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Analysis Of The Relationship Between Risk And Return Using The Capital Asset Pricing Model (Capm) Method At Kompas 100

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ABSTRACT

The risk-reward trade-off implies that risky investments should demand a premium over risk-free returns. It is critical to managing to change investment opportunities to maintain a healthy risk-reward relationship. This thesis employs a quantitative model in conjunction with a descriptive research strategy. This is a quantitative study using an analytic-descriptive approach. The sample size for this analysis is 100 Kompas. The data source is secondary sources from IDX publications. For four years, the data set contains the closing price of shares and the IHSG (1 January 2016 - 31 December 2019). The Rate of Return on Shares (Ri), Market Returns (Rm), Risk-Free Returns (Rf), Systematic Risk, Expected Return E (Ri), and the Relationship between Risk and Return with CAPM using Pearson Correlation are used to analyze the data. The results of the correlation coefficient test indicate that: 1) The sample used in the CAPM calculation exhibits a strong positive relationship between beta and the CAPM expected return. As beta increases, the predicted return increases proportionately and vice versa. If beta decreases, the expected return decreases; and 2) From the 52 study samples, 33 company stocks fall into the productive stock category, and 19 falls into the inefficient stock category.

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1. Introduction

The Capital Asset Pricing Model (CAPM) has been introduced by William Sharpe (1964) and John Lintner (1965) as a model for calculating the theoretical rate of increase in assets and thus of the anticipated price, where the company can predict expected cash flows (Adnyana &Nurwulandari, 2020).

Investors have chosen portfolios that use predictive variance figures given the level of expected expectations or expectations. Based on the different level. The "average model" assumes the investor's reliability, avoids the risk and optimizes the usage of the investor who opts for an effective frontier (called the minimum variation) (Dede, Tiara, Thameliya, Sofia &Ruhendra. , 2020). This model is known as the 'mean variance model.' Investors, therefore, select portfolios for only a single investment cycle and focus on the mean and variance of their return on investment (Azifah& Indah, 2017).

First of all, borrowers can borrow and lend on a risk level that can lend or lend money to creditors at the same risk levels without depending on the amount borrowed or loaned, can lend or lend money to creditors at the same risk levels (Fernos& Dona, 2018). Secondly, all investors have homogenous assumptions, namely a general agreement on the distribution of assets from T-1 to T, which will lead to an evaluation of a future probability distribution (Dulkiah, 2020).

Experts stress the importance of estimating the risk-return trade of conditioning variables (Firdaus, 2020). In particular, they are very positive depending on risk and return (depending on the average laggard and volatility lagging), whereas a weak and statistically unimportant unconditionally negative risk-return relationship (Geriadi&Wiksuana, 2017).

CAPM extends its portfolio of the markets model by arguing that investors are risk-reducing investor and trade between risk and return selecting portfolios for the investment period. Thus, investors will choose an efficient portfolio that will reduce the volatility of portfolio returns by increasing expected returns at a specific rate of return or with a particular variant. The model of CAPM is often called the "mean variance" (Kurniawan, Djaenuri, Prabowo & Lukman, 2020).

In the CAPM model, there are two main assumptions, that investors are distributed equally in assets and that each investor is permitted to borrow or borrow at free rates of interest (Mardhiyah, 2017). There are the same assumptions in the CAPM model. Consequently, its premises are the same as those of the CAPM portfolio model. 1) Each position investor that optimizes profitability for all investments is at the forefront of an effective one. Investors avoid risks, optimize benefits and focus only on returns and risks (average) (Mawaddah&Nurwulandari, 2019). 2) Investors are entitled to take on or lease RFR funds; 3) Uniform expectations of all investors are to be expected, which means that the future will be uniformly shared; 4) all investor investments are made for players to arrive cost-effectively at the right place on the border. 8) The balance is on the stock market, and each investment is subject to the same price. Investors cannot affect prices (Mulianingsih, 2019).

