How does urbanization affect the average working hours? Evidence from Spain and Germany

Abstract

In general, people work to serve their own needs. However, a number of physical and mental health issues arise with excessive work, aggravated by recent changes in the workplace. One factor that could be examined is urbanization, as it has affected the working patterns of people across multiple industries, such as agriculture and tourism. In particular, this paper examines how the degree of urbanization in a region affects the number of average monthly working hours employees worked in Spain and Germany in 2021. This paper determines the values for the two variables for each region of the two countries and performs linear regression to assess the relationship between them. The results show that the correlation between the two variables is rather weak, although it is significantly stronger in Germany, due to the former divide between East and West Germany.

Introduction

A number of reasons have been suggested to explain why people work. In particular, a combination of personal, social, as well as financial, reasons have been considered as reasons for people working. In order to further serve their needs, people often resort to working overtime. However, this has shown to have significant negative effects on employees' physical and mental health. The situation is further aggravated by recent developments in the workplace, often in response to the COVID-19 pandemic, which has increased job insecurity among employees. Therefore, it is important to identify potential reasons as for why people work longer hours in specific regions, in order to direct policy to decrease working hours, thus increasing the employees' physical and mental health.

One factor that could be examined is urbanization. Urbanization has been historically tied to the industrialization and economic growth of a country, yet it is an ongoing process, as the deindustrialization of major cities tends to move industries away, towards new areas, which are then urbanized. This factor could have an impact on the number of average monthly working hours people work on a regional basis, as urbanization has been shown to affect the working patterns of people in different sectors of the economy, such as agriculture and tourism. In particular, the increase of urbanization tends to decrease the percentage of people living in rural areas, as they are attracted by the prospect of higher-paying, more stable jobs in cities. On the contrary, the presence of tourism has a multiplier effect on other industries, thus helping urbanize new areas. Therefore, this paper examines how the degree of urbanization of a region itself, the independent variable of this study, affects the number of working hours employees work on average, which is the dependent variable.

In particular, this paper will examine the relationship between the two variables in the context of Spain and Germany, for the year 2021. Both countries share similarities in the way they are divided, as they are both rather decentralized countries. Moreover, both countries have

particular regions which are considered to be more industrialized than others. In addition, both countries are members of the European Union, and thus use similar definitions for urbanization and the way they define working hours. Nonetheless, the two countries are also affected by factors individually. On one hand, Germany is significantly affected by the former division of the country in West and East, which used to be two countries with significantly different economic models. On the other hand, Spain is considerably affected by tourism, which seemingly contributes much to the urbanization of certain regions.

This paper will use a combination of data sources, in order to determine the degree of urbanization and average number of monthly working hours for each region of the two countries. In particular, the majority of the data used is from the statistical agencies of Germany and Spain, with supplementary data provided by Eurostat. In general, the data sources show the data for the two countries in different forms. Specifically, the German data provides clear percentages for the urbanized population of each region, whereas the Spanish data is derived from dividing the total population of all urban areas in an autonomous community over the total population of said community. Moreover, the German data on working hours shows the number of annual working hours for 2021, whereas the Spanish data shows the monthly working hours for each quarter of 2021. As such, an average number of monthly working hours is used as a compromise. After determining the values of the two variables, linear regression is performed to assess the relationship and correlation between the two variables.

The results of this study show that the correlation between the degree of urbanization and the average number of monthly working hours is rather low. This happens as both variables are affected by other factors, as explained above. However, Germany demonstrates a higher, as well as negative, correlation between the two variables, as the historical division of Germany affects both the regional degrees of urbanization and the number of average monthly working hours. In the case of Spain, a slightly positive correlation is shown between the two variables. However, considering the lack of any significant factor in determining the average monthly working hours in Spanish regions, the correlation between the two variables is very low and insignificant.

This study is affected by a number of limitations, such as not examining the impact of other factors affecting the number of working hours, including but not limited to the COVID-19 pandemic. However, it demonstrates the importance of regional factors in determining the number of working hours employees work on average in a region, and could be useful in identifying regions where the issue of excessive working hours is prominent, thus helping organize plans to decrease the number of working hours. Moreover, this study could direct further research on other factors affecting the average number of monthly working hours employees work in different regions.

Working hours: Implications and Global Trends

A number of potential reasons have been suggested for explaining why people work. One model of these reasons suggests establishing four different groups: namely, social reasons, personal reasons, financial reasons, and generative reasons. In other words, the model suggests

that people choose to work for a combination of meeting essential needs, interacting with other people, for personal satisfaction and self-esteem, as well as for sharing knowledge with others. (Dendinger et al. 24).[1] Another model has been proposed by Morin, which references thirty points about why people choose to work, which can be further categorized into specific groups, such as the usefulness of work and its social contribution, cooperation, ensuring wages and personal autonomy, responsibility and promoting a spirit of service, recognition, using skills and providing opportunities for learning (Pignault and Houssemand 5).[2] Through comparing the two models, it can be concluded that people choose to work in order to ensure not only their financial needs, but also their social needs, their personal valorization, and using and expanding their skillset.

Special consideration needs to be taken into account when considering people working overtime. A number of reasons have been suggested as for why people choose to work overtime; Liu et al. suggest that the main reason for working overtime is ensuring financial stability and security, based on evidence from China (Liu et al, 10)[3], while Kanai et al. suggest that working overtime is typically not related to personal reasons, such as self-esteem and drive to work, but rather related to cultural differences among countries and individuals (Kanai et al, 421)[4] While working overtime may help individuals achieve their aims, a number of potential health concerns have been raised, such as chronic fatigue, stress, as well as increased alcohol abuse and smoking, among others (Wong et al, 1)[5]. Bannai and Tamakoshi also suggest further health issues associated with excessive working hours, such as depression, anxiety, sleep-associated problems, as well as coronary heart disease (Bannai and Tamakoshi, 15)[6]. Therefore, it is important to consider potential factors that could contribute to people overworking.

One also needs to acknowledge that the number of hours employees work are dependent on a number of factors. Having established the reasons why people work above, it can be stated that people work enough hours to satisfy their needs. However, a number of trends have also been shown to affect this number of hours. Recent years have posed challenges to the work environment, such as adapting to the COVID-19 pandemic and the demographic changes in aging populations. A number of changes to the workplace have been proposed with regards to these challenges; however, some of these changes have resulted in increased insecurity in the

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[1] Dendinger VM, Adams GA, Jacobson JD. Reasons for Working and Their Relationship to Retirement Attitudes, Job Satisfaction and Occupational Self-Efficacy of Bridge Employees. The International Journal of Aging and Human Development. 2005;61(1):21-35. doi:10.2190/K8KU-46LH-DTW5-44TU

[2] Pignault A, Houssemand C. What factors contribute to the meaning of work? A validation of Morin's Meaning of Work Questionnaire. Psicol Reflex Crit. 2021 Jan 4;34(1):2. doi: 10.1186/s41155-020-00167-4. PMID: 33394182; PMCID: PMC7782669.

[3] Liu Bei et al. Why Work Overtime? A Systematic Review on the Evolutionary Trend and Influencing Factors of Work Hours in China. Front. Public Health 7:343. doi: 10.3389/fpubh.2019.00343

[4] Kanai, Atsuko et al. An International Comparison of Factors Related to Long Work Hours. Japanese Psychological Research, Volume 64, No. 4, 410–425. doi: 10.1111/jpr.12338 2022

[5] Wong, Kapo et al. The Effect of Long Working Hours and Overtime on Occupational Health: A Meta-Analysis of Evidence from 1998 to 2018. International Journal of Environmental Research and Public Health, 2019, 16, 2102; doi:10.3390/ijerph16122102

[6] Bannai A, Tamakoshi A. The association between long working hours and health: A systematic review of epidemiological evidence. Scand J Work Environ Health. 2014;40(1):5–18. doi:10.5271/sjweh.3388

workplace. As such, employees may be forced to work longer hours and around the clock, with negative effects on their health and social needs. (Anttila et al. 290)[7]. As such, examining the conditions that lead to people overworking will be useful in mitigating the negative effects associated with this condition, as well as the recent changes in the workplace.

