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Is HICP really harmonized? Problems with quality adjustments and new products

Summary

The problem of accurate inflation measurement is far more frequently raised in the USA than in the European Union (EU). In 1996 the Boskin Commission identified four sources of the potential biases in the Consumer prices index (CPI) calculation related to the substitution of products and outlets, treatment of new products (entering the consumer basket some lag) and the quality adjustment. Similar problems are visible in the EU with even greater magnitude, especially when it comes to the latter factor. Currently, the Harmonized Index of Consumer Prices (HICP) methodology does not ensure standardization of quality adjustment process, new products entry or the analysis of missing prices. As a result, significant cross-country differences are observed. Based on the principal component analysis (PCA) we have identified major idiosyncratic deviations in the prices of most volatile categories. We found that Poland's and Ireland's annual HICP dynamics is downward biased by respectively 0.3 pp and 0.2 pp due to the inaccurate calculation of clothing prices. On the other hand, Austrian and Norwegian figures are upward biased by 0.1 pp on the telecommunication equipment. Finally, we have observed strong dispersions in dynamics of consumer electronics prices. Such differences account for 0.08 pp (information processing equipment) and 0.06 pp (sound recording and processing equipment) of unjustified disparity in the annual HICP inflation between countries with the highest and the lowest dynamics.

Keywords: HICP, quality adjustment, hedonic regression, new goods bias, seasonal products treatment

JEL: E31, C5

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1. Introduction

The problem of appropriate inflation measurement is becoming more and more important – recent easing of monetary policies by major central banks has failed to translate into higher consumer prices. Such phenomenon is typically explained by structural changes and low effectiveness of monetary policy close to the zero lower bound. However, we argue that problems are also related to methodological biases. Year after year share of technological products (i.e. consumer electronics) in the consumer basket increases. The strong disparities between HICP dynamics in those categories across the EU countries raise a question whether the calculation of inflation is correct, especially when it comes to products with relatively short lifecycles.

The debate over the correct measurement of CPI inflation started in the US with a report of the Boskin Commission[4], which identified 1.1 pp bias. Papers developed at the beginning of new millennium reported that bias narrowed[5]). Yet with the digitalization problems of mismeasurement seems to reinvigorate[6], putting the credibility of consumer prices calculation at stake.

The aim of this paper is to measure potential biases related to methodological differences between national statistical offices in the European Union. Based on the factor model and independent OLS regressions we attempted to derive exogenous price growth of the most cross-country volatile items in the HICP basket. Countries, where exogenous growth permanently differs from others, were suspected to be biased due to the methodological procedures. In each case discrepancies were discussed together with direct comparison of average prices provided by Central Statistical Offices.

This paper is structured as follows: The next chapter discusses sources of potential CPI biases. Section 3 provides basic information about methodological

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[4] *Final Report of the Advisory Commission to Study the Consumer Price Index*, The Boskin Commission 1996, https://www.finance.senate.gov/imo/media/doc/Prt104-72.pdf.

[5] D. Lebow, J. Rudd, *Measurement Error in the Consumer Price Index: Where Do We Stand?*, "Journal of Economic Literature" 2003, vol. 41(1), pp. 159–201; R. Gordon, *The Boskin Commission Report: A Retrospective One Decade Later*, "International Productivity Monitor" 2006, vol. 12, Spring, pp. 7–22.

[6] N. Ahmad, J. Ribarsky, M. Reinsdorf, *Can potential mismeasurement of the digital economy explain the post-crisis slowdown in GDP and productivity growth?*, 2017, OECD Statistics Working Papers no. 2017/09, OECD Publishing, Paris; A.D. Goolsbee, P.J. Klenow, *Internet Rising, Prices Falling: Measuring Inflation in a World of E-Commerce*, "AEA Papers and Proceedings" 2018, vol. 108, http://klenow.com/internet-rising-prices-falling_GoolsbeeKlenow.pdf.

discrepancies in HICP calculations across national statistical office. Section 4 summarizes the methodology of our research. Section 5 presents calculation of potential biases in EU countries. Finally, section 6 concludes the paper with policy recommendations.

2. Sources of potential CPI bias

This chapter discusses why inflation reported by statistical offices can overestimate or underestimate the real dynamics. The majority of research focusing on such problem were conducted in the USA. Subject literature quotes mismeasurement problems, repeating findings of the Boskin Commission[7] including:

1. Commodity and outlet substitution biases – arising from the tendency to substitute expensive commodities with less costly equivalents and to choose the cheapest outlet, if such possibility exists. Both results in overstating real inflation i.e. Hausman and Leibtag[8] concluded that US CPI was overestimated by approximately 0.32–0.4 pp due to omitting expansion of the supercentres. Eventual corrections of this problem may lead to significant dispersions between national CPI readings. Broda and Weinstein[9] highlighted that applying the US methodology to measure Japanese inflation would provide lower dynamics by 0.6 pp annually.
2. New goods bias – occurs when new products are introduced in the CPI basket with a strong lag. Historically problem was related to telecommunication prices – Hausman[10] discovered that the late introduction of cellular phones led to an overstatement of price dynamics by 2 pp. Problems are often visible also in the seasonal clothing (with new collections introduced every season).
3. Quality adjustment bias – this problem occurs in case of technological products i.e. consumer electronics. Evolution of such products leads to better performance over time. Correct analysis should answer to what extent the price drop of older models can be attributed to the worse parameters

[7] *Final Report of the Advisory Commission…*, op.cit.

[8] J. Hausman, E. Leibtag, *CPI Bias from Supercenters Does the BLS Know That Wal-Mart Exists?*, NBER Working Paper no. 10712, 2004.