Risk return trade-off is a fundamental financial connection, indicating a positive relation to the conditional variance between the expected excess returns. In the context of the medium model, empirical proofs based on the Kompas 100 index return series are mixed. There are several reasons why the empirical findings were not agreed upon (Noer, Saribanon&Nurwulandari, 2017). The sample sizes used in the studies are usually too small to estimate the relationship between risks and returns precisely. Data analysis at different frequencies can improve the assessment of conditional variance and its effect on expected results (Nurwulandari& Darwin, 2020). This relationship can not be monotonous, as it

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cannot be appropriately expressed by the models used in the literature between expected and conditional returns (Putri &nurwulandari, 2020).

This amount can no longer be construed as a risk premium, and no reason is expected to positively affect the desired outcome by conditional volatility (Sari &Oktavia, 2019). There are two opposite effects, the risk-return trading and the volatility return trading, depending on the volatility effect. The current link between returns and volatility is interpreted as an effect of volatility feedback (Rabiqy, 2018).

The conventional models for pricing financial assets may not apply to real estate, as real estate differs from financial investments in transaction costs. Furthermore, investors often have different risk preferences, leading to non-commercial or uncommon trades. In general, conventional option pricing due to this market imperfection (Wilis&Nurwulandari, 2020). The incompleteness of the market in the framework for real options has been shown to significantly lower accurate asset prices by an investor aversion to risk and an unspecific risk. This study does not explicitly examine how the price relationship between tangible assets and financial assets is affected by market incompleteness. Our paper fills this gap in the literature.

The seller is not concerned with the minimum price between the purchase of the property and the investment of the income or the retention of the property because the expected utility is the one between the two alternatives. The purchaser is also indifferent to purchasing or saving money and investing in financial assets at the maximum offer price. In particular, the further analysis focuses on the price impact of market movement on changes in returns and risks of financial support because the role of market movements in portfolio diversification is increasingly being understood. Investors are aware of significant losses due to strong market movements during the recent crisis, even portfolios normally well diversified.

A slow increase in the risk of a financial asset leads to a strong market movement, for instance, during a crisis, but ultimately prices drop with the chance. This non-linear relationship, totally ignored in the standard option, can help investors better understand the challenges of assessing investments in real estate in changing markets or in different countries with different market levels.

2. Research Method

This research is a quantitative study with a descriptive analysis approach. The research sample is Kompas 100 in this analysis. The data source is a secondary source from the IDX publication. The details used include the closing stock price and the four-year JCI (1 January 2016 - 31 December 2019). Data were analyzed based on the Rate of Return on Shares (Rm), Risk-Free Returns (Rf), Systematic Risk, E (Ri) and the Relationship between Risk and Return with CAPM using Pearson Correlation

3. Result and Discussion

3.1 Description of Research Data

The companies that were sampled were companies that were consistent in Kompas 100 during the study period. The related data is presented in table 1 below:

Table 1
IHS Kompas 100 2016-2019 Period

Month	Kompas 100 Index (IHS Kompas100)			
	2016	2017	2018	2019
January	803.343	887.498	1,071.175	989.787
February	861.893	937.447	1,091.610	1,041.578
March	890.563	942.145	1,204.409	1,059.741
April	891.258	851.582	1,094.023	1,071.782
May	884.921	884.459	1,039.837	1,065.740
June	952.957	929.665	979.567	1,122.029
July	952.957	885.849	885.370	1,126.397
August	812.732	955.19	927.582	1,128.493
September	874.123	977.548	977.880	1,209.531
October	850.088	951.724	908.183	1,142.955
November	875.211	956.276	920.098	1,154.643
December	881.174	989.625	959.029	1,168.92

Source: BEI

The sample in this survey is the most significant 52 stocks based on BEI historical figures for 2016-2019 based on the most prominent market capitalization criteria. Average inventory returns from 2016 to 2019, average operating income (market return), average risk-free income (SBI interest), from 2016 and 2019, as well as a systematic stock risk sample from 2016 to 2019, will be described. In an overview of this report.

3.2 Rate of return on Individual Shares (Ri)

Because investors expect high stock returns and low-risk risk from investing to assist investors in investing, it turns out that this involves precise and reliable analytical methods. At the end of each month (monthly closing price) in various public companies, stock returns take advantage of closing price fluctuations.

