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THE ECONOMIC PERFORMANCE OF SPANISH  
PROVINCES DURING 2020 AND ITS DETERMINANTS

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## ABSTRACT

This article presents an estimation of changes in provincial GDP over the course of 2020. The pandemic's impact on activity has been highly uneven across Spain's provinces, with the island provinces and those on the Mediterranean coast being the most affected. The factors that lie behind this disparity are also explored. The steepest declines in activity were associated with a greater weight of tourism – particularly inbound tourism – in provincial activity, a higher proportion of temporary employment, a lower weight for the public sector and lower levels of public mobility. However, after controlling for the effects related to mobility and economic structure, the excess mortality prompted by the pandemic does not appear to be a significant variable in explaining the cross-province differences in GDP change during 2020.

**Keywords:** mobility, regional economics, COVID-19.

**JEL classification:** E01, E32, P25.

## THE ECONOMIC PERFORMANCE OF SPANISH PROVINCES DURING 2020 AND ITS DETERMINANTS

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### Introduction

The COVID-19 health crisis is having an unprecedented economic impact in the vast majority of economies. Spanish GDP declined by 11% in 2020, one of the steepest falls among developed countries; this compares unfavourably with the 3.5% contraction of the global economy reported by the IMF.<sup>1</sup> In 2020, the Spanish quarterly GDP profile was shaped by the course of the pandemic. Following the quarter-on-quarter slide of 5.3% (-4.2% year-on-year) in Q1, the most pronounced decline took place in Q2, with a slump of 17.9% (-21.6% year-on-year) prompted by the strict lockdown measures associated with the first wave. The gradual lifting of lockdown allowed for a robust recovery of 16.4% (-9.0% year-on-year) in Q3. However, the containment measures introduced over Q4 to curb the second wave prevented any significant additional recovery in activity, leading to marginally positive GDP growth of 0.4% (-9.1% year-on-year).

One striking feature of these developments is the pronounced disparity across the different sectors of activity. The containment measures introduced in response to the health crisis are having markedly different effects by sector, depending mainly on the degree of social interaction involved in each; those activities that entail greater social interaction, such as hospitality, transport and culture, have been more affected. Conversely, the primary sector, certain branches of the industrial sector and general government, health and education services have barely declined. Indeed, on Quarterly National Accounts (QNA) data, gross value added fell in 2020 in trade, transport and hospitality (-24.1%) and the arts, entertainment and other services (-24.2%), while the figures were positive for the primary sector (4.8%), financial and insurance activities (2.9%) and the public sector (1.4%).

The shock prompted by the health crisis can also be expected to have an uneven impact at the regional level. The regional disparity in activity during 2020 appears shaped not only by differences between the Spanish regions' productive structures (Prades and Tello (2020)),<sup>2</sup> but also the mixed incidence of the pandemic, which has

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<sup>1</sup> *World Economic Outlook Update*, January 2021.

<sup>2</sup> E. Prades and P. Tello (2020). "The heterogeneous economic impact of COVID-19 among euro area regions and countries", Banco de España, *Economic Bulletin* 2/2020, Analytical Articles.

given rise to differing restrictions on movement, particularly during Q4. However, the Spanish Regional Accounts for 2020 compiled by the National Statistics Institute (INE) will not be made public until mid-2021, and, furthermore, will provide full-year data only, with no quarterly breakdown.

This article presents an estimation of changes in provincial<sup>3</sup> GDP over the course of 2020 based on the provincial-level data for actual social security registrations and changes in national GDP according to the QNA. After estimating the quarterly GDP profile for each province, the factors behind the cross-province differences in the change in this variable are explored.

## Estimated provincial GDP in 2020

The pandemic's varied impact across the sectors has been reflected in the labour market, based on the monthly Social Security data on registrations and furlough schemes (ERTEs, by their Spanish abbreviation). This is a reliable data source for monitoring activity in each sector, owing to a close correlation with GDP,<sup>4</sup> the short time-lag with which it is published (the second business day of the month following the reference month) and its high granularity both at the sector level (Spanish National Classification of Economic Activities, two-digit level) and the geographical level (provincial breakdown).

