therefore whether the growth rates are synchronized or not does not play a role either.

with a maximum correlation of 0.2 and a minimum of almost -0.4. Real convergence between two countries takes place without integration of their business cycles.

Figure 3: Convergence with no integration

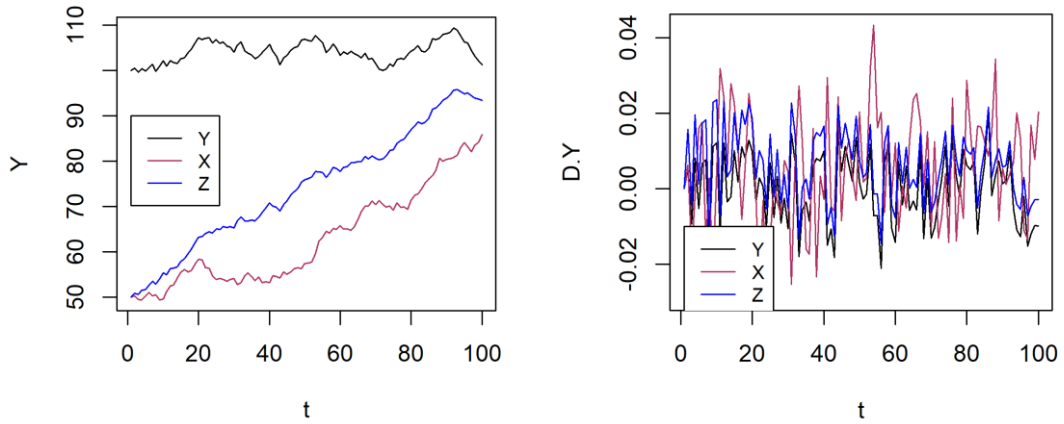Source: Own elaborations, Flossbach von Storch Research Institute

What would happen if the series were synchronized, that is, their growth rates were highly correlated? We can examine this by assuming that the error terms of a third series (z_t) are not independent. We define the third series as:

$$z_t = 0.5 + z_{t-1} + w_t$$

We assume the shock term $w_t = 0.7 \times u_t$ such that the growth rates of z_t and y_t are correlated. The series z_t has the same drift parameter as x_t, and the same starting point $z_0 = x_0 = 50$, such that both, x_t and z_t are assumed to be poor countries and the only difference between them is that Δy_t and Δz_t are correlated while Δy_t and Δx_t are not. Figure 4 shows the levels and growth rates for the series including z_t.
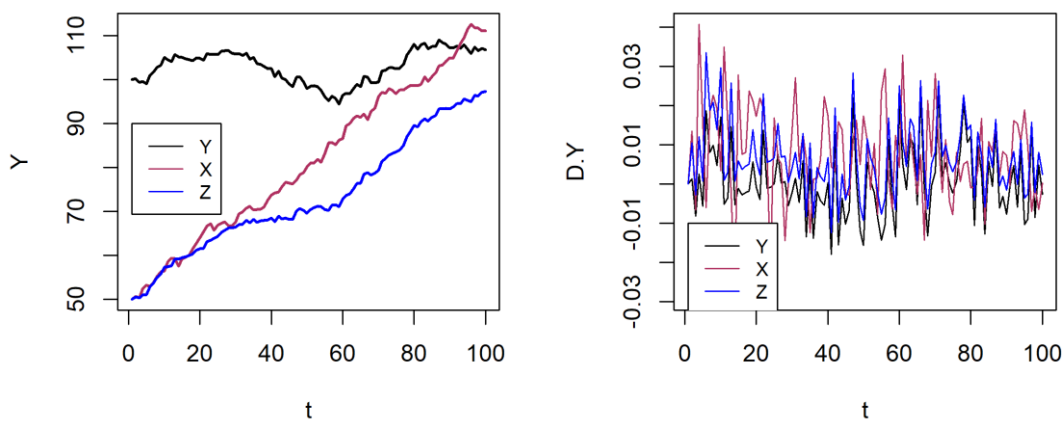
Figure 4: Convergence with integration, case 1