[9] C. Broda, D. Weinstein, *Defining Price Stability in Japan: A View from America*, NBER Working Paper no. 13255, 2007.

[10] J. Hausman, *Cellular telephone, new products, and the CPI*, "Journal of Business & Economic Statistics" 1999, vol. 17, issue 2, pp. 188–194.

(compared to trending alternatives). A novel approach is the hedonic regression[11] – analysis of behavior between prices and product features based on large transactions datasets. The impact of such techniques remains dubious – discrepancies between traditional bridge adjustment and hedonic regression will be discussed in the next chapter.

The major conclusion of the Commission's report is that the Bureau of Labor Statistics underestimated CPI by 1.1 pp annually. The procedure was repeated over time in the first decade of the XXI century. with the conclusion that potential biases were fading: Lebow and Rudd[12] reported that mismeasurement shrank to 0.9 pp (of which 0.4 pp due to the quality adjustment). Gordon's paper[13] presented only a 0.6 pp bias. Calculations based on Engel curves were also prepared for major developed economies in the dollar bloc i.e. Canada, Australia, New Zealand[14].

European literature is less developed and put stronger emphasis on discrepancies between households' inflation expectations and reported HICP readings[15]. Authors concluded that inflation reported by Eurostat is lower by 1.0–1.5 pp comparing to underlying perceptions, yet divergence is narrowing. In 1990's the discrepancy was close to 3 pp. The relevant literature does not cover the problem of cross-country consistency. However, a strong divergence between national readings is present in the European HICP statistics (even in the case of tradable goods). Problems is likely related to procedures applied by different statistical authorities within the EU. For example the amplitude in Telephone and telefax equipment prices reached nearly 690 pp in a 9-year window, what cannot be explained by economic factors. Detailed statistics are presented in Table 1.

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11 E. Groshen, C. Moyer, M. Aizcorbe, R. Bradley, D. Friedman, *How Government Statistics Adjust for Potential Biases from Quality Change and New Goods in an Age of Digital Technologies: A View from the Trenches*, "Journal of Econ. Perspectives" 2017, Spring.

12 D. Lebow, J. Rudd, op.cit.

13 R. Gordon, op.cit.

14 G. Barret, M. Brzozowski, *Using Engel Curves to Estimate the Bias in the Australian CPI*, "Economic Record" 2008, vol. 86, issue 272, pp. 1–14; T. Beatty, E. Larsen, *Using Engel curves to estimate bias in the Canadian CPI as a cost of living index*, "Canadian Journal of Economics/Revue canadienne d'économique" 2005, vol. 38, issue 2, pp. 482–499; D. Costa, *Estimating Real Income in the United States from 1888 to 1994: Correcting CPI Bias Using Engel Curves*, "Journal of Political Economy" 2001, vol. 109, pp. 1288–1310.

15 M. Wynne, D. Rodriguez-Palenzuela, *Measurement bias in the HICP: what do we know, and what do we need to know?*, "Journal of Economic Surveys" 2002, vol. 18(1), pp. 79–112; L. Aucremanne, M. Collin, T. Stragier, *Assessing the Gap between Observed and Perceived Inflation in the Euro Area: Is the Credibility of the HICP at Stake?*, ECB Working Paper Research no. 112, 2007.

Table 1. Discrepancy of HICP in categories, where quality process is executed

	Telephone and telefax equipment	Photographic and cinematographic equipment and optical instruments	Information processing equipment	Equipment for the reception, recording and reproduction of sound and picture	Recording media	Footwear	Clothing
COICOP:	08.2	09.1.2	09.1.3	09.1.1	09.1.4	3.2	3.1
Max.	790.32	409.17	381.93	283.23	196.3	182	159.5
Min.	103.77	98.42	127.17	108.82	78.58	66.6	68.59
Amplitude	686.5p	310.75p	254.76p	174.41p	117.72p	115.4p	90.91p
Std.Dev:	174.58	72.07	64.68	50.63	26.36	23.39	18.76

Data present index of HICP at constant taxes in categories specified by column headers at Jan-2006 (earliest available information). Indices were rebased by statistical office to ensure that 2015 = 100. Categories: Telephone and telefax equipment (COICOP 08.2) Audio-visual, photographic and information processing equipment (COICOP 09.1) and Clothing & Footwear (COICOP 3.1 & 3.2) present greatest amplitude across the overall HICP basket. The above-mentioned categories have different significance over the EU and constitutes from 4.8% to nearly 11% of the CPI basket.
Source: Eurostat.

Total elimination of potential biases is probably impossible, still one should expect that Harmonized indexes of Eurostat would present uniformly distributed distortions. We argue that without unification of quality adjustment methodology problems are likely to escalate further as a greater share of consumer spending will be dedicated to technological products.

3. Where HICP methodology is not uniformed

This part discusses quantity adjustment procedures conducted by National Central Statistical Offices (CSO), focusing especially on experiences with the hedonic regression. Subject literature reports strong discrepancies between inflation trajectories measured with this technique and more common bridge adjustment.

The national statistical offices so far do not have unilateral methodology to address quality adjustment process. There are four basic methods used in the process: 1) bridge adjustment, 2) hedonic regression, 3) option pricing model, and 4) judgmental assessment based on i.e. expertise of external entities (producers). The review of methods is presented below.

Table 2. Quality adjustment techniques during production of CPI indices

	Hedonic Regression	Option Pricing	Bridge Overlap	External Expertise
Bulgaria		X	X	
Czech Republic			X	
Estonia		X	X	X
Ireland		X	X	
Croatia		X	X	X
Cyprus		X	X	X
Latvia		X		X
Lithuania	X	X	X	X
Malta	X		X	
Netherlands		X		X
Austria	X	X		X
Poland		X	X	
Portugal			X	
Romania			X	
Slovenia		X	X	X
Slovakia			X	
Finland	X		X	
Sweden	X	X		X
United Kingdom		X	X	

Source: Authors' notes based on IMF SDDS.