Based on this information, the quarterly GDP figures at the provincial level are estimated following the methodology proposed by De la Fuente (2020)<sup>5</sup> to approximate changes in regional GDP. This methodology basically consists of calculating series of regional GDP as the product of counterfactual GDP (that which would have materialised, under certain assumptions, had there not been a pandemic),<sup>6</sup> and a ratio of actual social security registrations (ratio of actual registrations observed and the counterfactual registrations that would have been observed in the absence of COVID-19).<sup>7</sup> To disaggregate provincial data, each region's GDP published in the Spanish Regional Accounts is distributed across the provinces making up the region, according to their respective weights in regional GDP in 2017 (latest available INE

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3 Provinces have been used as a unit of analysis rather than regions so as to obtain a larger dataset and thereby exploit territorial differences that are not visible at the regional level.

4 Correlation coefficient of 83% for the year-on-year rates of change in the quarterly series of GDP and actual social security registrations at the sectoral level in 2020.

5 Á. de la Fuente (2020), *El impacto de la crisis del Covid sobre el PIB de las CCAA en 2020: una primera aproximación*, Apuntes - 2020/14, October, FEDEA and Instituto de Análisis Económico (CSIC).

6 The counterfactual GDP of all the provinces equals Spain's year-on-year GDP growth rate forecast for 2020 by the Banco de España in its December 2019 projections (1.7%).

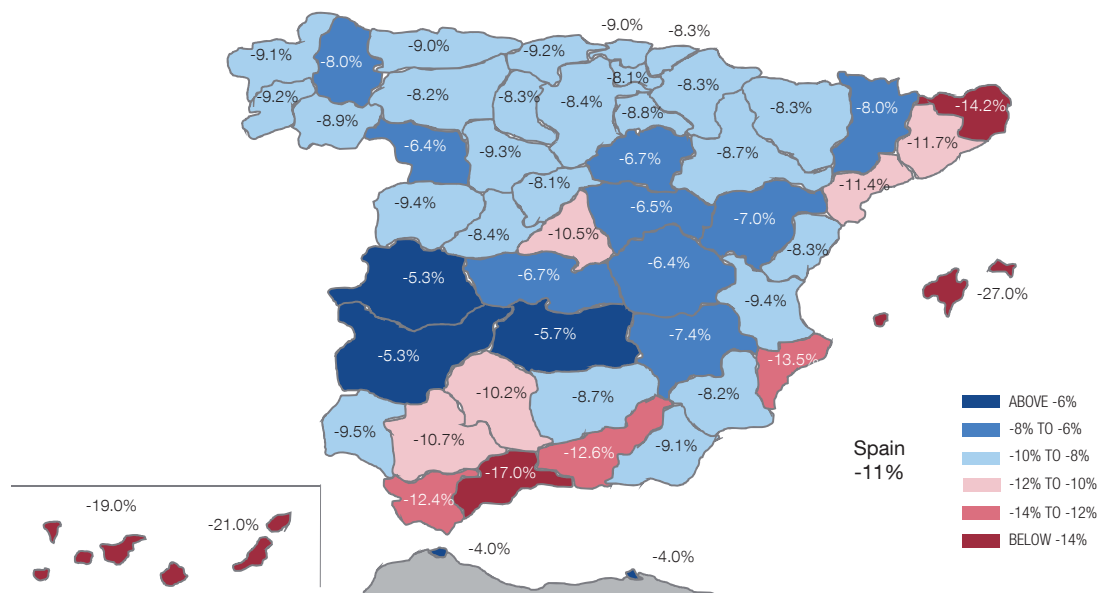
7 Actual social security registrations at the regional level are calculated as total registrations less the number of workers on furlough. Counterfactual social security registrations (in the absence of the pandemic) in month  $m$  of 2020 in a specific region are calculated as the number of social security registrations in the same month of 2019, multiplied by the year-on-year growth in social security registrations in February 2020, the latest available pre-pandemic figure.

Chart 1

### GDP CHANGES IN 2020 WERE HIGHLY UNEVEN ACROSS THE REGIONS

The crisis is having an extraordinarily uneven impact on economic activity. The steepest GDP declines in 2020 were concentrated among a group of provinces located on the Mediterranean coast and in the Canary Islands.

