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Financial Viability and Supplier monitoring in times of economic vulnerability (6)

EUROPEAN SPACE SMES' FINANCIAL VIABILITY:  
INSIGHTS AND POLICY PERSPECTIVES

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## **Abstract**

Small and medium-sized enterprises (SMEs) are at the core of the European space industry and bring a strong contribution to its innovation and renewal. The context of the space sector is changing fast, including disruptive technologies and business models, and an increasing focus on commercial aspects. Space SMEs in Europe face challenges in terms of access to finance to ensure business stability and growth and a suboptimal investment landscape. These changes and needs require a dedicated policy but surprisingly, figures on the financial viability of the SMEs to underpin this policy are lacking. The ESA SME Office and SME4SPACE, together with KU Leuven, looked at the financial viability of space SMEs in Europe in the period 2014-2020, including early evidence on the impact of Covid-19. The target population of this study are companies that fall under the European Commission definition of an SME in the year 2021 and have received public support through the European Space Agency or the space activities in the European Union Framework Programme Horizon 2020. This list is further completed with members of SME4SPACE, resulting in a sample of more than 1,600 companies.

For these companies, information on economic and financial performance has been collected for the period 2014-2020 from the ORBIS database. The central focus is on the SMEs' growth performance as well as financial position in terms of liquidity, leverage and profitability. Among the SMEs, a distinction is made between micro-sized, small-sized and medium-sized firms, and between young and more mature companies. Preliminary findings of the analysis for the period 2014-2020 showed that European Space SMEs are in a good condition in terms of liquidity (average current ratio exceeds 1) and leverage (average leverage rate of 60%). However, the business is highly capital intensive and the average profitability is rather low (an average of about 3% return on assets).

Based on these findings and consultations with the SME community the paper provides inputs for potential future measures for the industry stakeholders and policymakers.

**Keywords: Financial viability, Space, SMEs, ESA, European Commission, Policy**

## 1. Introduction

Small and medium-sized enterprises (SMEs) are at the core of the European space industry and bring a strong contribution to its innovation and renewal. The context of the space sector is changing fast, including disruptive technologies and business models, and an increasing focus on commercial aspects. However, only recently growing concern is raised about difficulties space SMEs in Europe face in terms of access to finance to ensure business stability and growth and a suboptimal investment landscape.<sup>1</sup> These changes and needs require a dedicated policy but surprisingly, figures on the financial viability of the SMEs to underpin this policy are lacking.

In this paper the main goal is to examine the financial viability of space SMEs in Europe in the period 2014-2020. As insights regarding the economic importance of SMEs in the space industry are largely missing, we start with a snapshot on general economic performance indicators as employment, turnover, total assets and intangible assets. We look at these indicators both in absolute terms (section 3) and in terms of average growth (section 4) terms. Next, we look at financial performance indicators (section 5) and link long-term debt financing indicators to general economic performance indicators (section 6). Throughout the paper we provide early evidence on the impact of Covid-19.

The target population of this study involves SMEs actively involved in space activities and supported by the European Space Agency or Horizon 2020. Data on space SMEs is hard to collect, and therefore use is made of national account data of private companies provided by ORBIS<sup>2</sup>. These data take into account all activities of the SMEs, which involve other than space activities as well. As financial account data are not always complete and

consistent, a rigorous process of consistency checks was followed, and a procedure was developed to obtain a good representation of the target population (section 2).

## 2. Sample and method

The target population of this study are companies that fall under the European Commission definition of an SME in the year 2021 and have received public support through the European Space Agency or the space activities in the European Union Framework Programme Horizon 2020. This list is further completed with members of SME4SPACE, resulting in a sample of 1,637 companies from 29 countries<sup>3</sup>. For these companies, information on economic and financial performance has been collected for the period 2014-2020 from ORBIS database. Appendix A.1 includes an overview of the number of observations per country. It is important to note that the list of companies is composed of SMEs that fulfilled the target population requirements in the year 2021. Therefore, we present a separate analysis for the more mature companies (those incorporate before 2014), and those newly created since the year 2014 (also referred to as “young” firms in this paper). Note that the sub-sample of mature firms is based on the same number of firms each year, whereas the sub-sample of young firms shows an increase in the number of firms each year. As a consequence, some financial indicators for the latter group are severely affected by the increase of the number of (new) companies each year.

Data on financial and economic indicators for SMEs is hard to collect. Orbis provides such data based on the annual accounts. However, SMEs have less detailed reporting obligations for their annual account data, resulting in missing information for some variables (so called item non-

<sup>1</sup> For example: ESA (2021). Financing space: options for SMEs and midcaps in Europe. <https://space-economy.esa.int/article/88/financing-space-options-for-smes-and-midcaps-in-europe>. SME4Space (2021). Economic importance and financial health of the SMEs in the European space industry. <https://www.sme4space.org/study-on-space-smes-importance-2021/>

<sup>2</sup> ORBIS has information on close to 400 million companies and entities across the globe – 41 million of these have

detailed financial information. It's a widely used database for international comparison [https://www.bvdinfo.com/en-gb/our-](https://www.bvdinfo.com/en-gb/our-products/data/international/orbis?gclid=EAIaIQobChMIo-KBwNXh-QIVl4jVCh2jcg2cEAAYASAAEgLTUvD_BwE)

