

# THE EFFECTS OF INVESTMENTS IN PERMANENT ASSETS ON EMPLOYMENT AND SALARIES BY ENTERPRISE SIZE

## INTRODUCTION

Investment decision has an important role in the functioning of enterprises and determining their development. This work focuses on investments in permanent assets and their effects on the number of employees and salaries by enterprise size. In their research, the authors have used four groups of enterprises by size: large, medium, small, and micro-enterprises. The criteria for the classification of enterprises by size are set in The Law on Accounting and are determined according to income, size of assets, and number of employees. Micro enterprises have up to 9 employees, operating income up to EUR 700,000 and the average value of business assets EUR 350,000 in RSD (Serbian dinar) equivalent; small enterprises have 10 to 49 employees, operating income up to EUR 8,800,000 and the average value of business assets EUR 4,400,000 in RSD equivalent; medium enterprises have 50 to 249 employees, operating income up to EUR 35,000,000 and the average value of business assets EUR 17,500,000 in RSD equivalent while enterprises that exceed the two criteria for medium-sized enterprises are classified as large entities (10). The amounts of income and average assets were insignificantly changed in the Accounting Law passed in 2019.

This paper aims to analyze and evaluate the effects of investments in permanent assets on employment growth and salaries by enterprises size. In their previous papers, the authors concluded that investments in permanent assets had a more significant impact on the number of employees in some sectors. The authors assume there are differences in the role of investments in permanent assets in increasing the number of employees and salaries between large, medium, small, and micro-enterprises.

## SUMMARY

This work aims to identify the impact of investments in permanent assets and the sources of these investments on the increase of employment and employee salaries by the size of enterprises. We draw the data from the Financial Statements Annual Bulletin published by the Serbian Business Registers Agency. The data set spans the period from 2014 to 2020. The results show a high, positive, and statistically significant correlation between investments in permanent assets and employees in large, medium, and micro-enterprises. There is a high, positive, and statistically significant correlation between salaries and investments in permanent assets in all group sizes. Long-term liabilities are a substantial source of financing investments in permanent assets in medium, small, and micro-enterprises.

**Keywords:** large, medium, small, and micro-enterprises; financial liabilities; capital; Serbia.

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## LITERATURE REVIEW

Empirical studies of the interdependence of fixed-asset investments and employment growth are relatively scarce and limited. In their previous work, the authors found a high correlation between new investments in permanent assets and the number of employees. This means that employment growth in the Republic of Serbia from 2013 to 2020 was the result, among other factors, of investments in permanent assets (1). These results encouraged the authors to research the impact of investments in permanent assets on employment by entrepreneurial sectors. They found a high, positive, and statistically significant correlation between permanent assets and employment growth in the manufacturing industry and the information and communication sector. However, in the agriculture sector, the correlation coefficient showed that investments in permanent assets contributed to a decrease in the number of employees (2, 14). These results are in line with the empirical study of Fanhui Fan and Li Jing (6, 955). Sommer (2021) also found that increasing the fixed-asset investments impacts employment growth by 0.77 percentage points (15).

The authors have now researched the differences between the effects of investments in permanent assets on the number of employees by enterprise size. The correlation between these variables by enterprise size is not in the focus of this research, so the empirical studies are relatively scarce. Analyzing the relationship between the investment decision (including investments in permanent assets) and the change in employment by enterprise size in Poland, Kolegovicz concludes that the increase of investments does not result in employment growth in large and small companies. However, in medium-size enterprises, investments are the critical factor of job creation. The increase in investments by PLN 1 million in medium-size enterprises will result in employment growth by 5.9 persons and in small enterprises by 3.11 persons (9, 115-117).

It is a common perception that small enterprises create most jobs. Small and medium enterprises account for more than half of all formal employment in developing countries. For that reason, the financing of investments (including investments in permanent assets) in small and medium enterprises is an important issue. For many small and medium enterprises (36.76 percent in developing countries), access to finance is one of the most difficult obstacles they face. There are more studies about the relationship between providing loans for investments in SMEs and the number of jobs cre-

ated. According to the IFC study, a loan of \$ 1 million for investments to SMEs in developing countries is associated with the creation of average 16.3 permanent jobs per firm (8, 84). Researching the access to finance for small and medium enterprises in Africa, Brixiova et al. emphasize that 26.1 percent of firms have an overdraft facility, while only 9 percent of firms have a loan from a financial institution. Their empirical study shows that having a loan from a financial institution increases the number of permanent employees in small and medium enterprises by 13.4 (3, 13-15).