ESTIMATED 2020 Y-O-Y GDP CHANGE, BY PROVINCE



SOURCES: Ministerio de Inclusión, Seguridad Social y Migraciones, INE and Banco de España.

figure at the provincial level). In addition, for each quarter, it is verified that the sum of the estimated provincial GDP figures matches the QNA national GDP aggregate.

Provincial GDP estimates for 2020 overall (see Chart 1) show the uneven impact of the crisis. Only ten provinces posted falls in activity exceeding the national average (11%), but their weight in overall GDP is approximately 33%. The most marked declines for the year as a whole were observed in the Balearic Islands (-27%) and in the provinces of Las Palmas and Santa Cruz de Tenerife, in the Canary Islands (-21% and -19%, respectively), followed by Malaga, Girona and Alicante. Activity in these six provinces is characterised by the notably high weight of the tourism sector, especially inbound tourism (this weight is measured as the ratio of incoming tourists to the population). By contrast, the most moderate declines were observed in provinces in Extremadura (with falls of -5.3% in both Cáceres and Badajoz) and in Castile-La Mancha, along with Zamora and Teruel.<sup>8</sup> All these provinces have in

8 Generally, these provinces are located in regions whose GDP has performed worse than the national average in recent years, owing to low or even negative population growth. Thus, in making the assumption about counterfactual GDP in 2020, according to which all regions grew at an average rate of 1.7%, the favourable difference in performance relative to the pandemic scenario may have been overestimated.

common that they are less exposed to tourism and have a greater weight of the sectors least affected by COVID-19, such as the agricultural and public sectors.

Other significant findings are worth noting. First, analysis of provincial data reveals differences that are not observed at the regional level. For example, in Lleida province GDP fell by 8%, owing to the lower weight of the sectors most affected by the health crisis, compared with the declines in the three coastal Catalan provinces, where it dropped by more than 11%. Second, quarterly disaggregation shows if provincial dispersion has changed over time. Indeed, heterogeneity between provinces was notably higher in Q3 and Q4 than in the first two quarters, as evidenced by the coefficients of variation for the year-on-year rates: 0.1 in Q1, 0.3 in Q2, 0.6 in Q3 and 0.5 in Q4. This may be related to the fact that the restrictions on activity introduced in the early stages of the pandemic affected a far higher number of sectors and, therefore, the sectoral composition of activity had less impact when explaining the unevenness of the GDP path across the different provinces. Lastly, this exercise also shows if there are different behaviour profiles across provinces in different quarters. For example, in Q2 the Aragonese provinces of Teruel and Huesca posted falls that were far more moderate (-13.5% and -15.1%) than the national aggregate (-21.6%), while the declines in Q4 (-6.6% and -8.5%) were closer to the average (-9.1%).

## The determinants of the heterogeneous impact on provincial economic activity

This section examines the factors that help to explain the cross-province differences in the change in GDP. Two types of factors are analysed: first, those relating to the effect of the pandemic in terms of mobility restrictions and incidence of the disease and, second, structural factors which capture the economic characteristics of each province.

The introduction of containment measures to curb the spread of the virus has been a major factor determining business activity since the onset of the pandemic. In the absence of a variable which captures the severity of the restrictions at the provincial level, a “mobility” variable is used, capturing the impact of the health crisis on people’s mobility, whether such restrictions are voluntarily adopted or are imposed by the authorities. This variable is built as the average of the “workplaces” and “transit stations” indicators provided by Google mobility reports.<sup>9</sup> Chart 2.1 shows this mobility indicator in Spanish provinces. Two distinct time periods can be identified: first, from the introduction of the first restrictions in March until the summer, there was a high comovement of mobility indices by province, which may be due to the fact that lockdown and the first stages of its gradual lifting were managed following a centralised model under the state of alert declared on 14 March