[products/data/international/orbis?gclid=EAIaIQobChMIo-KBwNXh-QIVl4jVCh2jcg2cEAAYASAAEgLTUvD\\_BwE](https://www.bvdinfo.com/en-gb/our-products/data/international/orbis?gclid=EAIaIQobChMIo-KBwNXh-QIVl4jVCh2jcg2cEAAYASAAEgLTUvD_BwE)  
<sup>3</sup> This also includes 7 companies from Canada which have also obtained public support through the European Space Agency or the space activities in the European Union Framework Programme Horizon 2020.

response). Also, reported information in the annual accounts sometimes contains some inconsistencies at firm level. Therefore, a rigorous method for data cleaning has been applied to the data. In order to maximize the number of non-missing values in our dataset allowing for a more meaningful (representative) analysis, several steps were followed. The detailed procedure can be found in Appendix A.2. First, we perform within-company within-year cleaning of the data. Some of the elements in the balance sheet and profit and loss account are logically linked. For instance, total assets are equal to fixed assets plus current assets. Hence, the true value of a missing value in one of these variables can be identified if we have non-missing values for the other variables. The links which are used in this step can be found in the appendix. In addition, for some cases with missing values for turnover but non-missing values for sales, the value of sales is used as proxy for turnover. This affects 1 (2013) to 6 (2017 and 2016) companies per year. Second, we perform within-company across year cleaning. If a company has missing values in between non-missing values (e.g. the company has total assets for 2017 and 2015 but not for 2016), we linearly interpolate the missing values (i.e. the total assets in 2016 will equal the average of total assets in 2017 and 2015). If a company still has missing values but has non-missing values in earlier years, the missing values are set equal to the non-missing value in the earlier year (only for companies which are still active). If a company still has missing values after this step but has non-missing values in later years, the missing values are set equal to the non-missing value in that later year (only for companies incorporated before 2014). Finally, for the variables total assets, employees, and turnover we

estimate any remaining item non-response using 5 different empirical models (see appendix).

### **3. Economic performance indicators: employment, total assets, turnover, intangible assets**

In this section we discuss some key economic performance indicators that give an insight in the size of the SME space industry in aggregate as well as the median (average) size of companies in the industry. We collected data on four size indicators: the number of employees, total assets, turnover, and intangible assets<sup>4</sup>.

#### *3.1. Aggregate size of the SMEs in our sample in 2020*

In Table 1 we present aggregate size statistics for the SME space industry in 2020. Four size measures are used: the aggregate number of employees, total assets, turnover and intangible assets. In addition we also present these statistics for three different types of SMEs, namely micro companies, small companies and medium sized companies<sup>5</sup>. Companies that cannot be classified due to missing observations for employees, total assets or turnover are not included in this analysis.

In 2020 we identified 902 micro companies in the European SME industry (or 56%), 544 small companies (34%) and 159 medium sized companies (10%). In total the industry employed 31,202 people in 2020, of which 10.8% in micro companies, 39.6% in small companies and 49.6% in medium sized companies. The aggregate assets accounted for in the European SME space industry was about 4.84 billion EUR, of which 10.0% were held in micro companies, 38.4% in small companies and 51.6% in medium size companies. In aggregate the industry accounted for 491 million EUR in intangible assets, of which 13.3% were held in micro companies, 42.3 % in small companies and 44.4 % in medium sized companies. Finally, the industry generated 3.52 billion EUR in turnover in 2020, of which 7.7 % was realized by micro companies, 38.5% by small companies and

<sup>4</sup> An intangible asset is an asset that is not physical in nature. Intellectual property (such as patents, trademarks, and copyrights), goodwill, and brand recognition are examples of intangible assets. Intangible assets have a monetary value since they represent potential revenue.

<sup>5</sup> Firms are categorized by size class according to the EU definition:

- micro enterprise: fewer than 10 employees and an annual turnover (the amount of money taken in a particular period)

or balance sheet (a statement of a company's assets and liabilities) below €2 million.

- small enterprise: fewer than 50 employees and an annual turnover or balance sheet below €10 million.

- medium-sized enterprise: fewer than 250 employees and annual turnover below €50 million or balance sheet below €43 million.

53.8 % by medium sized companies. These shares indicate a relatively high share of the intangible knowledge base with potential for future revenue in particular in the micro-sized companies, and at the

same time a more modest share in the overall revenue generated by this type of companies. The opposite holds for the group of medium-sized firms.

Table 1: Aggregate size statistics in the SME space industry in 2020

		2020			
		Aggregate size	%	N	%
Employees	Micro	3,360	10.77%	902	56.20%
	Small	12,358	39.61%	544	33.89%
	Medium	15,484	49.63%	159	9.91%
	<b>TOTAL</b>	<b>31,202</b>		<b>1,605</b>	
Total assets (Million EUR)	Micro	487	10.05%	902	56.20%
	Small	1,858	38.38%	544	33.89%
	Medium	2,496	51.57%	159	9.91%
	<b>TOTAL</b>	<b>4,841</b>		<b>1,605</b>	
Turnover (Million EUR)	Micro	272	7.72%	902	56.20%
	Small	1,355	38.47%	544	33.89%
	Medium	1,896	53.81%	159	9.91%
	<b>TOTAL</b>	<b>3,523</b>		<b>1,605</b>	
Intangible fixed assets (Million EUR)	Micro	65	13.30%	902	56.20%
	Small	208	42.36%	544	33.89%
	Medium	218	44.34%	159	9.91%
	<b>TOTAL</b>	<b>491</b>		<b>1,605</b>	

### 3.2. Evolution of the absolute size of the SME space industry in the period 2014-2020

In this sub-section we describe what the median (mean) SME company looks like in the European space industry in terms of size (along all four previously identified size measures). Table 2 presents the evidence in three panels. Panel A provides the mean and median size statistics for the industry as a whole. Note that the sample contain a relatively large portion of start-ups by construction (more specifically, 38.42% of the sample companies that were identified in 2021 is incorporated since 2014). Therefore, we split the sample in two sub-samples based on the maturity of the companies. In Table 2 panel B we present the statistics for the more mature firms which we define as firms that were incorporated before 2014. In Table 2 panel C we then present the mean and median size statistics for companies that were incorporated between 2014 and 2020.