Urbanization and its Relationship with Working Hours

One factor that could be examined is urbanization. Historically, the primary, agricultural, sector of the economy has been described as passive, whereas industrialization through the secondary sector has resulted in economic growth. In order to achieve this economic growth, the accumulation of human capital is considered essential; as such, people originally coming from rural areas are attracted to dense urban areas, thanks to the gap in income. Combined with the agglomeration economies developed in cities and the use of more modern technological means in production, this process of urbanization of a country's population has been tied to said country's economic growth. (Henderson 3)[8]. Moreover, already industrialized cities experience deindustrialization, as they shift to the tertiary sector and become service centers, with industries moving to new areas; however, as cities rely on the tertiary sector, the concentration of people in cities is still required. (Henderson 23)[9]. Overall, the process of urbanization is associated with a country's economic growth, in all stages of a country's development.

This process of urbanization has caused change in the working patterns of people across multiple industries. One such example is the agricultural industry. As mentioned above, urbanization has been a result of the industrialization and economic growth of societies. As societies become more developed, they tend to offer high-paying and stable jobs. On the other hand, agriculture is characterized by low labor productivity, job insecurity, thus driving people away from the primary sector. (Christiaensen et al. 3)[10]. Moreover, the technological advancements within the industry have resulted in decreased demand for manual labor. (Christiaensen et al. 6)[11]. As such, urbanization has brought changes in the agricultural sector, which ultimately result in an alteration of people's working conditions and working hours. It also needs to be noted that the agricultural sector is often seasonal. (Christiaensen at al. 3)[12]. As such, the working hours of employees may be unevenly distributed throughout the year, as some workers could only work a considerable number of hours for a small period of time, while working little hours for a larger period. Therefore, it can be argued that the average monthly working hours of employees in the agricultural sector are low; furthermore, with urbanization and industrialization driving away potential employees from agriculture towards more stable

[7] Anttila, Timo et al. Working hours – tracking the current and future trends. Industrial Health 2021, 59. doi: 10.2486/indhealth.2021-0086
[8] Henderson, J. Vernon. Urbanization and the Geography of Development. World Bank, November 2013.
[9] Henderson, J. Vernon. Urbanization and the Geography of Development. World Bank, November 2013.
[10]Christiaensen, Luc et al. Viewpoint: The future of work in agri-food. Food Policy, Volume 99, 2021, 101963, ISSN 0306-9192, doi: 10.1016/j.foodpol.2020.101963.
[11] Christiaensen, Luc et al. Viewpoint: The future of work in agri-food. Food Policy, Volume 99, 2021, 101963, ISSN 0306-9192, doi: 10.1016/j.foodpol.2020.101963.
[12] Christiaensen, Luc et al. Viewpoint: The future of work in agri-food. Food Policy, Volume 99, 2021, 101963, ISSN 0306-9192, doi: 10.1016/j.foodpol.2020.101963.

jobs, where people work consistently throughout the year, a tendency towards higher working hours can be assumed.

Another industry where strong links with urbanization have occurred is tourism. In particular, Liao and Zhang suggest that the development of tourism in a city results in an increase in the area's urbanization degree, as people who formerly worked in the agricultural sector have shifted to working in the tourism industry (Liao and Zhang, 3)[13]. Moreover, the study also suggests that the rise in tourism has resulted in the increase in job opportunities in other industries, such as housing and transportation (Liao and Zhang, 3)[14]. In addition, Parrilla-Gonzalez suggests that tourism can have a particularly positive effect on medium-sized cities, as it generates a multiplier effect on other industries through the enhancement of endogenous resources (Parrilla-Gonzalez 1)[15]. In general, tourism can generate significant job opportunities in the secondary and tertiary sector, thus increasing the demand for an urbanized population, as explained previously. However, the tourism sector is also characterized by excessively long working hours. (Future of Work in the Tourism Sector, 12)[16]. Therefore, urbanization due to tourism can have a significant impact in increasing the average monthly working hours of a region, as an increasing percentage of the population relies on the tourism sector.

Overall, in order to achieve economic growth, countries pursue the development of the secondary and tertiary sectors. In turn, this ensures that an urbanized population is needed, as the agglomeration of human capital is required to achieve growth. The advancements in a number of industries have shown that developed countries will have a high degree of urbanization; moreover, the stable work environment offered by most jobs in the secondary and tertiary sector, as well as the long working hours associated with tourism, indicate that an increase in an area's urbanization will indirectly be correlated to a higher number of working hours, compared to a less urbanized region.

Settings and Context

In order to understand this paper, it is necessary to provide an overview of how Spain and Germany are divided into administrative regions. On one hand, Spain is a decentralized unitary state under a parliamentary monarchy, consisting of seventeen autonomous communities and two autonomous cities, namely Ceuta and Melilla. These autonomous communities and cities have a degree of autonomy with regards to promoting their local culture and administering resources

[13] Liao, Min, and Zhang, Tao. Research on the Influences of Tourism on the Process of Local Urbanization in Western Regions: Taking Heavenly Pond in Tianshan Scenic Spot of Xinjiang Province as an Example. Advances in Economics, Business and Management Research, volume 165. 2020.

[14] Liao, Min, and Zhang, Tao. Research on the Influences of Tourism on the Process of Local Urbanization in Western Regions: Taking Heavenly Pond in Tianshan Scenic Spot of Xinjiang Province as an Example. Advances in Economics, Business and Management Research, volume 165. 2020.

[15]:Parrilla-González, J.A. Does the Tourism Development of a Destination Determine Its Socioeconomic Development? An Analysis through Structural Equation Modeling in Medium-Sized Cities of Andalusia, Spain. Land 2021, 10, 378. doi: 10.3390/land10040378

[16] The future of work in the tourism sector: Sustainable and safe recovery and decent work in the context of the COVID-19 pandemic. International Labor Organization, Geneva, 2022.

within their own region. Nevertheless, the state exercises significant political power, and can seize power away from autonomous communities through the Senate, if the actions by the autonomous communities are deemed unconstitutional. This shows that states are able to create their own local policies, but are significantly restricted by the state[17]

Figure 1. *The autonomous communities and cities of Spain*[18]

On the other hand, Germany is a federal state under a parliamentary republic, which consists of sixteen federal states. Three of these states are considered to be city-states, namely Berlin, Hamburg, and Bremen. Compared to Spain, the German states have a higher degree of autonomy, ranging from punishment for crimes, salaries and benefits of public employees, education, and taxation. As such, differences in policies on working hours could be more significant than the ones in Spain. In addition, the states are granted the right and duty to "execute federal statutes as matters of their own concern in so far as this Basic Law does not otherwise provide or permit". [19]

[17] European Committee of the Regions. "Spain Intro." Accessed May 3, 2023. https://portal.cor.europa.eu/divisionpowers/Pages/Spain-intro.aspx.
[18] ResearchGate. "[The 17 Spanish Autonomous Regions]." Accessed May 3, 2023. https://www.researchgate.net/profile/Tomas-Garcia-Azcarate/publication/331459987/figure/fig4/AS:837830578294802@1576765784554/The-17-Spanish-Autonomous-regions-Source.png.
[19] European Committee of the Regions. "Germany Introduction." Accessed May 3, 2023. https://portal.cor.europa.eu/divisionpowers/Pages/Germany-Introduction.aspx.

Figure 2. *The states of Germany, including city-states. States in former West Germany are colored blue, whereas former East German states are colored yellow.*[20]

One significant factor that needs to be considered in this paper is the historical division of Germany in two different countries during the Cold War. In particular, following the end of World War II, Germany was divided into four occupation zones by the United States, the United Kingdom, France, and the Soviet Union, with Berlin being divided into four similar zones by itself. The three former occupation zones would eventually be turned into the NATO and EU member of West Germany, whereas the Soviet occupation zone was turned into the Warsaw Pact member of East Germany. The two countries operated using two vastly different economic models, until the eventual reunification of Germany in 1990. The introduction of the Deutsche Mark as the currency of East Germany shortly before reunification, as well as the mass privatization of public enterprises of East Germany, led to a significant rise in unemployment and a fall in economic output by two thirds, thus having a significant impact on the economy of East Germany.[21] As of 2018, it was reported that East Germans work more hours, while earning less, thus highlighting the disadvantageous position of the eastern German states.[22]

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[20] "[The States of Germany]." Accessed May 3, 2023. https://image.jimcdn.com/app/cms/image/transf/none/path/s66fbe0abd6f917b2/image/i860c54d5b01beeef/version/1512479710/image.png.
[21] Encyclopedia Britannica. "Germany - Economic Unification and beyond" Accessed May 3, 2023. https://www.britannica.com/place/Germany/Economic-unification-and-beyond.
[22] dw.com. "Eastern Germans Working More, for Less." Accessed May 3, 2023. https://www.dw.com/en/workers-in-former-east-german-states-work-more-for-less/a-45154141.

