

The labour share in the service economy

Luis Díez Catalán - Spain and Portugal Unit

Key messages

- Labour's share of national income **has dropped in most of the developed countries and emerging economies** in the past few decades.
- This **trend is not common across industries**: the share of income accounted for by wages has seen an **increase in the service industry**, while it has recorded a **fall in the other industries**.
- To a large extent **these trends are explained by divergences within sectors in terms of the evolution of the share accounted for by wages** rather than to any changes in the economy's industry composition.
- The main reason underlying these trends appears to be the **sharp fall in the relative price of investment goods and capital with respect to labour**. The relative cheapening of machinery and capital goods **has prompted companies (particularly in the manufacturing industry, which is more intensive in routine tasks) to buy machinery instead of taking on workers**.
- In **Spain**, despite the fact that the share of wages in aggregate income has held relatively steady over recent decades, **we can also see a divergence between services and the rest of the economy**.

1. Introduction

Up until some years ago labour's share of total national income had been virtually constant, changing very little over time. Nonetheless, **several recent academic studies have shown that income attributable to labour as a factor of production has fallen away in most developed and emerging nations** in the past few years.¹ For example, in the United States and in the decades leading up to 1980 the labour share represented about 66% of national income. Yet in the early 80s this figure began to gradually come down and presently accounts for close to 60% of national income. This difference implies a shift of several billion dollars out of labour income and into capital income. This could be a cause of concern, because the less wealth there is in the hands of workers, the greater is the risk of economic inequality and social unrest increasing (Piketty, 2014).

Most academic research has focused on developments in labour's share of aggregate income.² Even so, less effort has been directed at gaining an understanding of the trends at the industry level.³ **This Watch examines the heterogeneity among industries, the primary goal being to improve the understanding of the forces that may be in play behind the aggregate decline in labour's share of national income in the United States.**⁴

1: For example, see Karabarbounis & Neiman (2014) or Piketty (2014).

2: Although there is no general consensus on the scale and precise starting point of the fall, the profession does agree that it is both real and substantial. Some of the concerns pinpointed in the literature can be found in Gollin (2012), Bridgman (2014), Rognlie (2015) or Yu, Santaaulàlia-Llopis, & Zheng (2015).

3: Notable exceptions are Jones (2003) or Elsby, Hobijn & Sahin (2013).

4: For a more detailed analysis, see Díez-Catalán (2018).

From this exercise it can be seen that **the drop in labour's share of income is not pervasive across industries**. In fact, there has been **a general divergence between services and the rest of the economy** over the last three decades.⁵ Moreover, this pattern is not exclusive to the United States, but it is also present in Spain and several European countries.⁶

What drives this diverging pattern? The evidence suggests that the **fall in the relative price of investment goods and machinery and equipment** can reconcile both the aggregate decline in the labour share and the divergence across sectors. The reduction in the relative price of capital affects the optimal mix of factors of production in each industry in a different way. In manufacturing, where companies tend to be more intensive in terms of routine tasks, they have preferred to acquire machinery instead of recruiting workers. In services though, where companies are more intensive in tasks that call for cognitive and social skills, replacing labour with machinery has proved more unworkable. These differences in the nature of the production process, in combination with **discrepancies in the evolution of the specific technical change of each sector**, are what offers us an explanation of sector disparities.

Moving on, in the second section of this Watch, we analyse the causes behind the aggregate downturn in the share of wages in income. In the third section we present the sector evolution for the United States, Spain and some other European countries. Then in the fourth section we dig deeper into the explanation advanced for sector divergence. To close, the final section offers some conclusions.

2. The causes of the drop in labour's share of income

The weight of wages in income **has diminished in most OECD countries and in a considerable number of emerging nations** over the past few decades (Dao, Das, Koczan & Lian, 2017). There are four major hypotheses about what underlies the fall in labour's share: increasing international trade and offshoring; the decline in the bargaining power of workers; the rise in market concentration and power; and the automation of production processes.