Source: Own elaborations, Flossbach von Storch Research Institute

The empirical correlation between x_t and y_t is almost zero (-0.05) but is very high between z_t and y_t (0.998). Taking 20 period rolling correlations, the minimum correlation is 0.986 and they fluctuate around 0.998. Convergence seems to be faster for the series with the highly correlated growth rates (blue line). The faster convergence, however, is mere coincidence. Re-doing the whole exercise with different (normally distributed random) numbers for the shocks e_t and u_t, results in the series x_t with uncorrelated shocks with y_t converging faster to it than z_t, as shown in Figure 5.

Figure 5: Convergence and integration, case 2

Source: Own elaborations, Flossbach von Storch Research Institute

In this case, the correlation between x_t and y_t is -0.007 and between z_t and y_t is 0.97.

This implies that synchronized business cycles neither require nor produce convergence per se.

3. Integration and convergence in a currency union

When countries agree to give up their national currency and their own monetary policy in favour of a common currency the considerations regarding business cycle synchronization and real income convergence change, especially if either has been set as an official goal of the currency union. In the case of the Eurozone, as mentioned above, synchronization was not given but rather expected to emerge from the monetary integration and real income convergence was wished for. Both were grounded on weak economic foundations.

Even with fully synchronized growth, real income convergence is not guaranteed

As explained above, synchronized growth and convergence are not necessarily connected. This does not change within a currency union. The theory of optimum currency areas (OCA) pioneered by Mundell (1961) stresses that business cycle synchronization between the members of a currency union is a crucial precondition for its well-functioning, but this does not guarantee that convergence will follow. In a nutshell, the more synchronized the business cycles of the countries in a currency union are, the lower is the probability of the occurrence of asymmetric shocks and therefore the more appropriate can the stabilizing response of central banks be. A shock is asymmetric if it hits only some member countries or if the same shock affects member countries differently across the currency union (for instance, German reunification, the European sovereign debt crisis, or the current COVID-19 pandemic). If the shock is symmetric, it impacts all members equally, and the monetary policy reaction to the shock should have an equally stabilizing effect across the union. Therefore, the stronger the co-movement of the business cycles, the lower would be the "cost" of giving up monetary policy independence.

Although synchronization does not guarantee convergence per se (as shown above), it could contribute – among other determinants and under benign circumstances – to real convergence. By eliminating exchange rate uncertainty, cross-border transaction costs decrease, interest rates across the

union fall, and therefore trade in goods, services and production factors within the currency area are enhanced, thereby boosting growth. In such a context of strengthened economic linkages within the union, the law of diminishing returns to capital would predict that poorer countries could benefit from capital inflows and enhanced economic growth more than richer countries, leading eventually to convergence in per capita incomes.[4]

However, as already discussed, convergence is a complex process where multiple factors – going far beyond the business cycle dynamics – play a role. In section 2 we explained that convergence depended on the average growth rates of the GDP and that the average growth rates are not per se connected with the synchronization of the business cycle. Following our example, to argue that a fully synchronized currency union leads to convergence would imply that business cycle synchronization can compensate for the differences in the drift parameters of the series. The differences in the average growth rates over time, however, reflect deeper structural and institutional characteristics of each economy that have determined the current stage of development. To assume that a currency union can compensate for these differences, such that the average growth rates of the poorer countries becomes larger than that of the richer countries, is unrealistic, even if the growth rates were fully synchronized and monetary policy stabilization were optimal. A currency union is unlikely to be per se a successful development policy measure.