**3.2.1. Employees.** The median (mean) number of employees in an SME in the space industry equals 7 (19.63) in 2020. Note that the median number of employees is rather stable from year to year, but decreased from 8 to 7 in 2017. The mean number

of employees ranges between 18.95 and 19.95 over 2014-2020. Looking only at the more mature companies in the industry, we see that the median (mean) number of employees is much higher and equals 12 (26.9) in 2020.

**3.2.2. Total assets.** The median (mean) total assets of an SME in the space industry equals 745,107 EUR (3,254,858 EUR) in 2020, which is the largest value over the 2014-2020 time span. Note that the median (mean) total assets number is significantly larger for mature companies, namely 1,425,660 EUR (4,566,884 EUR) in 2020.

**3.2.3. Turnover.** The median (mean) turnover of an SME in the space industry equals 583,679 EUR (2,264,409 EUR) in 2020. This is a slight decrease as compared to 2019. For the mature companies in the industry however, the median (mean) turnover equals 1,189,827 EUR (3,280,305 EUR) which is close to the achieved level in 2019.

**3.2.4. Intangible assets.** The median (mean) intangible assets of an SME in the space industry

equals 879 EUR (334,307 EUR) in 2020. This is a slight decrease as compared to 2019 for the median value but an increase for the mean value. This indicates that some larger companies with a higher values of intangible assets have increased their intangible assets in 2020. For the mature companies in the industry however, the median (mean) turnover equals 6,974 EUR (390,038 EUR) which is an increase from 2019.

*3.2.5. Early Covid19 effects.* In the year 2020, we observe a decline in the median turnover and employment in the sub-sample of mature firms (Panel B), but this is not the case for the evolution of the average turnover and employment numbers which remains positive. Note also that the total and the intangible assets further increased in 2020. For the SMEs incorporated since 2014 (Panel C), the evolution in absolute size terms remains positive for all parameters that we investigated during the first year of the Covid pandemic.

Table 2: Company level size statistics in the SME Space industry

Panel A: All companies

	2014	2015	2016	2017	2018	2019	2020
<i>Mean Employees</i>	19.95	19.95	19.32	18.95	19.13	19.27	19.63
<i>Median Employees</i>	8.00	8.00	8.00	7.00	7.00	7.00	7.00
<i>Mean Total Assets (in Million EUR)</i>	3.113	3.065	2.844	2.762	2.857	3.023	3.255
<i>Median Total Assets (in Million EUR)</i>	0.627	0.670	0.651	0.608	0.625	0.707	0.745
<i>Mean Turnover (in Million EUR)</i>	2.357	2.356	2.246	2.217	2.259	2.295	2.264
<i>Median Turnover (in Million EUR)</i>	0.663	0.680	0.670	0.651	0.682	0.631	0.584
<i>Mean Intangible Assets (in Million EUR)</i>	0.205	0.226	0.205	0.187	0.254	0.284	0.334
<i>Median Intangible Assets (in Million EUR)</i>	0.0019	0.0016	0.0010	0.0010	0.0010	0.0010	0.0009

Panel B: Mature companies (incorporated before 2014)

	2014	2015	2016	2017	2018	2019	2020
<i>Mean Employees</i>	20.64	21.87	22.40	23.44	24.82	26.20	26.88
<i>Median Employees</i>	9.00	9.78	10.00	11.00	12.00	13.00	12.00
<i>Mean Total Assets (in Million EUR)</i>	3.230	3.405	3.379	3.520	3.793	4.158	4.567
<i>Median Total Assets (in Million EUR)</i>	0.671	0.802	0.912	1.017	1.090	1.236	1.426
<i>Mean Turnover (in Million EUR)</i>	2.446	2.613	2.667	2.822	3.054	3.246	3.280
<i>Median Turnover (in Million EUR)</i>	0.731	0.860	0.960	0.986	1.109	1.193	1.190
<i>Mean Intangible Assets (in Million EUR)</i>	0.204	0.236	0.225	0.219	0.288	0.331	0.390
<i>Median Intangible Assets (in Million EUR)</i>	0.0036	0.0044	0.0040	0.0058	0.0061	0.0062	0.0070

Panel C: Young companies (incorporated from 2014 onwards)