Several writers argue that the opening up to **international trade of China, India and other emerging economies together with the development of new technologies** has enabled the offshoring of the more labour-intensive elements of the US production system, which has pared down the portion of national income used to remunerate labour. Elsby, Hobijn & Sahin (2013) show that the sectors that are more highly exposed to international trade (e.g. manufactures) suffered the heaviest falls as regards labour's share of sector income. The main criticism levelled at this theory is that the share of wages in national income is also even dropping in China and the emerging nations themselves (OECD, 2015).

Other commentators argue that the **loss of bargaining power on the part of workers** as a result of, for example, lower levels of unionisation, might account for the reduction of the weight of wages in income. However Elsby, Hobijn & Sahin (2013) show that greater declines in unionisation do not appear to be linked to bigger falls in labour's share of income by using industry data for the United States.

5: Services sub-industries include information and communications, professional activities, healthcare, education, and recreational and artistic activities. These industries represented roughly 40% of gross value added in the United States in 2015.

6: For example, as is explained in section 3, this divergence has also taken place in Germany, France and Italy.

Another line of research championed by Autor, Dorn, Katz, Patterson & van Reenen (2017) suggests that the increase in **industry concentration and market power** is what lies behind the dwindling of labour's share. The explanation can be found in the rise of a group of major companies on a worldwide scale that are capital-intensive and capable of adding value without any need to use so much labour proportionally speaking. Over the past few decades these companies have lifted the proportion of gross value added in the sectors in which they move and cut the share of wages in total income.

Finally, other theories allude to **technological enhancements, such as the automation of production processes**, which have led to a considerable **reduction in the relative cost of capital**. Karabarbounis & Neiman (2014) show that, given the relative fall in the cost of capital, companies replace workers with machines, which brings down labour's share in aggregate income. As is argued in this Watch, not only does this mechanism explain about half of the aggregate fall observed in the United States since the 80s, but it is also consistent with the way sector trends have played out.

3. Trends in the share of wages in income

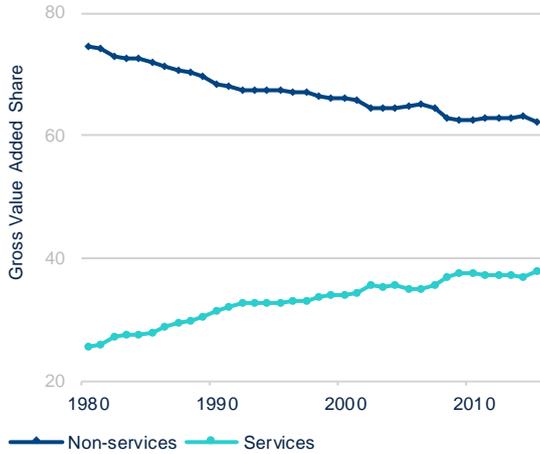
This section looks at the **share of wages in national income over time in the United States, Spain and certain European countries using disaggregated data from the national accounts**. The share of wages in national income is defined as the ratio of total labour compensation for workers on employers' payroll to gross value added (GVA).⁷ Similarly, the aggregate figure can be expressed as a combination of the specific weight of each industry in the economy and the proportion of total income in that industry that is received as labour remuneration. It is for this reason that we first describe the trend for the weight of the services sector and then go on to explain the trend in aggregated terms and by sector of the wage share of income.

Figure 1 offers us the proportion of the GVA of private, non-agricultural sectors that was represented by the services sector from 1980 to 2015.⁸ As we can see, the significance of the **services** sector in the US economy increased over this period from representing around **26% of GVA in 1980 to 38% in 2015**. This finding is a good illustration of the **steady transition of the United States from an economy focussed on manufactures to one dominated by services**. This transformation becomes even more evident if we examine the course of employment. As Figure 2 shows, the proportion of employment in the **services** sector experienced a notable increase over this period, rising from **35% in 1980 to around 55% in 2015**.

7: Labour incomes include both total remuneration for employed workers and the earnings of the self-employed. The latter are not available on a sector level in the national accounts and are therefore excluded from the analysis.