In both Spain and Germany, the industrialization of a region seems to serve as a key indicator of the urbanization of said region. Furthermore, the industries of Spain and Germany are not evenly distributed across the entire landmass of each country, but are concentrated in particular areas of each country. In the case of Spain, the country's industry has been traditionally regionalized, with some of the main industrial hubs of the country being the autonomous communities of the Basque Country, Asturias, Catalonia, and the Community of Madrid. In addition, different industries flourished in different communities, with the Basque Country and Asturias benefiting from mining, Catalonia from processing and engineering industries, and Madrid from being a major manufacturing center.[23]

Industrialization is also prominent in the case of Germany, which has been described as a "processing economy". In particular, industrialization has been particularly prominent in multiple parts of West Germany, including the Ruhr valley in the state of Nordrhein-Westfalen, which benefits from heavy industry, the southern states of Bavaria (Bayern) and Baden-Wurttemberg, where automotive production is significant, and areas surrounding major cities such as Frankfurt in Hessen, Hannover in Niedersachsen, Stuttgart in Baden-Wurttemberg, and Munich in Bavaria, with multiple types of industry being concentrated there. Industrialization was also present in East German territory, most prominently in Saxony (Sachsen), but also in the southern East German states of Sachsen-Anhalt and Thuringia (Thuringen).[24] However, the reunification of Germany led to mass privatization of once publicly-owned East German industries, leading to a significant number of industries closing down, thus diminishing East German economic output in the secondary sector.[25]

Spain also exhibits a correlation between tourist arrivals and urbanization in a specific province. According to data by the Spanish National Institute of Statistics, the autonomous communities of Spain that have the greatest number of tourists per year are Catalonia, the Valencian community, Andalusia, the island communities of the Balearic and Canary Islands, as well as the Community of Madrid. Specifically, these communities accommodate more than two million tourists per year, in contrast to the less than a million tourists per year in all other Spanish autonomous communities.[26] It is of particular importance to note that all of these communities exhibit extremely high levels of urbanization, exceeding 85% in every one of the aforementioned communities. As such, a correlation between tourism and the urbanization degree of each autonomous community of Spain is to be accounted for.

Tourism is also present in Germany. Specifically, according to data by the German Travel Association, tourism is more prevalent in the southern states of Bavaria and Baden-Wurttemberg,

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[23] CountryStudies. "Spain - INDUSTRY - Regional Concentration." Accessed May 4, 2023. https://countrystudies.us/spain/63.htm.
[24] CountryStudies. "Germany - Industry." Accessed May 4, 2023. https://countrystudies.us/germany/145.htm.
[25] Encyclopedia Britannica. "Germany - Economic Unification and beyond" Accessed May 3, 2023. https://www.britannica.com/place/Germany/Economic-unification-and-beyond.
[26] Instituto Nacional de Estadística (Spanish National Institute of Statistics). "Número de turistas según comunidad autónoma de destino principal." Accessed May 4, 2023. https://www.ine.es/jaxiT3/Datos.htm?t=23988.

as well as in the northern, coastal states of Niedersachsen, Schleswig-Holstein, both of which is former West German territory, as well as the eastern state of Mecklenburg-Vorpommern. Moreover, tourism is also important for a number of cities, such as Berlin, Munich, Hamburg, and Dresden.[27] However, the German economy is not reliant on tourism for income, as more money is spent by German tourists abroad than by foreign tourists in Germany.[28] As such, the impact of tourism in German urbanization appears to be rather limited.

Overall, a significant limitation of the study is that it is not feasible to account for all the factors that cause a higher or lower degree of urbanization and more or less average working hours in every region of the two countries. However, industrial concentration seems to affect urbanization prospects in both countries. Furthermore, different determinants of urbanization and average working hours can be used on a per country basis, such as the prevalence of tourism in Spain and the West-East divide in Germany.

Data and Methods

In order to examine whether the degree of urbanization affects the average monthly hours an employee works, this paper compares data from two different countries of the European Union, namely Spain and Germany, which will be separated by region (called autonomous community in Spain, and state in Germany). As such, this paper will assess whether more urbanized areas in a country result in people working longer hours per month, but also whether the degree of urbanization in a region has a bigger impact on the average working hours compared to the country itself.

For the purposes of this paper, the urbanized population of a country lives in urban centers and clusters. An urban center is defined as a densely populated area, as defined by the European Union's Degree of Urbanization (DEGURBA) Level 1, whereas the urban cluster is defined through DEGURBA Level 2. For the degree of urbanization of a region to be defined, the European Union uses 1 km^2 square regions. For a region to be classified at minimum as an urban cluster, which is the minimum requirement for an area to be considered urbanized, it needs to be comprised of contiguous squares with a minimum density of 300 inhabitants per km^2 , and the total population of the contiguous cells to be a minimum of 5000 people[29]. As such, urbanization is not defined strictly by the size of the community, but rather by its urban density and contiguity. For example, a community of 10,000 people living in close proximity to each other in a densely enough populated region may be considered as an urbanized area; on the contrary, a similarly sized population consisting of multiple villages with lower population density and away from each other will not be urbanized.

[27] "Der Deutsche Reisemarkt: Zahlen und Fakten 2021". Deutsche Reise-Verband (German Travel Association), March 2022.
[28] Encyclopedia Britannica. "Germany - Services." Accessed May 4, 2023. https://www.britannica.com/place/Germany/Services.
[29] Eurostat. "Background - Degree of Urbanisation." Accessed April 11, 2023. https://ec.europa.eu/eurostat/web/degree-of-urbanisation/background.

In addition, the paper will consider the average effective working hours an employee works, which are defined as the number of contractual working hours minus absent working hours[30]. An employee may work in any sector of a country's economy. In addition, for the purposes of this paper, the average working hours of an employee will be examined on a monthly basis, in order to use a common unit for both Germany and Spain, as the two countries' data are structured differently from each other.

For the degree of urbanization in Germany, this paper will use data from the "Grad der Verstädterung nach Fläche, Bevölkerung und Bevölkerungsdichte am 31.12.2021" (Degree of urbanization by area, population and population density on 31.12.2021) document, issued by the German Statistisches Bundesamt (Federal Statistical Office) on October 10th, 2022[31]. The document includes a 2021 estimate of the German population by state, gender, and population density. In particular, the population density is defined as one of three categories, namely densely populated (dicht besiedelt), medium-sized density (mittlere Besiedlungsdichte), and thinly populated (gering besiedelt), with the three categories corresponding to DEGURBA Levels 1, 2, and 3, respectively. As such, the document provides easily accessible data produced by a reliable public authority about the population of Germany in 2021, including data on urbanization by state. It needs to be noted that, amongst German states, three of them (Berlin, Hamburg, and Bremen) are classified as city-states, and their entire population is considered to live in densely populated areas, effectively making the percentage of urbanization in the three states equal to 100%. Therefore, the differences in working hours cannot be possibly explained by a different degree of urbanization, instead relying entirely on other factors, outside the scope of this study. As such, the three city-states will be excluded from the paper.