	2014	2015	2016	2017	2018	2019	2020
<i>Mean Employees</i>	2.98	4.30	4.90	4.96	5.80	6.63	7.92
<i>Median Employees</i>	2.00	2.50	3.00	3.00	3.00	3.00	4.00
<i>Mean Total Assets (in Million EUR)</i>	0.258	0.307	0.411	0.413	0.694	0.968	1.145
<i>Median Total Assets (in Million EUR)</i>	0.053	0.064	0.110	0.119	0.128	0.154	0.211
<i>Mean Turnover (in Million EUR)</i>	0.177	0.284	0.322	0.341	0.416	0.570	0.637
<i>Median Turnover (in Million EUR)</i>	0.061	0.055	0.080	0.081	0.088	0.104	0.114
<i>Mean Intangible Assets (in Million EUR)</i>	0.007	0.035	0.051	0.050	0.124	0.146	0.177
<i>Median Intangible Assets (in Million EUR)</i>	0.0016	0	0.0001	0	0	0.0001	0.0003

#### 4. Growth of the aggregate and average size of the SME space industry in the period 2014-2020

In this section we discuss the growth of SMEs active in the space industry over 2014-2020. Again, we make a distinction between young and mature firms. We look at the annual growth in the aggregate number of employees, total assets,

turnover and intangible assets. In addition to the growth rate of aggregate size indicators, we also include the growth rate in average size indicators per company which accounts for differences in the number of sample observations over time. As can be derived from Table 3 (all panels) 617 new firms were incorporated between 2014 and 2020. Note that there is an increase in the growth of the number of new firms in the period 2014-2016 and a decline in additionally created firms in the year 2020.

Table 3 Panel A: Annual and cumulative growth in the aggregate and average number of employees working in SMEs active in the space industry

	2014	2015	2016	2017	2018	2019	2020
<b>Incorporated since 2014</b>							
Aggregate employees	122	524	1,049	1,592	2,477	3,626	4,888
Annual growth in aggregate employees		329.51%	100.19%	51.76%	55.59%	46.39%	34.80%
Growth in aggregate employees since 2014		329.51%	759.84%	1204.92%	1930.33%	2872.13%	3906.56%
Annual growth in average number of employees *		44.21%	14.13%	1.18%	16.91%	14.29%	19.51%
Growth in average number of employees since 2014*		44.21%	64.59%	66.53%	94.70%	122.52%	165.93%
N	41	122	214	321	427	547	617
<b>Incorporated before 2014</b>							
Aggregate employees	20,624	21,784	22,408	23,420	24,777	26,125	26,779
Annual growth in aggregate employees		5.62%	2.86%	4.52%	5.79%	5.44%	2.50%
Growth in aggregate employees since 2014		5.62%	8.65%	13.56%	20.14%	26.67%	29.84%
Annual growth in average number of employees *		5.94%	2.45%	4.62%	5.90%	5.54%	2.61%
Growth in average number of employees since 2014*		5.94%	8.54%	13.56%	20.26%	26.92%	30.23%
N	999	996	1000	999	998	997	996

\* Growth in average number of employees is calculated as percentage increase of the average number of employees per year, to account for differences in the number of sample observations over time.

Table 3 Panel A documents an annual increase in the aggregate number of employees and average number of employees in the SME space sector for both mature and young companies. For mature companies the annual growth in aggregate employees ranges between 2.50% (2020) and 5.79% (2018). The growth rate in 2020 was at the lower end (namely 2.50%). Over 2014-2020 the cumulative growth in the aggregate number of

employees was about 30% for mature firms. For young companies we document much higher growth rates. Besides an increase in the annual number of newly incorporated companies resulting in a total cumulative growth of 3906%, young companies also exhibit a larger growth rate in the average number of employees (165.93% from 2014-202) than the average mature firm (30.23%).

Table 3 Panel B: Annual and cumulative growth in the aggregate and average total assets held by SMEs active in the space industry

	2014	2015	2016	2017	2018	2019	2020
<b>Incorporated since 2014</b>							
Aggregate Total Assets (In Million EUR)	10.57	37.73	90.41	133.42	300.37	534.31	709.92
Annual growth in aggregate total assets		256.87 %	139.65 %	47.58%	125.12%	77.89%	32.87%
Growth in aggregate total assets since 2014		256.87 %	755.22 %	1162.12 %	2741.28 %	4954.31 %	6615.49 %
Annual growth in average total assets *		18.96%	33.98%	0.52%	67.93%	39.54%	18.29%
Growth in average total assets since 2014*		18.96%	59.38%	60.21%	169.04%	275.41%	344.09%
N	41	123	220	323	433	552	620
<b>Incorporated before 2014</b>							
Aggregate Total Assets (in Million EUR)	3,239.72	3,408.08	3,382.39	3,523.93	3,793.07	4,154.16	4,553.18
Annual growth in aggregate total assets		5.20%	-0.75%	4.18%	7.64%	9.52%	9.61%
Growth in aggregate total assets since 2014		5.20%	4.40%	8.77%	17.08%	28.23%	40.54%
Annual growth in average total assets*		5.41%	-0.75%	4.18%	7.75%	9.63%	9.83%
Growth in average total assets since 2014*		5.41%	4.61%	8.99%	17.43%	28.74%	41.39%
N	1003	1001	1001	1001	1000	999	997

\* Growth in average total assets is calculated as the percentage increase of the average total assets per year, to account for differences in the number of sample observations over time.

From Table 3 Panel B we conclude that for the mature firms there is annual increase in average total assets held in the SME space industry ranging from 5-10 % except for 2016 where we find a decrease of 0.75%. We do not find descriptive evidence of a covid19-effect on total assets as the increase in average total assets is close to 10% in

2020. The cumulative growth in aggregate total assets for mature companies since 2014 is 40.54%. For young firms, we observe that the growth in aggregate as well as average total assets in 2020 is positive but substantially lower than the growth rate in 2019 and 2018.



