The role and importance fundamental strength indicator in economic analyses

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Agenda:

- Introduction

- The fundamental power and the Fundamental Power Index–issue, definition, construction and measurement

- Usefulness of FPI concept

- Examples

- Conclusions

Introduction

Data analysis – economic and financial data, non-financial data

Analysis of securities/companies

Analysis by using different kind of information which comes from different sources

Analysis by using different type of approaches: quantitative, qualiative, mix

Complex tools

Important are also:

- What does analyst want to do?
- What are the market (capital market) and economy conditions?
- What is the inportance of the risk aversion?
- The level of capital which analyst/investor posses
- Analytical skills and knowledge
- Others
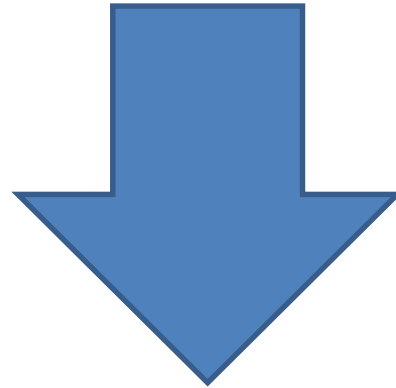
Assumption

Focusing on the company – focusing on the factors which create or refer to its intrinsic value
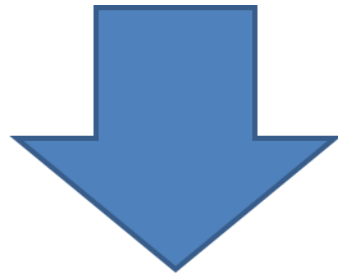
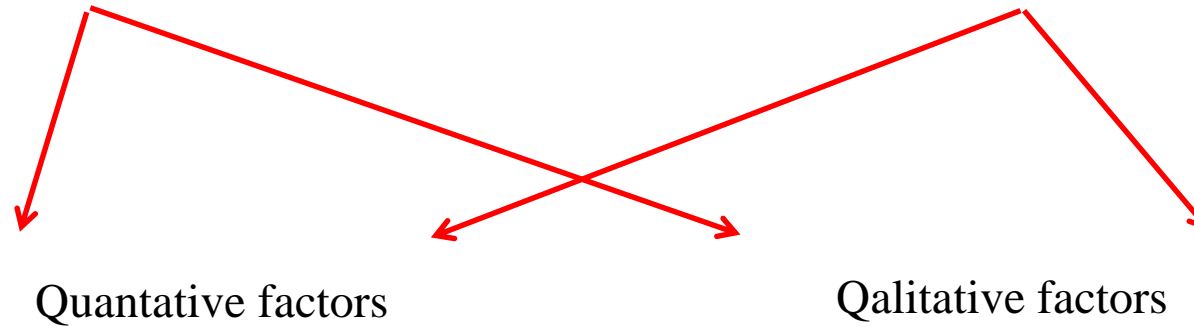Long term analysis

Fundamental analysis

The fundamental power of the company

The fundamental power Fundamental Power Index–issue, definition, construction and measurement

Fundamental power (fundamental strength) of the economic entity is a concept closely related to fundamental analysis, determining its economic and financial condition, which is the result of (all) fundamental aspects.

Fundamental power index is a multidimensional indicator directly immeasurable, which can be identified as a synthetic variable, endearing interaction effect of quantitative and qualitative factors in the companies as well as external and internal factors arising from the operation of companies in the market.

It is important to:

- define a set of variables for the measurement of the fundamental power, including an assessment of their value,

- analysis and evaluation of the quality of variables (economic and financial data) as the basis of analysis - in this respect the quality of the statistical data used to construct the index is important

Application of different kind of methods in order to determine the level of the fundamental power of companies (objects)

1. different type of methods for sorting and classification of objects (companies) the construction of synthetic indicators separately for quantative (SF_i) and qualiative (Q_i) factors

2. static or dynamic approach in FPI construction

3. the stability of quantitative and qualitative factors in time should be considered - fundamentally stable databases.