For the corresponding data from Spain, this paper will use data from a combination of sources. In particular, the data on the total population of each autonomous community in 2021 will be extracted from the open database of the Spanish "Instituto Nacional de Estadística" (National Institute of Statistics)[32]. Considering the lack of a source similar to the German document aforementioned, this paper will also make use of data from the document "Correspondence table LAU – NUTS 2021, EU-27 and EFTA / available Candidate Countries", produced by Eurostat using data from January 1st, 2021[33]. In particular, this document includes a list of all local communities of all countries of the European Union, including Spain, including their population. Moreover, the document also lists the degree of urbanization of each

[30] Pfeifer, Christian. Effective Working Hours and Wages: The Case of Downward Adjustment via Paid Absenteeism. University of Luneburg, Institute of Economics, Working Paper Series in Economics. 35. 2009.
[31] Statistisches Bundesamt (German Federal Statistical Office). "Grad der Verstädterung nach Fläche, Bevölkerung und Bevölkerungsdichte am 31.12.2021," October 10, 2022. https://www.destatis.de/DE/Themen/Laender-Regionen/Regionales/Gemeindeverzeichnis/Administrativ-Nicht/33-verstaedterung.html.
[32]Instituto Nacional de Estadística (Spanish National Institute of Statistics). "Población por comunidades y ciudades autónomas y tamaño de los municipios." Accessed April 11, 2023. https://www.ine.es/jaxiT3/Datos.htm?t=2915.
[33] Correspondence Table LAU – NUTS 2021, EU-27 and EFTA / Available Candidate Countries. Eurostat, 2022.

community, using the same DEGURBA Levels as the German document and as defined by the European Union. As such, by adding the population of all communities with DEGURBA levels 1 and 2 in each autonomous community and dividing over the total population of the community, the total urban population, as well as the percentage of urbanization in each autonomous community, may be identified. The combination of these two sources, both of which are from reliable public institutions, will provide data about the population of all urbanized areas (DEGURBA Levels 1 and 2) in Spain, which will then be grouped together by autonomous communities.

With regards to the average working hours in Germany, this paper will use data from the "Arbeitsvolumen in den Ländern der Bundesrepublik Deutschland 2000 bis 2022" (Volume of Work in the Federal States of the Federal Republic of Germany 2000 to 2022) document, published on February 2023 by the German State Statistics Offices[34]. In particular, this document includes data on the average yearly working hours in 2021 for all employees in Germany by state. As such, the data will be adjusted, so that the average working hours per month are found.

For the corresponding data in Spain, the paper will use data from the open database of the Spanish "Instituto Nacional de Estadística"[35]. The data offered through the database includes the average monthly working hours employees in each of Spain's autonomous communities worked for each quarter of 2021. As such, an average of the data for each quarter will be used, in order to determine the average working hours per month for the entirety of 2021. One issue arises, as the autonomous cities of Ceuta and Melilla are not included in the database, unlike in the Eurostat document on the urbanized communities of Spain. As such, the data from these two cities will not be included in the paper. Moreover, the two cities are also excluded, as the degree of urbanization would be equal to 100% of the total population of the two cities, similarly to Berlin, Hamburg, and Bremen in Germany.

For both countries, this paper will use data from the year 2021. This was done for two main reasons. The main reason is data availability and recency, as both countries produced sufficient data for this year. Moreover, the fact that the data is less than two years old would allow some of the findings to be extrapolated to a contemporary setting.

This paper will assume that the average monthly working hours an employee works in a country, which are similarly defined across the European Union, depends both on the policies of the country itself, as well as on the urbanization degree of each particular region of said country. As such, for both Spain and Germany, the paper will assume a linear regression model between the urbanization degree of a region (x) and the average monthly working hours in the region (β_c), which will also include a constant value for the entire country (γ_c):

$$\beta_C = \gamma_C + \gamma_R x$$

[34] Arbeitsvolumen in Den Ländern Der Bundesrepublik Deutschland 2000 Bis 2022. Statistische Ämter der Länder (German State Statistical Offices), 2023.

[35] Instituto Nacional de Estadística (Spanish National Institute of Statistics). "Tiempo de trabajo por trabajador y mes por comunidad autónoma, tipo de jornada, sectores de actividad." Accessed April 11, 2023. https://www.ine.es/jaxiT3/Datos.htm?t=6063.

By examining the two linear regression models produced for each of the two countries and plotting the two graphs on the same figure, the paper will examine whether a high urbanization degree is significantly associated with a high number of average working hours, while also taking count of the nationwide policies of both countries. Nevertheless, a number of limitations occur. For example, the impact of tourism is not examined, which may disproportionately affect the average monthly working hours of an employee in an otherwise less urbanized region. In addition, while the paper assumes that the policies of a country, as well as a region of a country, may play a role in affecting the average working hours of a region, the paper does not analyze any specific policy.

Results

This paper assesses the relationship between the degree of urbanization, expressed as a percentage of urbanized population, and the average monthly working hours, for states and autonomous communities of Germany and Spain, respectively, for the year 2021. This paper assumes that the increase of urbanization should increase the average monthly working hours, because of the shift away from the primary sector towards the secondary and tertiary sectors, which offer more stable work environments, as stated previously. In this section, the findings of this paper will be analyzed. Specifically, the paper will do a statistical analysis of the data on the urbanization degree and the average monthly working hours of each German state and Spanish autonomous community. After this analysis has been made, linear regression will be performed on the two sets of data from each country, in order to assess the correlation between the two variables in the context of the two countries.

Urbanization statistics

The two countries examined in this paper experience largely similar degrees of urbanization. In particular, the degree of urbanization exceeds 60% in every state of Germany and autonomous community of Spain. Moreover, in both of these countries, the percentage of urbanization is greater in regions where the secondary sector is highly prominent, such as the Basque Country in Spain, and Nordrhein-Westfalen in Germany.

For the case of Germany, I made use of the document produced by the German Statistics Office, which presented the percentage of the population of each state living in areas with European degrees of urbanization 1, 2, and 3, which are denoted as densely populated, areas of medium densely and sparsely populated areas in the original document. As such, the degree of urbanization of each state consists of the sum of the percentages of the population in degrees of urbanization 1 and 2.

State	Percentage DEGURBA 1	Percentage DEGURBA 2	Total
Baden-Wurttemberg	29.89%	52.80%	82.69%
Bayern	29.17%	38.67%	67.84%
Brandenburg	19.26%	50.29%	69.55%
Hessen	34.29%	48.91%	83.20%
Mecklenburg-Vorpommern	30.15%	24.61%	54.76%
Niedersachsen	23.72%	47.49%	71.21%
Nordrhein-Westfalen	54.70%	39.02%	93.72%
Rheinland-Pfalz	20.30%	47.71%	68.01%
Saarland	18.29%	69.35%	87.64%
Sachsen	41.16%	37.20%	78.36%
Sachsen-Anhalt	25.49%	38.13%	63.62%
Schleswig-Holstein	28.66%	42.50%	71.16%
Thuringen	22.77%	40.84%	63.61%

Table 1. *The percentage of urbanized population in each German state. The three city-states of Berlin, Hamburg, and Bremen, whose urbanization percentage is 100%, are excluded, as mentioned in the Data and Methods section.*[36]

[36] Source: Statistisches Bundesamt (German Federal Statistical Office). “Grad der Verstädterung nach Fläche, Bevölkerung und Bevölkerungsdichte am 31.12.2021,” October 10, 2022. https://www.destatis.de/DE/Themen/Laender-Regionen/Regionales/Gemeindeverzeichnis/Administrativ-Nicht/33-verstaedterung.html.