Without synchronized growth, real income convergence is less likely

Without business cycle synchronization, the currency union is not optimal and thus the chances for real income convergence decrease. The lack of business cycle synchronization within a currency area implies a high probability of the occurrence of asymmetric shocks. The stabilization response by the central bank, therefore, will be less than appropriate since the optimal monetary policy stance is not unique across the union. The monetary policy stance that can be implemented would turn out to be too loose for some areas and too tight for others. Therefore, it is likely to be harmful to some – if not all – members. Without a flexible exchange rate that can adjust to the shocks, other adjustment mechanisms are needed. If, however, the adjustment mechanisms, such as labor market mobility, wage flexibility and fiscal transfers are not sufficiently available, the net costs from being in such a currency union are likely to be higher than from being outside. As a consequence, since it is likely that in a setting with only weak or no business cycle synchronization stronger countries are more able than weaker members to

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[4] See, for instance, Franks et al. (2018) and Aglietta and Brand (2013).

compensate for economic losses due to negative shocks, economic convergence is a less likely outcome.

If synchronization is not given ex-ante, however, it could still emerge from a common currency and the currency union could evolve to eventually become an OCA. As Frankel and Rose (1998) proposed in their OCA-endogeneity hypothesis, synchronisation could result from within the currency union if a common currency increased trade via the elimination of exchange rate uncertainty, and stronger trade linkages in turn increased the co-movement of the business cycles (Frankel and Rose, 1997;1998). Synchronization, however, need not be a result of the currency union. As Krugman (1993, 242) argues on the basis of lessons from the US for EMU, the increasing economic integration and therefore intensity of trade that would be achieved in the process of creating the currency union is more likely to lead to the creation of regional clusters ending in less rather than more synchronization.

All in all, even if business cycles were fully synchronized and no asymmetric shocks occurred, the gap in the average growth rates, reflecting different development stages, is very unlikely to be closed by membership in a currency union. Synchronization, however, is rather unlikely. Without synchronization a currency area experiences asymmetric shocks which cannot be appropriately countered by a common monetary policy. This is more likely to prevent rather than promote real income convergence. To expect convergence from a currency union is therefore rather an unrealistic wish.

4. Euro area: Synchronization and convergence is wishful thinking

From the above discussion, business cycle synchronization could lead to income convergence only under very specific circumstances, but it does not guarantee it. This conclusion does not need to have a normative implication for countries not involved in any formal integration process. Even if both synchronization and especially convergence are desirable, they are not necessary for good economic performance and there is no formal obligation nor expectation that either of them should take place. This is different in the case of the EMU. Business cycle synchronization is considered instrumental for a proper functioning of the monetary union and economic convergence has been pursued as one of the final goals of monetary integration.

The ideas underlying the EMU creation – fed by the need to offer a politically attractive project – relied mainly on the most optimistic version of the possible scenarios. In one of the crucial documents published in the preparation for the common currency, the so called Delors Report of the European Council from 1989, the goal of economic convergence in living standards was

strongly emphasized. By giving up monetary sovereignty, euro area members would gain economic stability and – through positive growth effects – would experience a progressive real economic convergence.

This wishful thinking contrasted with the recognition – widespread before the official introduction of the common currency – that the euro area was by no means an optimum currency area (OCA) at its onset. As discussed extensively in the academic literature, business cycles were not synchronized at the start of the currency union (Eichengreen, 1991). Labor mobility across the euro area was persistently weak (Eichengreen, 1990; Blanchard and Katz, 1992). Finally, the euro area did not have a system of fiscal transfers to counteract asymmetric shocks (Sala-i-Martin and Sachs, 1991). The EMU was thus created under conditions of existential threat.[5]

