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Keywords: cost competitiveness, compensation per employee, unit labour costs

JEL codes: F10, F40

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Assessing Cost Competitiveness: The Bank of Finland Approach*

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Abstract

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1 Introduction

Competitiveness has long been a central theme in European economic policy discussions. For several decades, policymakers and researchers have emphasised the importance of maintaining and strengthening the competitive position of European economies in an increasingly integrated global environment.

While firms compete in markets through productivity, innovation, cost efficiency, and quality, national competitiveness operates differently. Countries do not compete in the same manner that firms do. In contrast, in international trade, economies are strongly interdependent: the success of an individual country can benefit everyone, for example, through market expansion and lower prices. Viewed more broadly, improving long-term competitiveness through innovation and technological change enhances global economic growth and benefits all. Competitiveness is therefore not a zero-sum game in which the economic success of one country comes at the expense of others. Instead, national competitiveness can be thought of as describing a country's ability to create an environment where firms can be productive and thrive.

In principle, it is useful to distinguish between short-term cost competitiveness and longer-term economic performance. Cost competitiveness indicators are primarily designed to capture relative cost developments and to assess the potential of short- to medium-term export performance and output dynamics. In the long run, structural factors such as productivity growth, innovation capacity, and industrial composition play a more dominant role. In practice, these two are connected. For example, productivity developments influence both long-term growth and short-term cost dynamics, while cost pressures can affect investment, employment, and resource allocation.

The Bank of Finland regularly monitors Finland's cost competitiveness as part of its broader macroeconomic analysis. The framework is documented and discussed in Kajanoja (2017). The purpose of this article is to review the indicators and data sources used in the cost competitiveness assessment and to illustrate the framework using European Commission (2025) forecasts.

The analysis focuses primarily on labour-cost-based indicators. This emphasis is particularly relevant in a monetary union, where countries cannot rely on nominal exchange rate adjustments to restore competitiveness. In such an environment, developments in relative cost and productivity become key mechanisms of adjustment. In addition, labour costs are typically one of the main components in production. In Finland, the share of labour compensation (wages, salaries, and employer's social security contributions) in

output at basic prices was roughly 40 percent in 2023.[1]

There are several additional reasons for concentrating on labour costs. First, labour costs are directly affected and shaped by national institutions and policies (such as wage bargaining, minimum wages, payroll taxes) unlike some important non-labour costs (energy prices, imported inputs of production). Second, labour constitutes a large share of value added, and indicators which include productivity development allow for capturing how well labour costs align with productivity increases. In addition, cost competitiveness analysis requires internationally comparable statistics. For labour costs, these types of data are widely available and are collected regularly.

Although cost competitiveness indicators provide valuable insight on relative labour cost development, they should not be interpreted in isolation. A comprehensive assessment of competitiveness also requires considering broader structural and institutional factors, including education, infrastructure, innovation capacity, and macroeconomic stability.

The remainder of the paper is structured as follows. Section 2 discusses related literature. Section 3 discusses the key methodological choices underlying competitiveness indicators. Section 4 presents the framework and illustrates the indicators. Section 5 concludes.

2 Related literature

In this section, we discuss the literature on cost competitiveness and divide the discussion into two broad strands. The first consists of analyses that examine how specific shocks, policy reforms, or structural changes have affected the competitiveness of particular countries or groups of countries. This strand also includes studies that compare alternative competitiveness indicators, for example, assessing whether broad price- and cost-based measures perform better than narrower ones. The second consists of recurring assessments of competitiveness over time, where we focus on monitoring Finland's relative cost position using regularly updated indicators.

2.1 Case studies

A large body of empirical research analyses cost competitiveness through country- or event-specific case studies. These studies typically evaluate how major economic shocks,

[1]Source: Statistics Finland. Supply, use, and input-output tables [online publication]. Reference period: 2023. ISSN=1799-201X. Helsinki: Statistics Finland. Access method: `https://stat.fi/en/publication/cm1arx1wy0k4306w2so226iyn`.

policy changes, or institutional adjustments affect the relative competitiveness of an economy. For instance, Gilbert and Muchová (2018) examine how export competitiveness evolved in Central and Eastern European countries[2] after their EU accession in 2004. Using COMTRADE data and constant market share analysis, the authors show that all these countries increased their global market share after joining the EU. The change is mainly explained by a higher market share within the EU, not relative to the rest of the world. The gains were particularly strong in sectors such as electrical machinery, mechanical appliances, and vehicle parts – industries that were not among the fastest-growing globally, suggesting regional-specific competitive advantages.

Another branch of the literature compares alternative indicators, evaluating, for instance, their relevance in explaining trade flows. For instance, Fischer et al. (2018) compare six widely used competitiveness indicators across 20 advanced economies.[3] Using data from multiple international sources[4] they find that broad indicators of price and cost competitiveness (such as real exchange rates based on GDP deflators, deflators of total sales, or unit labour cost for the total economy) perform better in explaining export development than narrow indicators, such as PPI- or CPI-based real exchange rates.[5]

Similarly, Christodoulopoulou and Tkacevs (2016) compare alternative harmonised competitiveness indicators and find that economy-wide measures – such as those based on GDP deflators or total-economy unit labour costs – outperform indicators focused solely on the manufacturing sector.[6]

Marczak and Beissinger (2022) propose a new sectoral unit labour cost indicator. The aim is to take into account the unit labour costs (ULC) included in (domestic and imported) intermediate goods. The authors illustrate this "embodied unit labour cost" (EUCL) indicator by comparing the EUCL and UCL for three sectors in Germany in 1995–2007. They show that the divergence between UCL and EULC is most pronounced in tradable

[2]Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia.

[3]The indicators are deflators of total sales, GDP deflators, unit labour costs in the total economy, consumer price indices, producer price indices, and export deflators. The advanced economies include the US, Canada, Japan, and 17 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK).

[4]OECD Economic Outlook (Import of goods and services and Gross domestic product); Deutsche Bundesbank (real effective exchange rates); Centraal Planbureau (CPB) World Trade Monitor (Volume of world trade).

[5]The authors do not consider indicators based on unit labour costs in the manufacturing sector citing results of the previous literature indicating their inferior performance relative to the more broad-based indicators.