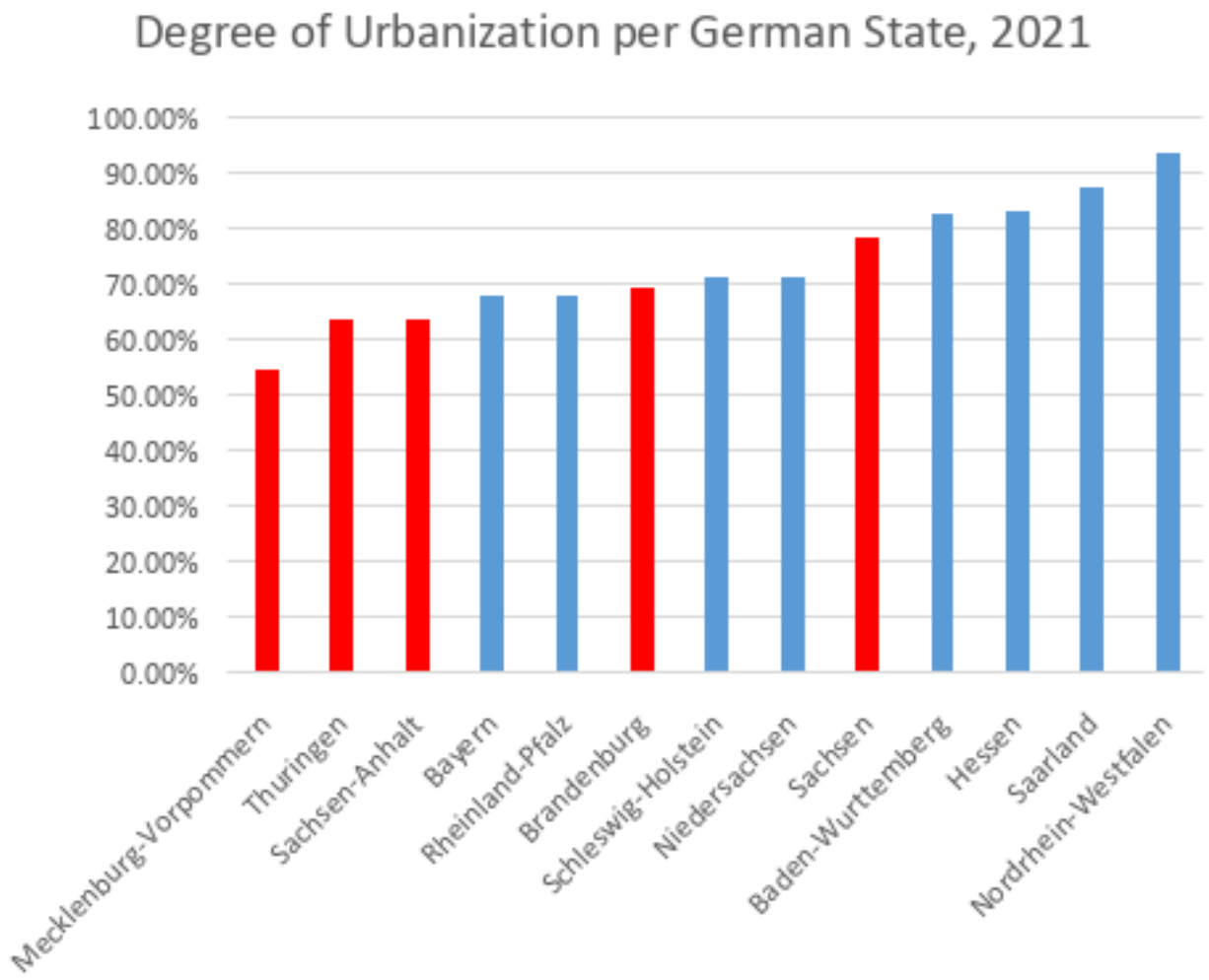

Figure 1. *Graph of the degree of urbanization of all included German states, sorted in ascending order East German states are denoted with red, and West German ones in blue.*

From the graph, it can be seen that Germany is highly urbanized, as the degree of urbanization exceeds 50% in each German state. However, there are a number of observations to be made. To begin with, it is evident that the states once part of East Germany are generally less urbanized than the West German states, as the three least urbanized states are all located in East Germany, and all East German states, with the exception of Sachsen, have urbanization degrees lower than 70%. Another observation to be made is that there is a relationship between urbanization and industrialization, as all five most urbanized states are states where large industrial areas are located, with the greatest industrial area in the most urbanized state, Nordrhein-Westfalen.

The data from Germany indicate an average degree of urbanization of 73.49%, with the standard deviation equal to 10.9775%. It needs to be noted that the average degree of urbanization is not equal to the actual percentage of urbanized population of Germany, as this data does not include the three city-states and the average percentage has been found through the

mean of each state's percentages of urbanization, thus ignoring the population of each state. Instead, this metric provides an approximation of how urbanized a German state is on average, and how much the standard deviation away from that mean is.

For Spain, I found all communities with degrees of urbanization 1 and 2, matched them by autonomous community, and divided the urbanized population over the whole population of each community, in order to find the degree of urbanization.

Autonomous Community	Total urbanized	Total of comunidad	Percentage urbanized
Andalucia	7468213	8472407	88.15%
Aragon	1007907	1326261	76.00%
Asturias	831184	1011792	82.15%
Balearic Islands	1026737	1173008	87.53%
Basque Country	2002793	2213993	90.46%
Canarias	2060627	2172944	94.83%
Cantabria	459345	584507	78.59%
Castilla-La Mancha	1399652	2049562	68.29%
Castilla y Leon	1543990	2383139	64.79%
Catalonia	6996837	7763362	90.13%
Community of Madrid	6578268	6751251	97.44%
Extremadura	671698	1059501	63.40%
Galicia	1986596	2695645	73.70%
La Rioja	245468	319796	76.76%
Navarre	457990	661537	69.23%
Region of Murcia	1495993	1518486	98.52%
Valencian Community	4691307	5058138	92.75%

Table 2. *The percentage of urbanization in each Spanish autonomous community. The autonomous cities of Ceuta and Melilla, whose urbanization degrees are 100%, are excluded.*[37]

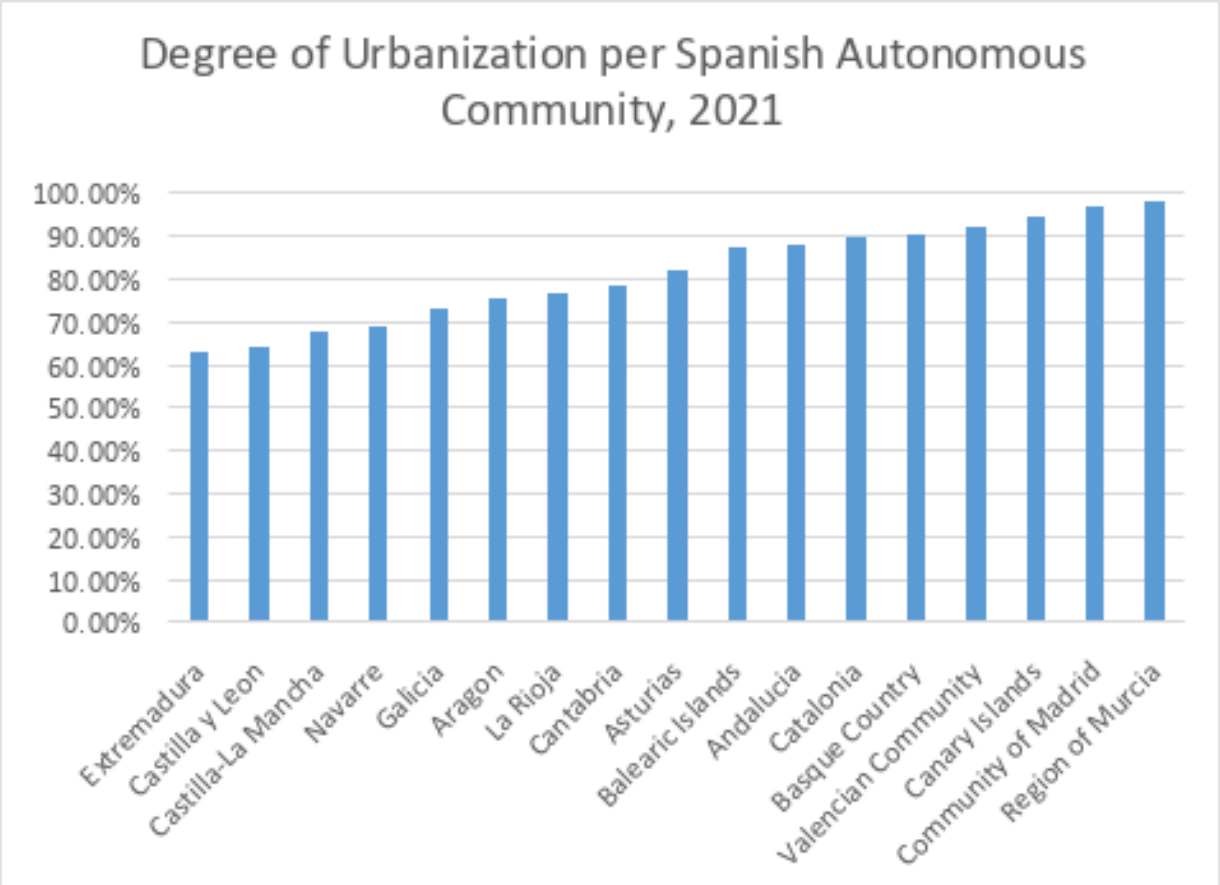

Figure 2. *Graph of the degree of urbanization of all Spanish autonomous communities, sorted in ascending order.*

By comparing the Spanish data to the German data, it appears that the Spanish population is more urbanized than the German one. In particular, all communities have degrees of urbanization exceeding 60%, whereas six communities have degrees of urbanization greater than 90%, compared to a single non-city-state in Germany. In addition, there is a correlation between urbanization and industrialization, as some of the most industrialized states, such as Madrid, Basque Country, and Catalonia, have very high degrees of urbanization. However, tourism also seems to play a role, with areas where tourism is significant, such as the Balearic and Canary Islands, as well as the Community of Valencia, having higher than average degrees of urbanization. Yet, there is the very notable exception of the Region of Murcia, which, despite having the higher degree of urbanization in the country, is not significantly dependent on either industrialization or tourism.