FPI design:

$$FPI_i = w_{(Q)} \cdot Q_i + w_{(SF)} \cdot FS_i$$

$$w_{(Q)} = \frac{n_Q}{N} \qquad w_{(SF)} = \frac{n_{FS}}{N}$$

$$\sum w = w_{(Q)} + w_{(FS)} = 1$$

Where:

i=1,2,…,k, j=*1,2,…,l and t=1,2,…n*

i-refers to objects – companies, j- refers to factors,

FPI_i - the fundamental power index for the j-th company

$w_{(Q)}$ – the weight for qualitative factors,

$w_{(FS)}$ - the weight for the quantitative factors, measured as a fundamental power,

N - number of all variables included in the WSF,

n_Q - number of qualitative variables,

n_{FS} - number of quantitative variables,

Q_i - the indices of the fundamental power designated for qualitative factors,

FS_{ij} – the indices of the fundamental power designated for quantitative factors.

The approach where the idea of fundamental stable data base is used :

$$FPI_i = FS_i$$

where:

FPI_j – Fundamental Power Index for i-th company, constructed on the base of stable fundamental base, included only quantitative variables,

FS_i – fundamental power (strength) quantitative stable in time indicator for j-th company obtained by applying one synthetic measure of development (e.g. TMAI) or point methods included i-th fundamental factor or vectoral measure

$$FF_j = \sum_{j=1}^{l} w_t \cdot F_j$$

$$w_t = \frac{nc_{jt}}{N} \qquad \sum_{t=1}^{n} w_t = 1, \ w_t \geq 0$$

where:
$j=1,2,\ldots,l$ and $t=1,2,\ldots n$

w_t – weight for *t-period* and *j*-th factor

nc_{jt} – number (order) of *j*-th quantitative factor in *t*-period

N – sum of the order of *i*-th factors in analysed period *(t=1, 2, …,n)*

k- number of all fundamental factors used in index construction

The scope of use of the fundamental power index refers to several aspects:

- assessment of the market on a different level of aggregation,
- selection and choice of companies in the long-term investment case,
- risk diversification – portfolio analysis selection,
- determining the potential of the company, sector or market,
- analysis and diagnosis of the market from the point of view of mergers and acquisitions of enterprises,
- analysis and diagnosis of the market from the point of view of the threat of bankruptcy/insolvency of enterprises.

Example – Research study

The study aims to analyze companies in terms of the level of the FPI index and companies' fundamental strength factors differentiation. The study used the methodology of estimating the FPI established by Tarczyńska-Łuniewska in *The Methodology of assessing the fundamental strength of companies (listed and over-the-counter)*, Zapol 2013.

Case 1

- Analysis was conducted for companies listed on European stock exchanges – 3984 companies

- Entity type - Corporate

- Period of time: 2016 – 2021

- Dynamic FPI for a period of 2014 – 2018 was assigned

- In the study, were used: basic descriptive statistic like average, standard deviation (S(x)), volatility coefficient (Vs)

Data
- financial statements data, esspecialy financial ratios
- Orbis database
- A set of variable for FPI determination:

  - ROA, ROE
  - Net assets turnover,
  - Collection period (days)
  - Credit period (days),
  - Current ratio (x),
  - Gearing (%)

The list of sectors and numer of the companies

No	sectors	Number of companies	No	sectors	Number of companies
1	Agriculture, Horticulture & Livestock	87	15	Mining & Extraction	152
2	Banking, Insurance & Financial Services	29	16	Miscellaneous Manufacturing	45
3	Business Services	328	17	Printing & Publishing	36
4	Chemicals, Petroleum, Rubber & Plastic	332	18	Property Services	222
5	Communications	45	19	Public Administration, Education, Health Social Services	74
6	Computer Hardware	15	20	Retail	145
7	Computer Software	79	21	Textiles & Clothing Manufacturing	109
8	Construction	178	22	Transport Manufacturing	132
9	Food & Tobacco Manufacturing	233	23	Transport, Freight & Storage	185
10	Industrial, Electric & Electronic Machinery	537	24	Travel, Personal & Leisure	136
11	Information Services	1	25	Utilities	216
12	Leather, Stone, Clay & Glass products	87	26	Waste Management & Treatment	10
13	Media & Broadcasting	33	27	Wholesale	270
14	Metals & Metal Products	179	28	Wood, Furniture & Paper Manufacturing	89

