Box 13. Price convergence across the European Union. Where does Romania stand?

Price convergence across the European Union is a relevant indicator of the economic integration of the single market. The price differences between EU countries had markedly narrowed until the outbreak of the economic and financial crisis in 2008 when the trend came to a halt and the price convergence process reached a relative standstill. The assessment of the price convergence process is relevant especially for developing economies such as Romania, given the implications of this process for the sustainable compliance with the Maastricht criteria, ahead of joining the euro area. In this context, the present Box aims at providing a picture of the price convergence across the EU, from both a dynamic and a static perspective, and ultimately focuses on the price level in Romania and on identifying the possible determinants of the still present differences in prices between Romania and the EU.

To this end, the analysis tool employed was the price level index of the actual individual consumption, calculated by Eurostat as a ratio of the purchasing power parity to the nominal exchange rate (domestic currency versus the euro) and expressed as a percent of the EU-28 average, available for 1995-2018. In essence, the indicator indicates a relative price, i.e. the cost of a consumer basket in a given country, as a percentage of the average cost of the same consumer basket in the EU-28 – expressed in the same currency. An indicator below/above 100 shows lower/higher prices in the country under review than the EU-28 average.

Theoretical framework

The convergence of prices originates in "the law of one price" theory, which postulates that, in a perfect competition market, the prices of the same products expressed in the same currency should be equal, as a result of arbitraging operations. Thus, higher integration of the market implies tighter competition, which in time should be conducive to price equalisation, as producers are forced to provide higher quality goods at increasingly competitive prices. However, considering that not all goods can be traded on an international market, in practice deviations were seen from this principle, often explained in literature by the Balassa-Samuelson effect (Balassa, 1964; Samuelson, 1964). This theory starts from the premise that two types of goods are produced in an economy, namely tradables and non-tradables, with "the law of one price" applying to the former category only. Given that wages are closely related to productivity and labour market features strong competition, the wage-setting process will display the interdependence relationship between the sectors producing the two types of goods, ultimately leading to uniform remuneration across the entire economy. In a first phase, the emerging economies exhibit a low efficiency of sectors open to trade and the fact that the goods produced by the latter are governed by "the law of one price" (the price is set externally) implies lower wages, which then translate into lower incomes and prices in non-tradable sectors. In catching-up with the advanced economies, transition countries will post significant rises in productivity in the tradable sector, which, in time, will reflect in higher wages; the latter can exert a demonstration effect in the non-tradable sector, which can cause a build-up of inflationary pressures if pay rises are not matched by productivity gains.

To sum up, in theory, two variables are deemed to be pivotal to explaining price convergence: on the one hand, the increase in competition on the single market is likely to put downward pressures on prices (through higher efficiency of economic activity, technological progress, mark-up adjustment) and, on the other hand, the bridging of development gaps by low-income countries should lead to a faster advance in prices (higher inflation) during the transition period. In practice, however, there may be other factors which influence prices, such as: the transport cost, consumer preferences (depending on culture, climate, tradition, living standard), the (de)synchronisation of business cycles, market features (such as segmentation or concentration), different fiscal and regulatory systems (Wolszczak-Derlacz, 2006; Dreger *et al*., 2007). The action of such forces may result, *inter alia*, in the formation of convergence clusters, even for goods seen as homogeneous.

Dynamic perspective

Most often, in literature, convergence over time of different variables is assessed by means of two general notions: beta- and sigma-convergence.

The beta-convergence process occurs when initially low prices in developing countries go up faster than those in the advanced countries. In 1995-2018, Eastern European economies, defined by the lowest prices, saw the largest rises (with Romania catching up approximately 20 percentage points of the EU-28 average in relative terms), therefore data confirmed the assumption. The negative relationship between the initial price level and the subsequent increases was subject to an empirical analysis[1] and the results indicated a beta-convergence of prices across the EU-28, albeit at a rather slow speed: only slightly above 5 percent of the price differential is caught up every year, so that the difference between prices in the EU is expected to halve in more than 13 years (Table A).