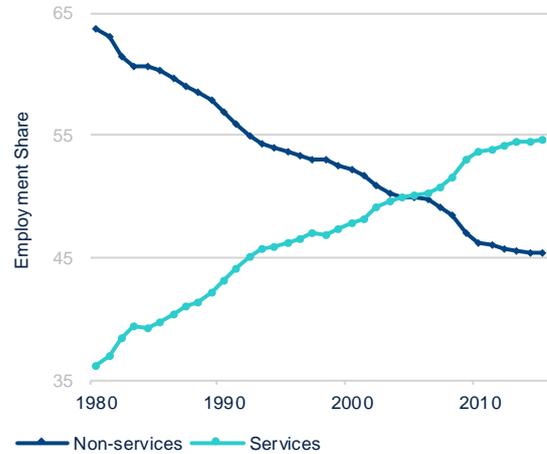
8: To be precise the definition of total gross value added excludes the agricultural sector and the public sector. This definition is standard in the literature.

Figure 1 Share of US Gross Value Added, 1980-2015 (%)



Source: BBVA Research based on BEA data

Figure 2 Share of US Employment, 1980-2015 (%)

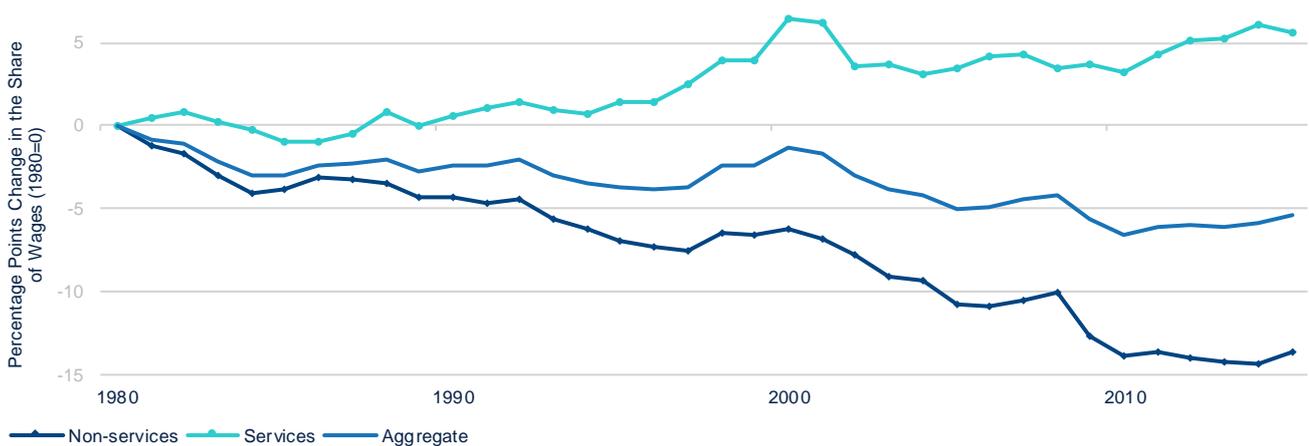


Source: BBVA Research based on BEA data

Figure 3 shows trends in the share of wages in income. In this regard, Elsby, Hobijn & Sahin (2013) distinguish three periods following the Second World War. First, between 1950 and 1980, the aggregate share of wages stayed relatively constant. Afterwards, in the 80s, it embarked on a gradual fall, which finally gathered pace in around the year 2000. As a result, the share of wages in overall income diminished by roughly 6pp between 1980 and 2015 (see Figure 3).

Developments as regards the share of wages in income is far from uniform across sectors. As we can see from Figure 3, the weight of services sector pay increased by 6pp from 1980, while in the other sectors it fell away by around 14pp. These trends are in contrast with the evidence prior to 1980, when both time series appeared to move in step with each other.⁹

Figure 3 Change in the share of wages in US income, 1980-2015 (1980=0, pp)