[6]The authors use ECB HCI database and Eurostat's national accounts and external trade datasets quarterly data from 1995–2013 and estimate export/import equations for euro-area countries, each euro area country being compared to 36 trading partners (the euro area and 20 global partners).

manufacturing. This is because the production structure of the manufacturing sectors relies heavily on the use of intermediate inputs and is deeply integrated into global value chains. This approach illustrates how production fragmentation shapes cost structures at the sector level but is less useful in assessing overall cost competitiveness, especially in small open economies. Moreover, since the construction of the indicator requires harmonised sector-level labour cost and productivity data that are of limited availability with significant publication lags, the method is not feasible for real-time monitoring.

2.2 Cost competitiveness assessments in Finland

Bank of Finland has a long history in analysing the cost competitiveness of the Finnish economy. The main indicators are represented and discussed in Kajanoja (2017). In recent years, analytical articles have been regularly published using these indicators.[7] The purpose of the analyses has been to provide information on developments, drivers, and forecasts of cost competitiveness to support informed policy discussions and decision making.

In addition to thematic articles, the Bank of Finland also publishes assessments of cost competitiveness in the June and December forecasts. In the forecasts, terms-of-trade-adjusted unit labour costs are compared with the euro area average (see, e.g. Bank of Finland (2026)).

Some other Finnish organisations also regularly publish evaluations of cost competitiveness. For instance, ETLA Economic Research publishes cost-competitiveness analysis including comparisons to a wider reference group of countries and to certain individual countries.[8]

Mankinen et al. (2012) evaluate Finland's cost competitiveness up until 2009 using measures unit costs in manufacturing and unit labour cost in the whole economy.[9] The two measures show a similar trend in Finland's cost competitiveness: both indicate a deterioration throughout the 2000's.

Huovari et al. (2020) evaluate Finland's cost competitiveness focusing mainly on unit labour costs as well as on terms-of-trade-adjusted or real unit labour costs. The analysis shows that nominal indicators overstate Finland's cost competitiveness in the 2000's.[10]

[7] See, e.g. Kajanoja and Pönkä (2021), Nippala et al. (2022), Obstbaum (2022), and Pönkä (2024).

[8] The analysis exploits the European Commission forecast. In the analysis, BIS double export weights are used. The reference group includes 33 countries. For details, see e.g. Kaitila (2025).

[9] Data source to construct the unit cost indicator is EU KLEMS.

[10] Huovari et al. (2020) analyse cost competitiveness relative to two reference groups: a group of 14 countries (Belgium, Denmark, Germany, Ireland, Spain, France, Italy, the Netherlands, Austria, Sweden, the UK, Norway, Portugal, and Greece) and a broader group of 19 countries (the above and the US,

Previously, the *Cost and Income Developments Review Commission* (Tukuseto) published cost competitiveness indicators for the whole economy as well as for the manufacturing sector in Finland in its annual report.[11] The annual report included cost competitiveness indicators such as compensation per employee, unit labour costs, real effective exchange rates, and intermediate input costs in manufacturing. Related to the last indicator, the committee noted that changes in intermediate input costs are also captured by the real unit labour cost indicator, as an increase in intermediate input prices decreases real value added, leading to an increase in unit labour costs even when the compensation per employee remains unchanged.

More recently, the *Productivity board* (Tuottavuuslautakunta) has also assessed the competitiveness of the Finnish economy. For example, Stenborg et al. (2021) consider the evolution of the relative nominal unit labour costs with and without terms-of-trade adjustment. The authors document that Finland's cost competitiveness deteriorated significantly after 2008, improved from 2015 onward, and returned close to its long-term averages by 2017–2019. The report also highlights the usefulness of real and terms-of-trade-adjusted unit labour costs, which give a more accurate picture of competitiveness when export prices fall faster than import prices.

3 On the main choices when building the framework

In this section, we discuss the relevant choices that need to be made when constructing cost competitiveness indicators.

Reference group. Cost competitiveness is assessed relative to a reference group. In principle, the choice of the reference group should be guided by two main criteria. First, for a meaningful comparison, the group should include similar countries, in the case of Finland, traditional industrialised countries. The purpose of this criterion is to avoid comparison with lower-income countries whose cost developments can be expected to converge over time toward the cost levels of advanced economies for reasons not related to cost competitiveness. Second, the reference countries should be relevant for Finland's foreign trade. In addition to these two considerations, in practice, the choice of the reference group is partly driven by data availability.

Japan, Canada, Australia, and Switzerland). The study constructs the indicators using three different trade weights (BIS, IMF, European Commission) and shows that the differences between these three are quite small.

[11] See, e.g. Tukuseto (2020). The mandate of the commission ended in 2020.

Traditionally in Bank of Finland's cost-competitiveness analysis, the reference group has consisted of 14 advanced-economy trading partners (Austria, Belgium, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK, and the US). The share of these countries in Finland's total foreign trade (imports plus exports) exceeded 60% in 2013 and increased to nearly 70% by 2024. That is, in terms of foreign trade, the relevance of this group of countries has been increasing over the recent years.

However, there are several countries (in particular China, Poland, Estonia, Canada, and Australia) that have become more important to Finland's foreign trade over the years and could therefore potentially be included in the reference group. However, an evaluation of each case suggests that it is well-grounded to exclude them at least for the time being.[12] We compare our results with the two alternative reference groups in Appendix C and show that the results are quite similar. This suggests that excluding individual countries does not materially affect the results.

Trade weights. The main idea of the cost-competitiveness analysis is to compare Finland's development with countries that compete with Finland on the same export markets. These countries need not be Finland's most important trading partners. For this reason, analyses typically employ so-called double export weights. Unlike bilateral trade weights, the double weights account not only for direct export competition (for example, Finland's exports to Germany and competition with German domestic producers) but also for indirect competition in third-country markets (for instance, Finland's exports compete with German products in the US market).

Several institutions publish these types of double weights. Traditionally, their construction has been based solely on manufacturing trade flows. In practice, these weight structures published by different organisations do not differ significantly (Stenborg et al., 2021). Therefore, key considerations when selecting a source have been the country coverage of the weights and the frequency with which they are updated.