$1+\beta$	0.949 (0.0000)
Convergence speed	0.052
Half-life (years)	13.2
Sargan/Hansen test	Prob > chi^2 = 0.000
Arellano-Bond AR(1) test	Pr > z = 0.000
Arellano-Bond AR(2) test	Pr > z = 0.832

Note: The results of the estimates are based on the following equation: $\Delta pricegap_{i,j,t} = \alpha + \beta pricegap_{i,j,t-1} + \theta t + \varepsilon_{i,t}$, which can be rewritten as $pricegap_{i,j,t} = \alpha + (1+\beta) pricegap_{i,j,t-1} + \theta t + \varepsilon_{i,t}$, and they cover the 1995-2018 period.

The variable $pricegap_{i,j,t}$ stands for the difference between the aggregate price index for the states i and j in the year t and considers all the possible combinations among the EU-28 states, being expressed as the absolute value of the logarithmic difference; α is a constant, θt stands for fixed effects per year, and $\varepsilon_{i,t}$ is the regression error.

In order for the beta-convergence assumption to be valid, the coefficient $(1+\beta)$ must be below one and equate a negative β parameter.

Half-life = $-(\ln(2))/(\ln(1+\beta))$

Table A
Results of beta-convergence estimates

[1] The methodology employed was that developed by Arellano and Bond (1991), namely the dynamic panel SYS-GMM. The results of the estimation should be however interpreted with caution, considering that the tests designed to validate the model reveal mixed results: the AR tests confirm that errors are uncorrelated, whereas Sargan/Hansen tests show that the instruments used are not exogenous (the model is not sufficiently specified and it is possible that the error might include variables that are correlated with the instruments). The problem was also encountered in other papers which took this econometric approach (for instance, Dominguez-Torreiro and Becker, 2016).

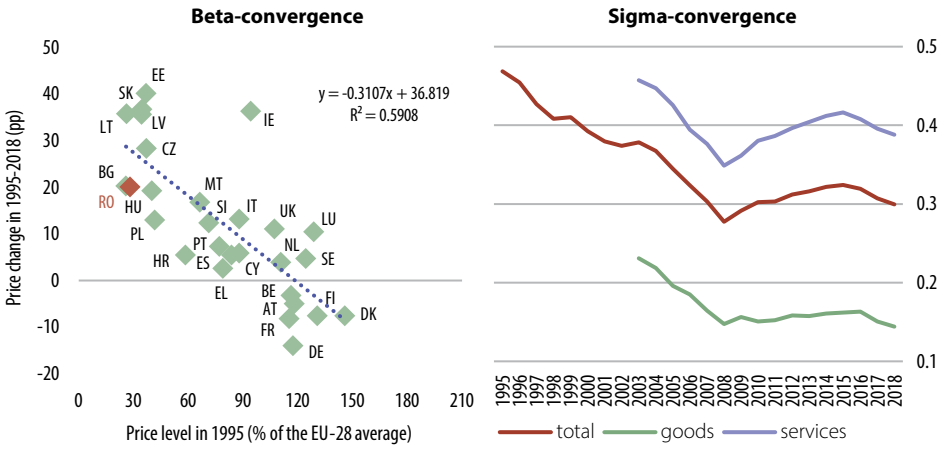

Chart A
Price convergence in the EU in 1995-2018

Source: Eurostat, NBR calculations

The sigma-convergence concept assumes a decrease in price dispersion over time at EU level, measured as the ratio of standard deviation of prices to the mean price. This indicator had followed a downward path until 2008, thus confirming the materialisation of the sigma-convergence process until that moment. The outbreak of the economic and financial crisis in 2008 marked, however, a halt in this trend and the sigma-convergence of prices posted a near-stagnation, while a divergence could be noticed in the case of services (Chart A). Some dedicated papers came to the conclusion that the evolution was ascribable to the slowdown in the real convergence process and the stabilisation of the regulatory framework, following the widest EU enlargement wave in the 2000s, which came with the removal of trade barriers, tax harmonisation, the enlargement of the single market by the accession of new Member States, the free movement of goods (Hałka and Leszczyńska-Paczesna, 2019).

Static perspective – comparisons and determinants

In spite of some progress in price convergence, the data for 2018 show that disparities still exist between the EU Member States, with prices remaining considerably lower in developing countries than in Western European states. Romania recorded a general price level of 48.2 percent of the EU average, with services markedly cheaper than goods (37.6 percent of the EU-28 average against 68.9 percent), thus ranking among the last EU countries in terms of price convergence. This seems to be closely related to the stage of development, with data providing descriptive evidence in favour of the Balassa-Samuelson model assumptions. Advanced economies are viewed as technologically more advanced, and therefore more productive than low-income states. This allows them to offer higher wages in the goods (tradable) sector with no major implications for prices, whereas in the services (mostly non-tradable) segment, the elevated labour costs will be factored into prices. At the same time, however, the income level can determine different consumer behaviours, which can reflect in the quality of goods and services purchased or in the importance assigned to some categories of

products. In less advanced countries, households seem to be more inclined to buy essential goods (such as food items) to the detriment of services (Charts B and C).