The quality adjustment process is explicitly present in the following categories:

1. clothing & footwear;
2. transport (spending on motor vehicles and replacement parts)
3. Recreation & culture, covering consumer electronics.

Methodologies of price measurement in these categories vary strongly between National CSOs. So far studies on hedonic regressions were actively developed in Spain (without providing information what classes of items were affected), Lithuania (books), Malta (cars, electronics, clothing and technical products), Austria (PC notebooks), Finland (housing) and Sweden (clothing). Option pricing method are applied in Estonia (motor vehicles), Ireland (PC), Latvia (motor vehicles), Austria (cars, durable goods), and Slovenia (new cars). Finally, the expert judgment is used in Estonia (mobile phones), Austria (clothing), Slovenia (clothing, second-hand cars), Sweden (cars).

The procedures are neither uniform in the case of new products – the majority of statistical offices introduce new products in January, while there are examples of mid-year or continuous review (Portugal, Slovenia, Slovakia).

The subject literature highlights strong discrepancies between results derived from different methods. Byrne et al.[16] analysed prices behaviour of semiconductors. The authors proposed a hedonic regression where prices of microchips were explained by wafer size, number of layers country of origin and order volume. The presented model concluded that use of the standard matched model results in an annual downward bias by 0.9 pp compared to hedonic methods.

Van Reenen[17] studied price developments of US servers between years 1996–2001. Based on hedonic regression including basic features (CPU speed, memory, hard drive size) author concluded that the use of the matched model method by BLS results in an underestimation of prices decline. According to the hedonic regression server prices fell by 30% in a specified time window, whereas official statistics reported only a 17% drop.

Parkhomenko et al.[18] studied prices of consumer electronics in Russia. The authors found that Rosstat matched model presents a lower decline compared to the hedonic methods. Implementation of the authors' method would result in lower CPI readings by 0.19–0.31% per year (12-month scale).

Presented papers confirm strong discrepancies between results of different statistical models applied to measure prices of same products. Our aim is to develop a statistical procedure, verifying whether a strong cross-country difference in exogenous dynamics of inflation exists.

4. Methodology and data

This chapter presents the methodology of our research. Our analysis relies on law of one prices, which state that long-term price growth dynamics expressed in single currency should be similar in effective market (we expect EU to has an effective market). Based on the panel of European economies and factor analysis, we derive time series reflecting common price shocks. We input those

[16] D. Byrne, B. Kovak, R. Michaels, *Quality-adjusted price measurement: a new approach with evidence from semiconductors*, "Review of Economics and Statistics" 2017, vol. 99, issue 2, pp. 330–342.

[17] J. Van Reenen, *The Growth of Network Computing: Quality-Adjusted Price Changes for Network Servers*, "The Economic Journal" 2006, vol. 116(509), pp. F29–F44.

[18] A. Parkhomenko, A. Redkina, O. Maslivets, *Estimating hedonic price indexes for personal computers in Russia: Case of Yekaterinburg*, University Library of Munich, MPRA Paper, 2007.

results into OLS equations (independently for each country) to receive pace of exogenous growth.

The data on European HICP inflation comes from Eurostat (and covers 2006–2018 period). To express prices in the common currency we denominated indices to EUR based on indices constructed with Banque de France monthly exchange rates (which average daily ECB fixings throughout the month). Analysis were conducted independently for seven categories mentioned in the chapter 1, based on two transformations: 1) year-on-year percentage change and 2) annualized month-on-month percentage change after seasonal adjustment (with airline specification of TRAMO-SEATS algorithm).

As mentioned before our aim was to decompose domestic inflation into global/regional and domestic factors based on the panel of EU Countries. To achieve such decomposition the Principal Component Analysis was used. Factor models are typically used for extracting global component i.e. in behaviour of commodities prices[19] or to derivate underlying pure inflation trend from various disaggregated categories[20]. Our approach was slightly different – we used as input developments of HICP inflation in a single category across the all EU countries. The Principal Component Analysis assumes linear transformation of series. Algorithm does not require any specific distribution of data series, yet its results (hypothetical factors presenting underlying shocks) does not have straight economic interpretation.

The next step was to regress generated factors with simple OLS regression on country HICP inflation. Calculations for each EU country were made separately and independently. The underlying model in each case had the following formula:

$$HICP_t = \gamma + \sum_i \beta_i * PCA_{i,t} + \varepsilon_t \quad (1)$$

Where $PCA_{i,t}$ denotes i-th factor derived by principal component analysis. The number of selected components were used in such manner that: 1) total

[19] S. Delle Chiaie, L. Ferrara, D. Giannone, *Common Factors of Commodity Prices*, Banque de France, Working Papers no. 645, 2017; A. Esmaeili, Z. Shokoohi, *Assessing the effect of oil price on world food prices: Application of principal component analysis*, "Energy Policy" 2011, vol. 39, issue 2, pp. 1022–1025.

[20] S. Cecchetti, M. Feroli, P. Hooper, A. Kashyap, K. Schoenholtz, *Deflating Inflation Expectations: The Implications of Inflation's Simple Dynamics*, CEPR Discussion Paper no. DP11925, 2017; M. Brzoza-Brzezina, J. Kotlowski, *Estimating pure inflation in the Polish economy*, Department of Applied Econometrics, Warsaw School of Economics, Working Papers no. 37, 2009.

volatility explained by factors is close to 95% (thus transformation should capture all volatility of raw data on the specified confidence level) and 2) factors driven by a single country were deleted.