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Table 2
Individual Shares Returns

No	Code	year			
		2016	2017	2018	2019
1	AALI	-0.171766725	0	0.157782038	-0.074705279
2	ADRO	-0.305992353	-0.101794816	-0.315565509	-0.083569907
3	AKRA	0.748664913	0.371800927	0.055217875	0.074143858
4	ANTM	-0.338654328	-0.210239703	-0.14890788	-0.033925864
5	ASII	0.356663621	0.028028028	-0.106263259	0.155512767
6	ASRI	0.559344034	0.305357836	-0.283443344	0.38473094
7	BBCA	0.26	0.1385	0.055946066	0.394229267
8	BBKP	-0.073623618	0.068767552	0.124188507	0.242935585
9	BBNI	-0.019343839	-0.027315889	0.068567669	0.584478582
10	BBRI	0.285766296	0.02862864	0.043265569	0.610444848
11	BBTN	-0.264524889	0.24688568	-0.5	0.144678262
12	BDMN	-0.259359359	0.37904878	-0.332858508	0.166672924
13	BHIT	0.819816951	0.830608576	-0.38038038	-0.174529513
14	BIPI	1.206882353	-0.128778889	-0.455675468	0.056066037
15	BJBR	-0.382423893	0.165835265	-0.170388359	-0.074066709
16	BKSL	1.432292661	-0.287792553	-0.168312268	-0.268525934
17	BMRI	0.056117509	0.3	-0.040865199	0.402273997
18	BMTR	0.524076933	1.425243434	-0.208443344	-0.024684233
19	BSDE	0.088778889	0.133654062	0.163163165	0.566891483
20	BWPT	-0.132539851	0.233008694	-0.036746424	-0.678023608
21	CPIN	0.168578361	0.698675518	-0.076343477	0.172851853
22	CTRA	0.543857243	0.482482482	-0.0635	0.93
23	ENRG	0.445484871	-0.549425853	-0.147342464	0.485814386
24	EXCL	-0.146336425	0.259778509	-0.089919499	-0.077923055
25	GGRM	0.66126	-0.149268527	-0.206299014	0.346834433
26	GJTL	0.304357836	-0.258344334	-0.25594483	-0.140953382
27	INCO	-0.374368984	-0.229508197	0.128659674	0.302886892
28	INDF	-0.066420256	0.27173913	0.129205228	0.144959395
29	INDY	-0.63968354	-0.347126437	-0.585507052	-0.166202696
30	INTP	0.078967717	0.316715543	-0.108131504	0.16
31	ISAT	0.046396396	0.14159292	-0.357588157	-0.014253022
32	ITMG	-0.248424646	0.075032342	-0.324089433	-0.413380703
33	JPFA	0.224285814	0.607843137	-0.008230082	-0.270591904
34	JSMR	0.226288372	0.297619048	-0.155028524	0.524809625
35	KIJA	0.390598015	0.054054054	-0.036898446	0.586107384
36	KLBF	0.046254846	0.558823529	0.179445383	0.482
37	LPKR	-0.029422765	0.515151515	-0.08	0.248253757
38	LSIP	-0.125513629	0.022222222	-0.160969665	-0.047732225
39	MEDC	-0.282482482	-0.327835052	0.299343668	0.499095338
40	MNCN	0.394617031	0.908396947	0.06	0.08962391
41	PGAS	-0.283485976	0.448818898	-0.027273923	0.12949263
42	PNBN	-0.316789574	-0.192307692	0.048619058	0.607070607
43	PNLF	-0.455976403	0.173913043	0.444554455	0.395872796
44	PTBA	-0.269259359	-0.111764706	-0.325504411	0.116197079
45	PTPP	-0.39476	0.711340206	0.398590461	2.385
46	PWON	-0.144640663	0.196808511	0.3	0.847147147
47	SMCB	-0.033443335	0.333333333	-0.216617342	-0.146363836
48	SMRA	0.137714779	0.532258065	-0.188948368	1.125485625
49	TINS	-0.392457474	-0.077945084	0.028425593	0.087956533
50	TLKM	-0.113407557	0.283687943	0.188845404	0.31728908
51	UNTR	0.151660188	-0.252371917	-0.036632885	-0.058894838
52	UNVR	0.138383838	0.109042553	0.248002498	0.398885616

Source: (Processed Data)