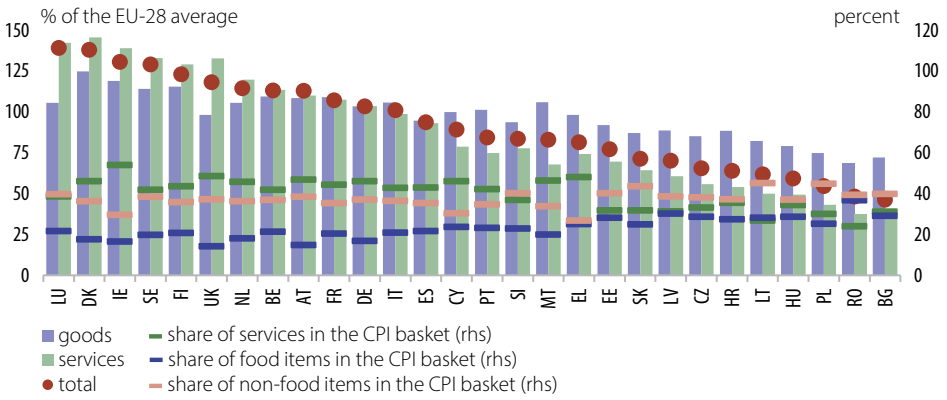

Chart B
Price level and the importance of products in the CPI basket in 2018

Note: Shares in the CPI basket are based on the Eurostat methodology; food items include alcoholic beverages and tobacco.

Source: Eurostat

Despite a lower dispersion of the prices of goods compared to services across the EU, the persistence of some differences (sometimes very large) suggests, in essence, possible deviations from the "the law of one price" assumptions, which indicates that the disparities in the aggregate indicator cannot be solely explained by the Balassa-Samuelson effect and that prices are also influenced by other factors. Under these circumstances, a more in-depth analysis can prove useful in identifying the factors behind the price-setting manner.

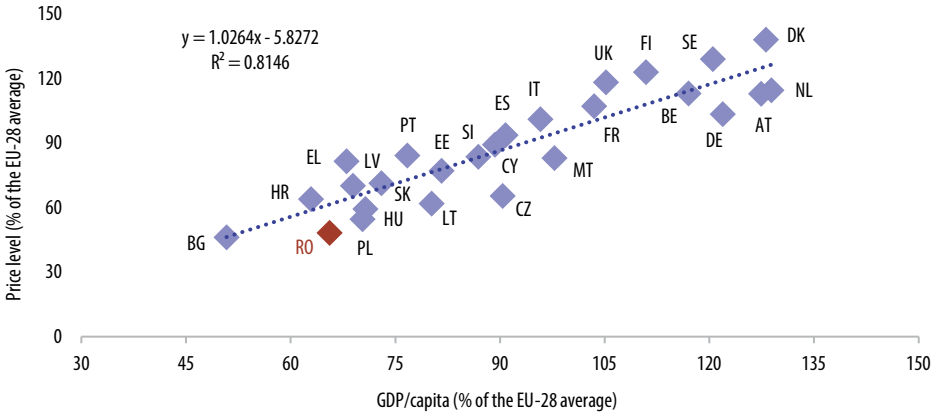

Chart C
Price level and the stage of development in 2018

Note: Ireland and Luxembourg were ruled out because of the extreme GDP per capita values.