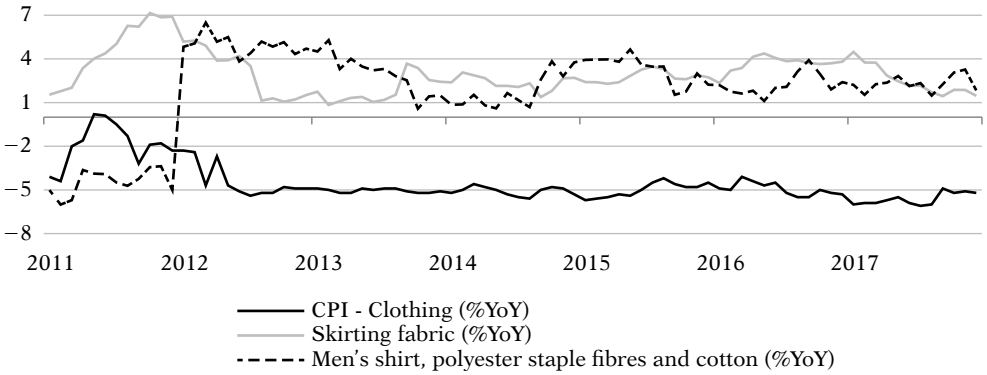
Authors compared estimates of equations' constant (γ) across the countries. Mentioned parameter should reflect long-term dynamics of prices growth. Participation in a single market theoretically leads to convergence of dynamics given law of one price and similar inflation targets in the majority of European countries (eventual differences in the monetary policy objectives should be explained by the behaviour of the exchange rate). We assumed that excessive differences (situations when country's γ was identified as outlier) are caused by methodological issues.

We defined bias in the selected category as a difference between realized exogenous growth and cross-country median (when the hypotheses about belonging to the same distribution were rejected). Finally, we derive the impact of the category's bias on the headline CPI figure by multiplying the achieved figure by country weight in consumer basket.

5. Results

The final results (charts with estimates of endogenous growth pace) are presented in Appendix 1. The application of PCA for clothing and footwear at annual dynamics presented a strong negative bias in Poland and Ireland. In Poland exogenous growth were estimated at –5.8% (clothing) and –5.3% (footwear). In Ireland respectively at –5% and –5.1%. At the same time cross country means were equal to 0.25% and –0.5%. Similar findings were also when the technique was applied to monthly changes. To emphasize that problem is related to statistical procedures we referred to direct comparison of clothing & footwear representative prices published by GUS (Polish Central Statistical Office).

Prices' dynamics of the most popular products permanently deviates from CPI aggregates by: 5.6 pp to 10.4 pp in the case of Clothing and 6.1 pp to 7 pp in the case of Footwear. Irish CSO does not provide detailed information on clothing & footwear prices. According to our analysis HICP/CPI is underestimated by 0.3 pp annually in Poland and 0.2 pp in Ireland.



Most popular items in clothing category has been permanently deviating by 5.6 pp (Skirting fabric) to 10.4 pp (men's suit) from CPI clothing aggregate dynamics. There is a level shift in case of men's suits prices probably related to change of product definition.

Chart 1. Clothing prices in CPI basket (%YoY) vs. direct comparison of prices published by GUS

Source: GUS

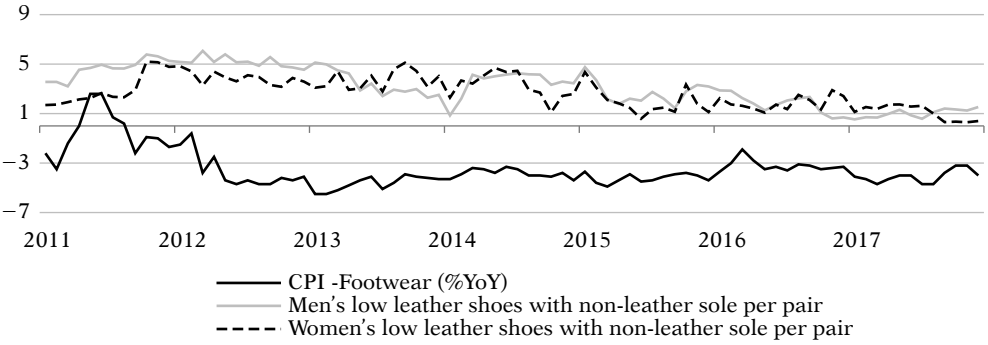
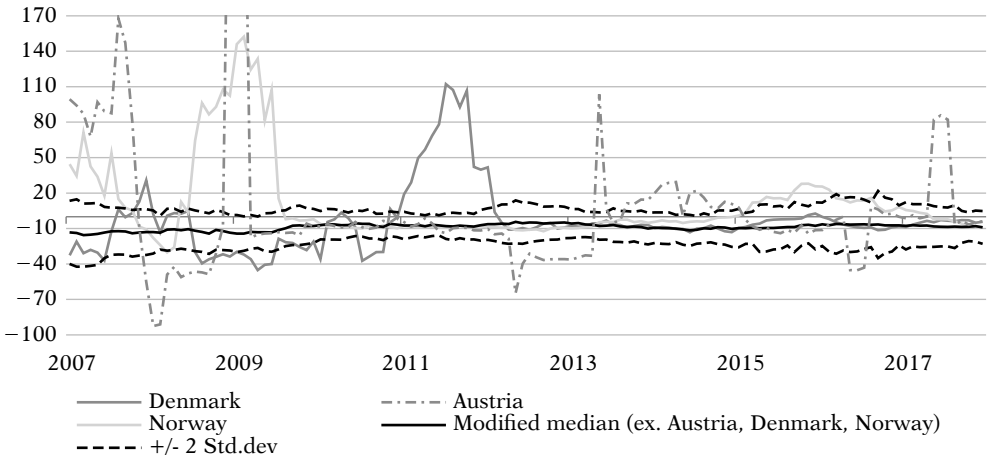


Chart 2. Footwear prices in CPI basket (%YoY) vs. direct comparison of prices published by GUS

Source: GUS.