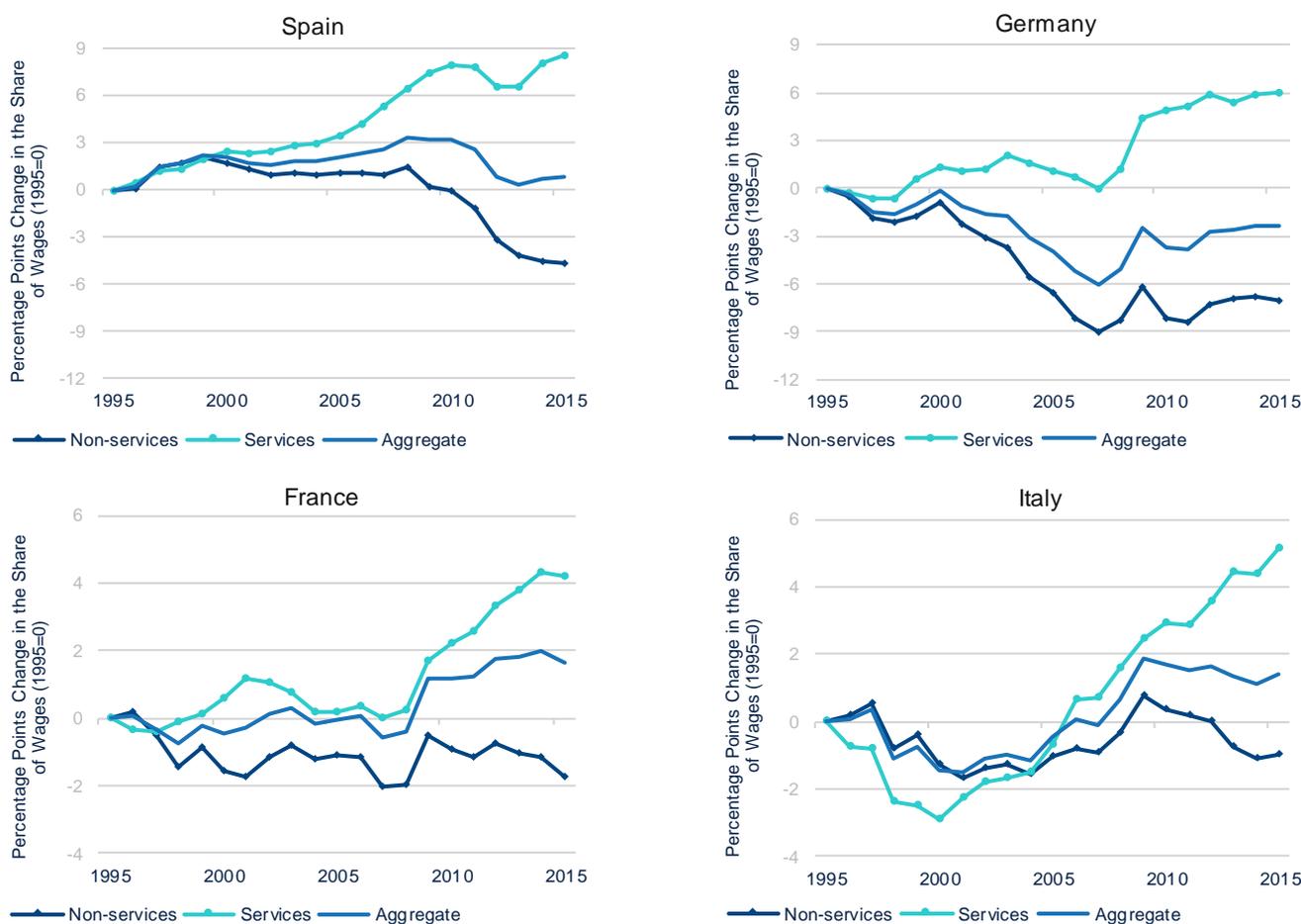
Source: BBVA Research based on BEA data

9: For a discussion on the course of labour's share since 1950 see Díez-Catalán (2018).