3.3 Rate of Market Return (R_m)

If we look at the ups and downs of the stock index, we can conclude that the market is in a rising or falling state. As an analysis of investing in stock prices or not, market indices support investors. The movement of all Kompas100 share ownership in the IDX was created from IHS Kompas100. To calculate business returns, IHS Kompas100 (Rm). The complete Rm value is shown in the following table:

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Table 3
Market Returns (R_m)

Month	Year			
	2016	2017	2018	2019
January	-0.092266926	0.030108066	0.036242744	0.042887183
February	0.02668823	0.008964470	0.084237903	0.053605779
March	0.062770644	0.034469907	0.019365882	0.032777551
April	0.044654957	0.006066674	0.030995757	0.017716872
May	0.000889288	-0.097256538	-0.020229031	0.022460933
June	0.016604249	0.049077178	-0.048750849	-0.006690588
July	0.053776856	0.052696774	-0.048553742	0.05441762
August	-0.026897778	-0.026897768	-0.09619208	0.00492897
September	-0.159709214	0.054988514	0.024830256	0.002877586
October	0.076678542	0.023755536	0.055695443	-0.009013638
November	-0.029991605	-0.027790435	-0.063604204	0.021441814
December	0.029991048	0.004844739	0.003691165	0.010416576

Source: (Processed Data)

3.4 Risk-Free Rate of Return(R_f)

SBI is one of the risk-free properties in Indonesia. When investing in this asset, the risk to the investor amounts to 0 because the government issues and guarantees it. Investor returns are consistent with the government's interest rate. The monthly SBI rate is used to measure the return on this risk-free asset.

Table 4
Risk-Free Returns of Assets (R_f)

Period	SBI Interest Rate			
	2016	2017	2018	2019
January	0.0709	0.0589	0.0585	0.0824
February	0.0772	0.0483	0.0587	0.0818
March	0.0773	0.0483	0.0588	0.0814
April	0.0819	0.0493	0.0588	0.0815
May	0.0837	0.0525	0.0603	0.0816
June	0.0837	0.0534	0.0629	0.0815
July	0.0829	0.0557	0.0653	0.0809
August	0.0879	0.0556	0.0687	0.0798
September	0.0729	0.0568	0.0797	0.0699
October	0.0678	0.0576	0.0798	0.0786
November	0.0624	0.0578	0.0823	0.0788
December	0.0605	0.0581	0.0823	0.0790
Total		2.869		
Rf		0.059664		
Rf per month		0.005965		

Source: (Processed Data)

Based on the above calculations, it can be seen that risk-free return assets with a mean Rf value received by investors with a value of 0.005965 or 5.96% per year or 0.596% per month, which includes a minimum interest rate of 0.0483 or 4.83% at February and March 2018 and the maximum interest rate is 0.0587 or 5.87% in May and June 2018.

3.5 Systematic riskRisk (β)

The stock beta (β) factor is the systematic risk calculation of market risk by security or portfolio. Beta test to determine the level of stock price fluctuation when the stock price goes down and up. CAPM tests option exposures to market portfolios in beta stocks of securities. There is only systemic risk in a well-diversified portfolio. The stock beta value comes from the covariance between securities I and the market return-separated by the variance of market returns. Covariance describes the relationship between multiple stock returns and market returns and vice versa. If a given market return is responsive to every minor adjustment in the market, β will be large (β> 1). If the returns to supply are constant even if demand shifts, then β is set (β = 1). While returns are less sensitive than market shifts, then β shows a low value (β <1). The calculations for the subsequent covariants are the same as the ones above.