The second troubled category is telephone and telefax equipment. Our analysis indicates an upward bias in Austria, Norway and Denmark, which on average increases CPI by 0.1 pp annually. Data from those countries raises significant questions related to the presence of outliers (see chart below).



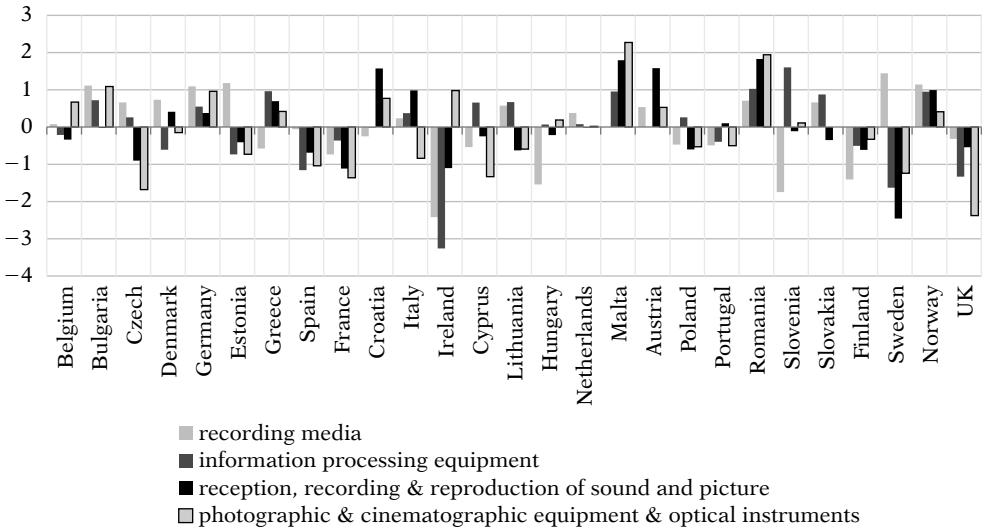
Volatility of telecommunication equipment inflation in Denmark, Austria and Norway is multiple times stronger comparing to other EU counties.

Chart 3. Telephone and telefax equipment prices (%YoY)

Source: Eurostat.

Finally, we found a strong dispersion of exogenous growth in recreation & culture components P091 (Audio-visual, photographic and information processing equipment). Such differences account for 0.08 pp (information processing equipment) and 0.06 pp (sound recording and processing equipment) of unjustified disparity in the annual HICP inflation between countries with the highest (Romania in both cases) and the lowest (Sweden, Ireland) dynamics. The cross-country standard deviations were estimated respectively at 3.4–3.5 pp (information processing) and 4.2–5 pp (sound recording). The distribution of outliers is similar in each category (normalized exogenous growth against. cross country average is presented in the chart below). Countries that report deeper deceleration of prices do it persistently in every subcategory, which raise suspicions that such phenomenon is related to methodological issues.

Furthermore, we have a strong suspicions that dynamics presented in such categories tends to underestimate underlying inflation – according to our analysis potential exogenous cross-country growth is lower than –7% year-on-year. As before we would refer to direct comparison of Eurostat representative prices. Eurostat publishes information on detailed average price of products annually, covering the time frame from 2012 to 2015. Price statistics are available only in the case of CEE economies, Cyprus Malta, Netherlands and Lithuania. Unfortunately, transparency of published information is much lower in Western Europe (there is no information from Germany, France or Italy available).

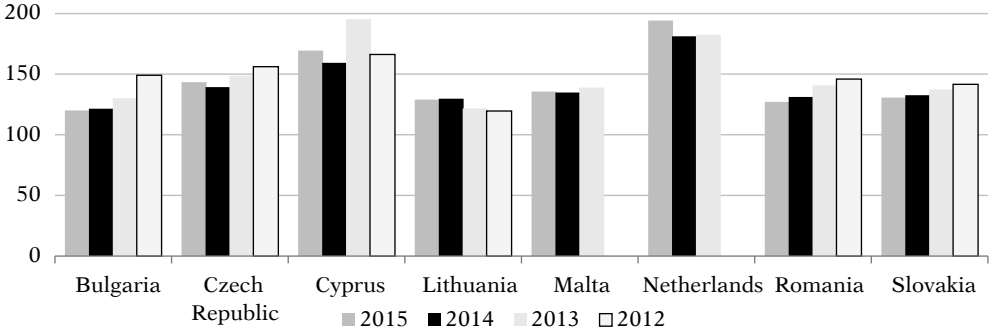


This chart present normalized exogenous growth in the consumer electronics. Ireland, Sweden and UK are constantly biased downwards comparing to other peers. On the other side Romania is systemically above EU states.

Chart 4. Normalized Exogenous growth of consumer electronics' prices

Source: Authors' calculations.

There are two time series provided in the information processing category. The first, which is present across all years is Full HD monitor (Eurostat does not specify what model was selected). Direct comparison of such prices leads to the conclusion that the median price drop was close to –3.5 pp (twice lower compared to estimated exogenous growth).