Source: Eurostat

Disaggregated data for 2018 (Chart D) show that all the components of the consumer basket in Romania were cheaper compared to the EU average (as was also the case of Poland), while in most other developing countries more than three quarters of the prices of the items in the sample stood below the EU-28 average. More specifically, on the Romanian market (similarly to the regional context), the prices of non-food items (in principle, the prices of semi-durables and durables:

clothing, audio-visual and photographic equipment, household appliances, personal transport equipment) seem to be closer to the EU average, accounting for more than 80 percent of it. This can be explained by the presence of some multinational companies in the EU which follow a standard price policy at group level, the lower price variance for these products supporting this assumption; moreover, the sectors dominated by multinational companies, especially the fashion sector, have a higher exposure/visibility in the online space, which implies a larger degree of transparency and easier access to information for consumers, which can lead to price alignment (McKinsey, 2012; Eurostat data for 2018 show that at EU level more than a third of consumers purchased online clothing and over a quarter bought household products, compared to only 15 percent who purchased food items). However, these categories of products continue to exhibit price differences across the countries, albeit of a lower magnitude, which may signal a certain adjustment of prices by the large international players based on the purchasing power of each country/region (price-to-market) – empirical evidence for applying differentiated price-setting strategies is provided by Dvir and Strasser (2017) for the motor car market and by Fischer (2012) for the washing machine market.

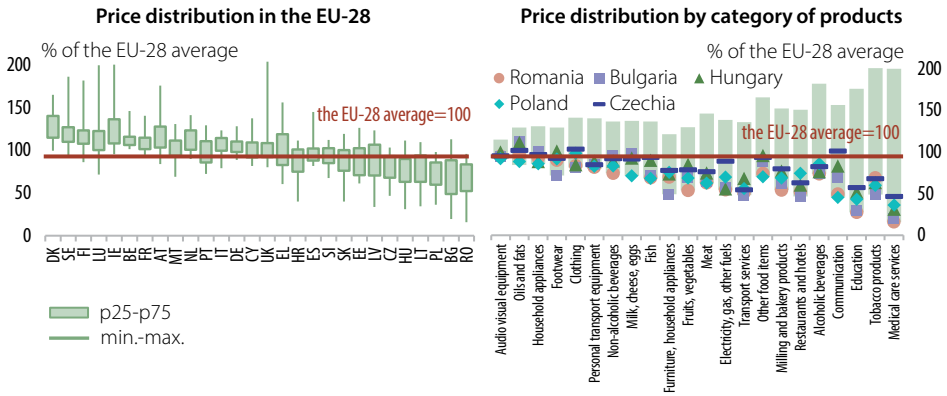

Chart D
Price index for 2018, disaggregated data

Note: The left-hand chart takes into account the whole CPI basket used for calculating the aggregate index for each state and shows the minimum prices, the maximum prices and the 25-75 percentile range. The vertical columns in the right-hand chart stand for the range between the minimum and the maximum value across the EU. The prices for the educational services in Luxembourg were ruled out, as they would post extreme values (above 300% of the EU-28 average).

Source: Eurostat, NBR calculations

The food segment shows mixed developments: the prices for oils and fats or milk, cheese and eggs are more uniformly distributed and closer to the EU average, whereas the prices for meat or milling and bakery products are more dispersed, with the lowest levels being reported by Eastern European countries – Romania carries 62.9 percent and 54.3 percent, respectively, of the EU-28 average. A relevant explanation of the differences in the case of the Romanian economy refers to market concentration, with products whose prices are closer to EU averages coming from markets dominated by international players, present in several EU countries – for instance, the top five players on the segment of milk processors hold almost half of the market share.

By far, public services come at the lowest prices, especially health and educational services, which, in 2018, accounted for in Romania around 16 percent and

28 percent respectively of the EU-28 average, these items actually reporting the widest price divergence in the EU. This owes primarily to lower labour costs recorded usually in the services sector, as in the case of accommodation and food service activities, reflecting in principle the stage of development of local economy.

There are also categories of goods and services the prices of which are not always explained by economic factors (such as demand, costs, competition), but rather by administrative decisions – excisable products, regulated products, some services (such as public transport). Thus, tobacco product and alcoholic beverage prices in Romania took 69.1 percent and 73.6 percent respectively of the EU-28 average (close to the values in peer countries in the region), with large disparities being, however, reported at EU level. To such goods, Member States should apply a minimum excise duty according to EU regulations, but the tax on vices can remain lower in the new Member States compared to some advanced economies, where concern for preventing diseases associated with the consumption of such products may be higher – the highest tobacco prices were reported by the United Kingdom, Ireland (around 200 percent of the EU average) and France (140 percent of the EU average). Energy prices in Romania in 2018 were the lowest across the EU, accounting for 54.5 percent of the EU-28 average, in the context in which the prices charged to household end-users were still regulated by the national competent authority, and sometimes, artificially kept at lower levels.

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