Comparative results are presented in the Bui et al. research on the impact of financial constraints on employment growth. They found that a one percent increase in financing obstacles decreases the probability of employment growth in all enterprises by 40.9 percent. However, in small and medium enterprises, a one percent increase in legal financing obstacles reduces employment growth by 1.987 percent (4, 7-8). In the empirical literature about the impact of financial barriers on fixed-asset investments in small and medium enterprises, the results suggest that it has strong adverse effects. In the sample of small and medium enterprises from 12 European countries, bank constraints raise the probability of decreasing the investments in fixed assets by 2.1 percentage points and the likelihood of reducing employment by 2.9 percentage points (7, 2-3). Similarly, there is a positive, statistically significant effect of long-term external credit inflows on investments (including investments in permanent assets). A one percent increase in the long-term external credit flows increases the investments by 0.14 percent approximately (5, 93).

## METHODOLOGY

To determine the impact of investments in permanent assets and the sources of permanent assets on the increase of employment and employee salaries by the size of enterprises, we drew the data from the Financial Statements Annual Bulletin published by the Serbian Business Registers Agency, which represents aggregated data of all enterprises which submitted their financial reports, according to the Law on Accounting from 2013. The data set spans the period from 2013 to 2020. The data include data from financial statements of all enterprises and their analysis by size (11, 12, 13, 14).

We performed the analysis of the aggregated balance sheets for each enterprise size and the aggregated data on the number of enterprises and the number of employees, us-

ing financial and non-financial indicators related to the relationships among permanent assets, salaries, capital, and long-term liabilities. This was a qualitative analysis of quantitative data. Relevant statistics were initially performed in MS Excel and once again in STATA. MS Excel statistical functions can be easily applied during the analysis. For its robustness, we check some results in STATA if we find it convenient.

All financial data are presented in thousands of RSD (Serbian dinars).

We are aware of the limited time series of analyzed data, and we also believe that the accounting information of the presented book values is fair enough for this analysis.

## RESULTS AND DISCUSSION

The overview of the number of enterprises by size shows the trend of continual increase during the period from 2014 to 2020. The number of large enterprises increased by 26%, the number of medium enterprises increased by 48%, the number of small enterprises increased by 32% and the number of micro-enterprises increased by 11%.

Table 1: Number of enterprises by enterprise size

	2014	2015	2016	2017	2018	2019	2020	Increase 2020/2014
Large	336	309	305	321	361	415	422	26%
Medium	1.225	1.204	1.267	1.294	1.391	1.497	1.815	48%
Small	8.812	8.702	9.126	9.601	10.359	11.036	11.617	32%
Micro	83.386	84.441	86.845	93.000	91.884	93.085	92.257	11%

Source: Authors' calculation

The number of employees also increased in enterprises of all sizes. The number of employees in large enterprises increased by 29%, the number of employees in medium enterprises increased by 37%, the number of employees in small enterprises increased by 19%, and the number of employees in micro-enterprises increased by 15%.

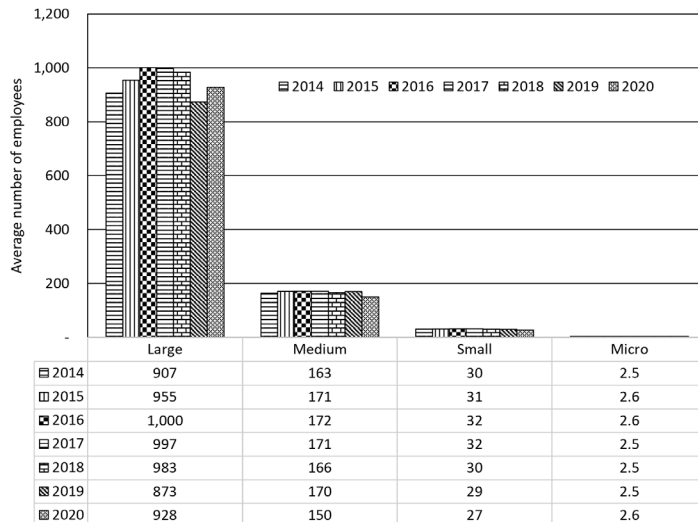
These two processes resulted in an increase in the average number of employees in large enterprises and a decrease in the average number of employees in medium and small enterprises. The average number of employees in micro-enterprises remained almost unchanged, as it was 2.5 in 2014 and 2.6 in 2020.