Table 3 Panel C: Annual and cumulative growth in the aggregate and average turnover generated by SMEs active in the space industry

	2014	2015	2016	2017	2018	2019	2020
<b>Incorporated since 2014</b>							
Aggregate Turnover (in Million EUR)	7.27	35.27	70.47	109.68	178.73	313.73	395.38
Annual growth in aggregate turnover		384.96%	99.82%	55.63%	62.96%	75.53%	26.03%
Growth in aggregate turnover since 2014		384.96%	869.06%	1408.11%	2357.61%	4213.87%	5336.65%
Annual growth in average turnover *		60.35%	13.14%	5.85%	22.03%	37.23%	11.62%
Growth in average turnover since 2014*		60.35%	81.42%	92.03%	134.33%	221.58%	258.94%
N	41	124	219	322	430	550	621
<b>Incorporated before 2014</b>							
Aggregate Turnover (in Million EUR)	2,443.65	2,613.40	2,667.20	2,819.25	3,047.72	3,236.43	3,263.90
Annual growth in aggregate turnover		6.95%	2.06%	5.70%	8.10%	6.19%	0.85%
Growth in aggregate turnover since 2014		6.95%	9.15%	15.37%	24.72%	32.44%	33.57%
Annual growth in average turnover *		6.84%	2.06%	5.81%	8.21%	6.30%	1.05%
Growth in average turnover since 2014*		6.84%	9.04%	15.37%	24.84%	32.71%	34.10%
N	999	1000	1000	999	998	997	995

\* Average growth is calculated as percentage increase of the average turnover per year, to account for differences in the number of sample observations over time.

In Table 3 Panel C we observe an annual increase in the aggregate turnover of the mature SMEs in the space industry between 2014 -2020 between 0.85% and 8.10%. The lowest growth rate occurred in 2020 and might be attributable to Covid19. As to

the young companies, we see a larger annual growth rate in average turnover. Note that the growth rate in average turnover 2020 was only 11.62%, which is substantially lower than in 2018 and 2019.

Table 3 Panel D: Annual and cumulative growth in the aggregate and average intangible assets held by SMEs active in the space industry

	2014	2015	2016	2017	2018	2019	2020
<b>Incorporated since 2014</b>							
Aggregate Intangible Assets (In Million EUR)	0.28	4.35	11.24	16.04	53.71	80.38	109.83
Annual growth in aggregate intangible assets		1462.32 %	158.48%	42.75%	234.86%	49.64%	36.64%
Growth in aggregate intangible assets since 2014		1462.32 %	3938.25 %	5664.57 %	19203.01 %	28785.09 %	39368.34 %
Annual growth in average intangible assets*		420.78%	44.51%	-2.77%	149.79%	17.38%	21.65%
Growth in average intangible assets since 2014*		420.78%	652.59%	631.74%	1,727.79 %	2,045.48 %	2,510.03 %
N	41	123	220	323	433	552	620
<b>Incorporated before 2014</b>							
Aggregate Intangible Assets (in Million EUR)	204.32	236.58	225.39	218.85	287.91	330.26	388.87
Annual growth in aggregate intangible assets		15.79%	-4.73%	-2.90%	31.56%	14.71%	17.75%
Growth in aggregate intangible assets since 2014		15.79%	10.31%	7.11%	40.92%	61.64%	90.33%
Annual growth in average intangible assets *		16.02%	-4.73%	-2.90%	31.69%	14.82%	17.98%
Growth in average intangible assets since 2014*		16.02%	10.53%	7.33%	41.34%	62.29%	91.47%
N	1,003	1,001	1,001	1,001	1,000	999	997

\* Growth in average of intangible assets is calculated as percentage increase of the average intangible assets per year, to account for differences in the number of sample observations over time.

In Table 3 Panel D we document a negative annual growth rate in average intangible assets in the year 2017 (both for young and for mature SMEs), and there seems no immediate negative influence of the Covid pandemic in 2020.

## 5. Financial performance: liquidity, leverage (solvency) and profitability

In this section we discuss the overall financial performance of the SME space sector in the EU among the three common dimensions: liquidity, leverage and profitability. Liquidity refers to a company's ability to repay both short- and long-term obligations. Leverage ratios measure the amount of financing that comes from debt. Profitability ratios give an indication of a company's ability to generate income. We use the following ratios in this section:

$$\begin{aligned} \text{Liquidity} &= \text{Current Ratio} &= \text{Current Assets/Current Liabilities (a ratio of } > 1 \text{ is recommended)} \\ \text{Leverage} &= \text{Debt to Assets ratio} &= \text{Total Liabilities/Total Assets} \\ \text{Profitability} &= \text{Return on Assets (ROA)} &= \text{Net Income/ Total Assets} \end{aligned}$$

Note that we report median values to reduce the influence of outliers.