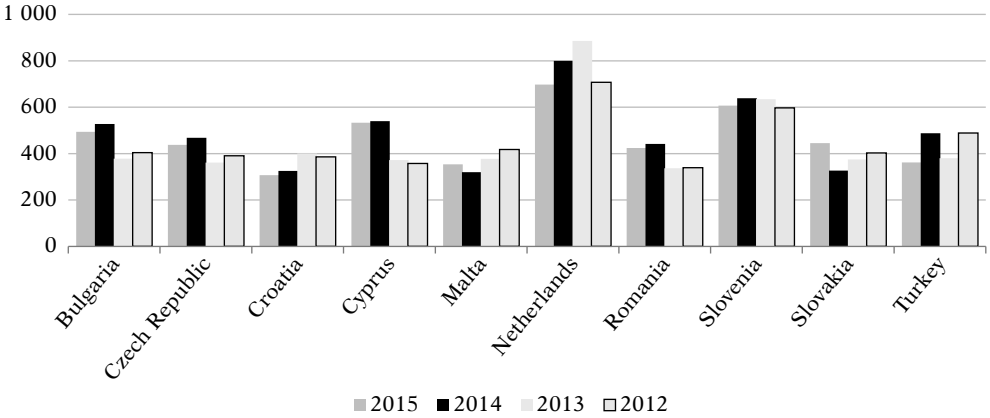


The direct comparison of the most favorable common Full HD monitor prices (consistent with COLI definition), present much lower annual drop of prices comparing to HICP

Chart 5. Full HD Monitor – average price (EUR)

Source: Eurostat.

The latter (laptop cost) has two specifications. In 2012–2013 benchmarked model had a hard disc of 640 GB and RAM memory card of 4GB. In 2014–2015 the parameters were updated to 750GB and RAM 8GB (graphic card or processor power were not specified). The price of the selected model in the next year is indeed decreasing by –5.2 pp (on average). Still, while the new benchmark is introduced, the price returns to higher level (while HICP Index still present price drop).



The case of Television screen prices is a good example to emphasize problems with measuring inflation in consumer electronics. During the 2 years of product lifetime, the prices are indeed decreasing in magnitude close to reported by Stat Offices (in years 2012–2013 benchmarked model was screen size 32"). Yet with the introduction of a new benchmark (screen size 42" in years 2014–2015) prices return to higher level. CSOs do not recollect that innovation occurred (and new product started trending). Thus a further drop of prices is reported as old alternatives are becoming cheaper. As a result mismeasurement occurs.

Chart 6. Television screen – average price (EUR)

Source: Eurostat.

The following situation proves that positive technological innovations are treated as deflationary changes. As a result, CPI is failing to correctly estimate cost of living (COLI theorem) even regarding a measurable consumption basket. Estimation of potential biases is not possible with the presented method and likely should require development of expert imputation (regarding technological progress) or time-decaying function, which measures price depreciation within the lifecycle of the selected item (approximated i.e. by days between the present moment and product launch).

6. Policy recommendations

Our research presented a non-theoretical diagnosis procedure for calculating HICP integrity between EU countries. We identified 0.3 pp bias in Poland and 0.2 pp in Ireland related to clothing at footwear prices. Both figures are alarming when we compare it with subject literature – single category in those countries creates bias equal of 33–50% total US mismeasurement reported by Gordon[21] (2006). Fortunately bias elimination should be relatively straightforward – countries, which produce the outliers should review procedures, which are applied by other EU peers (the sound majority of statistical offices present consistent HICP trajectory).

Secondly we found strong divergence of measures in consumer electronics across nearly all countries. Such problems creates permanent 0.2 pp annual difference between economies with highest-and lowest dynamics. Again this amount is hardly negligible compared to US figures (where quality adjustment generated bias at the most equal 0.4 pp). Solution of this problem is not straightforward – agreement between national CSOs on how to measure inflation is probably required.

Furthermore, our paper highlighted the lack of transparency on production of CPI. At the moment of writing there is no uniformed publicly available database describing what statistical procedures are used in detail. Statistics Explained (Eurostat glossary) presents only a broad overview. More detailed information can be obtained from national CPI methodology based at the IMF SDDS. Yet quality of filled content varies between EU countries – major countries including Germany, France, Italy does not provide explicit information.

Finally the release of supplementary data (i.e. tables on average aggregated prices) is not standardized. The most influential statistical offices were not publishing such information. Furthermore after four years of publications at the Eurostat webpage the project seems suspended (there is no data for 2016 and 2017). Eurostat also does not allow for accessing microdata on prices for scientific purposes.

[21] R. Gordon, op.cit.