Table 2: Number of employees by enterprise size

	2014	2015	2016	2017	2018	2019	2020	Increase 2020/2014
Large	304.608	294.962	305.111	320.012	354.988	362.456	391.557	29%
Medium	199.576	205.377	218.054	221.896	230.680	253.876	273.115	37%
Small	266.411	271.750	288.595	303.351	311.705	321.391	316.247	19%
Micro	205.466	218.811	224.297	235.848	233.854	236.639	237.035	15%

Source: Authors' calculation

The analysis of the value of permanent assets by enterprise size shows the increase in value in all enterprises. The value of permanent assets in large enterprises increased by 19%, the value of permanent assets in medium enterprises increased by 74%, the value of permanent assets in small enterprises increased by 42%, and the value of permanent assets in micro-enterprises increased by 52%. The coefficient of correlation of the increase in permanent assets and the number of employees is very high in all four groups of enterprises. The amount is 0.96 for large enterprises, 0.99 for medium enterprises, 0.91 for small enterprises, and 0.97 for micro-enterprises. Investments in medium enterprises contribute to the highest increase in employment (correl 0.91), while investments in small enterprises make the least contribution to employment (correl 0.91).



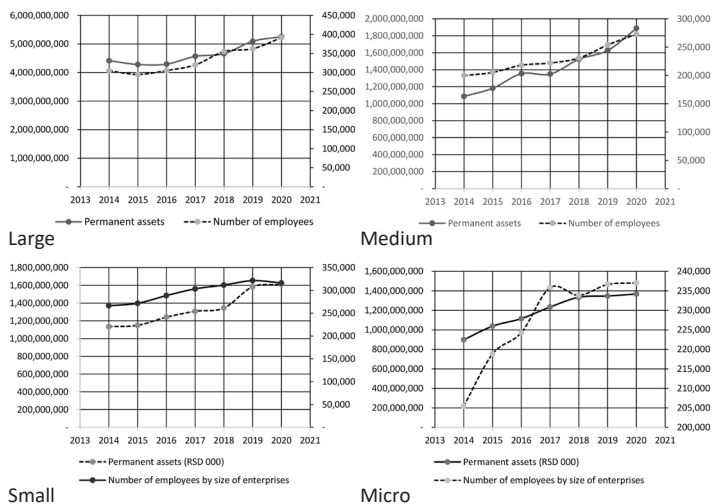
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Figure 1: Average number of employees by enterprise size

Table 3: Permanent assets by enterprise size (in RSD 000)

	Large	Medium	Small	Micro
2014	4,412,537,016	1,086,017,565	1,134,796,402	898,628,359
2015	4,280,554,798	1,182,537,085	1,148,972,978	1,037,990,872
2016	4,293,590,666	1,354,062,618	1,240,990,831	1,115,618,302
2017	4,564,659,034	1,349,020,411	1,307,064,975	1,234,434,790
2018	4,659,029,946	1,523,807,407	1,344,235,638	1,334,532,510
2019	5,092,928,249	1,627,727,073	1,583,478,676	1,347,338,760
2020	5,253,377,633	1,888,471,036	1,608,844,766	1,368,017,412
Increase 2020 /2014	19%	74%	42%	52%

Source: Authors' calculation



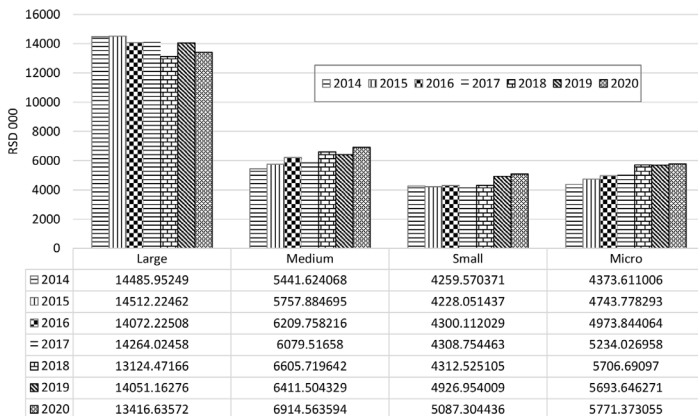
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Figure 2: Trends in permanent assets values and number of employees by enterprise size

The indicator of average permanent assets by employee, measured by enterprise size, continually increases for groups of medium, small and micro-enterprises, and decreases for large enterprises.