### 5.1 Financial performance by company age

Table 4: median financial performance (liquidity, leverage and profitability) of the SMEs in the space industry according to maturity

	2014	2015	2016	2017	2018	2019	2020
<b>Mature companies (incorporated before 2014)</b>							
Liquidity	1.808	1.769	1.840	1.920	1.870	1.946	2.047
Leverage	0.594	0.590	0.597	0.579	0.575	0.561	0.570
Profitability	0.035	0.036	0.036	0.042	0.037	0.035	0.032
<b>Young companies (incorporated since 2014)</b>							
Liquidity	1.749	1.635	1.562	1.517	1.619	1.595	1.636
Leverage	0.591	0.515	0.621	0.643	0.610	0.650	0.695
Profitability	0.041	0.047	0.022	0.023	0.033	0.020	0.025
<b>All companies</b>							
Liquidity	1.807	1.752	1.799	1.837	1.800	1.823	1.938
Leverage	0.594	0.576	0.598	0.597	0.580	0.583	0.611
Profitability	0.035	0.040	0.035	0.037	0.036	0.033	0.032

We find that the median company in our sample has a relatively high (but not problematic) leverage (around 60% total liabilities, or 60% of its assets are financed by creditors), a rather low return on assets but a very good liquidity (exceeding 1). As is to be expected, we also find that mature companies are in a better position than young companies. Young companies have a higher leverage and a lower but still very good liquidity. In 2020 the median young company realized a ROA equal to 2.5%, whereas this ratio equalled 3.2% for mature companies, which is 0.7% points higher or relatively speaking 28% percent higher ROA for mature firms. However, both mature and young firms seem to experience significant pressure on their bottom line earnings.

We further investigate the evolution over time of the fraction of SMEs in the space sector whose performance falls below critical thresholds commonly used in financial statement analysis. In particular, we define the following critical levels: liquidity below 1, Leverage in excess of 66,66% and profitability below zero (indicating loss firms). We note an increase in the number of companies that report a loss in 2020, with the strongest effect in the sample of mature companies which suggests that covid19 may have had a negative effect on bottom line earnings. In contrast, liquidity does not deteriorate in 2020. Finally, we observe an increase in the percentage of highly leveraged young firms.

Table 5: Percentage of firms below critical performance thresholds

	2014	2015	2016	2017	2018	2019	2020
<b>% of companies with liquidity &lt;1</b>							
All	16.6%	15.9%	18.1%	16.9%	18.5%	17.6%	16.2%
Young	14.3%	17.8%	22.1%	22.7%	24.3%	24.5%	23.5%
Mature	16.7%	15.7%	17.3%	15.2%	16.3%	14.3%	12.2%
<b>% of companies with leverage &gt;66.66%</b>							
All	41.0%	40.1%	40.6%	40.6%	41.1%	41.4%	42.2%
Young	32.0%	40.6%	42.9%	43.6%	46.4%	46.5%	51.5%
Mature	41.3%	40.0%	40.1%	39.9%	39.3%	39.3%	38.1%
<b>% of companies with profitability &lt;0</b>							
All	30.9%	28.4%	28.7%	28.3%	28.5%	29.2%	32.2%
Young	48.0%	34.4%	41.2%	41.3%	39.6%	40.0%	40.7%
Mature	30.2%	27.9%	26.5%	24.9%	24.8%	24.8%	28.4%

Table 6: Percentage of firms below critical performance thresholds by size category.

	2014	2015	2016	2017	2018	2019	2020
<b>% of companies with liquidity &lt;1</b>							
micro	18.5%	18.3%	20.3%	19.3%	19.8%	20.3%	19.8%
small	13.4%	12.1%	15.0%	14.4%	16.5%	15.0%	13.4%
medium	13.9%	13.3%	15.6%	10.2%	17.5%	11.7%	8.5%
<b>% of companies with leverage &gt;66.66%</b>							
micro	42.5%	43.6%	44.7%	45.1%	44.1%	43.2%	45.8%
small	40.7%	38.8%	38.7%	36.2%	37.5%	39.8%	39.1%
medium	35.6%	29.5%	29.7%	33.9%	39.7%	39.1%	37.4%
<b>% of companies with ROA&lt;0</b>							
micro	31.6%	31.2%	33.3%	34.8%	31.0%	32.8%	35.4%
small	31.1%	27.3%	22.6%	22.9%	26.0%	25.0%	28.3%
medium	22.8%	18.1%	24.8%	16.1%	23.8%	25.6%	29.5%

## 5.2. Financial performance by company size class

In this sub-section we report median financial performance for the three size categories of SMEs in the space sector.

Table 7: Median financial performance (liquidity, leverage and profitability) of the SMEs in the space industry according to size class

	2014	2015	2016	2017	2018	2019	2020
<b>Liquidity (current ratio)</b>							
micro	1.816	1.752	1.7	1.73	1.787	1.811	1.794
small	1.809	1.782	1.858	1.905	1.848	1.997	2.043
medium	1.836	1.773	1.862	1.936	1.742	1.738	1.897
Total	1.819	1.764	1.799	1.841	1.803	1.824	1.938
<b>Current liabilities scaled by total assets</b>							
micro	39.40%	42.10%	41.60%	43.70%	42.70%	42.30%	40.40%
small	37.40%	37.60%	37.70%	37.10%	39.00%	38.40%	35.70%
medium	34.50%	30.30%	30.30%	32.70%	34.70%	36.00%	34.50%
Total	38.00%	38.50%	38.40%	40.20%	40.20%	39.70%	37.70%
<b>Non-current liabilities scaled by total assets</b>							
Micro	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.60%
Small	10.10%	12.20%	9.00%	8.70%	8.70%	7.40%	10.20%
Medium	12.20%	10.60%	10.70%	12.00%	10.00%	10.80%	12.90%
Total	4.40%	4.00%	3.60%	3.00%	3.10%	3.40%	5.10%
<b>Leverage (debt to assets ratio)</b>							
Micro	60.30%	58.60%	63.10%	62.80%	62.80%	59.90%	60.90%
Small	59.40%	59.40%	59.30%	57.70%	57.70%	56.90%	56.30%
Medium	58.90%	53.40%	55.70%	54.90%	54.90%	58.10%	57.80%
Total	59.40%	57.50%	60.00%	59.70%	59.70%	58.20%	58.40%
<b>Profitability (ROA)</b>							
Micro	3.80%	3.60%	3.30%	2.20%	4.20%	3.30%	3.30%
Small	3.20%	3.60%	4.30%	4.90%	3.10%	3.60%	3.30%
Medium	4.00%	5.30%	3.10%	4.00%	3.70%	2.40%	3.00%
Total	3.50%	4.00%	3.50%	3.70%	3.60%	3.30%	3.20%

