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Comparing Wage Levels and Developments in Europe: Mind the Data Source

Joris Schröder and Monika Schwarzhappel

The Vienna Institute for International Economic Studies
Wiener Institut für Internationale Wirtschaftsvergleiche

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JORIS SCHRÖDER
MONIKA SCHWARZHAPPEL

Joris Schröder is Economist at The Vienna Institute for International Economic Studies (wiiw).
Monika Schwarzhappel is Head of Statistics at wiiw.

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Abstract

Wages directly affect the wellbeing and living conditions of the working population, household consumption and domestic demand, but also a country's competitiveness. However, methodological differences across multiple data sources mean that it is a complex matter to make an accurate assessment of wage levels, their developments and differentials across European countries. Consequently, this paper seeks to compare the available data sources regarding coverage, concepts and the measurements used. First, we look at the most frequently used data sources for information on individual wages (national accounts data, Labour Cost Survey, Structure of Earnings Survey and administrative data) in terms of coverage, the various definitions applied (labour cost, compensation, wages and salaries, gross earnings) and measurement issues (employees, full-time equivalents (FTEs)). To underpin this research, a comprehensive database has been set up, encompassing data from these sources. In this report, we present selected results to illustrate how a comparison of data sources and concepts regarding wage developments can improve our assessment of wage levels and wage developments across European countries. These results also provide some insight into the impact of applying various conversion rates (exchange rates, purchasing power parity (PPP), price deflators such as the Consumer Price Index (CPI)) to wage data.

Keywords: labour cost, compensation, wages and salaries, earnings, living conditions, competitiveness

JEL classification: J30, J31, C82, C83

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1. Context and aims

Wages are the major source of household income for most of the European population (ILO, 2016) and they constitute the largest portion of labour costs. Thus, they directly affect the wellbeing and living conditions of the working population, household consumption and domestic demand, as well as a country's competitiveness (Carlin et al., 2001; Fritsch et al., 2019). However, methodological differences across multiple data sources mean that it is a complex matter to make an accurate assessment of wage levels, developments and differentials across European countries. A comprehensive comparison of available data sources is necessary to shed light on the underlying causes of diverging assessments of wage levels and developments across Europe.

Consequently, this paper aims at comparing the available data, using a comprehensive database that contains the most frequently used data sources of information on individual wages – namely, national accounts data (NA), the Labour Cost Survey (LCS), the Structure of Earnings Survey (SES) and administrative data (ADM). We disentangle the underlying causes of diverging assessments by comparing the coverage of these databases in terms of a country's population, the concepts used (labour cost, compensation, wages and salaries, gross earnings) and the measurements employed (employees, full-time equivalents (FTEs)). In this report, we confine our analysis to the level of the total economy. This provides a foundation for future in-depth analysis of the causes underlying wage developments across Europe.

Furthermore, we provide selected results illustrating how a comparison of data sources and concepts regarding wage developments can improve our understanding of wage levels and wage developments in European countries. These results provide some insight into the impact of applying various conversion rates (exchange rates, purchasing power parity (PPP), price deflators such as the Consumer Price Index (CPI)) to wage data.

2. Databases: Concepts and coverage

This section first explains the concepts related to wages. Subsequently, we break down the data sources' coverage of the economy and report which of the concepts and measurements are used in the different data sources.

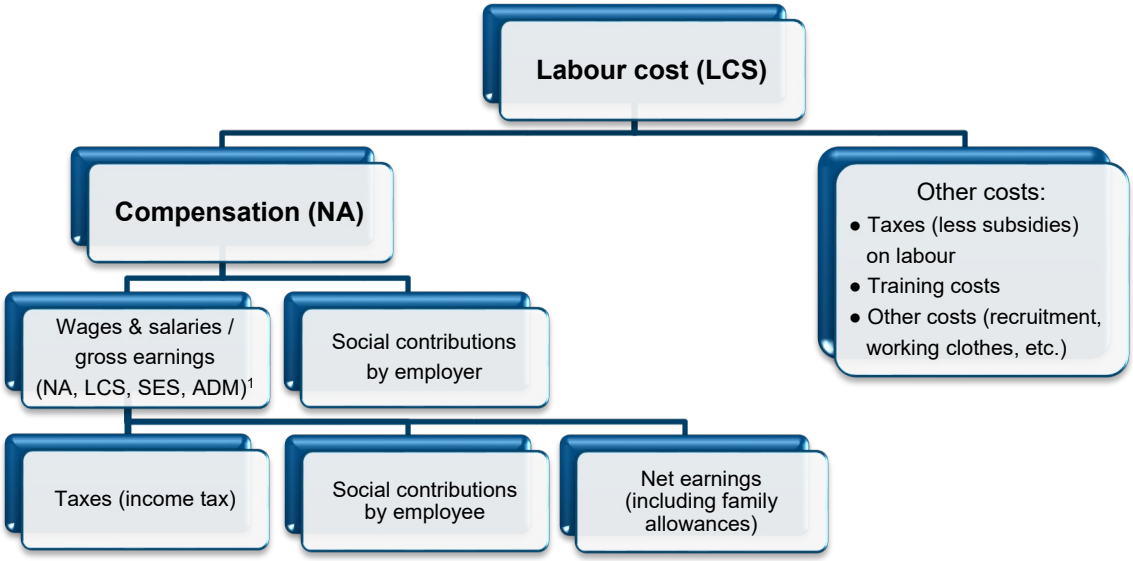
2.1. CONCEPTS RELATED TO WAGES

Below, we explain the following concepts that are related to wages: labour cost, compensation, wages and salaries, and gross earnings.

2.1.1. Labour cost

Labour cost encompasses the total expenditure borne by employers in the employment of staff (see Figure 1). As described in the Commission Regulation (EC) No. 1737/2005, labour cost includes employee compensation (D.1);[1] vocational training costs (D.2); other costs, such as recruitment costs and working clothes provided by the employer (D.3); and employment taxes, such as penalty taxes in some countries (D.4). The calculation also takes account of subsidies received by the employer (D.5), which are deducted from labour cost (European Commission, 2005a).

Figure 1 / Concepts related to wages and their usage, by data source



Note: [1] Wages and salaries in NA, LCS, ADM data, as well as annual gross earnings in SES data, cover payments in cash and kind; hourly gross earnings in SES data cover only payments in cash.
Source: authors' own chart, adapted from European Commission (2005a).

[1] This and the following abbreviations refer to variable names regarding structural statistics on labour cost, as defined in the Commission Regulation (EC) No. 1737/2005 (European Commission, 2005a), which are used to determine concepts of labour cost, compensation and wages and salaries for NA, LCS and SES.

2.1.2. Compensation

Compensation of employees encompasses wages and salaries (D.11, see below) and employers' social contributions (D.12). Employers' social contributions include a) employers' actual social security contributions (D.121 and D.123), which consist of statutory social security contributions (D.1211) and collectively agreed, contractual and voluntary social security contributions (D.1212), and b) employers' imputed social contributions (D.122), such as payments to employees leaving the enterprise.

2.1.3. Wages and salaries

Wages and salaries include remuneration in cash and in kind. Wages and salaries in cash are made up of direct remuneration, bonuses and allowances (D.1111), payments to employee savings schemes (D.1112) and payment for days not worked (D.1113). Wages and salaries in kind include remuneration such as company products, staff housing, company cars, stock options and share purchase schemes, and meals and drinks or subsidised commuting (D.11141-D.11145).