One of the most used sources of double weights is the Bank for International Settle-

[12] China's economy has grown rapidly since the early 2000's, and China has become a more important trading partner for Finland. However, the availability and reliability of data pose challenges for international comparisons. Moreover, wages in China have evolved in ways that differ markedly from those in Finland and other advanced industrial economies. As a result, including China in the reference group would complicate historical comparisons. Including Poland and Estonia in the reference group could be justified by their fairly significant shares in Finland's foreign trade. On the other hand, both countries may still be classified as catching up countries where wages are rising faster than in advanced economies. This speaks in favour of excluding these countries from the reference group for now. Canada and Australia, in turn, are traditional industrialised countries that could well be part of the reference group. However, for them, not all relevant forecasts are available.

ments (BIS).[13] The BIS weights are available for all major trading partners relevant to Finland. A drawback of the BIS weights is that they include only goods trade.

Weights including services are currently available from the ECB (Schmitz et al., 2024). The ECB weights have also been updated more recently than the BIS weights, with the latest weights based on trade from 2022–2024.

In previous analyses, the Bank of Finland has used the weights published by BIS. We compare the BIS and ECB trade weights in Appendix A. As shown in Figure A1, there are indeed clear differences in the weights of manufacturing and services. Interestingly, however, changing the weight structure has a negligible effect on the past development of cost competitiveness indicators (see Figure A2). Since the ECB weights are more comprehensive, updated regularly, and more up-to-date, we conclude that moving from BIS weights to using ECB weights with goods and services is advisable. An additional motivation for using weights that include both goods and services is that they are not susceptible to the bias that arises from the fact that the division between goods and services involves at least some degree of discretion. Such discretion affects the indicators if the classification changes over time, for example, as a result of changes in trade policy.

Entire economy vs. sectoral level. Cost competitiveness is typically examined at the level of the entire economy, although only a part of total output is directly exposed to international competition. There are two main reasons for this. First, internationally comparable industry-level data are generally not available for a sufficiently large set of countries and time horizons. Second, labour costs in the non-tradable sector also affect the internationally competitive sector, both through intermediate input use and indirectly by increasing wage pressures. These links are difficult to properly account for in industry-level analysis.

For these reasons, the Bank of Finland cost competitiveness analysis focuses mainly on the entire economy, but the analysis is complemented using indicators on the tradable sector.

There is no clear-cut definition for the tradable sector. However, manufacturing is often used as a proxy for sectors exposed to international competition. One reason is that there exist internationally comparable time series for traditional manufacturing. Although the increase in service trade might limit the usefulness of this proxy, it still has several advantages.

First, a significant share of manufacturing output is exported. For example, in Finland in 2023, manufacturing exports amounted to about 76% relative to the value of sold

[13]The method was originally described in Turner and dack (1993).

output. Second, at least in the case of Finland, manufacturing accounts for nearly 40% of the value of services exports.

However, when interpreting the indicators on manufacturing, it should be noted that manufacturing relies heavily on intermediate inputs, many of which are produced domestically. This means that domestic wage costs have a significant effect on the total costs of manufacturing through domestic intermediate input use. In addition, the share of intermediate inputs varies over time within countries and between countries. As a result, unit-labour-cost-based comparisons cover different shares of total cost changes in different countries.

These issues can be addressed in a few different ways. In principle, a complementary indicator could be the development of unit labour costs in non-tradable industries that supply intermediate goods to manufacturing. Bank of Finland has also used this approach in earlier analyses.[14] A potential concern with this indicator is that manufacturing firms also use each other's products as intermediate inputs. Also, constructing a relevant reference group is more difficult, as harmonised industry-level data are in more limited availability than data covering the economy as a whole.

Another possibility is to examine the development of unit costs more broadly instead of unit labour costs. This approach would account for indirect wage-cost pressures and the use of intermediate inputs.

A third alternative is to examine separately the indirect wage-cost pressures arising from other parts of the economy on manufacturing. Using 2015 industry-level input-output data, Silvo (2019) shows that a one-percent general wage increase increases manufacturing production costs by up to 0.3%.[15] Slightly more than half of this effect results from increased labour costs within manufacturing (direct wage-cost pressure). The rest is transmitted through domestic intermediate input use from the rest of the economy, primarily from service sectors (indirect wage-cost pressure). We find this approach to be the most promising in complementing indicators that focus on direct labour costs in manufacturing.

4 Framework and illustration

As discussed above, cost competitiveness is inherently a relative concept. What matters is not labour costs in Finland per se, but how they evolve compared with those of competing countries. The choices regarding the relevant group of comparison countries are discussed

[14] See e.g. Kajanoja (2017).

[15] A similar approach has been used by Mankinen et al. (2012).

in the previous section.

In this section, we describe the construction of the main indicators used in the Bank of Finland cost competitiveness analysis and illustrate the indicators using data from national accounts data and European Commission (2025).

4.1 Indicators

In describing the construction of the main indicators, we proceed in three steps. First, we define national measures of labour costs and productivity. Second, we show how these measures are transformed into relative, trade-weighted competitiveness indicators. Finally, we discuss the role of terms-of-trade adjustment.

Compensation per employee. From the perspective of firms at the aggregate level, labour costs are captured by compensation of employees as recorded in the national accounts. This measure includes wages and salaries, as well as employers' social security contributions. To obtain a comparable per-unit measure across countries, compensation is divided by the number of employees.

We define compensation per employee (CPE) at time t as

$$CPE_t = \frac{COMP_t}{LEF_t}, \tag{1}$$

where $COMP_t$ denotes total compensation of employees and LEF_t the number of employees.

Relative labour costs. Cost competitiveness is assessed by comparing the growth rate of labour costs in Finland (FI) with those in its trading partner countries. For each reference country i, we compute the relative change in compensation per employee as

$$x_{i,t} = \frac{CPE_{FI,t}/CPE_{FI,t-1}}{CPE_{i,t}/CPE_{i,t-1}}. \tag{2}$$

These bilateral relative changes are aggregated into a single indicator using trade weights that reflect competition in export markets. All data are converted into the same currency. Specifically, the relative labour cost is defined as a weighted geometric mean:

$$CPE_t^{relative} = \exp\left(\sum_{i=1}^{n} w_{i,t} \ln x_{i,t}\right), \tag{3}$$

where $w_{i,t}$ denotes the trade weight of country i at time t and the weights sum to unity. The use of a geometric mean ensures that proportional changes are treated symmetrically across countries.