Descriptive statistics for FPI's

Descriptive stat.	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016
mean	0,321	0,317	0,318	0,319
st.dev.	0,036	0,036	0,036	0,036
Mediana	0,321	0,316	0,317	0,318
Vs	0,113	0,114	0,113	0,112
Minimum	0,000	0,000	0,000	0,000
Maksimum	0,658	0,655	0,657	0,658

The level of FPI division in case of fundamental strength

>=0,6	the best
<0,4 - 0,6)	good
<0,2 - 0,4)	acceptable
<0,0 - 0,2)	poor

The best companies

sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016	sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016
Property Services	mean	0,324	0,320	0,321	0,322	Wholesale	mean	0,322	0,317	0,318	0,319
	st.dev	0,043	0,043	0,043	0,042		st.dev	0,037	0,038	0,038	0,039
	Vs	13,2%	13,4%	13,3%	13,1%		Vs	11,6%	11,9%	12,0%	12,3%
	min	0,250	0,256	0,251	0,247		min	0,113	0,109	0,090	0,057
	max	0,658	0,655	0,657	0,658		max	0,617	0,615	0,616	0,617
	rank min	3883	3861	3892	3900		rank min	3979	3981	3980	3981
	rank max	1	1	1	1		rank max	5	4	4	4
Chemicals, Petroleum, Rubber & Plastic	mean	0,323	0,319	0,320	0,321	Food & Tobacco Manufacturing	mean	0,327	0,322	0,323	0,324
	st.dev	0,042	0,042	0,043	0,042		st.dev	0,033	0,034	0,035	0,034
	Vs	13,1%	13,3%	13,4%	13,1%		Vs	10,2%	10,7%	10,8%	10,6%
	min	0,054	0,047	0,039	0,054		min	0,211	0,205	0,150	0,169
	max	0,648	0,654	0,652	0,637		max	0,615	0,612	0,612	0,614
	rank min	3982	3982	3982	3982		rank min	6	5	5	5
	rank max	2	2	2	2		rank max	3949	3954	3971	3969
Retail	mean	0,324	0,320	0,321	0,322						
	st.dev	0,046	0,046	0,047	0,049						
	Vs	14,3%	14,5%	14,7%	15,2%						
	min	0,214	0,214	0,214	0,158						
	max	0,634	0,633	0,633	0,633						
	rank min	3947	3944	3948	3971						
	rank max	3	3	3	3						

The good companies

sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016	sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016
Wood, Furniture & Paper Manufacturing	mean	0,327	0,323	0,324	0,325	Textiles & Clothing Manufacturing	mean	0,323	0,320	0,321	0,322
	st.dev	0,019	0,019	0,019	0,019		st.dev	0,048	0,047	0,046	0,047
	Vs	5,8%	5,9%	5,8%	5,8%		Vs	14,8%	14,6%	14,4%	14,6%
	min	0,279	0,276	0,283	0,286		min	0,111	0,115	0,124	0,125
	max	0,445	0,441	0,442	0,442		max	0,580	0,577	0,577	0,577
	rank min	3744	3735	3683	3652		rank min	3981	3980	3977	3977
	rank max	34	34	32	33		rank max	8	8	8	8
Travel, Personal & Leisure	mean	0,308	0,304	0,308	0,308	Public Administration, Education, Health Social Services	mean	0,319	0,315	0,316	0,317
	st.dev	0,034	0,032	0,029	0,029		st.dev	0,035	0,035	0,034	0,034
	Vs	11,0%	10,4%	9,5%	9,6%		Vs	10,9%	11,0%	10,8%	10,7%
	min	0,162	0,193	0,194	0,195		min	0,135	0,131	0,136	0,140
	max	0,435	0,431	0,433	0,434		max	0,421	0,417	0,417	0,417
	rank min	3971	3960	3959	3959		rank min	3975	3976	3975	3975
	rank max	39	39	39	39		rank max	46	45	47	46
Transport, Freight & Storage	mean	0,315	0,311	0,313	0,314	Printing & Publishing	mean	0,322	0,319	0,320	0,321
	st.dev	0,031	0,031	0,030	0,031		st.dev	0,026	0,026	0,025	0,025
	Vs	9,8%	9,8%	9,7%	9,7%		Vs	8,0%	8,1%	7,9%	7,9%
	min	0,194	0,193	0,186	0,175		min	0,267	0,271	0,278	0,281
	max	0,504	0,501	0,499	0,496		max	0,416	0,413	0,413	0,414
	rank min	3957	3961	3962	3967		rank min	3823	3774	3744	3711
	rank max	17	17	17	19		rank max	51	50	51	51
Miscellaneous Manufacturing	mean	0,339	0,334	0,335	0,334	Metals & Metal Products	mean	0,325	0,321	0,322	0,323
	st.dev	0,038	0,036	0,035	0,026		st.dev	0,026	0,025	0,025	0,025
	Vs	11,3%	10,8%	10,5%	7,7%		Vs	8,0%	7,9%	7,7%	7,6%
	min	0,294	0,290	0,291	0,291		min	0,228	0,221	0,229	0,231
	max	0,544	0,524	0,513	0,416		max	0,445	0,442	0,442	0,442
	rank min	3542	3548	3554	3577		rank min	3927	3934	3932	3932
	rank max	11	13	15	48		rank max	33	32	31	34

sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016
Mining & Extraction	mean	0,321	0,318	0,320	0,321
	st.dev	0,040	0,038	0,037	0,037
	Vs	12,4%	11,9%	11,5%	11,4%
	min	0,197	0,206	0,208	0,210
	max	0,502	0,499	0,498	0,499
	rank min	3956	3952	3952	3950
	rank max	18	18	18	18
Agriculture, Horticulture & Livestock	mean	0,321	0,316	0,319	0,320
	st.dev	0,039	0,041	0,038	0,037
	Vs	12,2%	13,0%	11,9%	11,6%
	min	0,218	0,160	0,225	0,226
	max	0,533	0,530	0,531	0,532
	rank min	3942	3972	3937	3936
	rank max	13	12	12	12
Banking, Insurance & Financial Services	mean	0,341	0,335	0,335	0,336
	st.dev	0,056	0,057	0,057	0,059
	Vs	16,3%	17,0%	17,1%	17,6%
	min	0,244	0,227	0,229	0,189
	max	0,560	0,558	0,560	0,560
	rank min	3899	3926	3934	3961
	rank max	10	10	10	10
Communications	mean	0,320	0,317	0,318	0,319
	st.dev	0,033	0,034	0,034	0,034
	Vs	10,3%	10,6%	10,6%	10,7%
	min	0,225	0,221	0,222	0,223
	max	0,466	0,464	0,466	0,468
	rank min	3932	3935	3941	3938
	rank max	25	25	25	22

sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016
Industrial, Electric & Electronic Machinery	mean	0,323	0,319	0,320	0,321
	st.dev	0,037	0,037	0,037	0,037
	Vs	11,4%	11,5%	11,6%	11,5%
	min	0,000	0,000	0,000	0,000
	max	0,496	0,486	0,490	0,517
	rank min	3984	3984	3984	3984
	rank max	19	19	19	13
Leather, Stone, Clay & Glass products	mean	0,329	0,325	0,326	0,327
	st.dev	0,034	0,034	0,035	0,034
	Vs	10,4%	10,6%	10,7%	10,4%
	min	0,232	0,224	0,215	0,239
	max	0,542	0,539	0,540	0,541
	rank min	3920	3928	3947	3921
	rank max	12	11	11	11
Business Services	mean	0,316	0,312	0,313	0,314
	st.dev	0,038	0,038	0,037	0,037
	Vs	12,2%	12,1%	11,8%	11,7%
	min	0,125	0,119	0,122	0,122
	max	0,565	0,562	0,563	0,563
	rank min	3978	3978	3978	3978
	rank max	9	9	9	9
Information Services	1-comp	0,343	0,339	0,340	0,341
	rank	597	590	581	581