[37] Source: Correspondence Table LAU – NUTS 2021, EU-27 and EFTA / Available Candidate Countries. Eurostat, 2022.

The data from Spain result in an average degree of urbanization equal to 81.92%, with a standard deviation of 11.5505%. By comparing this to the German data, this metric shows that Spanish autonomous communities are, on average, more urbanized than German states. However, in similar fashion to the German example, this metric is not equal to the actual percentage of urbanized population in Spain, as the autonomous cities of Ceuta and Melilla are excluded and the metric did not take into account the differences in population between Spanish autonomous communities.

Overall, both countries exhibit a high degree of urbanization, as every German state and Spanish autonomous community has a percentage of urbanization higher than 50%. Nonetheless, Spanish autonomous communities tend to have higher urbanization than German states. In both countries, industrialization performs a significant role, as industrialized states have generally higher degrees of urbanization. However, there are also differences between the two countries. In particular, there appears to be a divide between East and West German states in the case of Germany, whereas tourism is a factor that seemingly drives increased urbanization in Germany.

Average monthly working hours statistics

In both Germany and Spain, there is no extreme difference between the average working hours of each state within one country. Nonetheless, there is a significant difference between the working hours of the two countries. In particular, employees in Germany work fewer hours than their Spanish counterparts across all states, with an employee in the German state of Sachsen-Anhalt, where the average working hours are the largest in Germany (116.3 hours per month), working less hours on average than an employee in the Canary Islands, the Spanish province with the least average working hours (120.3 hours per month). Nevertheless, there exist significant differences between the distribution of average monthly working hours per state in each of the two countries.

State	Yearly working hours	Average monthly working hours
Baden-Wurttemberg	1332	111.0
Bayern	1347	112.3
Brandenburg	1392	116.0
Hessen	1339	111.6
Mecklenburg-Vorpommern	1384	115.3
Niedersachsen	1327	110.6
Nordrhein-Westfalen	1319	109.9
Rheinland-Pfalz	1312	109.3
Saarland	1306	108.8
Sachsen	1373	114.4
Sachsen-Anhalt	1395	116.3
Schleswig-Holstein	1348	112.3
Thuringen	1388	115.7

Table 3. *Average monthly working hours in each of the included German states*[38]

[38] Source: Arbeitsvolumen in Den Ländern Der Bundesrepublik Deutschland 2000 Bis 2022. Statistische Ämter der Länder (German State Statistical Offices), 2023.

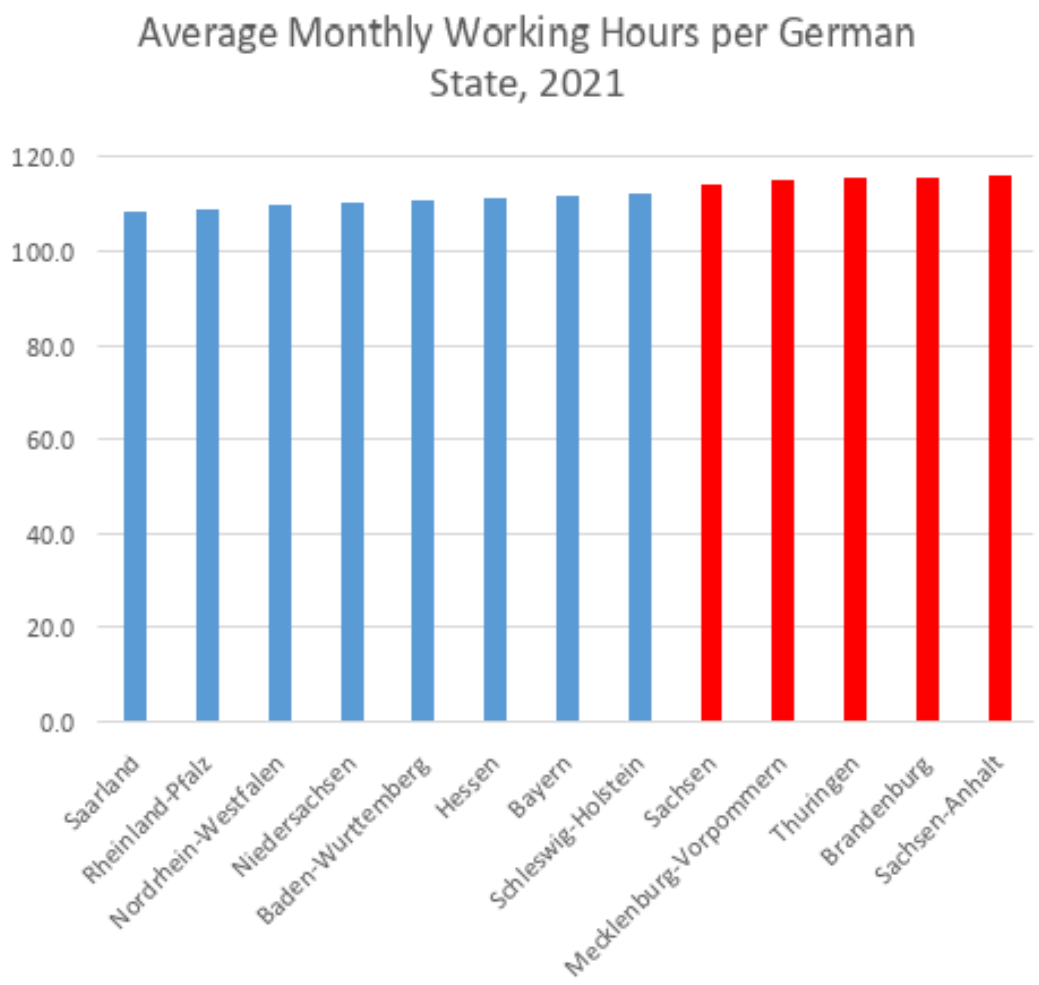

Figure 3. *Graph of the average monthly working hours per German state, sorted in ascending order. East German states are denoted with red, and West German ones with blue.*

As evident by the graph, one particular feature of the German distribution of average working hours by state is that there is a significant disparity between the states formerly part of West Germany and the ones which used to be part of East Germany. In particular, the five states that have the highest working hours per month are the five states that were incorporated after the German reunification. It also needs to be noted that, among all formerly East German states, the one with the lowest average monthly working hours is Sachsen, which is also the most urbanized one.

Among the West German states, there does not appear to be any significant differences between the average monthly working hours of each state. It also needs to be noted that there is no clearly evident relationship between the degree of urbanization and the average monthly working hours. For instance, Saarland and Rheinland-Pfalz are the two states with the lowest number of average monthly working hours. Nevertheless, Saarland is the second most urbanized state, whereas Rheinland-Pfalz is the second least urbanized state among the West German ones.

In comparison, Bayern and Schleswig-Holstein are the states with the most working hours in former West Germany, but the states have vastly different economic profiles.

The German data indicate an average of 112.6 monthly working hours per week among the states, with a standard deviation of 2.66 hours per month. This shows that the differences in average monthly working hours between states is rather small, although the trends previously explained should also be taken into consideration. In similar fashion to the average degree of urbanization, this information does not correspond to the average monthly working hours across Germany, given that the city-states are excluded and that the population of each state has not been taken into account for this metric.