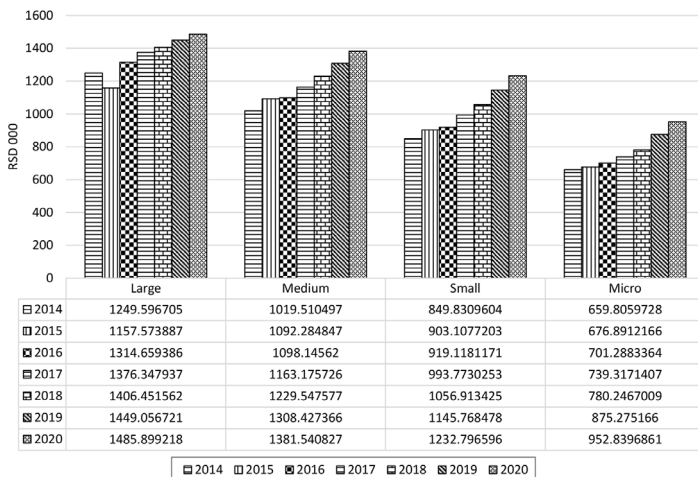
The increase in investments in permanent assets contributes significantly to the increase of the average salary in medium and small enterprises (corells 0.91 and 0.90 respectively), slightly less in micro-enterprises (correl 0.87) and far less in large enterprises (correl 0.72).

From 2014 to 2020, the average salary increased by 19% in large enterprises, 36% in medium enterprises, 45% in small enterprises, and 44% in micro-enterprises.



Source: Authors' calculation

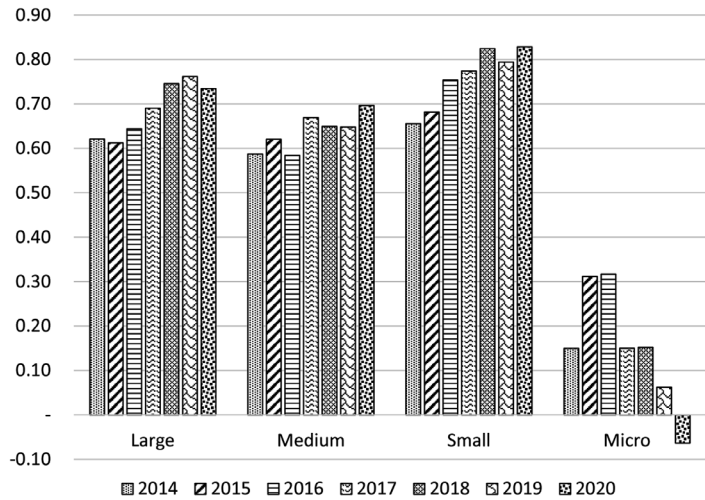
Figure 3: Average permanent assets by employee by enterprise size



Source: Authors' calculation

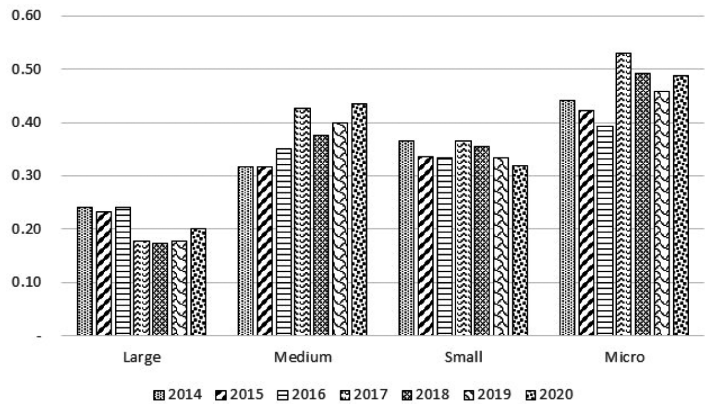
Figure 4: Average salary by employee by enterprise size

The analysis of the sources of finance for investments in permanent assets is performed by comparing the values of long-term liabilities and capital with the value of permanent assets. The results show that the main source of financing new investments in large, medium, and small enterprises is own (share) capital. Moreover, the share of own (share) capital in new investments continually increases. On the other hand, the main source of finance for investments in permanent assets in micro-enterprises is borrowed capital, mainly long-term.