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Appendix 1

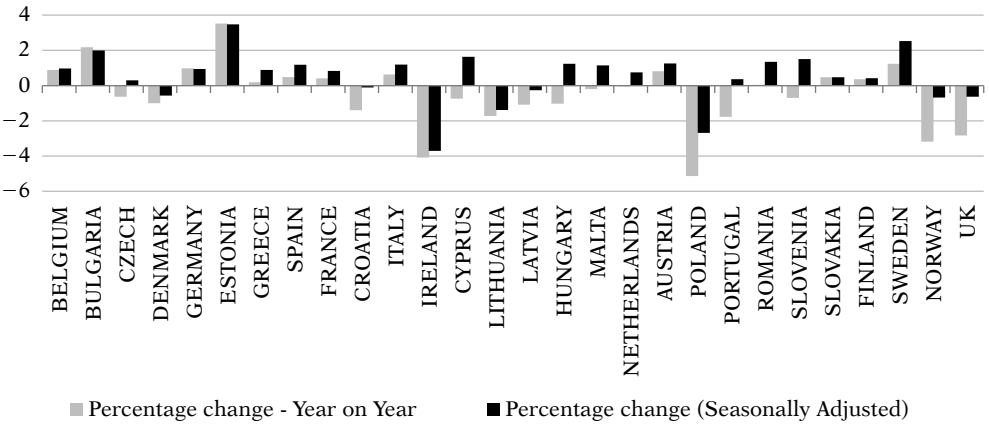
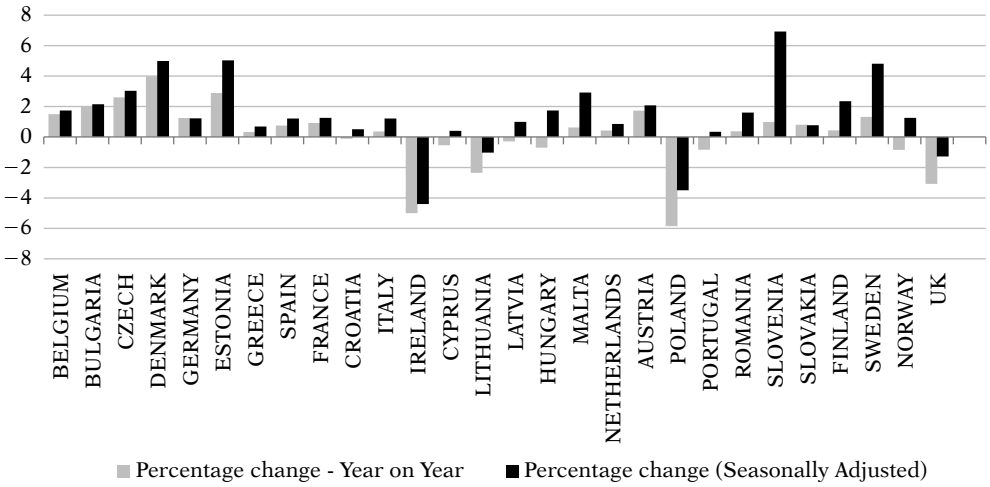


Chart 7. Exogenous growth of clothing prices

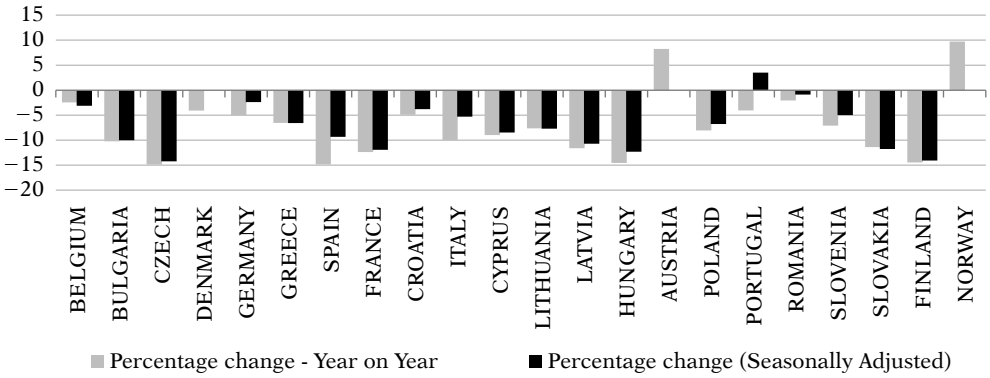
Source: Authors' calculations.



The strong negative bias (exceeding 2 standard deviations from cross country average) is reported in Poland and Ireland (both in case of annual and monthly changes). Exogenous growth of inflation is reported higher compared to other peers in Estonia, which plays a rather minor role in the calculation of EU headline HICP inflation.

Chart 8. Exogenous growth of footwear prices

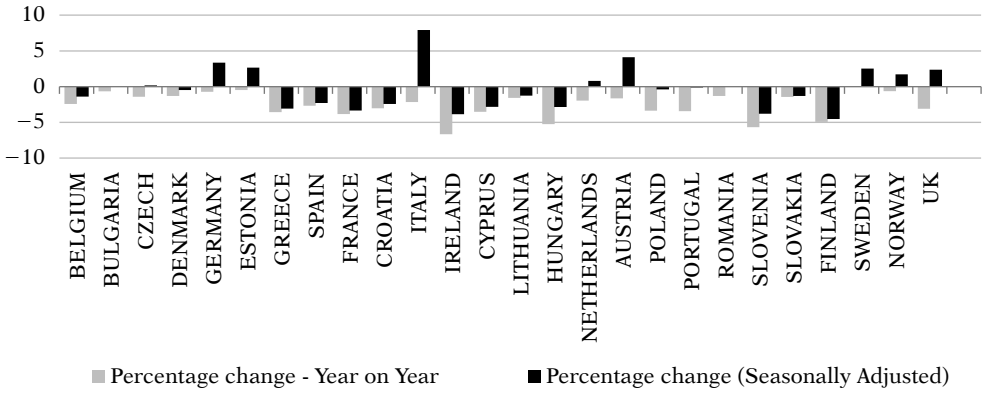
Source: Authors' calculations.



Austria and part of the Nordic countries (Denmark and Norway) report positive exogenous growth, which raise suspicions about probable bias. The presence of outliers in such countries (discussed in chapter 4) does not allow to compute correctly monthly changes.