2.1.4. Gross earnings

Gross earnings correspond to wages and salaries from an employee's perspective.[2] They encompass remuneration in cash and kind before any tax deductions and social security contributions payable by a wage earner and retained by the employer (European Commission, 2005b). In the SES, which uses the concept of gross earnings, there is an important conceptual difference between *annual* and *monthly* gross earnings. Whereas annual gross earnings cover regular payments in cash and in kind, as well as 'non-standard payments' (such as a 13th or 14th month's salary), monthly gross earnings cover payments made during the reference month (European Commission, 2005b; Eurostat, 2019c). Thus, annual gross earnings are usually higher than monthly gross earnings multiplied by 12.

2.2. DATABASES AND COVERAGE

NA, LCS, SES and ADM data vary in terms of coverage of the economy and concepts used. Additionally, different units of measurement are used and/or reported. These vary along the dimensions of the time period covered, the inclusion of employees vs. inclusion of all employed persons, the inclusion of hours worked or hours paid, and the currency reported. In the following, we provide an overview of the concepts and measurement units used by these various data sources.

2.2.1. National accounts[3]

National accounts combine data from multiple statistical sources, such as administrative data, population censuses, and business and household surveys (Eurostat, 2019a). Therefore, the concept of a statistical population is not applicable in an NA context. In principle, national accounts are regarded as comprehensive: all statistical units that have their centre of predominant economic interest on the economic territory of a given country are covered, including undeclared earnings in the 'non-observed' economy (Eurostat, 2019a).

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2 Thus, in what follows, earnings and wages and salaries are used interchangeably.

3 Eurostat branches: nama_10_a64; nama_10_a64_e.

The time coverage of NA data varies from country to country and depends on time series provided by individual countries. Most time series start in 1995, but there are several exceptions to this, due to data availability in individual countries. Some countries provide longer time series. At the time of writing, the latest available year for most countries is 2017. NA data from Eurostat cover all member states of the EU and European Free Trade Association (EFTA) countries. Additionally, it covers some countries that have the prospect of joining the EU, if their data is available according to ESA 2010 (Eurostat, 2013).

Concepts

› Compensation of employees (D.1)

› Wages and salaries (D.11)

Units

› National currency series (CP_MNAC): millions of national currency

- For euro area member states, the national currency series are converted into euros using the irrevocably fixed exchange rate

› Euro series (CP_MEUR): million euros

- Using historic exchange rates

› Employed persons

› Employees[4]

› Hours worked by employed persons

› Hours worked by employees

2.2.2. Labour Cost Survey[5]

The Labour Cost Survey covers employees (including apprentices) in enterprises with at least 10 employees, in all economic activities, excluding agriculture, forestry and fishing (NACE Rev. 2 section A), public administration, defence and compulsory social security (NACE Rev. 2 section O), activities of private households (NACE Rev. 2 section T) and activities of extraterritorial organisations (NACE Rev. 2 section U) (Eurostat, 2019b, 2008). Only certain countries voluntarily provide data on the latter (excluded) sectors and on smaller enterprises with fewer than 10 employees. Thus, an aggregate of NACE Rev. 2 sections B-S (excluding O) of enterprises with 10 or more employees is used as a proxy measure for the total economy.

The LCS was conducted in 1996, 2000, 2004, 2008, 2012 and 2016. Eurostat provides access to data from 2000 and 2004 according to NACE Rev. 1.1, and for 2008, 2012 and 2016 according to NACE Rev. 2.

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[4] NA-based OECD data calculate average wages for approximate FTEs by dividing the NA-based total wage bill by the average number of employees in the total economy, and then multiplying that result by the ratio of the average usual weekly hours per full-time employee to the average usual weekly hours for all employees (see https://www.oecd-ilibrary.org/employment/average-wages/indicator/english_cc3e1387-en).

[5] Eurostat branch: lc_ncostot_r2.

Concepts

› Total labour cost

› Wages and salaries

Units

› Euro series

- Per FTE per year, month and hours worked

› National currency series

- Per FTE per year, month and hours worked

2.2.3. Structure of Earnings Survey6

The Structure of Earnings Survey also covers enterprises with 10 or more employees in all economic activities, excluding agriculture, forestry and fishing (NACE Rev. 2 section A), public administration, defence and compulsory social security (NACE Rev. 2 section O), activities of private households (NACE Rev. 2 section T) and activities of extraterritorial organisations (NACE Rev. 2 section U) (Eurostat, 2019c, 2008). Again, some countries voluntarily provide data on the latter (excluded) sectors and on smaller enterprises with fewer than 10 employees. Hence, the SES also uses the aggregate of NACE Rev. 2 sections B-S (excluding O) of enterprises with 10 or more employees as a proxy measure for the total economy.

The SES provides data for 2002, 2006, 2010 and 2014. Data from the SES conducted in 2018 will presumably be available in 2020. Eurostat provides access to data from 2002 and 2006 according to NACE Rev. 1.1, and for 2010 and 2014 according to NACE Rev. 2. Aggregates for the years 2002 and 2006 are given for NACE Rev. 1.1 sections C-O (excluding L), which corresponds to the aggregate of the sections B-S (excluding O), according to NACE Rev. 2.

Concepts

› Average gross earnings

› Median gross earnings

- Derived from hourly gross earnings

Units

› Euro series

› Average annual gross earnings

› Average monthly gross earnings

- Remuneration in cash paid during the reference month

[6] Eurostat branch: earn_ses_main.

› Average hourly gross earnings
  - Derived from monthly gross earnings, which are divided by the hours paid in the reference month

› Use of FTEs

2.2.4. Administrative data

Administrative data are based either on monthly/annual earnings surveys or on other business surveys that provide information on employees and wages. Data are supplemented by information from tax records and/or social security data, and information from the public administration on wages in the public sector. Recently, surveys have come to be replaced more and more by wage tax administration data or social security data. A central registry can serve as a single source of information on wages in a country.

The administrative wage data cover the whole economy – i.e. NACE Rev. 2 from A-U. Comparability between countries may be limited by the fact that the coverage of enterprises varies from country to country (e.g. some report only enterprises with 10 or more employees). If tax administration data are already being used, this inconsistency can be eliminated by considering all employees who are formally employed.

Concepts

› Gross wages

Units

› National currency
  - Annual
  - Per employee per month – derived from average monthly gross wages per employee, multiplied by 12

› Employees/FTE

The concept of ‘employees’ that is used is not entirely uniform. While most of the countries provide their monthly wages per employee, others (BG, CZ, EE, LV, LT, PL and RO) provide their monthly wages per full-time equivalent, and Hungary only provides details on wages for full-time employees.

3. Comparisons of wage levels and developments across data sources

3.1. MAIN CONCEPTUAL DIFFERENCES ACROSS DATA SOURCES

A look at the discrepancies in the coverage, concepts and units used by the data sources shows why examinations of wage levels and developments based on different data sources arrive at diverging results – and thus might also lead to different policy conclusions. In what follows, we summarise the insights that can be derived from the comparison above, and discuss how these might affect assessments of wages and wage-related concepts across data sources. The subsequent sub-sections illustrate these differences by comparing data across multiple countries, and looking at wage levels and developments within individual countries over time.

One major difference between the data sources is their coverage. Because the LCS and SES only cover establishments with 10 employees or more, where wages tend to be higher on average, the wages reported in NA and ADM data should be lower than those reported in the LCS and SES. This might be of major importance for the Western Balkan countries, as their national sample of establishments is particularly biased toward large firms (World Bank & wiiw, 2018).