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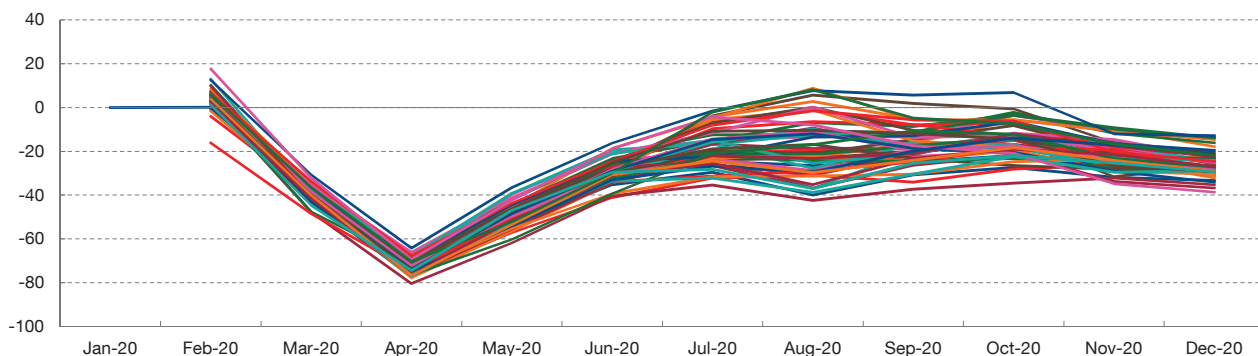
9 [Google Mobility Report](#).

Chart 2

**ECONOMIC ACTIVITY IN 2020 HAS BEEN HIGHLY CONDITIONED BY CHANGES IN PEOPLE'S MOBILITY**

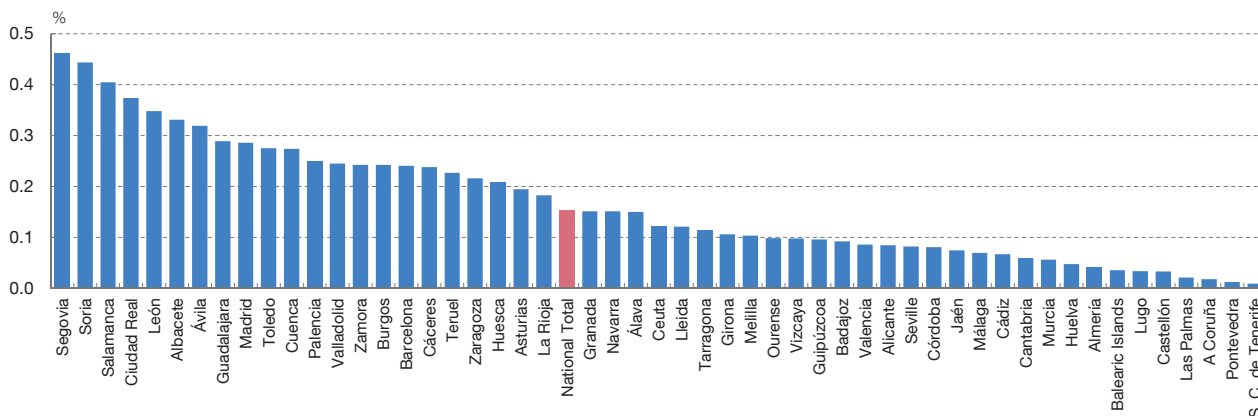
Provincial GDP growth dispersion was lower in H1 than in H2, largely owing to more uniform developments in terms of mobility until June. This was due to the centralised adoption of lockdown measures in that period. The pandemic has also had an uneven impact by territory. Excess mortality in H1 was concentrated in a limited group of provinces, while in H2, excess mortality was more evenly distributed.