Sector divergence is not a phenomenon inherent to the United States. In this regard, Figure 4 demonstrates that the difference between the change in the share of wages over time in the services sector and in the rest of the economy can also be observed in the major economies in the European Union. Germany, France and Italy have exhibited a positive trend in the share of wages in services and a negative change for the rest of the economy in the past few decades.¹⁰

Spain, in line with the evidence for the United States and Europe. Figure 4 reveals that the divergence in the share of the wages is also taking place in Spain, although the proportion of aggregate income going towards paying wages has held relatively steady since 1995.¹¹ As can be seen, the fraction of income accumulated by services sector workers has risen by 9pp since 1995, whereas in the rest of the economy this has come down by about 5pp.

Figure 4 Change in the share taken up by wages in income in Europe, 1995-2015 (1995=0, pp)



Source: BBVA Research based on Eurostat data

Why do services industries experience a constant rise in terms of the share taken up by wages, while the rest of the economy suffers a drop? What is the reason for this divergence between sectors? One possibility is that the rise/fall in the share of wages in income is a widespread phenomenon in most of the services/non-services

10: In fact, most EU countries have followed a similar trend: 19 countries have experienced a divergence in the share of wages in income since 1995. Furthermore, in keeping with the evidence for the United States, in most cases this divergence has resulted in a rise in the share of wages in services and a fall in share in the other sectors.

11: Consistent with the evidence for the United States, the share for wages since 1980 has also dropped in Spain as well as in Germany, France and Italy. Nevertheless, the fall was concentrated within the 80s and therefore has not been observable in the data since 1995 (since when data disaggregated into sectors has been available).

sub-sectors. Alternatively the industrial composition might have changed. Changes in trade barriers, or the cost of capital or subcontracting, for example, might have altered the portion of total services/non-services income that goes to workers by transforming the significance of the various sub-sectors within these industries.

To attempt to provide an answer to the questions raised here, we run a shift-share analysis. The change in the share of wages in income between two years for each sector (i.e. services and the rest) can be expressed thus:

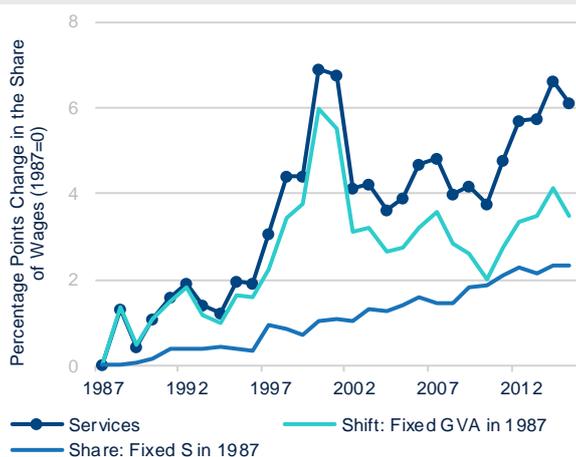
$$\Delta S_j = \underbrace{\sum_{i \in J} \omega_i \Delta S_i}_{\text{"shift"}} + \underbrace{\sum_{i \in J} \Delta \omega_i S_i}_{\text{"share"}}$$

where ω is the proportion of GVA, S is the labour share, i denotes the sub-sector and J the sector.

The “*shift*” component is a weighted mean of the changes in the share taken up by wages per sub-sector and captures the contribution of individual trends assuming a fixed sector structure. On the other hand, the “*share*” component measures the contribution of changes to sector structure assuming that the share for wages in each sub-sector remains stable. For example, if this component is positive, the interpretation is that the sectors where the share accounted for by wages is historically higher have gained in relative weight in the economy (i.e. they have increased their share of GVA).