Table 5
Covariance, Variants, Beta Period 2016-2019

No	Code	Covariance	Variant	Beta
1	AALI	6.52E-06	0.00336	0.02995
2	ADRO	0.00138	0.00336	0.56824
3	AKRA	0.00371	0.00336	1.58869
4	ITEM	0.00276	0.00336	1.19528

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5	ASIA	0.00182	0.00336	0.86213
6	ASRI	0.00503	0.00336	1.7912
7	BBCA	0.00309	0.00336	0.94471
8	BBKP	0.00448	0.00336	1.48648
9	BBN	0.00278	0.00336	1.19609
10	BABRI	0.00346	0.00336	1.66529
11	BBTN	0.00334	0.00336	1.44744
12	BDMN	0.00168	0.00336	0.75978
13	BUT	0.00363	0.00336	1.17348
14	BIPI	0.00038	0.00336	0.13475
15	BBC	0.00406	0.00336	1.36656
16	BKSL	0.00462	0.00336	1.70186
17	BMRI	0.00388	0.00336	1.29144
18	BMTR	0.00204	0.00336	0.46449
19	BSD	0.00492	0.00336	1.74477
20	BWPT	0.00099	0.00336	0.44588
21	SPIN	0.00465	0.00336	1.62514
33	CTRA	0.00462	0.00336	1.70034
23	ENRG	0.00586	0.00336	2.15982
24	EXCL	0.00026	0.00336	0.08095
25	GGRM	0.00133	0.00336	0.59288
26	JUL	0.00334	0.00336	0.98478
27	INFO	0.00554	0.00336	1.04736
28	INDF	0.00288	0.00336	0.8293
29	INDY	0.00472	0.00336	1.64822
30	INTP	0.00334	0.00336	0.95644
31	ISAT	0.00285	0.00336	0.82728
32	ITMG	0.00088	0.00336	0.44859
33	JPFA	0.00348	0.00336	1.10383
34	JSMR	7.68E-06	0.00336	0.04499
35	KIJA	0.00442	0.00336	1.52046
36	KLBF	0.00285	0.00336	0.82527
37	LPK	0.00463	0.00336	1.268956
38	LSIP	0.00333	0.00336	0.50357
39	MEDIA	0.00047	0.00336	0.16305
40	MNCN	0.0026	0.00336	0.70922
41	PGAS	0.00144	0.00336	0.5944
42	NBN	0.00245	0.00336	1.04383
43	PDF	0.00397	0.00336	1.72428
44	PTBA	0.00178	0.00336	0.75539
45	PTPP	0.00475	0.00336	2.06398
46	PWON	0.00288	0.00336	1.44649
47	SMCB	0.0026	0.00336	1.20834
48	SARA	0.0006	0.00336	0.4419
49	TINS	0.00302	0.00336	0.89979
50	TLKM	0.00094	0.00336	0.42305
51	UNTER	0.00276	0.00336	0.78826
52	UNVR	0.0005	0.00336	0.18874

Source: (Processed Data)

3.6 Expected Return E(R_i)

Using the CAPM method to evaluate viable investment options β from the previous calculation, investors can calculate the risk for return. In contrast, the return can be calculated by the number of risk-free return assets with the difference in market returns and average returns and free asset returns in the market. The risk premium is often the difference between the average market return and the risk-free return on an asset.

The following table shows the standard CAPM for other organizations using the same equation as above:

Table 6
CAPM 2016-2019 Period

No	Kode	Beta	Rm	Rf	E(Ri)
1	AALI	0.02995	0.00677	0.00597	0.00600597
2	ADRO	0.56833	0.00677	0.00597	0.0068629
3	AKRA	1.58877	0.00677	0.00597	0.00760199
4	ITEM	1.28539	0.00677	0.00597	0.00784471
5	ASIA	0.86232	0.00677	0.00597	0.00641497
6	ASRI	1.7822	0.00677	0.00597	0.00889196
7	BBCA	0.93371	0.00677	0.00597	0.00742722
8	BBKP	1.59757	0.00677	0.00597	0.00744938
9	BBN	1.18708	0.00677	0.00597	0.00694588