1 GOOGLE MOBILITY INDEX: "WORKPLACES" AND "TRANSIT STATIONS" AVERAGE

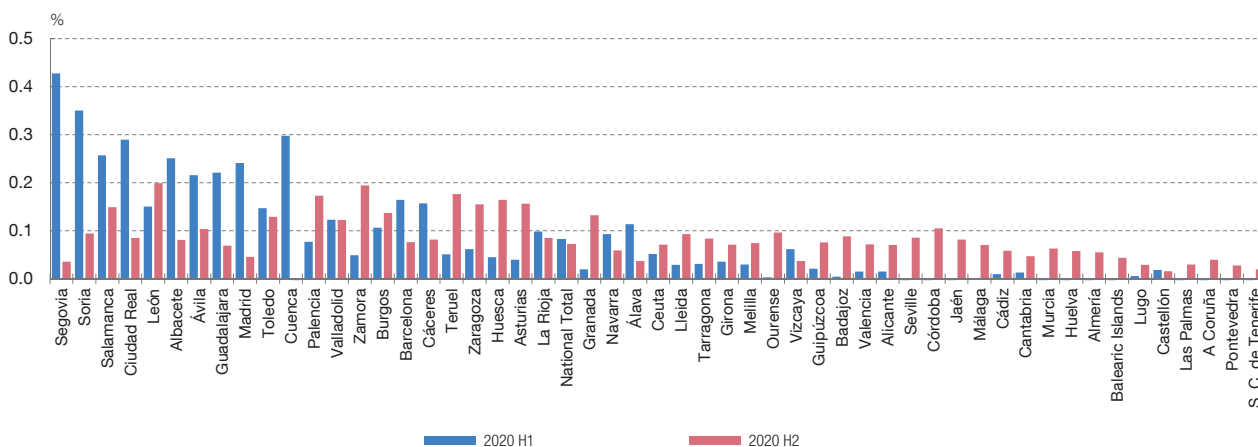


2 EXCESS MORTALITY: (DEATHS IN 2020 - AVERAGE OF DEATHS IN 2018 AND 2019) / POPULATION

2.1 2020 TOTAL



2.2 2020 H1 AND H2



SOURCES: Google Mobility Report, INE and Banco de España.



2020, with hardly any territorial differences in the restrictions. However, from the summer onwards, regional governments gained greater capacity to establish and to ease containment measures, depending on the incidence of the virus in their territories. Thus, the switch from a centralised to a decentralised command may have led to greater dispersion in mobility indices since the summer, which was especially noticeable from August onwards. This pattern continued throughout the rest of the year, which was marked by the second wave of the pandemic.<sup>10</sup> This would explain the above-mentioned finding whereby the provincial GDP dispersion in the first half of the year was lower than in the second half.

In addition, the effect of the incidence of the disease was explored through a variable measuring excess mortality in each quarter of 2020 relative to the population of the province. Drawing on the INE's weekly death estimates since the COVID-19 outbreak, excess mortality in 2020 is calculated by province as the difference between that year's deaths and the average recorded in 2018 and 2019, relative to the population of each province. The number of deaths in Spain in 2020 was 17.2% higher than the average of the two preceding years, which is equivalent to 0.15% of the population. Chart 2.2.1 shows that the provinces with the highest excess mortality in 2020 were those comprising Castile and Leon, Castile-La Mancha and Madrid. Notable on the less negative side are the Galician and island provinces. This excess mortality was broken down by quarter in order to capture potential differences in how the pandemic has evolved over time in each territory. To illustrate this, Chart 2.2.2 summarises the information for H1 and H2 to show the effects of the first and second waves of the pandemic. While excess mortality is similar for H1 and H2 (0.08% and 0.07%, respectively), its regional impact differs greatly. Mortality in H1 was concentrated in a limited group of provinces (seven provinces had excess mortality levels above 0.2% of their population), while in 2020 H2, excess mortality was more evenly distributed.

As for the remaining explanatory variables, of a more structural nature and not directly related to the pandemic, the variable "tourism" calculates the weight of this sector in provincial activity through the ratio between incoming tourists and the population. Additionally, the variable "inbound tourism" measures the weight of inbound tourism through the ratio of foreign tourists to total tourists. Both variables are taken from the INE's 2019 Hotel Occupancy Survey. Likewise, other structural factors have been considered, such as the variables "public sector employment" and "temporary employment" (which show the share of public sector employees and employees on temporary contracts, respectively, as a share of all employees, according to the 2019 Spanish Labour Force Survey), the variable "SME" (which measures the percentage of firms with fewer than 50 employees)<sup>11</sup> and the variable

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10 For example, Murcia, Catalonia, Navarre, Asturias, Castile and Leon, Galicia and Rioja ordered the shutdown of the hospitality sector at different times during Q4, whereas this sector remained open in other territories.

11 *Estructura y dinámica empresarial en España*, May 2020.