The SES is the only data source that uses hours paid (rather than hours worked) to derive average hourly earnings. Thus, the hourly gross earnings reported in the SES should be higher than the wages and salaries reported in the NA and LCS data. Furthermore, as the monthly gross earnings reported in the SES cover only cash remuneration paid during the reference month, these should be lower than the monthly wages and salaries in the LCS (and NA and ADM) data, which take annual earnings and divide them by 12. Additionally, because the hourly earnings in the SES are derived from monthly earnings, rather than annual earnings, they might also be lower than figures for hourly wages from NA, LCS and ADM data.

Another aspect of particular relevance for the comparability of wage levels across data sources is that in concept ADM and NA data cover the whole economy, whereas in the other data sources an aggregate of the NACE Rev. 2 sections B-S (excluding O) is used as a proxy measure for the total economy.

The use of different units (employees, employed persons or FTEs) poses a further challenge to the comparability of data sources. While compensation/wage data are available for employees and employed persons in NA data, in the SES and LCS data labour cost and wage data are reported for FTEs. Comparisons between countries pose a particular challenge when they include ADM data, because its use of these units is not consistent across countries (see section 2.2.4).

Besides the dimensions systematically considered above, further differences between the data sources might drive variations in data on wage levels and wage developments across European countries. For example, employees with multiple jobs are counted in LCS and SES according to the number of jobs they hold, whereas they are counted only once in NA data. Thus, NA wages include wages from

secondary jobs, whereas wages from secondary jobs are counted as a separate person's wages in LCS and SES data. This would lead to average wages in LCS and SES data being lower than in NA data, with the extent of the difference depending on the composition of the workforce in the various countries and on the discrepancy in pay between part-time and full-time employment.

In what follows, we display four sets of comparisons. First, we compare wages and salaries from NA, SES and ADM data in euros; at PPP; and real CPI deflated and PPP adjusted for all available countries (section 3.2). Then we focus on how these differences might affect assessments of wage convergence or divergence between countries. We show how wages and salaries from all available sources change over time in five selected countries (DE, EL, LT, MK, RO) and relate these changes to the situation in Austria (section 3.3). Next, we compare labour cost, compensation and wages and salaries in NA and LCS data, using values in euros; at PPP; and real CPI deflated and PPP adjusted for all available countries (section 3.4). Lastly, we return to our five selected countries and show how labour cost, compensation and wages and salaries develop over time, relating the developments to Austrian labour cost, compensation and wages and salaries (3.5).

3.2. ANNUAL WAGES AND SALARIES ACROSS COUNTRIES

Table 1 shows the annual wages and salaries of employees for the EU28, Western Balkan countries and non-EU12 countries in 2014, using NA, SES and ADM data. We show data for 2014, because all three sources focusing on wages and salaries provided data for that year. The data regarding different concepts, including labour cost and compensation, are examined in sections 3.4 and 3.5.

It becomes evident that the levels of, and developments in, wages and salaries diverge sharply between the data sources. If we look at absolute values in 2014, then NA and ADM data usually report lower wages than SES data. Average annual wages (in euros) within the EU28 amounted to 24,109 euros according to NA data, but to 27,629 euros using SES data. This most likely reflects the higher wages paid in larger firms. In the EU-CEE11 countries, where ADM data are shown additionally, average wages amounted to 10,298 euros using ADM data, 11,207 euros using NA data and 11,597 euros using SES data. The lower wages and salaries reported in ADM data (as opposed to the SES data) most likely reflect primarily the fact that ADM and NA data cover the whole economy. As stated above, SES data cover only sections B-S (excluding O), and employees in enterprises with 10 or more employees, whereas ADM and NA data also cover people working in those sectors where wages are generally lower. Still, there is considerable cross-country variability within these groups that needs to be considered. This will be explored below.

Turning to wages at PPP and comparing them with Austrian wages (column 2), it becomes evident how much these differences matter for between-country comparisons of wage levels (for instance, when comparing living standards). For example, while wages and salaries at PPP in Germany are equal to wages and salaries in Austria on the basis of SES data, they amount to only 93% of Austrian wages and salaries on the basis of NA data. By contrast, in Luxembourg, Lithuania and Croatia, wages reported on the basis of NA data are much higher than on the basis of SES data, again using Austrian wages as the benchmark. In general, EU28 wages lag further behind Austrian wages on the basis of SES data than on the basis of NA data. ADM data generally place the level of wages relative to Austria somewhere between the levels estimated using the SES and the NA data. This pattern also seems to hold for wages

in the non-EU12 countries, where the shortfall relative to Austrian wages is usually less if we look at ADM data than if we consider SES data.

Table 1 Annual wages and salaries of employees in 2014

	in euros			at PPP, AT=100			real CPI deflated, 2010=100, PPP 2010 adj.		
	NA	SES	ADM	NA	SES	ADM	NA	SES	ADM
AT	35395	42392	.	100	100	.	99	99	.
BE	38932	45704	.	110	108	.	102	98	.
BG	5973	5756	5042	40	32	34	126	119	119
CY	19837	25191	.	66	70	.	86	88	.
CZ	11068	12522	11230	54	51	55	99	101	101
DE	31641	40931	.	93	100	.	104	98	.
DK	48451	55237	.	111	106	.	101	99	.
EE	12476	13460	12060	53	48	52	111	114	113
EL	16667	22142	.	62	68	.	81	85	.
ES	25133	27390	.	86	78	.	94	95	.
FI	37298	44722	.	93	93	.	99	101	.
FR	33496	36086	.	94	84	.	100	100	.
HR	13284	13057	12501	65	53	61	91	101	96
HU	9639	10328	9240	52	46	50	97	105	105
IE	38470	45990	.	106	106	.	97	104	.
IT	25778	34506	.	79	88	.	94	101	.
LT	9944	8822	8129	51	38	41	112	113	108
LU	55871	59009	.	143	126	.	101	105	.
LV	10867	10714	9180	49	41	42	118	118	113
MT	19984	21794	.	77	70	.	103	108	.
NL	35185	43500	.	98	101	.	97	97	.
PL	10433	11577	10832	56	52	58	103	107	108
PT	15734	17297	.	61	56	.	90	88	.
RO	6859	6672	6287	42	34	39	102	103	107
SE	38405	44833	.	90	88	.	107	107	.
SI	21167	22508	18483	81	72	71	95	99	97
SK	11572	12155	10296	54	47	48	99	109	102
UK	35506	39316	.	92	86	.	96	92	.
EU28	24109	27629	10298[1]	77	73	50	100	102	106
AL	.	.	3904	.	.	29	.	.	96
BA	.	.	7912	.	.	51	.	.	101
ME	.	8775	8676	.	46	54	.	*	93
MK	.	6585	6100	.	40	45	.	103	94
RS	.	7019	6284	.	39	42	.	*	97
XK	.	.	5784	.	.	39	.	.	119
TR	.	10362	7513	.	51	45	.	107	103
BY	.	.	5494	.	.	36	.	.	146
KZ	.	.	6099	.	.	35	.	.	121
MD	.	.	2634	.	.	18	.	.	120
RU	.	.	7681	.	.	42	.	.	118
UA	.	.	2657	.	.	22	.	.	127

Note: NA – National accounts, SES – Structure of Earnings Survey, ADM – Administrative data based on surveys or tax records. In column 2, the NA data for Austria serve as the basis for calculating the shares based on ADM data. * no data for 2010. [1] See text on the averages in NA and SES data for the EU-CEE11 countries where ADM data is provided.
Sources: Eurostat, wiiw Annual Database.