Source: Authors' calculation

Figure 5: The trend of capital share in permanent assets by enterprise size



Source: Authors' calculation

Figure 6: The trend of liability share in permanent assets by enterprise size

All the results are specified in Table 4, and can be summarized in the following way: the rate of increase in the number of employees in large and micro-enterprises is higher than the rate of increase in the number of enterprises, and less in medium and small enterprises. The rate of increase of average permanent assets by employee is negative for large enterprises and positive for the other three groups. A negative employment rate indicates a trend of non-efficient employment policies in large enterprises. The increase in the number of employees in medium enterprises is higher than

the growth rate of the average permanent assets by employee. In contrast, small and micro-groups of enterprises manage their investments much more efficiently. This is especially true for the micro-group, whose rate of the average permanent assets by employee is two times higher than its rate of the number of employees. The average salary per employee is also higher in all four groups. The lowest value is realized in large enterprises, while the rate of average salary in medium enterprises is two times higher than in the large group. The highest values are realized in the small and micro-groups. The small group has a slightly higher rate of increase than the micro-group. This may be the result of the investment practices of the micro-entrepreneur, buying substantial resources in order to increase production, or because of certain limitations of the resources themselves.

Table 4: The rates of increase in the number of enterprises, the number of employees, the value of permanent assets, and the rate of average salary by employee

Group size	Large	Medium	Small	Micro
Number of enterprises	26%	48%	32%	11%
Number of employees	29%	37%	19%	15%
Permanent assets value	19%	74%	42%	52%
Correl (permanent assets and number of employees)	0.96	0.99	0.91	0.97
Average permanent assets by employee	-7%	27%	19%	32%
Average salary by employee	19%	36%	45%	44%
Correl (average permanent assets by employee and average salary by employee)	-0.72	0.91	0.90	0.87

Source: Authors' calculation

The results of the statistical analysis of the correlation coefficient between permanent assets, the number of employees, long-term liabilities, and salaries calculated in MS Excel are confirmed in STATA program. The results in Table 3 show the correlation coefficient between these variables in four groups of enterprises measured by their size. There is a positive, high, and statistically significant correlation between permanent assets and the number of employees in large, medium, and micro-enterprises, while in small enterprises, this correlation is also positive but not statistically significant. This means that investments in permanent assets contributed to employment growth in large, medium, and micro-enterprises. In addition, the increase of long-term liabilities was accompanied by the growth of the number of employees in medium, small, and micro-enterprises. The results show that the correlation coefficient is positive,

high, and statistically significant for these enterprises. But in large enterprises, the correlation between long-term liabilities and the number of employees is weak and not statistically significant. According to the correlation coefficient results, we can conclude that long-term liabilities are a particularly important source of financing investments in permanent assets in medium, small, and micro-enterprises. In addition, there is a high, positive, and statistically significant correlation between salaries and investments in permanent assets in all the groups of enterprises.

Table 5. The correlation between employment, permanent assets, long-term liabilities, and salaries

Variable	Large enterprises			Medium enterprises			Small enterprises			Micro enterprises		
	EMP	PA	LTL	EMP	PA	LTL	EMP	PA	LTL	EMP	PA	LTL
EMP	1.0000			1.0000			1.0000			1.0000		
PA	0.7663*	1.0000		0.9808*	1.0000		0.6850	1.0000		0.9656*	1.0000	
LTL	0.2574	-0.0638	1.0000	0.9907*	0.9949*	1.0000	0.8787*	0.9037*	1.0000	0.8875*	0.9604*	1.0000
SAL	0.8140*	0.9472*	0.3526	0.9773*	0.9842*	0.9794*	0.3882	0.8952*	0.6867	0.8555*	0.9223*	0.9082*

Note: EMP – the number of employees; PA – permanent assets; LTL – long-term liabilities; SAL – salaries.

\* Represents statistical significance at 5 percent

Source: Authors’ calculation

Considering that long-term liabilities have an impact on both employment and permanent assets, we have determined the partial correlation between the number of employees and permanent assets, excluding the effect of long-term liabilities. The results in Table 4 confirm that the correlation between the number of employees and permanent assets is positive and statistically significant at a 5 percent level, without the impact of long-term liabilities on both variables, for the groups of large and micro-enterprises. This means that investments in permanent assets are statistically significantly connected to the employment growth in these enterprises. However, in medium and small enterprises, the correlation between permanent assets and the number of employees is statistically insignificant, without the impact of long-term liabilities.