Unit labour costs. Labour costs alone are an incomplete measure of competitiveness, as they do not account for differences in labour productivity. Higher wages do not weaken competitiveness if they are matched by higher output per worker. To capture this interaction, we use unit labour costs (ULC), which relate labour compensation to labour productivity.

Nominal unit labour costs are defined as

$$ULC_t = \frac{CPE_t}{GDP_t/L_t}, \tag{4}$$

where GDP_t denotes real gross domestic product and L_t total employment (employees and self-employed).[16] Relative unit labour costs are constructed analogously to relative compensation per employee, using the same trade weights and aggregation method as in equations (2) and (3).

Terms-of-trade adjustment. Nominal unit labour costs can give a misleading picture of cost competitiveness if countries differ significantly in their industry structures and if price developments vary across sectors. When prices in a given industry fall rapidly, nominal unit labour costs improve mechanically. This is because falling prices inflate the real output denominator. The aggregate terms of trade are sensitive to such industry-level price developments if that industry represents a large share of the country's exports or imports. In such cases, an apparent improvement in cost competitiveness does not reflect genuine gains in the economy's potential for future employment and income generation.

This is precisely what happened in Finland in the early 2000's. In the electronics industry, quality improvements were recorded as price declines by statistical convention, and the paper industry faced persistently weak global prices. Both industries were sufficiently dominant in Finnish exports that their unusual price dynamics dragged down the aggregate export price index, producing an unusual deterioration in Finland's terms of trade relative to Sweden, the UK, and the euro area. This pattern is documented and discussed in Kajanoja (2017).

To address this problem, he proposes a terms-of-trade adjustment to the standard relative unit labour cost measure. The adjustment ensures that a terms-of-trade deterior-

[16] We assume here that compensation per employee can be used as a proxy for the self-employed.

ation registers as a genuine weakening of competitiveness. We follow the same approach.

GDP adjusted for the terms of trade per person employed can be expressed as

$$\frac{GDP_t^{ToT}}{L_t} = \frac{GDP_t + \left(\frac{UXGS_t}{PMGS_t}\right) \times 100 - OXGS_t}{L_t}, \tag{5}$$

where $UXGS_t$ denotes exports of goods and services at current prices, $PMGS_t$ the import price deflator of goods and services, and $OXGS_t$ exports of goods and services at constant prices.[17]

Terms-of-trade-adjusted relative unit labour costs are then obtained by substituting GDP_t^{ToT}/L_t for GDP_t/L_t in the definition of unit labour cost (equation (4)) and constructing the relative indicator using the same trade-weighted procedure as above.

Real unit labour costs in manufacturing. As discussed in Section 3, cost competitiveness may be examined at the level of the entire economy or at a more disaggregated level. The sector of primary interest is typically the tradable sector, that is, industries facing direct international competition. Manufacturing serves as a standard proxy for the tradable sector, as it accounts for a large share of goods exports in most advanced economies and is the sector for which timely and internationally comparable data are most readily available.

Cost competitiveness is often measured using relative nominal unit labour costs, which compare labour costs per unit of volume between countries. As Kajanoja (2017) notes, this measure is straightforward to interpret only when country differences in industrial structure are limited and price developments across sectors are broadly similar. When this condition does not hold, as in the Finnish case discussed above, the measure can give a misleading picture of competitiveness.

Real unit labour costs address this shortcoming by dividing labour compensation by the value rather than the volume of output. Hence, it avoids the distortions arising from diverging output prices across countries or industries. For this reason, we follow Kajanoja (2017) in using relative real unit labour costs defined as

$$RULC_t^{MAN} = \frac{COMP_t^{MAN}}{GVA_t^{MAN}}, \tag{6}$$

[17]For further details, we refer to the AMECO Database. Directorate-General for Economic and Financial Affairs, European Commission. URL: `https://economy-finance.ec.europa.eu/economic-research-and-databases/economic-databases/ameco-database_en`, where GDP at constant market prices adjusted for the impact of terms of trade per person employed is denoted by code RVGDAE.

where $COMP_t^{MAN}$ denotes compensation of employees in the manufacturing sector and GVA_t^{MAN} denotes manufacturing sector gross value added at basic prices (in current prices).

4.2 Assessment of cost competitiveness developments in Finland

We compute the indicators using data from national accounts and European Commission (2025) forecasts. The forecasts are available for individual EU countries as well as for important trading partners.

We focus on relative changes over time.[18] We normalise the indices in the figures to the average of the actual observations in the data, but leave out the final full year of data which is quite often subject to revisions. Using the long-term average as a reference point is preferable compared to single reference year. Anchoring analysis to a single year may distort all subsequent comparisons if the reference year is atypical due to temporary shocks, cycles, or volatility.

Figure 1 illustrates the cost of labour in Finland relative to the reference group of 14 advanced-economy trading partners. Relative labour costs in Finland decreased at the end of the 1990's, but their growth picked up in the early 2000's. After peaking in 2009, Finland's cost competitiveness based on this indicator gradually started improving towards levels experienced in the early 2000's. This was in part driven by moderate wage agreements. In the first decade of the 2000's the annual growth in compensation per employee was 3.1%, but in the 2010's growth slowed to 1.6%.

Figure 2 shows the development of terms-of-trade-adjusted unit labour costs in Finland relative to the reference group for the period 1995–2027. The early part of the sample 1995-2000 was a period of strong recovery and productivity growth in the Finnish economy after the early 1990's recession. Relative unit labour costs started to increase in the early 2000's and increased further after the financial crisis. In the mid 2010's cost competitiveness improved moderately and has remained relatively stable since then.

As discussed in Section 4.1, the terms-of-trade adjustment corrects for price effects that are not related to the development of domestic costs and thereby allows for a more reliable assessment of the evolution of relative unit labour costs. It should be noted that unadjusted unit labour cost indicators are also commonly used in the literature.

[18] Comparing levels is less informative and may be misleading as indicators are often measured on different scales and are influenced by structural, country-specific factors that are difficult to standardise. Related to this, there is no optimal level of cost competitiveness.