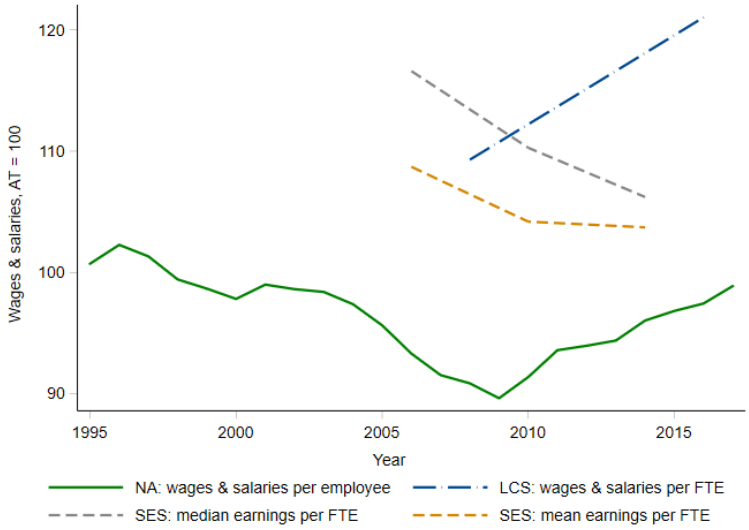
Column 3 shows wages and salaries in 2014, deflated by the real CPI, using 2010 as the base year and using PPP in 2010. In general, differences between the data sources are relatively small. Values observed based on ADM data seem fairly close to those based on SES data. Still, the assessments of wage growth (or decline) from 2010 to 2014 depend on the data source used. For example, Croatia and North Macedonia show increases in average wages based on SES data, while based on ADM data real wages decreased.

The country coverage regarding the Western Balkan countries emphasises the importance of ADM data, since no information is available from the other sources. At the same time, the differences regarding the other country groups call for caution when comparing wage levels and developments across these country groups on the basis of different data sources.

3.3. COMPARISONS OF WAGES AND SALARIES OVER TIME FOR SELECTED COUNTRIES

This section compares the levels of, and developments in, wages and salaries in individual countries and across the available data sources, each in relation to the level of wages and salaries in Austria. We select Germany, Greece, North Macedonia, Lithuania and Romania to show that the discrepancies between the wages and salaries observed across the data sources are not outliers specific to individual countries or regions, but occur in Northwestern Europe, Southern Europe, Eastern Europe and the Western Balkans alike. Even though discrepancies are visible in all of these countries, the comparison also shows that they are not homogeneous across countries. This suggests that further analysis is required.

Figure 2 / Wages and salaries of employees in Germany, CPI 2010 deflated and PPP 2010, AT = 100



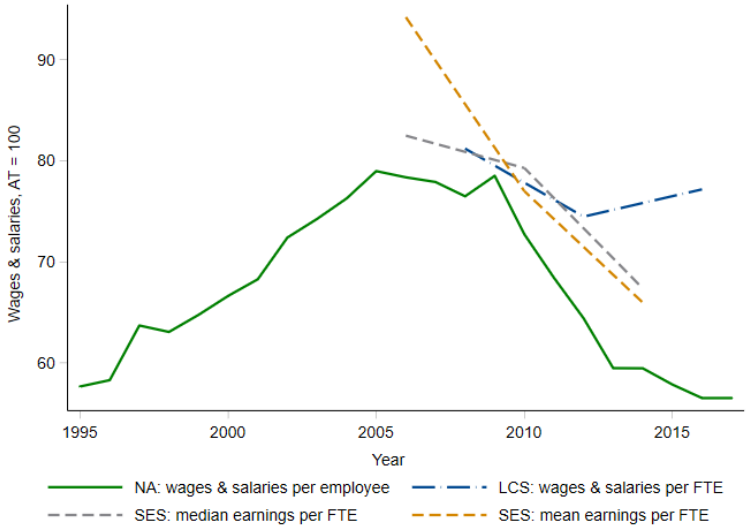
Note: NA – National accounts, SES – Structural Earning Survey, LCS – Labour Cost Survey.
Source: Eurostat.

Figure 2 shows the development of wages and salaries in Germany, in comparison to Austria, using NA, LCS and SES data. In general, two trends are visible. Compared to Austria, the NA data show lower

wages in Germany, while the LCS and SES show higher wages. Furthermore, while NA and LCS data point to a strong increase in German wages from 2008/2009 onwards (compared to Austrian wage developments), the SES data indicate further declines in German wage levels relative to Austrian wages, as was the case between 1996 and 2009 in the NA data. It is not immediately clear what might drive these differences. They most likely reflect different income scales in the two countries across sectors that are not included in SES and LCS data.

Figure 3 shows the development of wages and salaries in Greece, compared to Austrian wages and salaries. It shows some differences in the absolute level of wages compared to Austria; these differences were particularly acute between the SES and NA data in 2006. However, the observable trends are relatively similar across the data sources.

Figure 3 / Wages and salaries of employees in Greece, CPI 2010 deflated and PPP 2010, AT = 100

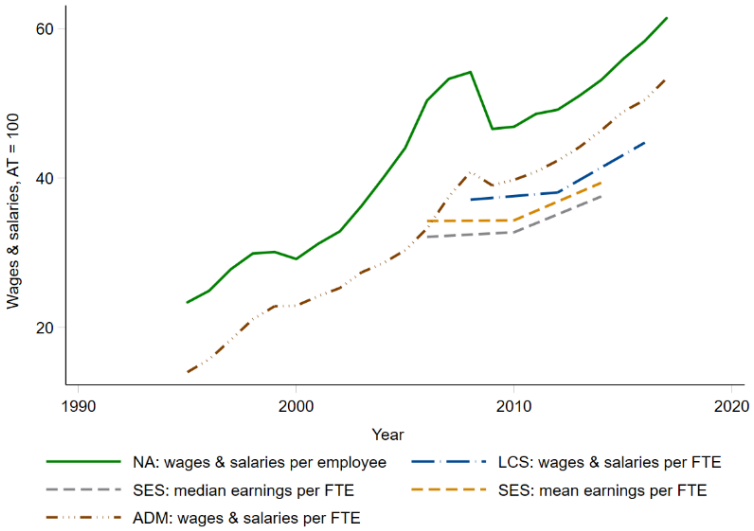


Note: NA – National accounts, SES – Structural Earning Survey, LCS – Labour Cost Survey.
Source: Eurostat.

Figure 4 shows the development of wages and salaries in Lithuania, compared to Austria, using NA, LCS, SES and ADM data.[7] For Lithuania, observable trends over time are very homogeneous across the different data sources. As reported in Table 1 and Table 2, Lithuanian is one of few countries where wages in NA data are higher than those reported in LCS, SES and ADM data. This is also reflected in the shortfall relative to Austrian wages being the lowest on the basis of NA data. Lithuanian wages in those sectors not included in the LCS and SES are likely higher than those in the NACE Rev. 2 sections B-S (excluding O). Furthermore, it may be that wages and salaries from secondary jobs are more common and/or substantive in Lithuania than in Austria. These conjectures should be explored in future analysis, which should include a sectoral breakdown of wage levels and developments.

[7] Since wages and salaries from NA data have been used as a basis for the comparison of ADM data (see Table 1), only the development, rather than the level, of wages based on ADM data should be interpreted.