Table 6. The partial correlation between the number of employees and permanent assets

Large enterprises		Medium enterprises		Small enterprises		Micro enterprises	
Partial correlation	Significance Value	Partial correlation	Significance Value	Partial correlation	Significance Value	Partial correlation	Significance Value
0.8117	0.0266	-0.3584	0.4298	-0.5334	0.2176	0.8820	0.0201

Source: Authors’ calculation

## CONCLUSION

The number of enterprises by size shows the trend of continual increase during the period from 2014 to 2020. The most significant increase can be seen in the group of medium size enterprises (48%), and the slightest significant increase in the group of micro-size enterprises (11%). At the same time, the number of employees and the value of permanent assets also increased in each group, but the rates of increase differ significantly. The growth rate of the number of employees is negative in large enterprises and positive in the other three groups. The negative employment rate indicates a trend of non-efficient employment policies in large enterprises. Average salary per employee also increased in all groups, the most significantly in small (45%) and micro (44%) group of enterprises. The small group has a slightly higher rate of increase than the micro-group. This may be the result of the investments practices of the micro-entrepreneur, buying substantial resources in order to increase future production, or because of certain limitations of the resources themselves.

*Investments in permanent assets are connected to employment growth in large, medium, and micro-enterprises.*

The results of the statistical analysis of the correlation coefficient between permanent assets, the number of employees, long-term liabilities, and salaries show a positive, high, and statistically significant correlation between permanent assets and the number of employees in large, medium, and micro-enterprises, while in the group of small enterprises, this correlation is also positive but not statistically significant. This means that investments in permanent assets are connected to employment growth in large, medium, and micro-enterprises. In addition, there is a high, positive, and statistically significant correlation between salaries and investments in permanent assets in all the groups of enterprises.

*Large, medium, and small enterprises finance their investments in permanent assets by own capital,*

The analysis of the sources of financing permanent assets shows that large, medium, and small enterprises finance their investments in permanent assets by own capital, while micro-enterprises finance their investments in permanent assets by long-term liabilities, whose share in financing increases continually during the period.

Statistical analysis shows the increase of long-term liabilities is accompanied by the growth in the number of employees. The results show a positive, high, and statistically significant correlation coefficient for medium, small, and micro-enterprises. However, in large enterprises, the correlation between long-term liabilities and the number of employees is weak and not statistically significant. Accord-

ing to the correlation coefficient results, we can conclude that long-term liabilities are a substantial source of financing investments in permanent assets in medium, small, and micro-enterprises.

Keeping in mind that long-term liabilities impact both the employment and permanent assets, we have determined the partial correlation between the number of employees and permanent assets, excluding the impact of long-term liabilities. The results confirm that the correlation between the number of employees and permanent assets is positive and statistically significant at a 5 percent level, without the impact of long-term liabilities on both variables, for the groups of large and micro-enterprises. This means that investments in permanent assets are statistically significantly connected to the employment growth in these enterprises. However, in medium and small enterprises, the correlation between permanent assets and the number of employees is statistically insignificant, without the impact of long-term liabilities.



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## UČINAK ULAGANJA U STALNA SREDSTVA NA ZAPOSLENOST I ZARADE ZAPOSLENIH ZAVISNO OD VELIČINE PRIVREDNOG DRUŠTVA

### REZIME

Cilj ovog rada je da se utvrde učinak ulaganja u stalna sredstva i izvori tih ulaganja na povećanje zaposlenosti i zarade zaposlenih, zavisno od veličine privrednog društva. Potrebni podaci preuzeti su iz Godišnjeg biltena finansijskih izveštaja koji objavljuje Agencija za privredne registre Republike Srbije. Podaci obuhvataju period od 2014 do 2020. godine. Rezultati pokazuju visok, pozitivnu i statistički značajnu korelaciju između ulaganja u stalna sredstva i zaposlenosti u velikim, srednjim i mikro privrednim društvima. Postoji visoka, pozitivna i statistički značajna korelacija između zarada i ulaganja u stalna sredstva u privrednim društvima svih veličina. Dugoročne obaveze su značajan izvor finansiranja ulaganja u stalna sredstva za srednja, mala i mikro privredna društva.

**Ključne reči:** velika, srednja, mala i mikro privredna društva; finansijske obaveze; kapital; Srbija