Autonomous Community	Q4	Q3	Q2	Q1	Average monthly working hours
Andalucia	125.6	122.7	127.3	123.6	124.8
Aragon	125.2	119.6	128.9	127.6	125.3
Asturias	120.5	117.2	127.0	125.9	122.7
Balearic Islands	127.1	132.2	124.9	116.9	125.3
Basque Country	122.2	112.6	122.9	124.4	120.5
Canary Islands	126.1	119.8	118.2	117.0	120.3
Cantabria	124.5	122.8	127.6	129.2	126.0
Castilla - La Mancha	126.6	121.1	127.4	126.9	125.5
Castilla y Leon	124.2	119.3	125.2	127.1	124.0
Catalonia	126.8	118.5	126.9	126.8	124.8
Community of Madrid	130.4	124.6	133.2	131.6	130.0
Extremadura	123.2	116.0	126.1	122.4	121.9
Galicia	126.3	124.3	128.0	126.4	126.3
La Rioja	123.1	117.1	123.9	127.1	122.8
Navarre	121.3	118.3	125.4	126.4	122.9
Region of Murcia	127.1	119.6	129.7	128.1	126.1
Valencian Community	126.7	120.9	126.8	125.1	124.9

Table 4. *Average monthly working hours per Spanish autonomous community. The columns Q1 through Q4 correspond to the average monthly working hours in each of the four quarters of 2021.*[39]

[39] Instituto Nacional de Estadística (Spanish National Institute of Statistics). “Tiempo de trabajo por trabajador y mes por comunidad autónoma, tipo de jornada, sectores de actividad.” Accessed April 11, 2023. https://www.ine.es/jaxiT3/Datos.htm?t=6063.

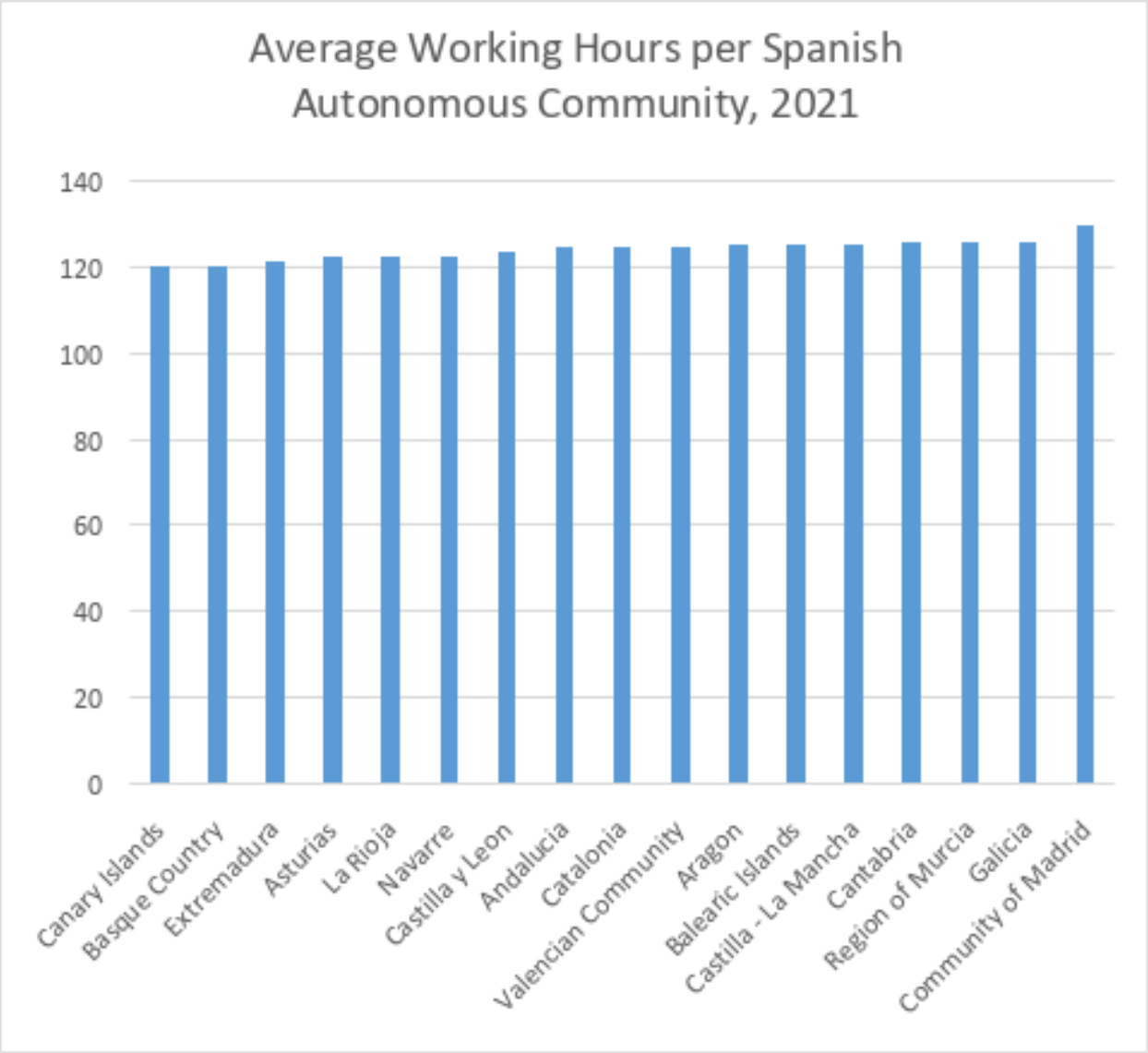

Figure 4. *Graph of average monthly working hours per Spanish autonomous community, sorted in ascending order.*

Unlike Germany, Spain does not appear to have a specific feature that separates the average working hours of one type of state from another. With the notable exception of the Community of Madrid, employees of all other communities work between 120.3 and 126.3 hours per month. In addition, there does not appear to be any correlation between the urbanization degree of each state and the average monthly working hours. For instance, the Basque Country and Extremadura have similar average monthly working hours, even though they are on opposite ends of the urbanization spectrum of the country. In the Community of Madrid, people work noticeably longer hours, at 130 per month, while having the highest average monthly working hours across every quarter.

The Spanish data indicate an average of 124.4 monthly working hours per week among the states, with a standard deviation of 2.37 hours per month. In similar fashion to Germany, the differences in average monthly working hours between states is rather small; however, the average of all average monthly working hours per state shows that Spanish employees work significantly longer hours than their German counterparts. In similar fashion to the average degree of urbanization, this information does not correspond to the average monthly working hours across Spain, given that the autonomous cities are excluded and that the population of each state has not been taken into account for this metric.

Overall, the average monthly working hours are significantly different between Germany and Spain, with every Spanish autonomous community having longer average working hours than every German state. However, with the exception of a clear East-West divide in Germany, there is no evident factor behind the number of average working hours in Germany or Spain Moreover, the standard deviation in both countries is rather low, indicating that the effect each state has on the average monthly working hours is not considerably significant.

Combining the two: Linear regression between urbanization degree and average monthly working hours

After performing linear regression on the data from the two countries, there are a number of trends that can be observed.