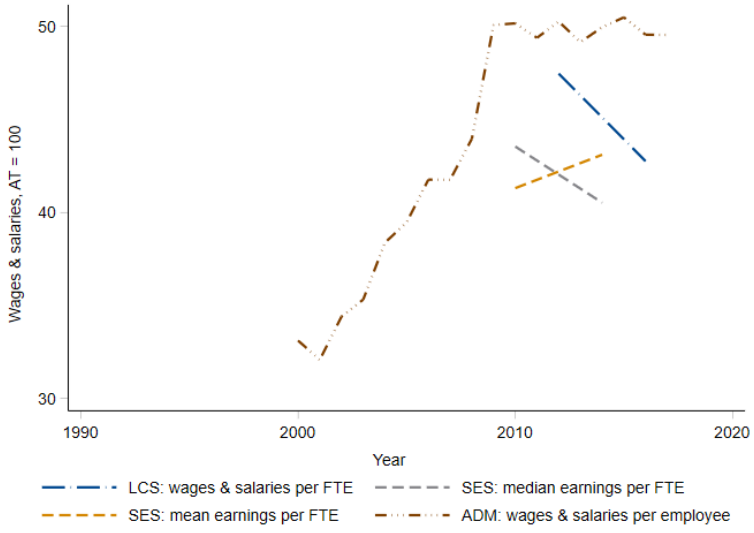
Figure 4 / Wages and salaries of employees in Lithuania, CPI 2010 deflated and PPP 2010, AT = 100



Note: NA – National accounts, SES – Structural Earning Survey, LCS – Labour Cost Survey, ADM – Administrative data based on surveys or tax records. NA wages used as proxy for Austrian ADM wages.
Source: Eurostat, wiiw Annual Database.

Figure 5 shows the development of wages and salaries in North Macedonia, compared to Austria, using LCS, SES and ADM data. As in Lithuania, the wage differentials observed in the LCS and SES are bigger than those observed on the basis of ADM data. The time series for the LCS and SES are very short and do not allow for much interpretation of trends.

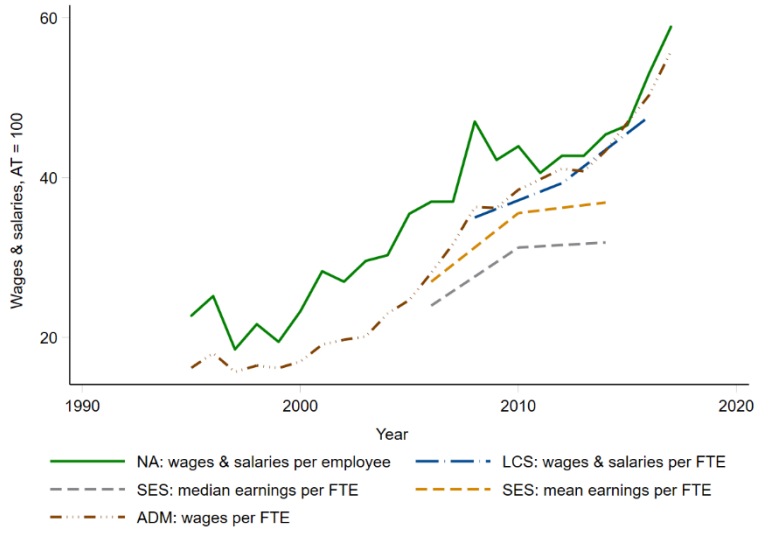
Figure 5 / Wages and salaries of employees in North Macedonia, CPI 2010 deflated and PPP 2010, AT = 100



Note: LCS – Labour Cost Survey, SES – Structural Earning Survey, ADM – Administrative data based on surveys or tax records. NA wages used as proxy for Austrian ADM wages.
Source: Eurostat, wiiw Annual Database.

Figure 6 shows the development of wages and salaries in Romania, compared to Austria, using NA, LCS, SES and ADM data. The wage developments across time in Romania appear to be relatively homogeneous across the data sources. By contrast, the observed levels show relatively sharp differences between the data sources. For example, the SES and ADM show wages at about 27% of those observed in Austria in 2006, whereas the NA data show the wage levels at about 37%. Interestingly, the divergence in the observed levels between wages reported in NA and ADM seems to narrow over time. The Romanian ADM makes use of the LCS data, which is reflected in the overlap between those two curves.

Figure 6 / Wages and salaries of employees in Romania, CPI 2010 deflated and PPP 2010, AT = 100



Note: NA – National accounts, LCS – Labour Cost Survey, SES – Structural Earning Survey, ADM - Administrative data based on surveys or tax records. NA wages used as proxy for Austrian ADM wages.
Source: Eurostat, wiiw Annual Database.

3.4. ANNUAL LABOUR COST, COMPENSATION AND EARNINGS

We now focus on the concepts of labour cost and compensation, how they relate to earnings (wages and salaries) and how they compare between countries. Table 2 shows the annual labour cost, compensation of employees, and wages and salaries for the EU28 and Western Balkan countries in 2016, using NA and LCS data. Furthermore, we examine the wage and salary data for 2016 in the NA and LCS, in order to assess how the LCS compares to the other data sources analysed in section 3.2 in terms of the data on wages and salaries.

Regarding the concepts, the data sources show the expected differences based on the components that are contained within labour cost, compensation and wages and salaries (see section 2). Across the EU28, employee compensation amounts to 30,669 euros on average, while average labour cost amounts to 35,322 euros, and wages and salaries amount to 24,973 euros (NA data) or 27,676 euros (LCS data).

Table 2 / Annual compensation (NA), labour cost (LCS) and wages and salaries of employees in 2016

	Annual compensation (NA) / labour cost (LCS)						Annual wages and salaries					
	in euro		at PPP, AT =100		real CPI deflated, 2012=100		in euro		at PPP, AT=100		real CPI deflated, 2012=100	
	NA	LCS	NA	LCS	NA	LCS	NA	LCS	NA	LCS	NA	LCS
AT	44862	56272	100	100	103	104	36980	41294	100	100	103	103
BE	54124	56835	120	100	100	99	39535	43090	106	104	101	104
BG	7818	7659	40	31	133	135	6709	6444	41	36	133	134
CY	24035	28492	66	62	91	97	19623	23487	65	70	92	96
CZ	15851	18208	59	54	107	109	12033	13312	54	54	106	109
DE	40672	54924	93	100	106	106	33309	42787	93	106	107	106
DK	54044	65036	98	94	105	104	49817	56521	109	111	105	104
EE	18385	19152	61	50	116	120	13656	14144	55	51	116	121
EL	21327	26753	62	62	91	99	16079	21308	57	68	90	101
ES	32050	36551	86	78	101	100	25511	27301	83	80	102	101
FI	47143	54761	92	85	101	105	38133	42365	91	90	101	104
FR	46899	53518	104	94	103	99	34296	36123	92	87	103	102
HR	15833	17006	61	52	94	101	13967	14402	65	60	96	100
HU	12060	14198	49	46	103	114	9725	10590	48	47	102	113
IE	47461	51470	103	89	104	104	40361	43434	106	102	104	101
IT	35834	44704	88	88	101	102	26303	32221	79	86	102	102
LT	14267	12866	56	40	123	124	11208	9195	54	39	122	123
LU	66389	65468	134	105	106	107	57345	57203	140	125	107	109
LV	15089	13301	54	38	131	123	12523	10520	54	41	131	123
MT	23792	25905	71	61	108	105	21751	24341	78	79	109	106
NL	45907	58636	100	102	102	102	36232	44890	95	106	102	103
PL	12759	14643	55	51	111	116	10629	11953	56	56	110	116
PT	20629	23423	62	56	103	104	16078	18688	59	61	102	103
RO	9551	9877	46	38	127	126	8020	7936	47	42	128	131
SE	46469	63872	86	94	107	108	38784	43470	87	87	107	108
SI	25760	27576	77	66	105	102	22109	23240	80	75	105	102
SK	15935	17134	58	50	110	113	12238	12650	54	50	109	112
UK	43779	50767	90	84	102	105	36289	42029	91	94	104	103
EU28	30669	35322	78	70	107	108	24973	27676	76	75	107	109
AL	.	5390	.	24	.	*	.	4527	.	28	.	*
BA	.	9743	.	39	.	*	.	8927	.	48	.	*
ME	.	.	.	.	.	*	.	.	.	.	.	*
MK	.	6253	.	28	.	92	.	6159	.	38	.	96
RS	.	8117	.	34	.	*	.	6898	.	40	.	*
XK	.	.	.	.	.		.	.	.	.	.	.