We find that the financial performance is good across all three types of SMEs in the space industry. Note that “small” companies in our sample have the highest liquidity in 2018-2020. In prior years, the difference in liquidity between the three size groups is negligible. Micro companies have the highest leverage, while there are no consistent differences for profitability between the different company categories.

For the leverage ratio, we make a further distinction in the nominator between current and non-current liabilities. Non-current liabilities are only due in the long term (after more than one year), compared to short-term or current liabilities, which are due within one year. The long-term (non-current) debt-to-total-assets ratio represents the percentage of a firm’s assets financed with long-term debt (encompassing loans or other debt obligations lasting more than one year), and provides insights in the long-term financial position of a company. Whereas a low

ratio could be an indication of a “solvent” company, it could also be an indication of difficulties of access to this type of long-term financial resources. Comparing the ratio over several time periods helps to reveal trends in a company's choice or ability to finance assets with debt instead of equity.

We observe that the median value of non-current liabilities to total assets is very low for all types of space SME companies. This could indicate that European Space SMEs have difficulties attracting external long term debt funding (i.e. bank loans). In particular, the median of micro firms has barely any long-term debt funding, while small and medium firms have some (but limited) access to long-term debt funding. European Space SMEs seem to rely on equity funding, short term loans, creditors or subsidies for their funding.

## 6. The relation between long-term debt financing and SME size

In this section we take a closer look at the relation between long term debt (which we define as non-current liabilities) in the year 2019 and 2020, and some size indicators. We made the following classifications:

- Firms with no non-current liabilities (“no debt”)

- Firms with non-current liabilities between 0 and 25% of balance sheet total (“median debt”)
- Firms with non-current liabilities exceeding 25% of balance sheet total (“high debt”)

As can be seen from Table 8, over one third of the SMEs have zero long term debt, and only about one in five SMEs have long-term debt exceeding 25% of the balance sheet.

Table 8: Relationship between SME Size and access to long-term debt

	Employees			Total assets (in Million EUR)		
	2019	2020	growth	2019	2020	growth
	Firms with no non-current liabilities					
Aggregate	5,561	5,994	7.77%	980.952	1,069.108	8.99%
Average	11.08	12.01	8.42%	1.935	2.125	9.85%
N	502	499		507	503	
	Firms with non-current liabilities between 0 and 25% of balance sheet total					
Aggregate	17,212	17,952	4.30%	2,706.368	3,002.546	10.94%
Average	28.40	29.62	4.30%	4.451	4.947	11.13%
N	606	606		608	607	
	Firms with non-current liabilities exceeding 25% of balance sheet total					
Aggregate	6,061	6,499	7.23%	910.378	1,065.526	17.04%
Average	20.27	21.81	7.59%	3.035	3.564	17.43%
N	299	298		300	299	

	Turnover (in Million EUR)			Intangible assets (in Million EUR)		
	2019	2020	growth	2019	2020	growth
	Firms with no non-current liabilities					
Aggregate	630.118	659.349	4.64%	32.617	48.972	50.1%
Average	1.250	1.316	5.27%	0.064	0.097	51.3%
N	504	501		507	503	
	Firms with non-current liabilities between 0 and 25% of balance sheet total					
Aggregate	2,122.112	2,143.420	1.00%	267.799	315.676	17.9%
Average	3.513	3.549	1.00%	0.440	0.520	18.1%
N	604	604		608	607	
	Firms with non-current liabilities exceeding 25% of balance sheet total					
Aggregate	717.696	765.115	6.61%	103.100	121.897	18.2%
Average	2.392	2.559	6.96%	0.344	0.408	18.6%
N	300	299		300	299	

The results in Table 8 reveal that companies without access to long term debt financing are on average smaller than those which do have access. For most size indicators, they are at least half the size of the medium or the high debt companies.

Also, medium debt firms are on average larger than high debt firms.

In terms of growth performance in the period 2019-2020 (and so in light of facing the start of the Covid pandemic), the high debt firms experience higher

growth on all indicators than the medium debt firms. The growth rate of total assets increases with the extent of long-term debt financing. Note, however, that firms with no long term debt by far faced the strongest growth in terms of intangible assets.

Finally, Table 8 reveals that over one third of the SMEs has no access to long-term debt financing despite a positive turnover growth and large investments in intangible assets that can generate future growth.