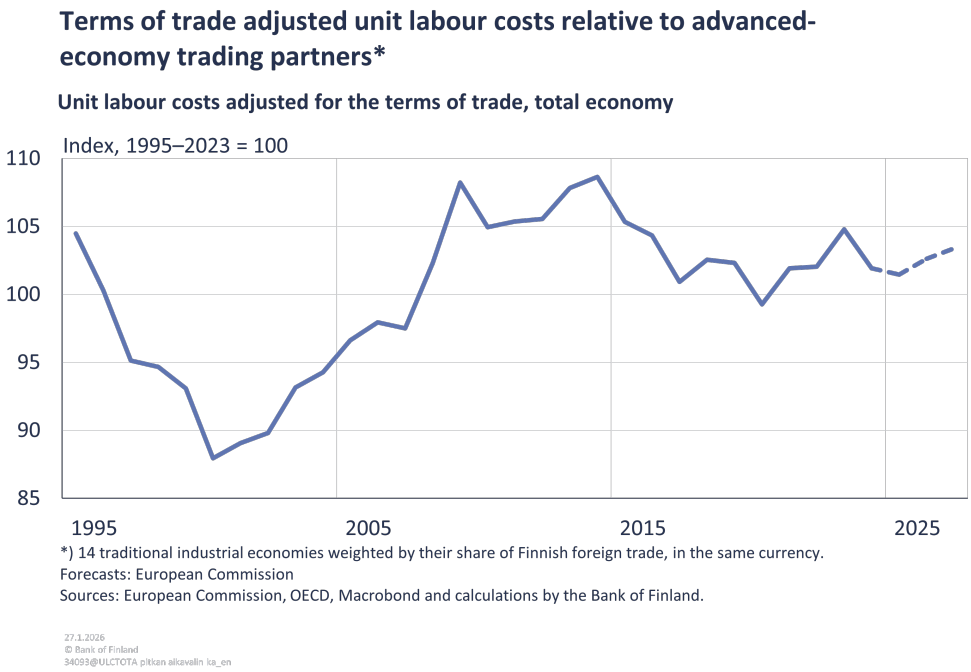
Figure 1: Cost of labour relative to the reference group in 1995-2027.

Indeed, although the terms-of-trade-adjusted indicator is better suited for the Finnish case than the relative unit labour cost indicators, for some countries, there might not be a specific need for adjusting for terms-of-trade. For robustness, we assess the effects of the adjustment in Appendix B. The findings indicate that the use of terms-of-trade-adjusted data has an effect on the magnitude of the movements of the indicator, but it does not change the development and conclusions qualitatively.

To get a more detailed picture of the drivers of cost competitiveness, relative unit labour costs may be broken down into the contributions of its components. This is done in Figure 3, which presents the cumulative effects of various factors on the development of relative terms-of-trade-adjusted unit labour costs since 2009. The main takeaway from the figure is that in recent years weaker than peer labour productivity has increased unit labour costs.

Since the financial crisis, labour productivity development in Finland has been weak compared to competitor countries (see, Pönkä (2024)). This is evident from Figure 3. Slower growth in labour productivity compared to the reference group has increased terms-of-trade-adjusted unit labour costs by almost 9 percentage points compared to the reference group by 2024. At the same time, the relative cost of labour has decreased by approximately 11 percent, which has compensated for the effects of the weak post-financial crisis productivity development on Finland's cost competitiveness at the economy-wide

Figure 2: Terms-of-trade-adjusted unit labour costs 1995–2027.



level. In contrast, the cumulative effect of exchange rates was close to neutral in 2024, but played a more significant role in the early 2010's. The effect of terms-of-trade developments was relatively small until 2024, when it started to have a visible role.

Figure 4 shows the real unit labour costs in manufacturing in Finland relative to the reference group. Before the financial crisis in 2008, the competitiveness of the Finnish manufacturing sector remained broadly unchanged on the basis of this indicator. Similarly to the whole economy the cost competitiveness in manufacturing deteriorated in the years following the financial crisis, before improving in the latter half of the 2010's. More recently, manufacturing cost competitiveness worsened in 2023, largely due to a decrease in manufacturing gross value added in Finland.

Figure 3: Cumulative contributions to terms-of-trade-adjusted unit labour costs 2009–2024.