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10	BABRI	1.45619	0.00677	0.00597	0.00726786
11	BBTN	1.44753	0.00677	0.00597	0.00744881
12	BDMN	0.75979	0.00677	0.00597	0.00623622
13	BUT	1.26449	0.00677	0.00597	0.00780885
14	BIPI	0.13574	0.00677	0.00597	0.00615844
15	BBC	1.36656	0.00677	0.00597	0.00722535
16	BKSL	1.60286	0.00677	0.00597	0.00760695
17	BMRI	1.29144	0.00677	0.00597	0.00799848
18	BMTR	0.46449	0.00677	0.00597	0.00569263
19	BSD	1.74477	0.00677	0.00597	0.00881822
20	BWPT	0.44588	0.00677	0.00597	0.00665388
21	SPIN	1.62514	0.00677	0.00597	0.00753807
22	CTRA	1.60035	0.00677	0.00597	0.00760448
23	ENRG	2.25971	0.00677	0.00597	0.0084783
24	EXCL	0.08095	0.00677	0.00597	0.00607289
25	GGRM	0.47288	0.00677	0.00597	0.0067445
26	GJTL	0.88578	0.00677	0.00597	0.00664178
27	INFO	1.04736	0.00677	0.00597	0.00770938
28	INDF	0.8394	0.00677	0.00597	0.00637853
29	INDY	1.65822	0.00677	0.00597	0.00766476
30	INTP	0.95633	0.00677	0.00597	0.00656559
31	ISAT	0.82728	0.00677	0.00597	0.00635933
32	ITMG	0.45849	0.00677	0.00597	0.00575705
33	JPFA	1.10383	0.00677	0.00597	0.00681358
34	JSMR	0.04388	0.00677	0.00597	0.00601405
35	KIJA	1.52046	0.00677	0.00597	0.00746163
36	KLBF	0.82518	0.00677	0.00597	0.00635622
37	LPK	1.17885	0.00677	0.00597	0.00682864
38	LSIP	0.50466	0.00677	0.00597	0.00676907
39	MEDC	0.16305	0.00677	0.00597	0.00531765
40	MNCN	0.70913	0.00677	0.00597	0.00708592
41	PGAS	0.6944	0.00677	0.00597	0.0069026
42	NBN	1.05292	0.00677	0.00597	0.00771809
43	PDF	1.72428	0.00677	0.00597	0.00868995
44	PTBA	0.77749	0.00677	0.00597	0.00624368
45	PTPP	2.06288	0.00677	0.00597	0.00834025
46	PWON	1.33649	0.00677	0.00597	0.0079102
47	SMCB	1.10933	0.00677	0.00597	0.00674423
48	SARA	0.3219	0.00677	0.00597	0.00631277
49	TINS	0.89878	0.00677	0.00597	0.00647324
50	TLKM	0.42305	0.00677	0.00597	0.00661683
51	UNTER	0.78826	0.00677	0.00597	0.00629584
52	UNVR	0.18874	0.00677	0.00597	0.00525518

Source: (Processed Data)

3.7 Risk and Return Relationship with CAPM

The risk-return relationship using the CAPM method uses a simple coefficient model to assess whether the relationship between the two variables is linear and meaningful, beta and the expected return from the CAPM method, respectively.

Table 7
Pearson Correlation
Correlations

		Beta	E(Ri)
Beta	Pearson Correlation	1	1,000**
	Sig. (2-tailed)		,000
	N	52	52
E(Ri)	Pearson Correlation	1,000**	1
	Sig. (2-tailed)	,000	
	N	52	52

Source (Processed Data SPSS 22.0)

From the results of table 7, it can be seen that there is a close relationship between return and risk. If the correlation coefficient is (+), there is a one-way relationship between return and risk. The company's increase will be followed by an increase in the risk that the company must bear. Conversely, if the correlation coefficient shows a negative value (-), there is an opposite relationship between risk and return. This means that the rise does not follow an increase in return in riskRisk; the greater the return received, the smaller the risk that the company must bear. Interpretation of the magnitude of the resulting relationship or correlation can be seen in table 6; the assessment of whether or not there is an absolute correlation between risk and return is contained in the sig (2-tailed) section. If the significant value of the correlation coefficient is 0.05,

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the risk and return are not significantly risky. Meanwhile, the considerable weight of the correlation coefficient, which is below 0.05, indicates that riskRiskis correlated with recovery.

4. Conclusion

The results of the correlation coefficient test show that: 1) The sample used in the CAPM calculation shows a strong positive relationship between beta and CAPM expected return. As beta increases, the predicted yield increases proportionately and vice versa. If beta decreases, the anticipated results decrease; and 2) Of the 52 research samples, 33 company stocks are included in the productive stock category and 19 stores are included in the inefficient stock category. Investors must choose between buying abundant supplies and selling at a high price.

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