## 7. Conclusion

This study provides a snapshot containing descriptive evidence on the economic and financial performance of the European SME space industry. For the purpose of the study we defined the European SME Space industry as small and medium-sized enterprises that received public support from ESA or are funded by space activities in Horizon 2020, or are on a regular basis involved in space activities. In the year 2020, 1605 such companies were identified and in aggregate they host 31,202 employees and generate a turnover of over 3.5 billion EUR. In the period 2014-2020, the sub-sample of more mature companies (those incorporated before 2014) witnessed an increase in employment and turnover by over thirty percent, an increase in total assets by over forty percent, and nearly doubled investment in intangible assets. In

particular, the descriptive statistics suggest that the Covid19 pandemic had a negative impact on average turnover growth (stagnation of turnover) in the year 2020.

In terms of financial performance, in general, SMEs in the European space industry perform well in terms of liquidity, leverage, and profitability. However, the descriptive statistics suggest European Space SMEs face difficulties in obtaining long-term debt financing (such as long-term bank loans). This is true for all types of SMEs but most problematic for the micro-sized firms. The median micro-sized firm has barely any long term debt and seems to be financed primarily from equity capital, short term loans or creditors (suppliers) and subsidies. This is worrying as access to external financing was found to be positively related to firm growth in SMEs active in space activities.

Our descriptive analysis provides a snapshot on the economic and financial performance of SMEs in the European space industry. Given the short time-span under consideration and the focus on the SME population as of 2021 our descriptive analysis does not allow to draw causal inferences, as more detailed data and analysis are required to establish causal links.

## Appendices

**Table A.1. Number of observations per country**

Country	#N in original database	Not retrieved	#N in retrieved sample	Not-SME firms	Unknown status firms	year of incorporation = 2021	No information firms*	#N with information
Austria	42	4	38	2	0	0	2	34
Belgium	74	1	73	0	0	0	10	63
Bulgaria	30	10	20	0	0	0	0	20
Canada	16	2	14	0	0	0	7	7
Croatia	7	1	6	0	0	0	0	6
Cyprus	11	0	11	0	0	0	11	0
Czech Republic	48	0	48	0	0	0	1	47
Denmark	23	1	22	0	0	0	0	22
Estonia	20	0	20	0	0	0	1	19
Finland	29	0	29	0	0	0	1	28
France	149	10	139	2	35	0	5	97
Germany	208	14	194	1	0	2	8	183
Greece	60	11	49	0	1	0	2	46
Hungary	22	0	22	0	0	0	0	22
Ireland	68	7	61	0	0	1	1	59
Italy	225	3	222	0	0	4	4	214
Latvia	13	0	13	0	0	1	1	11
Lithuania	17	0	17	0	0	0	0	17
Luxembourg	36	2	34	0	0	0	3	31
Netherlands	90	5	85	0	0	1	4	80
Norway	26	3	23	0	0	0	1	22
Poland	81	1	80	1	0	1	2	76
Portugal	58	9	49	3	0	0	1	45
Romania	21	1	20	0	0	0	0	20
Slovakia	16	1	15	0	0	0	0	15
Slovenia	14	0	14	0	0	0	2	12
Spain	81	3	78	0	0	3	10	65
Sweden	24	1	23	0	0	0	0	23
Switzerland	60	4	56	0	0	0	0	56
United Kingdom	333	20	313	1	0	6	9	297
Total	1,902	114	1,788	10	36	19	86	1,637

## Appendix A.2. Data cleaning (consistency checks) and item non-response estimation

### Linked relationships between balance sheet items and P&L items

- Total assets= fixed assets + current assets
- Fixed assets= intangible fixed assets + tangible fixed assets + other fixed assets
- Current assets= stock + debtors + other current assets + cash and cash equivalents
- Total assets= shareholders + non-current liabilities + current liabilities
- Shareholders= capital + other shareholders funds
- Non-current liabilities= long term debt + other non-current liabilities
- Current liabilities = loans + creditors + other current liabilities
- Extra-ordinary P&L = extra-ordinary revenue - extra-ordinary expenses
- Financial P&L = financial revenue - financial expenses
- Gross profit = operating P&L + other operating expenses
- P&L before tax= operating P&L + financial P&L + extra-ordinary P&L
- P&L before tax= P&L after tax + taxation.

### Models used to estimate item non-response

- MODEL 1:  $\text{LN}(\text{ASSETS}) = a + b1 \cdot \text{LN}(\text{EMPLOYEES}) + b2 \cdot \ln(\text{turnover}) + b3 \cdot \ln(\text{age}) + b4 \cdot \text{manufacturing} + e$
- MODEL 2:  $\text{LN}(\text{EMPLOYEES}) = a + b1 \cdot \text{LN}(\text{ASSETS}) + b2 \cdot \ln(\text{turnover}) + b3 \cdot \ln(\text{age}) + b4 \cdot \text{manufacturing} + e$
- MODEL 3:  $\text{LN}(\text{ASSETS}) = a + b1 \cdot \text{LN}(\text{EMPLOYEES}) + b2 \cdot \ln(\text{age}) + b3 \cdot \text{manufacturing} + e$
- MODEL 4:  $\text{LN}(\text{EMPLOYEES}) = a + b1 \cdot \text{LN}(\text{ASSETS}) + b2 \cdot \ln(\text{age}) + \text{manufacturing} + e$
- MODEL 5:  $\text{TURNOVER} = a + b1 \cdot \text{ASSETS} + b2 \cdot \text{employees} + b3 \cdot \ln(\text{age}) + \text{manufacturing} + e$