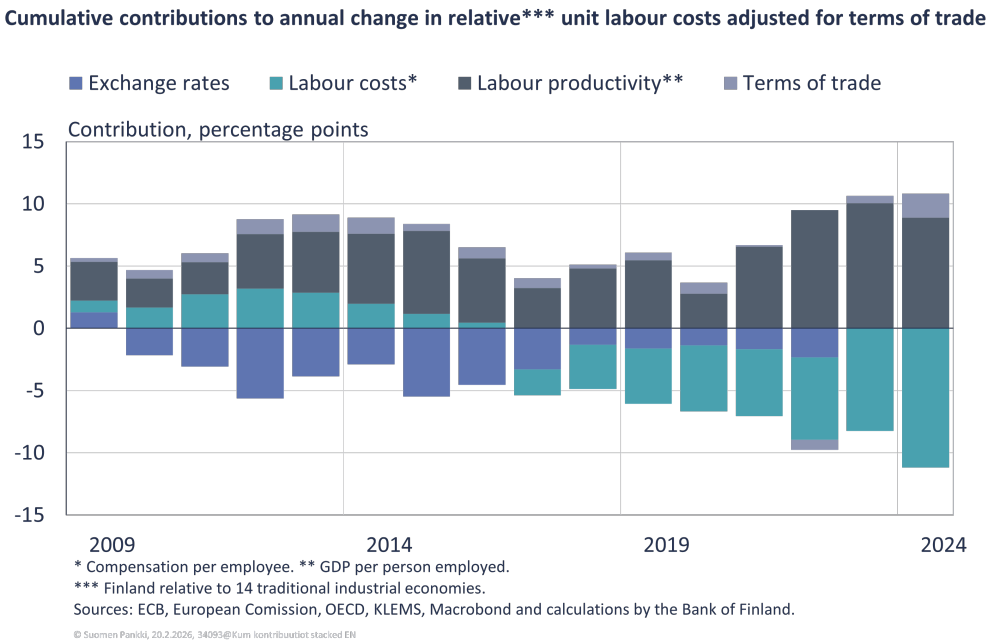
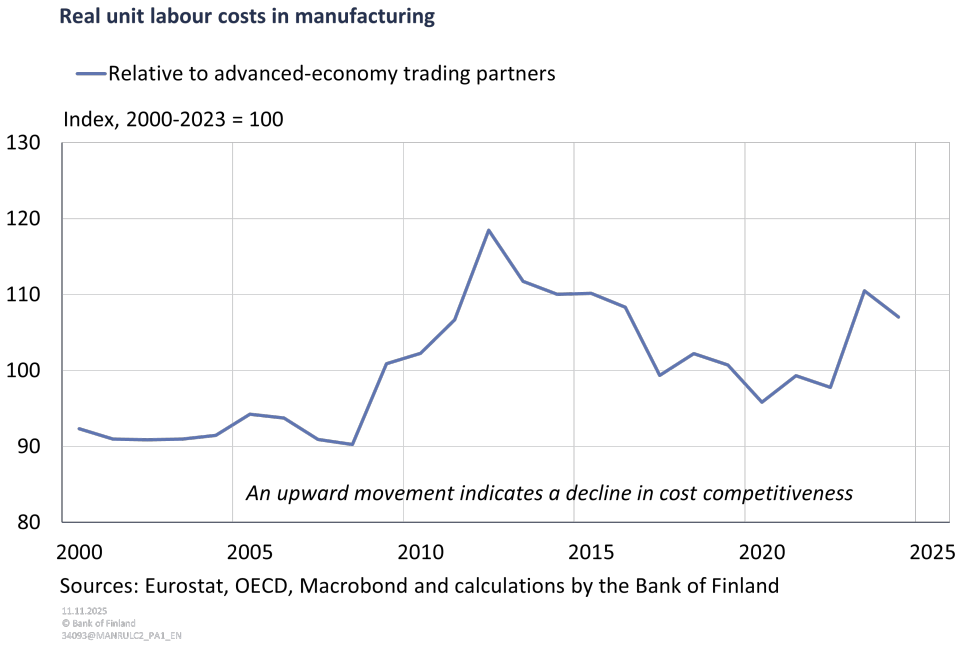


Figure 4: Real unit labour cost in manufacturing 2000–2025.



5 Conclusions

In this paper, we describe the main indicators used in Bank of Finland's cost competitiveness analysis. The analysis builds on earlier work by Kajanoja (2017). We review and document the methodological choices underlying the selected indicators and data sources, and illustrate the framework using the forecasts published in European Commission (2025).

Our primary focus is on indicators for the entire economy, which the literature generally finds to be more informative than narrower sector-specific measures. We examine three complementary indicators: relative labour costs, unit labour costs, and terms-of-trade-adjusted unit labour costs. In the case of Finland, standard unit labour cost measures may give a misleading picture of competitiveness when there are significant changes in relative export and import prices. Terms-of-trade-adjusted indicators correct for these price movements and therefore provide a clearer view of underlying domestic cost and productivity developments.

Overall, we do not identify a strong need to revise the existing Bank of Finland approach to the cost competitiveness analysis. We report a number of robustness checks to assess whether the main findings are sensitive to the specific choices made in constructing the indicators. In general, we find that the results are robust to reasonable variations in the definition of the reference group and in the weighting of countries.

We complement our economy-wide indicators with real unit labour costs in manufacturing. This indicator should be interpreted with caution because labour costs represent a much smaller share of total production costs in manufacturing than in the rest of the economy. As a result, domestic wage developments affect manufacturing costs indirectly through the prices of domestically produced intermediate inputs.

To account for these indirect wage-cost pressures arising from other parts of the economy on manufacturing, Kajanoja (2017) proposes using relative unit labour costs in the non-tradable sector. Our preferred approach would be a separate analysis using industry-level input-output data. The data required for such an analysis are published with a substantial delay after each statistical year. This limits their usefulness for frequent cyclical monitoring. However, the structural changes that affect the quantitative importance of these indirect wage-cost pressures are quite slow. It would therefore seem useful to repeat this type of analysis regularly.

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Appendix

A Trade weights

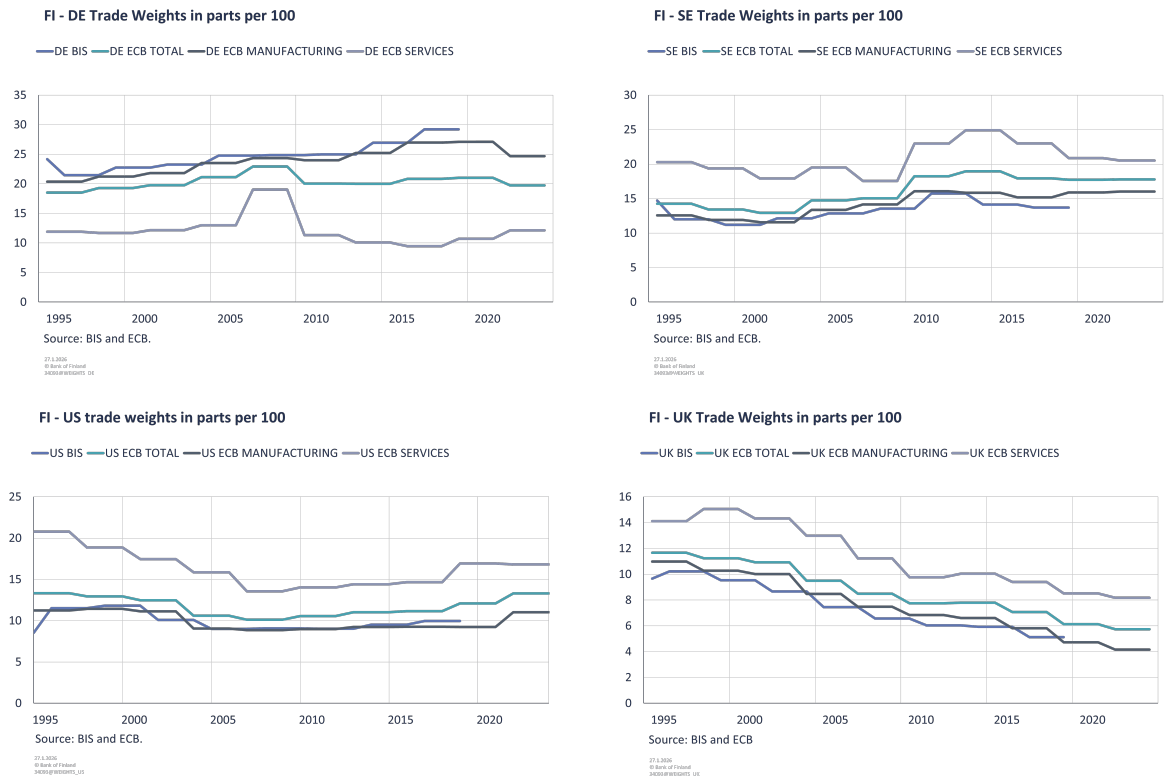
In earlier analyses, the Bank of Finland has used the double-weights published by BIS (see, Klau and Fung (2006)). The weights capture both direct bilateral trade and third-market competition. The weights are updated every three years, and their changes reflect shifts in the geographical structure of foreign trade. Each three-year period uses the average weights calculated for that period. For example, the 2023 update used data from the years 2017–2019. As a result, the current weight structure does not account for potential changes in the most recent years.