The poore companies

sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016
Computer Hardware	mean	0,317	0,314	0,315	0,316
	st.dev	0,037	0,037	0,036	0,036
	Vs	11,7%	11,7%	11,5%	11,3%
	min	0,240	0,241	0,244	0,247
	max	0,376	0,373	0,373	0,373
	rank min	3910	3907	3911	3899
	rank max	154	158	156	163
Construction	mean	0,317	0,313	0,314	0,315
	st.dev	0,027	0,027	0,030	0,029
	Vs	8,5%	8,8%	9,7%	9,2%
	min	0,206	0,206	0,073	0,106
	max	0,394	0,390	0,390	0,390
	rank min	3952	3953	3981	3980
	rank max	89	91	93	95
Utilities	mean	0,315	0,311	0,312	0,313
	st.dev	0,020	0,019	0,019	0,019
	Vs	6,4%	6,0%	6,0%	6,2%
	min	0,176	0,220	0,248	0,242
	max	0,384	0,380	0,381	0,382
	rank min	3967	3937	3896	3913
	rank max	117	117	117	119
Waste Management & Treatment	mean	0,316	0,312	0,311	0,312
	st.dev	0,023	0,023	0,024	0,026
	Vs	7,3%	7,4%	7,9%	8,2%
	min	0,261	0,259	0,261	0,261
	max	0,345	0,341	0,342	0,343
	rank min	3850	3851	3855	3857
	rank max	517	503	507	503

sector	mesures	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016
Computer Software	mean	0,320	0,316	0,317	0,318
	st.dev	0,028	0,028	0,028	0,028
	Vs	8,9%	8,9%	8,9%	8,9%
	min	0,193	0,194	0,195	0,196
	max	0,400	0,397	0,397	0,397
	rank min	3960	3959	3958	3958
	rank max	78	78	78	80
Media & Broadcasting	mean	0,319	0,317	0,318	0,319
	st.dev	0,021	0,018	0,019	0,019
	Vs	6,7%	5,7%	6,0%	5,9%
	min	0,255	0,257	0,247	0,252
	max	0,378	0,375	0,376	0,377
	rank min	3869	3858	3904	3888
	rank max	141	139	136	140
Transport Manufacturing	mean	0,316	0,312	0,314	0,315
	st.dev	0,028	0,029	0,028	0,027
	Vs	9,0%	9,2%	8,8%	8,6%
	min	0,167	0,161	0,174	0,176
	max	0,396	0,392	0,393	0,395
	rank min	3970	3971	3965	3966
	rank max	85	85	87	86

No	Company name Latin alphabet	Country ISO code	BvD sectors	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016	2021_2019	2020_2018	2019_2017	2018_2016
1	ELECTROMETAL AD	BG	Property Services	0,658	0,655	0,657	0,658	1	1	1	1
2	B.M.P. PHARMA TRADING AG	DE	Chemicals, Petroleum, Rubber & Plastic	0,648	0,654	0,652	0,637	2	2	2	2
3	S.C. MAGAZIN UNIVERSAL MARAMURES S.A.	RO	Retail	0,634	0,633	0,633	0,633	3	3	3	3
4	MONTENEGRO-EXPRESS GROUP A.D.	ME	Property Services	0,618	0,611	0,600	0,583	4	6	6	7
5	BIM AD SVETI NIKOLE	MK	Wholesale	0,617	0,615	0,616	0,617	5	4	4	4
6	STADLAUER MALZFABRIK AG	AT	Food & Tobacco Manufacturing	0,615	0,612	0,612	0,614	6	5	5	5
7	PLAYWAY SA	PL	Retail	0,593	0,591	0,593	0,593	7	7	7	6
8	INTEXA SA	FR	Textiles & Clothing Manufacturing	0,580	0,577	0,577	0,577	8	8	8	8
9	VEMAL DD	BA	Business Services	0,565	0,562	0,563	0,563	9	9	9	9
10	OEKOWORLD AG	DE	Banking, Insurance & Financial Services	0,560	0,558	0,560	0,560	10	10	10	10