Note: NA – National accounts, LCS – Labour Cost Survey. * no data for 2012.
Sources: Eurostat, wiiw Annual Database.

The picture gained of labour cost and compensation of employees at PPP (relative to Austria) clearly shows the impact of indicator selection on comparisons between countries. Take Belgium as an example: while labour cost in 2016 was at the same level as in Austria, the compensation of employees was 120% of the compensation of employees in Austria. Across the EU28, the level of compensation of employees, relative to Austria, is usually higher than the level of labour cost (again relative to Austria). This reflects the comparatively high cost in Austria of those components of labour cost that are not included in the compensation of employees.

Interestingly, substantial differences become evident regarding developments between 2012 and 2016 based on labour cost, as opposed to compensation of employees. In most countries, labour cost rose more (or declined less) than compensation of employees. This trend was particularly strong in Greece, Croatia, Cyprus and Hungary. In some other countries – most notably Latvia – compensation of employees rose faster than the average annual labour cost.

The LCS reports wages and salaries that are higher than wages and salaries based on NA data in most countries (see column 2). This most likely reflects the differences in the coverage of enterprises and sectors, as is also observed in the comparison of NA/ADM data and SES data: whereas NA data cover the whole economy, the LCS only covers the NACE Rev. 2 sections B-S (excluding O) and enterprises with 10 or more employees, where wages are usually higher.

If we look at Table 1 and Table 2, the divergence between annual wages and salaries from the LCS and NA data is similar to the divergence between SES and NA data. Again, using Austria as the benchmark, wages in the EU28 according to the LCS data are slightly lower than according to NA data; however, the differences between countries overshadow this observation.

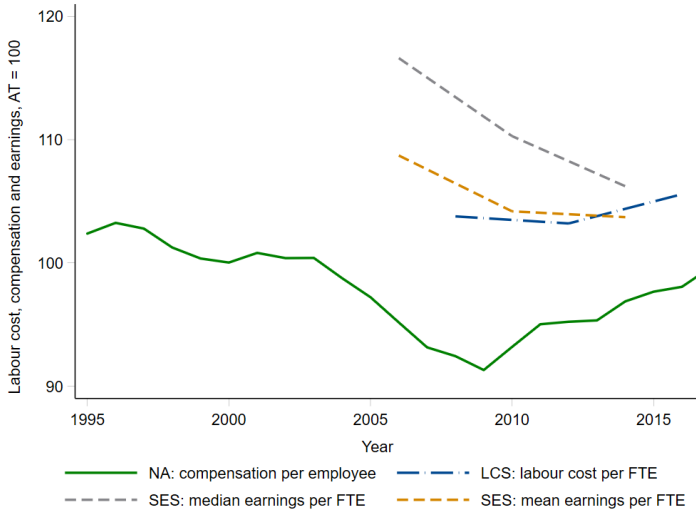
Lastly, Table 2 shows wages and salaries in 2016 deflated by the real CPI, using 2012 as the base year and using PPP in 2010. In general, the differences between the data sources are relatively small, apart from in Greece, Hungary and Latvia.

3.5. COMPARISONS OF LABOUR COST, COMPENSATION AND GROSS EARNINGS OVER TIME FOR SELECTED COUNTRIES

This section looks at the levels of, and developments in, labour cost, compensation and earnings within individual countries, each relative to the level in Austria. Examination of these concepts across our selection of countries from various European regions shows how the proportion of labour cost, compensation and earnings (which equal wages and salaries) varies relative to Austria. This has important implications for the selection of indicators, when comparing the development of wages or wage-related concepts to the situation in Austria. It shows how comparisons of wellbeing and living conditions of citizens, domestic demand and a country's competitiveness might vary according to different data sources and indicators.

Figure 7 shows the developments in labour cost, compensation of employees and earnings over time in Germany, relative to developments in Austria. We can see that between 2008 and 2016, the level of labour cost in Germany was slightly above that in Austria. The German level of compensation of employees matched the Austrian level in the late 1990s and early 2000s; declined to 92% of the Austrian level in 2009; and then started catching up again, finally matching Austrian levels in 2017. Meanwhile, average earnings in Germany have been consistently higher than in Austria. Moreover, we can see that in Germany median wages have again been consistently higher than in Austria, although developments in recent years suggest a convergence of the two countries' median wage levels.

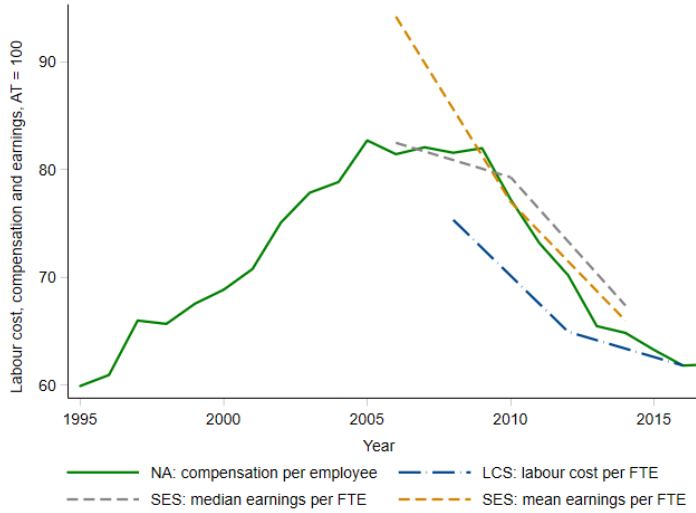
Figure 7 / Labour cost, compensation and earnings of employees in Germany, CPI 2010 deflated and PPP 2010, AT = 100



Note: NA – National accounts, LCS – Labour Cost Survey, SES – Structural Earning Survey.
Source: Eurostat.

Figure 8 shows the development of labour cost, compensation per employee and earnings in Greece, in comparison to Austria, using NA, LCS and SES data. The levels of labour cost, compensation and earnings relative to Austria are very similar and develop consistently over time. Generally, labour cost in Greece relative to labour cost in Austria is lower than compensation per employee and mean earnings (again relative to Austria). To some extent, the LCS 2008 and SES 2006 waves are exceptions to this observation, as the differences observed are much bigger in those years than subsequently.