A drawback of the BIS weights is that they include only goods trade. If the geographical structure of service trade differs from that of goods trade, using the BIS weights may introduce distortion into the indicators. The distortion can be expected to grow as the share of services in foreign trade increases.

ECB publishes trade weights that are used in the calculations of their HCI (Schmitz et al., 2024). These weights are available for manufacturing, services, and total trade.

To study whether there are notable differences between the weights published by the BIS and the ECB, we show the development of scaled weights for four of Finland's most important trading partners (Germany, Sweden, the US and the UK) in Figure A1. Some points are worth noting from the figure. First of all, the development of the ECB weights based on manufacturing trade corresponds very closely to those of BIS. This indicates that the methods of the two institutions are relatively similar. Second, there are notable differences in the services and manufacturing weights for all four countries. This could have potential effects on the assessment of cost competitiveness. Finally, apart from the UK, the trade weights have remained relatively stable over time.

Figure A1: Trade weights of Finland's most important trading partners



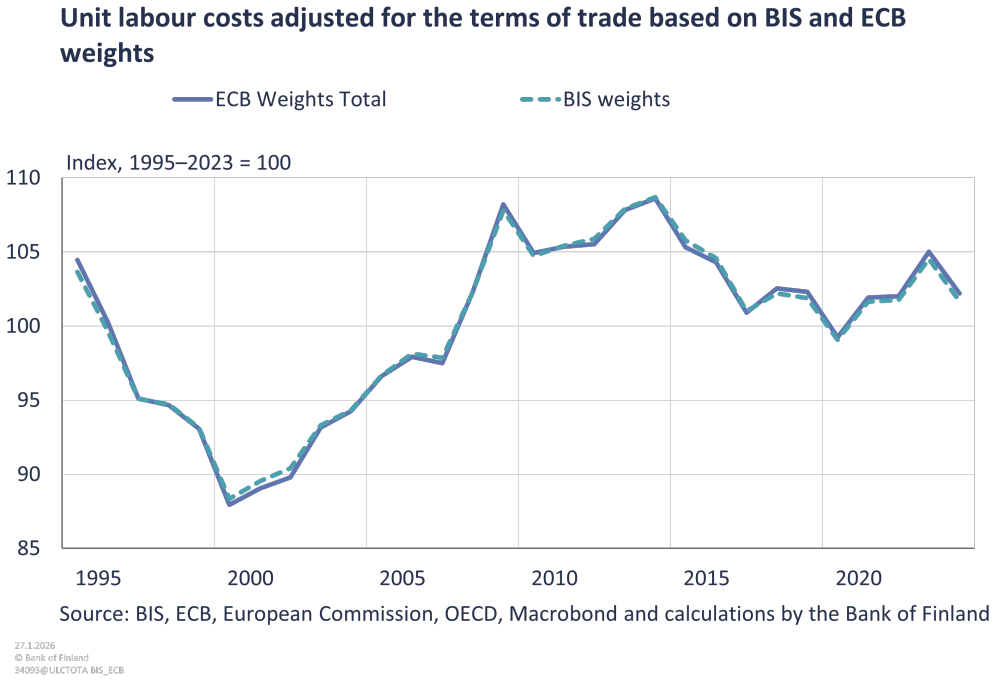
Notes: The BIS trade weights include only manufacturing. The ECB TOTAL includes both services and manufacturing. The latest update of the BIS trade weights is for year 2019.

The next step is to analyse how the choice of weights affect our competitiveness indicators. As it turns out, the choice between the BIS weights (manufacturing) and the ECB weights (total trade) has a negligible effect on cost competitiveness measured by the relative terms-of-trade-adjusted unit labour costs (see Figure A2). This finding is in line with those presented in Lynch and Whitaker (2004) and Schmitz et al. (2024), where the choice between manufacturing and total weights only had a small effect on the assessment of nominal and real effective exchange rates.[19]

[19]Lynch and Whitaker (2004) present the trade weights which the Bank of England uses for the UK, and find that when including services trade the weight of some trading partners (e.g. the US, Australia and Canada) increases and some others (e.g. the euro area and Japan) decreases. These opposite changes mostly offset each others. Hence including the services trade has negligible impact on the aggregate competitiveness indicators.

As a conclusion, since the choice of the weights does not have a large effect on the competitiveness indicator, in our analysis, we use the broader ECB weights that are updated regularly and at this point in time are also more up-to-date. There are two advantages of the ECB weights over the BIS weights. First, the ECB weights would allow accounting for services weights, which would give a more comprehensive picture of competitiveness. Second, the ECB weights have been updated more recently, with latest weights based on trade from 2022–2024.

Figure A2: Terms-of-trade-adjusted unit labour costs based on BIS and ECB trade weights in 1995-2025.