Table 1

**DETERMINANTS OF THE CROSS-PROVINCE 2020 GDP DIFFERENCES IN SPAIN**

	(1) (Y-o-y GDP change)	(2) (Y-o-y GDP change)	(3) (Y-o-y GDP change)	(4) (Y-o-y GDP change)
Mobility	0.001***	0.001***	0.0009***	0.0011***
(SE)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Tourism	-0.0148***	-0.0149***	-0.0162***	-0.0151***
(SE)	(0.002)	(0.002)	(0.002)	(0.002)
Inbound tourism	-0.0729***	-0.071***	-0.0535***	-0.0669***
(SE)	(0.014)	(0.015)	(0.019)	(0.015)
Temporary employment	-0.1289***	-0.1296***	-0.1152***	-0.1191***
(SE)	(0.036)	(0.036)	(0.037)	(0.036)
Public sector employment	0.1182***	0.1196***	0.114***	0.1162***
(SE)	(0.03)	(0.03)	(0.03)	(0.03)
SME		0.0283		
(SE)		(0.081)		
Rural			0.0289	
(SE)			(0.019)	
Excess mortality				6.6693
(SE)				(4.385)
Dummy 2020 Q1	0.0391***	0.0254	0.0259	0.0358**
(SE)	(0.015)	(0.041)	(0.017)	(0.015)
Dummy 2020 Q2	-0.0802***	-0.0943*	-0.0965***	-0.0825***
(SE)	(0.024)	(0.047)	(0.026)	(0.024)
Dummy 2020 Q3	0.0136	-0.08397	0.01672	0.0101
(SE)	(0.016)	(0.042)	-0.018	(0.016)
Dummy 2020 Q4	0.0062	-0.0075	-0.0076	0.0012
(SE)	(0.016)	(0.042)	(0.019)	(0.017)
# obs	208	208	208	208
R squared	0.952	0.952	0.953	0.953

**SOURCE:** Banco de España. **NOTE:** \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

“rural” (calculated as the percentage of the population living in rural municipalities, i.e. those with fewer than 5,000 inhabitants, on INE data).

The results<sup>12</sup> point to the importance of both mobility and sectoral structure in explaining cross-province differences in estimated 2020 GDP growth. Table 1 shows that, in 2020, GDP fell most sharply in those provinces that recorded a more pronounced decline in movement, had a higher weight of tourism (particularly inbound tourism) and had a lower proportion of public sector employees. It should be noted that, after controlling for behavioural and economic

<sup>12</sup> The results are based on a panel regression with quarterly fixed effects linking year-on-year changes in GDP for each quarter and Spanish province to a set of factors.

structure effects, neither the weight of SMEs and rural population nor excess mortality appear to be statistically significant, as shown in Table 1, Columns 2, 3 and 4. Therefore, it can be inferred that the uneven impact of the pandemic in 2020 responded more to differences in sectoral specialisation and to changes in people's mobility decisions (whether voluntary or dictated by restrictions) than to differences in the incidence of the disease. These results are in line with other papers that attempt to explain the geographical disparities in the impact of the pandemic, such as Sapir (2020),<sup>13</sup> which concludes that the stringency of the restrictions, reliance on tourism and the quality of the institutional framework play a key role in explaining the differences in the macroeconomic impact of COVID-19 across European countries.

Overall, the estimated model explains 95% of the cross-province variation in economic activity in 2020. To find out which variables contribute to a greater degree to these regional differences, R squared is decomposed following the methodology suggested by Hüttner and Sunder (2011).<sup>14</sup> Mobility is clearly the most important variable, as it explains 35% of cross-province differences in GDP. Additionally, total tourism and inbound tourism jointly account for slightly more than 20%, while the contribution of public sector and temporary employment as a share of total employment is 3% and 1%, approximately. The remaining differences (around 40%) are due to quarterly fixed effects.

10.2.2021.

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13 A. Sapir, "Why has Covid-19 hit different European Union economies so differently?", *Policy Contribution 2020/18*, Bruegel.

14 F. Hüttner and M. Sunder (2011), *Decomposing R2 with the Owen value*, Working Paper No. 100, Leipzig, Universität Leipzig, Wirtschaftswissenschaftliche Fakultät.