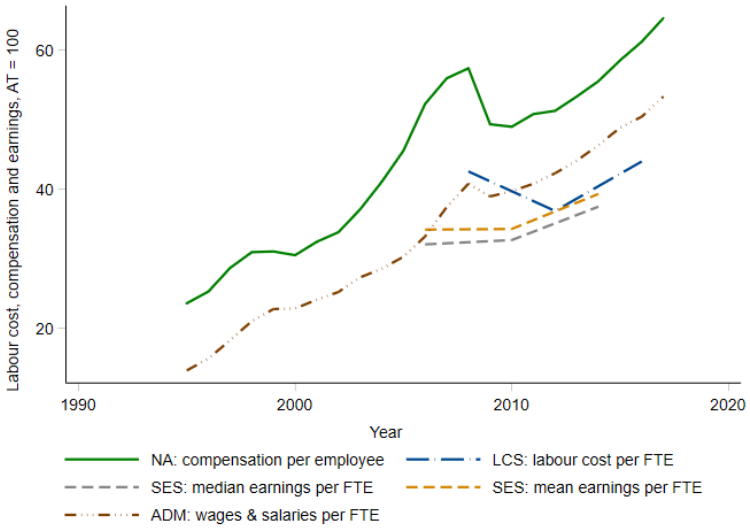
Figure 8 / Labour cost, compensation and earnings of employees in Greece, CPI 2010 deflated and PPP 2010, AT = 100



Note: NA – National accounts, LCS – Labour Cost Survey, SES – Structural Earning Survey.
Source: Eurostat.

Figure 9 shows the development of labour cost, compensation per employee and earnings in Lithuania, relative to Austria, using NA, LCS, SES and ADM data. The inclusion of compensation and labour cost from the NA and LCS data does not make much of a difference to the picture for just wages and salaries (Figure 4). In Lithuania, compensation per employee (just as wages and salaries) reported in the NA data is closer to Austrian levels than are wages and salaries reported in ADM or SES data. Over the observed time period, Lithuanian labour cost makes up approximately the same proportion of Austrian labour cost as Lithuanian wages make up of Austrian wages.

Figure 9 / Labour cost, compensation and earnings of employees in Lithuania, CPI 2010 deflated and PPP 2010, AT = 100

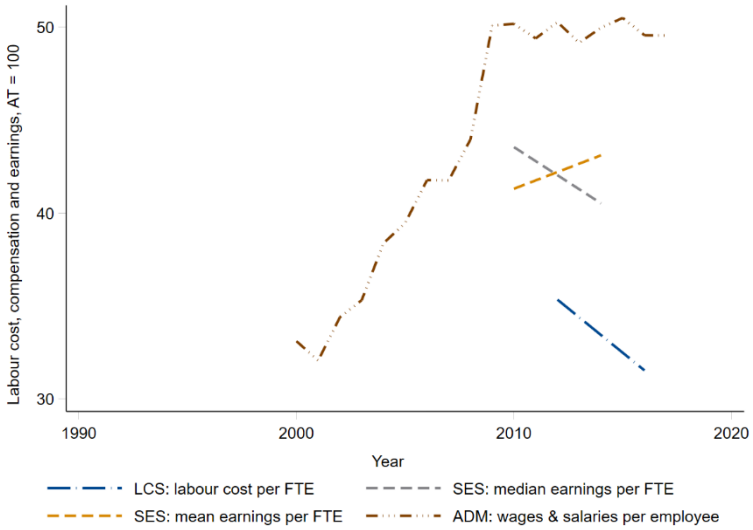


Note: NA – National accounts, LCS – Labour Cost Survey, SES – Structural Earning Survey, ADM – Administrative data based on surveys or tax records. NA wages used as proxy for Austrian ADM wages.
Source: Eurostat, wiiw Annual Database.

Figure 10 displays the development of labour cost and earnings in North Macedonia, relative to Austria, using LCS, SES and ADM data. Relative to Austrian wages, North Macedonian earnings observed in the SES are quite a bit lower than wages observed using ADM data. Labour cost in North Macedonia made up only approximately 33% of labour cost in Austria between 2012 and 2016, while earnings constituted 42-50% of Austrian average earnings. This reflects the fact that components of labour cost besides wages and salaries are lower in North Macedonia than in Austria.

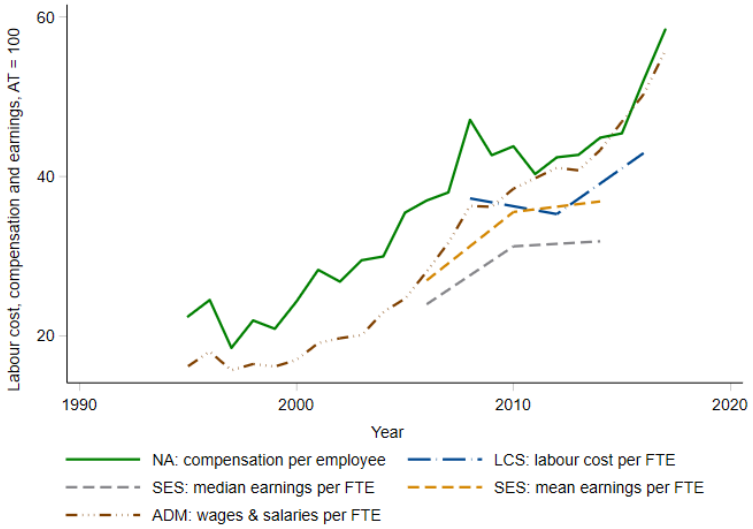
Figure 11 shows the development of labour cost, compensation per employee and earnings in Romania, relative to Austria, using NA, LCS, SES and ADM data. The patterns regarding compensation of employees in the NA data do not differ much from the patterns for wages and salaries in the NA data (see Figure 6). Likewise, Romanian labour cost makes up a similar proportion of Austrian labour cost as Romanian wages make up of Austrian wages.

Figure 10 / Labour cost, compensation and earnings of employees in North Macedonia, CPI 2010 deflated and PPP 2010, AT = 100



Note: LCS – Labour Cost Survey, SES – Structural Earning Survey, ADM – Administrative data based on surveys or tax records. NA wages used as proxy for Austrian ADM wages.
Source: Eurostat, wiiw Annual Database.

Figure 11 / Labour cost, compensation and earnings of employees in Romania, CPI 2010 deflated and PPP 2010, AT = 100



Note: NA – National accounts, LCS – Labour Cost Survey, SES – Structural Earning Survey, ADM – Administrative data based on surveys or tax records. NA wages used as proxy for Austrian ADM wages.
Source: Eurostat, wiiw Annual Database.

4. Conclusion

This report has assessed the comparability of four commonly used data sources for information on labour cost, compensation of employees, and wages and salaries – namely, national accounts data, the Labour Cost Survey, the Structure of Earnings Survey and administrative data. These indicators are frequently used to assess the wellbeing and living conditions of citizens, domestic demand and a country's competitiveness (Carlin et al., 2001; Fritsch et al., 2019). In much of the existing literature, differences regarding the coverage of a country's economy, the concepts used (labour cost, compensation, wages and salaries, gross earnings) and the measurement units used (employees, FTE) are often neglected, which renders comparisons of wage levels and trends either difficult or misleading.

We first provided an overview of the components included in the concepts of labour cost, compensation of employees, wages and salaries, and gross earnings, and show how these relate to each other. Secondly, we described the data sources' coverage of a country's population, sectors or specific enterprises, and summarised the concepts and measurement units used for each data source. At the start of section 3 we discussed how methodological differences might result in data diverging between the sources. The results indicate that wages reported in LCS and SES data tend to be higher than in NA and ADM data, because 1) the former do not cover certain parts of the economy, where lower wages prevail, and 2) they use FTEs instead of the number of employees. The comparability of data from ADM and other sources is particularly challenging, because the use of concepts and measurement units also varies between countries.