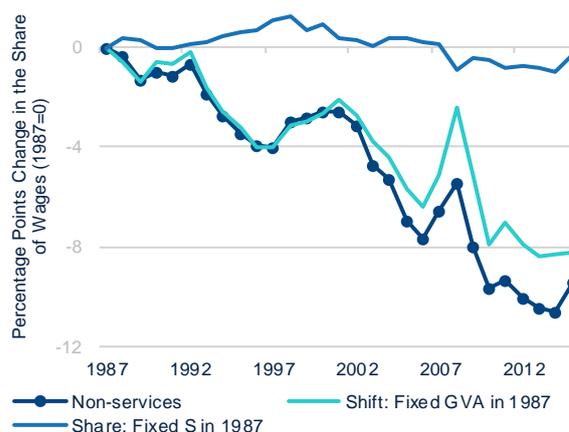
Figures 5 and 6 show the changes in labour’s share in income for each sector (ΔS_j) and sub-sector (ΔS_i) and in the industry composition ($\Delta \omega_i$) since 1987.¹² This decomposition tells us that **trends within sectors (which are so disparate) are behind the divergence**. In the services sector, changes within sectors (the *shift* component) account for around two thirds of the increase in the share of wages in sector income at the end of the period under review. The contribution of changes within sectors is even greater in the case of the rest of the economy, as can be noted from Figure 6. Sector structure (the *share* component) only takes on importance from the year 2000, mainly due to the growth in healthcare, education and professional activities (sub-sectors with high levels of the share of wages in income).

Figure 5 Decomposition of the share of wages in income in the United States (Services Sector, 1987=0, pp)



Source: BBVA Research based on BEA data

Figure 6 Decomposition of the share of wages in income in the United States (Rest of the Economy, 1987=0, pp)



Source: BBVA Research based on BEA data

12: This is the year after which there is data that is more disaggregated and consistent in terms of sub-sectors.

4. The fall in the relative cost of capital

The previous section demonstrates that the divergence is to a large extent taking place within each sector and is therefore not a result of changes in the industry composition. This section offers an explanation of how the **sharp reduction in the relative price of capital assets and investment goods**, which is a consequence of technological change, has played a supremely important role in both the decline in the aggregate share of wages in income and the divergence between services and the rest of the economy.

The technological changes that the US economy has experienced in recent decades (for example the progress made in information technologies or the automation of processes) have prompted a drop in the relative price of capital with respect to labour. This has affected **the optimal combination of capital and labour: companies have replaced workers with machines**. Consequently, and as Karabarounis & Neiman (2014) have argued, labour's share in national income has fallen.

The strength of this response, however, has differed between sectors: companies that do not belong to the services sector, which tend to have a greater **scope for substitution between labour and capital**, have responded more aggressively to the fall in the relative cost of capital than have services companies.¹³ To illustrate this point, it is easy to imagine that in the automotive industry a robot might be brought in to fit together the various parts of a vehicle more efficiently than a person. On the other hand, in a restaurant or an office a machine is not capable of replacing a person so easily given, for example, the relevance of interpersonal skills in dealing with customers. Services companies thus find it harder to bring technological advances into the mix that are associated with investment goods and capital assets and replace the workforce than companies in other sectors of the economy. These differences in the nature of the production process, in combination with **discrepancies in the evolution of the specific technical change of each sector and the general equilibrium effects in the economy**, mean that labour's share is on the rise in the services sector and falling away in the others.

In Díez-Catalan (2018) a quantitative parameterized general equilibrium model is used for the US economy to study the explanatory power of the mechanism described. To be precise, the author finds that in its standard version the model accounts for about **90% of the increase in the share taken up by wages in services and half of the decline in the rest of the economy** since 1980.

In the case of **Spain**, as has been previously explained, **there is also a discernible divergence** of the share of wages in income between the services sector and the others even though on aggregate this has remained relatively constant over recent decades. The data shows that the fall in the relative cost of capital with respect to labour has not been so significant when compared with the series for the US economy. This, together with other aspects peculiar to the Spanish economy such as how the labour market functions, may explain the differences in the trend in the share of income accounted for by wages between Spain and the United States, especially in the more capital-intensive sectors.

5. Conclusions

This Watch demonstrates that over the past few decades there has been a **divergence in the change in the share of wages in income between the services sector and the rest of the economy, both in the United States and in several European countries**. What lies behind this phenomenon? Part of this can be explained by the drop in the relative cost of capital assets and investment goods which has altered the optimal mix of capital and labour in different ways in the various different branches of activity. Consequently the share taken up by wages has increased in the services sector and decreased in the others. This explanation predicts that, while technological advances imply a drop in the relative cost of capital assets and investment goods, the divergence and the fall in the share of wages in income are set to continue.