Why then was the euro eventually introduced, despite the lack of synchronization? The economic argument can be derived from the aforementioned OCA-endogeneity theory (Frankel & Rose, 1998). But it was eventually a strong political will that gave the final push.[6] The possibility that business cycle synchronization would not automatically follow – and the risk of divergence would increase – was ignored.
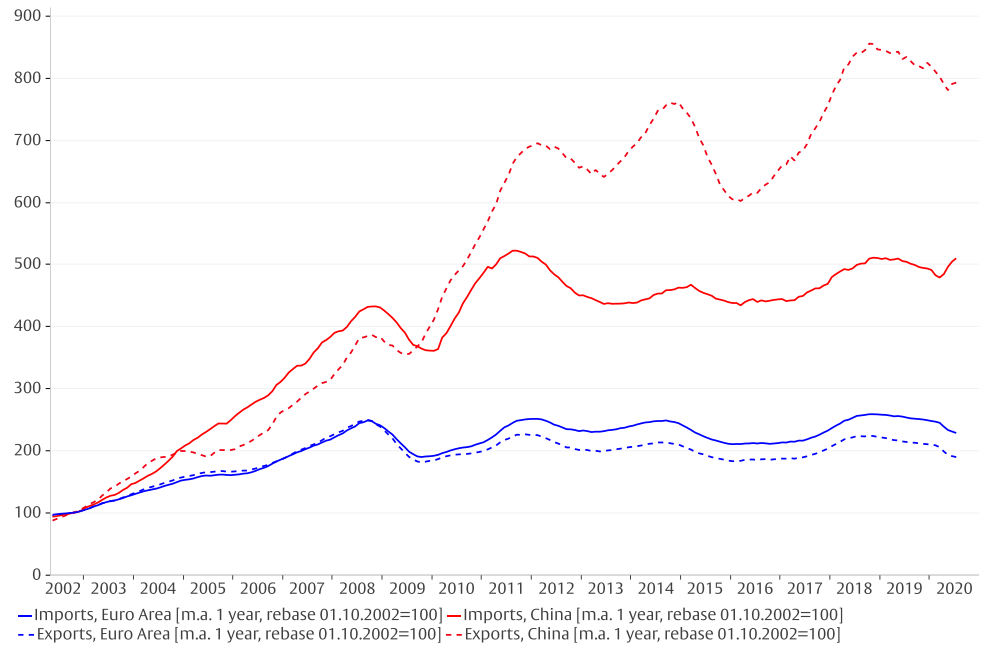
After more than two decades of the monetary union, the economic outcomes are disappointing. As Duarte (2020) and Gehringer et al. (2020) show, neither stronger economic integration nor the final goal of real income convergence was even approximately achieved. To the contrary, undesirable forces seem to be at work. For instance, trade between Germany and the rest of the Eurozone has not increased as much as trade with China since the Euro introduction, suggesting that trade integration, through which the OCA-endogeneity hypothesis should work, is not there (Figure 6).

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[5] Already in July 1992, a large group of economists from Germany published in the Frankfurter Allgemeine Zeitung a manifesto "Die EG-Währungsunion führt zur Zerreißprobe" warning against a hasty and incorrect introduction of a common currency. A counter manifesto by the Euro Optimists called "10 Punkte wider die Euro-Skepsis", was published in managermagazin, September 1997. In the academic literature as well, the euro area was generally considered being far from an OCA. See, for instance, Eichengreen (1991) and Blanchard and Katz (1992).

[6] In the meantime, it is evident that the political will overweights the economic rationale. Indeed, the intra-euro-area trade has remained at unsatisfactorily low levels (Baldwin, 2006). There is, moreover, only weak evidence for a euro-driven trade boost. In a recent meta-analysis, Polák (2019) shows that, contrary to a 50% increase on trade estimated by Glick & Rose (2016), the effect of the EMU on trade had been at best 6%, and controlling for publication bias, the effect would not be statistically different from zero.

Figure 6: Germany's international trade flows, 2002=100.

Source: Flossbach von Storch Research Institute, Macrobond

Finally, the tendency to disintegration has significantly strengthened over the last years and – given the asymmetric nature of the current COVID-19-driven shock – it is unlikely to revert soon. This is bad news for the euro area as it will become increasingly difficult to compensate for the crux of not being an optimal currency area.

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