Lastly, we examined the data from the different sources to see how the methodological differences identified between data sources are reflected in the levels of, and developments in, wages and related concepts. By illustrating the levels and developments relative to Austrian wages, we sought to provide insights into how comparisons of living conditions might vary, depending on the use of different or multiple data sources. We implemented four sets of comparisons: first, we compared wages and salaries from NA, SES and ADM data in euros, at PPP and real CPI deflated and PPP adjusted for all available countries. Then, we chose five countries (DE, EL, LT, MK, RO) and showed how wages and salaries from all available sources changed over time, relative to Austria. Third, we compared labour cost, compensation, and wages and salaries in NA and the LCS, using values in euros, at PPP and real CPI deflated and PPP adjusted for all available countries. And fourth, we returned to our five selected countries and showed how labour cost, compensation, and wages and salaries developed over time, relative to Austrian labour cost, compensation, and wages and salaries.

On the basis of these comparisons, we discussed how the differences identified between data sources are reflected in assessments of the levels of, and developments in, wages and related concepts. We show that the choice of a data source and indicators will greatly affect the results of analysis. This is particularly true when wage levels and developments are compared between countries, and when one must rely on administrative data sources, which do not share a common methodology between countries.

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6. Appendix

Table A1 / Overview of wage data available in national accounts, the Labour Cost Survey, the Structure of Earnings Survey and administrative data

Data source	Population	Coverage	Variable	Unit of observation			Concept of wages				Time			Description
				Employees:										
				FTE	Full time	Head count	Compensation	Labour costs	Gross wages	Net wages	Year	Month	Hour	
National accounts (NA)	National accounts combine data from many source statistics. The concept of statistical population is not applicable in an NA context. In principle, national accounts are comprehensive. This means that all resident statistical units are covered. National accounts describe the total economy of a country.	The time coverage of NA data produced by countries and published by Eurostat varies from country to country and depends on the length of the time series transmitted by the countries. In general, the time series published correspond to the requirements defined in Annex B of the ESA 2010 Regulation. Most of the data series in the transmission programme start in 1995, but there are several exceptions. If countries provide Eurostat with longer time series than required in the transmission programme, Eurostat will also publish them. Countries may also sometimes provide shorter time series as a result of temporary derogations. available according to NACE Rev.2 (64 activities)	**Compensation of employees**			x	x				x		x	**Compensation of employees** consists of wages and salaries in cash or in kind (D.11) and an employer's actual and imputed social contributions (D.121 and D.122).
			Wages and salaries			x			x		x		x	**Wages and salaries** include wages and salaries in cash and kind (also including social security contributions payable by the employee).
Labour Cost Survey (LCS)	Enterprises with 10 or more employees in all economic activities, excluding agriculture, fishing, public administration, private households and extraterritorial organisations; including apprentices.	**Surveys done 1996, 2000, 2004, 2008, 2012 and (2016)** **LCS 2008, 2012, 2016:** NACE Rev. 2 sections B to S (excluding section O). Some countries also provided data for section O. **LCS 2000, 2004 and 2008:** NACE Rev. 1.1 Sections C to K, as well as M to O (for 2004). Some countries also provided data in respect of sections A, B and L. Five **size categories** are distinguished: 10 to 49 employees, 50 to 249 employees, 250 to 499 employees, 500 to 999 employees and units with at least 1,000 employees. Some countries also provide information on a sixth size category (fewer than 10 employees). 'The data are collected by the National Statistical Institutes in most cases on the basis of stratified random samples of enterprises or local units, restricted in most countries to units with at least 10 employees. The stratification is based on economic activity, size category and region (where appropriate). Regional metadata is identical to the metadata provided for national data. **Some countries also complement the survey results with administrative data.** Monetary variables are expressed in EUR, national currencies (for non-euro-area countries) and Purchasing Power Standards (PPS).' (Eurostat, 2019b)	**Labour cost**	x				x			x	x	x	**Yearly labour cost** refers to the total expenditure borne by employers for the purpose of employing staff. It includes employee compensation, which mainly comprises gross wages and salaries in cash and in kind and employers' social security contributions, vocational training costs, other expenditure, such as recruitment costs and spending on working clothes, and employment taxes regarded as labour costs, minus subsidies received. **Monthly labour cost** per employee is the annual labour cost divided by 12 and by the average number of employees during the year (converted into full-time equivalents). **Hourly labour cost** is annual labour cost divided by the number of hours worked during the reference year.
			Wages and salaries	x					x		x	x	x	**Wages and salaries** include wages and salaries in cash and kind (also including social security contributions payable by the employee)

contd.

Table A 1 / contd.

Data source	Population	Coverage	Variable	Unit of observation			Concept of wages				Time			Description
				Employees:										
				FTE	Full time	Head count	Compensation	Labour costs	Gross wages	Net wages	Year	Month	Hour	
Structure of Earnings Survey (SES)	The statistics refer to enterprises with at least 10 employees in the areas of economic activities defined by NACE Rev. 2 sections B to S (excluding O), NACE Rev. 1.1 sections C-O (excluding L).	The 'economic activity' is coded in NACE Rev. 2, whereas the 'occupation' is coded according to the International Standard Classification of Occupations (ISCO-08). Number of hours paid includes all normal and overtime hours worked and remunerated by the employer during the reference month. Hours not worked but nevertheless paid are counted as 'paid hours' (e.g. for annual leave, public holidays, paid sick leave, paid vocational training, paid special leave, etc.).	**Mean gross earnings**	x					x		x	x	x	**Mean annual gross earnings** also cover all 'non-standard payments', i.e. payments not occurring in each pay period, such as: 13th or 14th month payments, holiday bonuses, quarterly or annual company bonuses and annual payments in kind. **Mean monthly gross earnings** in the reference month cover remuneration in cash paid before any tax deductions and social security contributions payable by wage earners and retained by the employer, and are restricted to gross earnings which are paid in each pay period during the reference month. **Mean hourly gross earnings** are defined as gross earnings in the reference month divided by the number of hours paid during the same period.
			Median gross earnings	x					x		x	x	x	**Median earnings** are defined so that half of the population earns less than this value and the other half earns more.
Administrative data	The statistics refer to all enterprises, institutions and organisations; in some countries the surveys cover enterprises with a certain minimum limit on employees: HU enterprises with more than 5 employees, MD enterprises with more than 20 employees until 2010, KZ exclude small enterprises engaged in entrepreneurial activity and UA reports enterprises with 10 or more employees from 2010.	Administrative data are based either on monthly or annual earnings surveys that provide information on employees and wages. Data are supplemented by information from tax records or social security data (e.g. for employees working for sole proprietors) and with information from the public administration. Recently these surveys have come to be replaced more and more by wage tax administration data or social security data. The surveys cover all economic activities (NACE Rev. 2 sections A-U).	**Average gross monthly wages**	x	x	x			x					**Average annual gross wages** per employee are derived from average monthly gross wages per employee, which are multiplied by 12 months. The unit of observation for employees is not entirely uniform – i.e. most countries provide their monthly wages per employee (heads), while others such as BG, CZ, EE, LV, LT, PL and RO provide their monthly wages per full-time equivalent (FTE) and Hungary only provides wages for full-time employees.

Source: Eurostat metadata.

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Wien 6, Rahlgasse 3

ZVR-Zahl: 329995655

Postanschrift: A 1060 Wien, Rahlgasse 3, Tel: [+431] 533 66 10, Telefax: [+431] 533 66 10 50
Internet Homepage: www.wiiw.ac.at

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