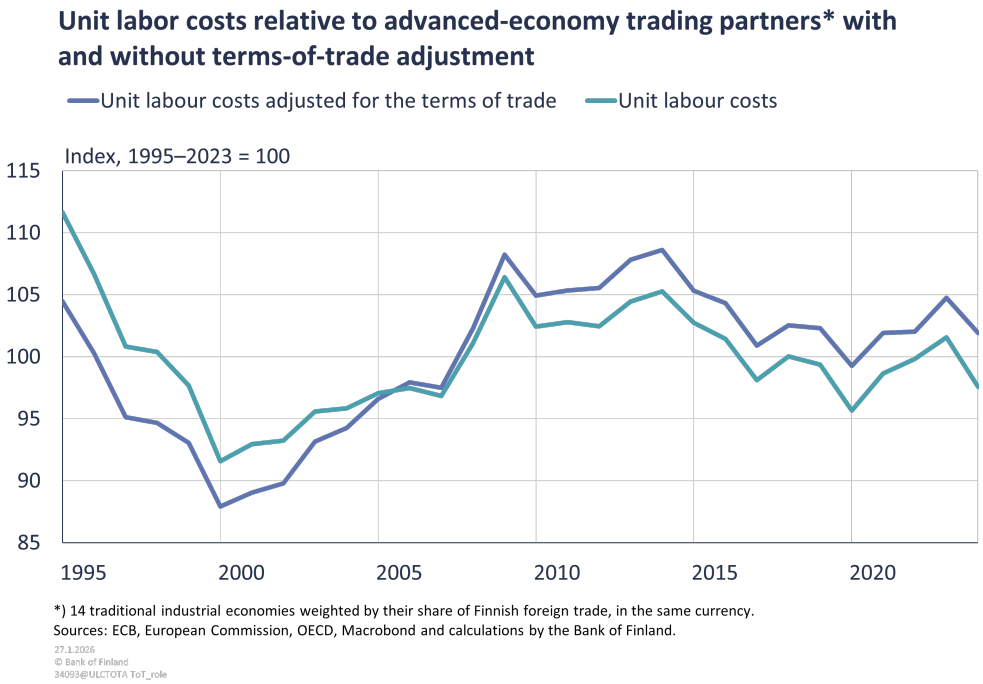


B Terms-of-trade adjustment

Kajanoja (2017) motivates the use of terms-of-trade-adjusted indicators by the exceptional development of the terms-of-trade in foreign trade. A similar measurement problem has been highlighted in other countries as well, as changes in GDP volume provide a distorted picture of the development of real income in the economy when the terms-of-trade change significantly (see, e.g. Kohli (2004) and Reinsdorf (2010)).

The effects of the use of terms-of-trade adjustment are shown in Figure B1 where we report relative unit labour costs using adjusted and unadjusted GDP data. The use of terms-of-trade-adjusted data has an effect on the magnitude of the movements of the indicator, but does not change the development and conclusions qualitatively. The findings in Figure B1 support the effects explained in Kajanoja (2017). Based on the indicator using unadjusted data, the development of cost competitiveness seemed more favourable in the first decade of the 2000's. More recently, the difference between the two indicators has remained relatively stable, which implies a smaller role for changes in terms-of-trade.

Figure B1: Unit labour costs relative to reference group with and without terms-of-trade adjustment 1995–2025.

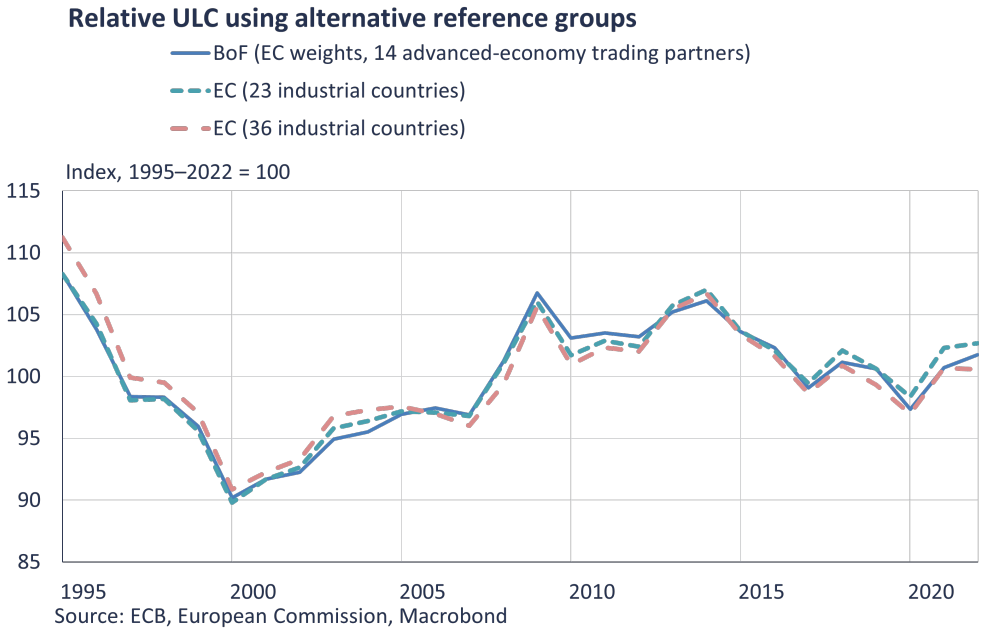


Based on the comparison, we conclude that while the terms-of-trade adjustment does not currently play a crucial role in the short-term assessment of cost competitiveness, it does have an effect when we look at longer-term developments.

C Reference group

In this appendix, we compare the findings with alternative reference groups to assess the robustness of our results. In Figure C1 we show the relative unit labour costs for the Bank of Finland reference group of 14 advanced economy trading partners as well as two alternative reference groups produced by the European Commission (23 and 36 trading partner countries).[20] The European Commission indicators are based on nominal unit labour costs for the total economy, relative to different competitor groups.[21]

Figure C1: Relative unit labour cost using alternative reference groups.



The use of different reference groups has a small numerical effect on the findings in Figure C1, but these differences generally do not change the qualitative interpretation of the findings.

[20] The 23 country group includes the EU-15 countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the UK), Australia, Canada, Japan, Mexico, Norway, New Zealand, Switzerland, Turkey, and the US. The 36 country group includes also the rest of the EU-28 countries.

[21] AMECO Database, Directorate-General for Economic and Financial Affairs, European Commission, variables: Nominal unit labour costs, total economy, relative to a competitor group, double export weights (PLCDQ).

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