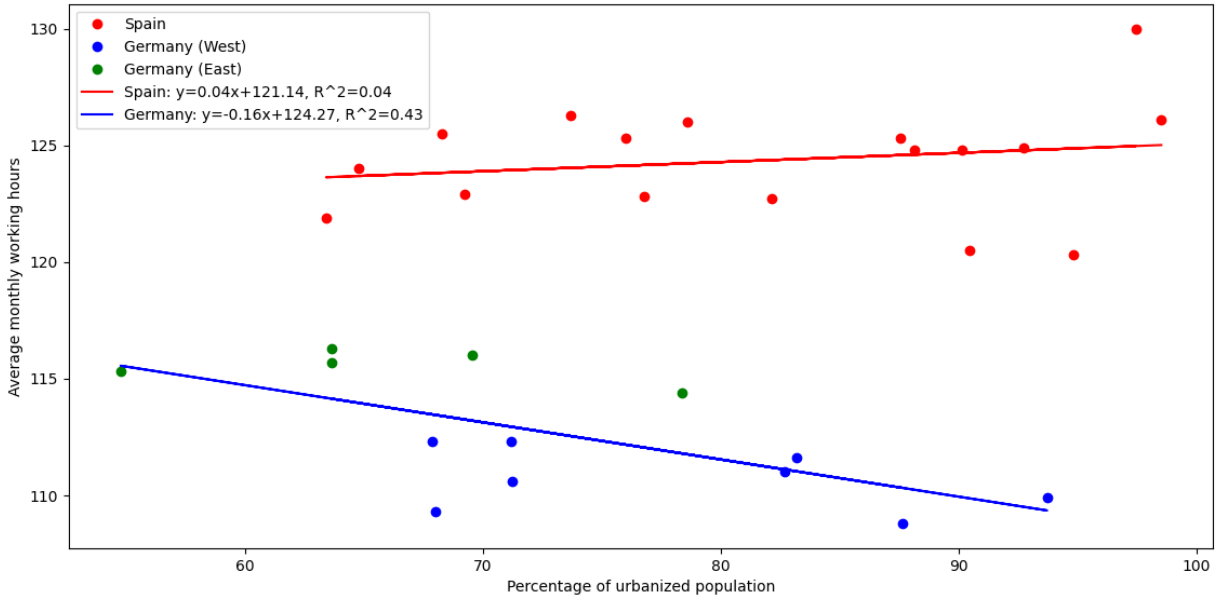

Figure 5. *Linear regression graphs for the average monthly working hours against the degree of urbanization of each state of Spain and Germany.*

By the graph, it is shown that the correlation between the urbanization and the average monthly working hours is rather weak, as the coefficient of determination is below 0.5 in both cases. In particular, it is especially weak for Spain, as it is only 0.04.

Another interesting feature of the graph is that the slope of the linear regression graph for Germany is negative, contrary to the expectation that a higher degree of urbanization will result in increased working hours. Nevertheless, this can be expected, bearing in mind the divide between West and East Germany. As shown in the sections above, East German states are typically less urbanized than West German states, and employees in East German states tend to work longer hours. Therefore, linear regression shows that there is a negative correlation between urbanization and the average working hours, even though this is a result of the differences between East and West Germany.

Even if the extremely low correlation coefficient was to be ignored, linear regression only shows a very marginally significant positive correlation between the two variables for Spain. This is mostly because there is no evident trend in the average working hours, as shown in the corresponding section. Whereas the urbanization levels tend to be affected by the presence of particular sectors of the economy, there is no such trend for the average monthly working hours. As such, a very weak correlation is created, and the effect of urbanization on the average monthly working hours is insignificant.

Overall, linear regression shows that the correlation between the degree of urbanization of a region and the average monthly working hours is rather low, as the coefficient of determination and the value of the slope for both Spain and Germany are rather low. Considering the earlier findings about urbanization and the average monthly working hours for each country, it appears that urbanization is not a clear indicator of the average working hours, as other factors come into play when determining the two variables for each state.

Limitations and Implications

Overall, the results of this paper show a rather weak correlation between the degree of urbanization in a region and the number of average monthly working hours employees work there. However, a number of limitations need to be addressed. To begin with, a major limitation of the study is that it does not take into account other factors that determine the number of working hours. For instance, this paper does not examine how the working population may be divided differently across sectors in each region. In addition, the paper does not examine any potential cultural differences that may affect the number of working hours people tend to work in every specific region.

Another limitation of the study is that it does not include data on fully urbanized regions, namely the three German city-states and the two Spanish autonomous cities. This decision was taken because of two reasons. The first one concerns data availability, as no data on the average monthly working hours in the two Spanish cities was available. However, another reason was that, considering the fact that all of these regions would have a fully urbanized population, yet different numbers of working hours. Therefore, other factors, such as local policies, would have

to be taken into account, which are out of scope of this study, which focuses on the impact of the degree of urbanization itself on the number of average working hours.

A third limitation arises because of the year selection. One thing to consider is that, even though data for 2021 is rather recent and available for both countries, it was significantly affected by the COVID-19 pandemic. Considering the rather decentralized nature of both countries, one could assume that different policies were taken on a local scale, to deal with the pandemic on a regional basis. As such, differences in policy could have an impact on the number of working hours employees worked, as employees could have their work schedules altered in response to the measures taken.

Nevertheless, the fact that the data was affected by the COVID-19 pandemic shows a potential implication for this study. In particular, considering that different regions may have been affected differently by the pandemic, it can be reasonably assumed that different policies have been established in each region. As such, the differences in policies could be a significant reason for the differences in working hours shown. Therefore, the study shows how local policy can have a significant effect on the number of working hours employees work, especially when considering an emergency situation, such as the pandemic.

As examined above, this study shows the differences in the degree of urbanization and the average monthly working hours within regions of Spain and Germany. As a result, the study could be helpful in identifying the regions with the highest number of working hours. If those regions also exhibit high degrees of urbanization, the study could assist cities and industries in said regions, in order to decrease the number of working hours employees work. In turn, this decrease of working hours could have a significant positive effect on the physical and mental health of employees, which is especially important in emergency situations, such as the COVID-19 pandemic, and could have a lasting effect for future years.

Discussion and Conclusion

In general, determining the regions which are more highly urbanized in a country seems to follow a rather similar pattern in both countries. In particular, areas which are historically considered to be highly industrialized generally exhibit higher degrees of urbanization in both Spain and Germany. However, a number of differences can also be identified between the two countries. In particular, Germany is affected by the historical division of the country in West and East Germany. Considering the large number of industries in former East Germany that had to be closed following the German reunification, it can be assumed that a large number of people left East German cities, either for jobs in the primary sector or for jobs in the more prosperous West Germany. In both cases, this would result in a decrease of urbanization in the former East German states. On the other hand, whereas Germany is not significantly affected by tourism, it appears that the presence of a large tourism industry affects the prospects of urbanization in Spain, with highly visited areas demonstrating higher degrees of urbanization. Overall, while industrialization appears to be a consistent factor in determining the degree of urbanization of a region, other factors have to be considered on a country basis.

Determining the regions with the higher amounts of working hours does not seem to follow any significant pattern, based on the degree of urbanization or the presence of particular sectors in a region's economy. For instance, Saarland and Rheinland-Pfalz demonstrate similar working hours, even though they have significantly different profiles when it comes to urbanization. In similar fashion, the two regions with the lowest number of working hours in Spain are the Canary Islands and Basque Country, which are both highly urbanized, yet whose economies are based on different sectors, namely tourism and industry. Moreover, they also demonstrate similar working hours with states such as Extremadura, with significantly lower degrees of urbanization and higher dependency on the primary sector. However, one needs to acknowledge the potential impact of the COVID-19 pandemic, which may have affected regions of both countries differently. It also needs to be noted that there seemingly exists a pattern in East German states working longer compared to the rest of Germany, which could be attributed to the closure of industries resulting in migration of skilled personnel and lack of advanced technology, thus increasing the average number of monthly working hours in this region. Once again, this shows that different factors on a country basis need to be considered when determining the regions with the highest number of working hours.

Performing linear regression shows a weak correlation between the degree of urbanization and the number of average monthly working hours. Considering the fact that the patterns in determining the regions with high degrees of urbanization and high number of working hours are not similar, the weak correlation between the two variables make sense, as a factor affecting urbanization may not affect the number of working hours, and vice versa. Moreover, it also makes sense for Germany to demonstrate a higher and negative correlation between the two variables, considering that East German states are both less urbanized and work a higher number of hours. This weak correlation shows that urbanization cannot be safely used as an indicator of the number of working hours employees work on average, and reiterates the importance of examining other factors on a regional scale.

Considering the results of this study, further research could be conducted across a number of factors. For instance, research could be conducted to analyze the impact of regional division of labor on the number of average working hours, in order to examine whether particular industries contribute to an increase or decrease in the number of working hours. In addition, research could be conducted on the impact of local policy on the number of working hours, in order to examine whether policy can be effective in decreasing the number of working hours, as well as on the impact of the COVID-19 pandemic on working hours, which could potentially provide an explanation for the differences in working hours not following similar patterns with the ones for urbanization. Lastly, considering the fact that an excessive amount of working hours has been shown to be correlated with physical and mental health issues, one could examine whether the physical and mental health effects of urbanization can be correlated with the ones resulting from high working hours.

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