13: Herrendorf, Herrington & Valentinyi (2015) estimate the degree of substitutability between labour and capital by sector and find that in services labour is more complementary to capital than in the rest of the economy.

References

- Autor, D., D. Dorn, L. Katz, C. Patterson, and J. van Reenen (2017), "Fall of the Labor Share and the Rise of Superstar Firms," Cep discussion papers, Centre for Economic Performance, LSE.
- Bridgman, B. (2014): "Is Labor's Loss Capital's Gain? Gross versus Net Labor Shares," Bea working papers, Bureau of Economic Analysis.
- Elsby, M., B. Hobijn, and A. Sahin (2013): "The Decline of the U.S. Labor Share," *Brookings Papers on Economic Activity*, 44, 1–63
- Dao, M., M. Das, Z. Koczan, and W. Lian (2017): "Why is Labor Receiving a Smaller Share of Global Income? Theory and Empirical Evidence," IMF Working Papers 17/169, International Monetary Fund
- Díez-Catalán, L. (2018): "The Labor Share in the Service Economy," WP 18/09, BBVA Research
- Gollin, D. (2012): "Getting Income Shares Right," *Journal of Political Economy*, 110, 458–474.
- Herrendorf, B., C. Herrington, and A. Valentinyi (2015): "Sectoral Technology and Structural Transformation," *American Economic Journal: Macroeconomics*, 7(4): 104-133
- Jones, C. (2003): "Growth, capital shares, and a new perspective on production functions," Proceedings.
- Karabarnounis, L. and B. Neiman (2014): "The Global Decline of the Labor Share," *The Quarterly Journal of Economics*, 129, 61-103
- OECD (2015): "The Labour Share in G20 Economies," Report prepared for the G20 Employment Working Group.
- Piketty, T. (2014): *Capital in the Twenty-First Century*, Harvard University Press
- Rognlie, M. (2015): "Deciphering the Fall and Rise in the Net Capital Share," *Brookings Papers on Economic Activity*, 46, 1–69
- Yu, Koh, D., R. Santaeuàlia-Llopis, and Zheng (2015): "Labor share decline and intellectual property products capital," Economics Working Papers ECO2015/05, European University Institute.

LEGAL NOTICE

This document, prepared by the BBVA Research Department, is informative in nature and contains data, opinions or estimates as at the date of its publication. These derive from the department's own research or are based on sources believed to be reliable, and have not been independently verified by BBVA. BBVA therefore makes no guarantee, either express or implied, as to the document's accuracy, completeness or correctness.

Any estimates contained in this document have been made in accordance with generally accepted methods and are to be taken as such, i.e. as forecasts or projections. Historical trends in economic variables (positive or negative) are no guarantee that they will move in the same way in the future.

The contents of this document are subject to change without prior notice, depending on (for example) the economic context or market fluctuations. BBVA does not give any undertaking to update any of the content or communicate such changes.

BBVA assumes no liability for any loss, direct or indirect, that may result from the use of this document or its contents.

Neither this document nor its contents constitute an offer, invitation or solicitation to acquire, disinvest or obtain any interest in assets or financial instruments, nor can they form the basis of any contract, undertaking or decision of any kind.

In particular and with regard to investment in financial assets that could be related to the economic variables referred to in this document, readers should note that in no case should investment decisions be made based on the contents of this document; and that any persons or entities who may potentially offer them investment products are legally obliged to provide all the information they need to take such decisions.

The contents of this document are protected by intellectual property law. The reproduction, processing, distribution, public dissemination, making available, taking of excerpts, reuse, forwarding or use of the document in any way and by any means or process is expressly prohibited, except where this is legally permitted or expressly authorised by BBVA.

ENQUIRIES TO:

BBVA Research: Calle Azul, 4. Edificio La Vela – 4ª y 5ª plantas. 28050 Madrid (España). Tel.: +34 91 374 60 00 y +34 91 537 70 00 /
Fax: +34 91 374 30 25 - bbvaresearch@bbva.com www.bbvaresearch.com
Legal Deposit: M-31254-2000