No	Company name Latin alphabet	Country ISO code	BvD sectors	FPI_2021_2019	FPI_2020_2018	FPI_2019_2017	FPI_2018_2016	2021_2019	2020_2018	2019_2017	2018_2016
1	IMPLANET	FR	Public Administration, Education, Health Social Services	0,135	0,131	0,136	0,140	3975	3976	3975	3975
2	C SECURITY SYSTEMS AB	SE	Business Services	0,135	0,165	0,198	0,201	3976	3970	3957	3956
3	POXEL	FR	Chemicals, Petroleum, Rubber & Plastic	0,135	0,131	0,143	0,130	3977	3975	3974	3976
4	SAFETURE AB	SE	Business Services	0,125	0,119	0,122	0,122	3978	3978	3978	3978
5	PIXIUM VISION	FR	Wholesale	0,113	0,109	0,111	0,113	3979	3981	3979	3979
6	SVENSKA AEROGEL HOLDING AB	SE	Chemicals, Petroleum, Rubber & Plastic	0,113	0,129	0,146	0,201	3980	3977	3973	3957
7	PROLETER A.D.	RS	Textiles & Clothing Manufacturing	0,111	0,115	0,124	0,125	3981	3980	3977	3977
9	GENSIGHT BIOLOGICS	FR	Chemicals, Petroleum, Rubber & Plastic	0,054	0,047	0,039	0,054	3982	3982	3982	3982
9	MIRIS HOLDING AB	SE	Industrial, Electric & Electronic Machinery	0,043	0,033	0,038	0,036	3983	3983	3983	3983
10	OBDUCAT AB	SE	Industrial, Electric & Electronic Machinery	0,000	0,000	0,000	0,000	3984	3984	3984	3984

Case 1

- Analysis was conducted for companies listed on WSE
- Period of time: 2006 – 2014
- Dynamic FPI for period of time 2006 – 2010 was assigned
- Number of analysed companies 203 (main market)

Data

- Financial and economic ratios:
- ROA, ROE
- Current Ratio
- Average Collectio Period,
- Average Inventory
- Assets Turnover – the higher, the better
- Debt Margin

Intervals of FPI$_{2006/2010}$ classification by points

max 36		
36,00	27,00	strong
27,00	19,00	good
19,00	10,00	weak
10,00	0,00	threatended

The number of companies according to the accepted division of dynamic FPI$_{2006/2010}$

strong	0
good	20
weak	161
threatended	22

Sector	mean	S(x)	Vs in %	min	max
Construction	13,25	2,09	16,00	9,27	17,80
Developers	15,29	3,79	25,00	13,07	19,67
Energetics	13,38	2,04	15,00	11,07	14,93
Finance - others	13,73				
Retails	14,62	4,13	28,00	6,73	21,20
Wholesale	12,54	3,24	0,26	6,20	17,60
Hotels & Restaurants	**16,38**	5,15	31,00	12,27	22,93
IT	14,08	3,14	22,00	6,20	21,20
Media	14,52	0,64	4,00	13,73	15,47
Chemicals	12,20	6,46	**53,00**	5,07	17,67
Wood & Paper	14,33	4,75	33,00	9,60	23,13
Electroengineering	14,38	3,00	21,00	8,93	22,60
Pharmaceutical	14,65	4,45	30,00	7,80	19,67
Light Industry	15,09	3,15	21,00	10,47	19,07
Building materials	12,65	4,99	**39,00**	4,20	22,13
Metals	14,89	4,96	33,00	9,13	24,87
Automobiles	13,45	2,74	20,00	9,47	15,73
Oil & Gas	**16,33**	1,13	**7,00**	15,53	17,13
Food	13,60	2,40	18,00	10,67	18,07
Plastics materials	13,65	2,80	21,00	9,07	15,67
Telecom	14,60				
Services - others	13,37	5,72	**43,00**	7,53	27,73
mean	*14,14*	*3,54*	*24,00*		

Year of BbL	Company	Level of FPI$_{2006/2010}$	Recommendation of FPI$_{2006/2010}$
2011	ORZEL	18.00	WEAK
2012	JAGO	9.13	THREATENED
	VISTULA	14.00	WEAK
	PBG	13.47	
	DUDA	12.60	
	DREWEX	10.80	
2013	BOMI	16.33	WEAK
	PLJADLO	12.27	
2014	ENERGOPL	14.00	WEAK

Conclusions

➢ The companies are diversified in case of the level of the FPI index

➢ It is possible to identify the best and the worst companies on the whole market

➢ It is possible to identify the best and the worst companies in particular sectors

➢ It is possible to assess market, sectors or companies through the prism of the fundamental strength of the entities

The problems

fulfillment of typical conditions for statistical data:

 reliability, availability, comparability

the financial data:

accounting data problem - unification

legal aspects and accounting regulations

Thank you for your attention!