Chart 9. Exogenous growth of prices in category Telephone and telefax equipment

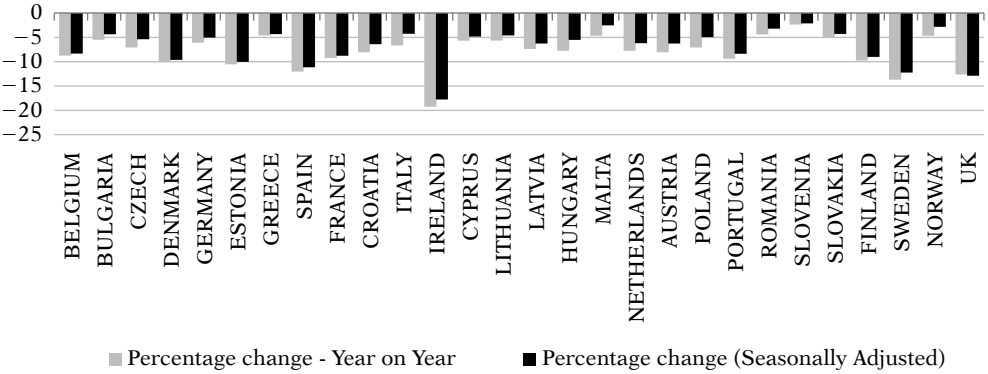
Source: Authors' calculations.



Recording media is the subcategory with the lowest volatility in consumer electronics. Still the cross-country standard deviation is close to 2 pp. The relatively high exogenous growth in Romania (–1.3 pp per year), and lowest in Ireland (–6.7 pp) again will return in the other subcategories.

Chart 10. Exogenous growth of prices in category Recording media

Source: Authors' calculations.



Apart from countries mentioned in previous table, Sweden and UK produce persistently lower figures comparing to other peers. Malta is another example where exogenous inflation is reported higher.

Chart 11. Exogenous growth of prices in category information processing equipment

Source: Authors' calculations.

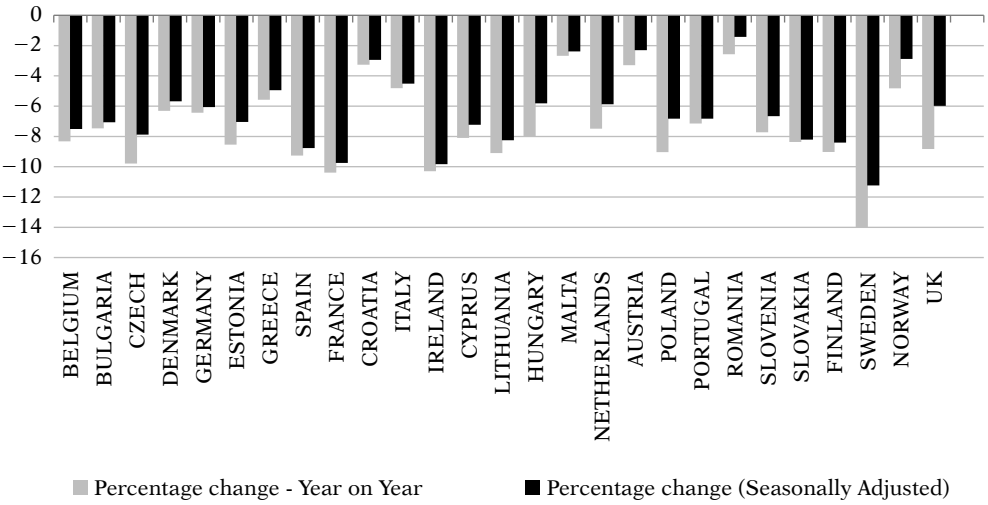


Chart 12. Exogenous growth of prices in category equipment for the reception, recording & reproduction of sound and picture

Source: Authors' calculations.

* * *

Problemy z harmonizacją HICP – wdrożenie nowych produktów i *quality adjustment*

Streszczenie

Problem właściwego pomiaru inflacji był jak dotychczas znacznie częściej poruszany w USA aniżeli w Europie. W 1996 r. Komisja Boskina opublikowała raport identyfikujący cztery przyczyny obciążeń wskaźnika cen konsumenckich CPI, tj. substytucję produktów, zmianę miejsca zakupów, opóźnienie we wprowadzaniu nowych produktów do badanego koszyka oraz tzw. korektę o zmianę jakości (ang. *quality adjustment*). Problem obciążenia inflacji jest jednak paradoksalnie znacznie ważniejszy w Unii Europejskiej – w chwili obecnej metodologia przygotowania indeksu HICP nie zawiera procesów standaryzujących podejście do zmian jakościowych, wprowadzanie nowych produktów czy podejście do brakujących cen. W efekcie między gospodarkami występują znaczne rozbieżności. Na podstawie analizy PCA autorzy przebadali obciążenia występujące w poszczególnych gospodarkach UE. Według analizy, wskaźniki HICP dla Polski oraz Irlandii są zaniżone o odpowiednio 0,3 p.p. i 0,2 p.p., jeśli chodzi o ceny odzieży i obuwia. W Austrii i Norwegii ceny sprzętu telekomunikacyjnego zawyżają łączny indeks średnio o 0,1 p.p. w skali roku. Autorzy zaobserwowali także znaczne różnice w przypadku cen elektroniki konsumenckiej. Rozbieżności odpowiadają m.in. za obciążenie rzędu 0,08 p.p. dla kategorii sprzęt do przetwarzania informacji oraz

0,06 p.p. w przypadku kategorii nagrywanie i przetwarzanie dźwięku między krajem z najwyższą i krajem z najniższą inflacją we wspomnianych grupach.

Słowa kluczowe: HICP, *quality adjustment*, regresja hedoniczna, produkty sezonowe, nowe produkty w koszyku cen

Zgodnie z oświadczeniem autorów, ich udział w przygotowaniu artykułu wyniósł: Jakub Rybacki – 60%, Tamara Bińczak – 20%, Filip Kaczmarek – 20%.