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Illinois Tool Works

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Illinois Tool Works
Dr. R. Fare
University Honors

By
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I. Founding

Illinois Tool Works develops and produces an extensive array of engineered components and systems supported by customer service. These products provide solutions to improve the competitiveness of customers in the automotive, appliance, beverage & food, construction, general industry, packaging and a variety of other industries. ITW focuses on building close working relationships with their customers. This strategy allows ITW easy entry into new market niches and builds the basis for deep penetration into markets served. Although decentralized, ITW fosters intracompany research & development with a high technology center that eases the flow of technology. ITW is a stable company with a decentralized strategy that allows it to succeed where it chooses to compete.

Illinois Tool Works is a multinational corporation that began operations in 1912 as a manufacturer of gear cutting tools. May 23, 1915 Illinois Tool Works (ITW) was incorporated in Illinois. On June 19, 1961 Illinois Tool Works incorporated in Delaware as a subsidiary of Illinois Tool Works Incorporated (Illinois). August 10, 1961 these two companies merged into Illinois Tool Works Incorporated (Delaware). Today, ITW has operations in nearly 40 countries and has more than 18,000 employees. Its principle markets are: Engineered Components and Industrial Systems & Consumables.

II. Objective

The objective of this project is to define the relationship of the stock price of Illinois Tool Works to the dividends paid, earnings per share, and cash flows. Illinois Tool Works public information will be examined and analyzed using the Farrell model of output efficiency. Through analysis, this paper will account for outliers and non conforming results, as well as explain similarities between the results and the real market. This paper will conclude with whether or not the chosen variables have a definable relationship to the data, and if they do, propose a method of investment based on the results.

The data chosen to compare to the stock price is the dividends paid, common earnings per share, and the operating cash flows. Each of these variables is believed to have a relationship with the stock price. The dividends paid will influence the price of the stock because the purchasers of stock purchase the future cash flows from the their investment, not the investment itself. The earnings per common share variable will account for the income earned (rather than only that paid out in dividends). This variable is used in addition to the dividends paid, because it will account for the amount of income that is reinvested (increases the book value of the stock) in the corporation or used to retire outstanding debt or securities. This will effect the stock price because the dollar value of the assets held by each share of stock will increase. The cash flows correlate to the stock price because the cash earned from operations determines the actual cash return on the stockholders equity. This is a more valuable measure than net income because the income figure takes into account non cash

expenses such as depreciation. These variables should have a determinable correlation with the price of the stock of Illinois Tool Works.

III. Business Segments, Business Groups, and Operating Units

IIIA. Engineered Components

Engineered Components include short lead time plastic and metal components, small assemblies, industrial fluids and adhesives, and plastic and metal fastening systems and fasteners.

1. ITW Industrial Fluids & Adhesives
2. ITW Industrial Components
3. ITW Construction Products
4. ITW Specialty Products

1. Engineered Components Business Segments

ITW has approximately fifty operating units serving this market segment. These operating units are divided into the four business groups listed in figure 1.

1. ITW Industrial Fluids & Adhesives includes general fluids and adhesives for industrial, marine, consumer, and other applications. Two of the larger subsidiaries in this business group are Devcon and Philadelphia Resins. Devcon produces adhesives and sealants for maintenance and repair for the industrial and consumer markets. Consumer products include the common Sure Shot One-Minute Epoxy and a variety of floor sealants. Philadelphia Resins develops and manufacturers epoxy resins, adhesives, specialty coatings, and chocking and grouting systems.

2. ITW Industrial Components include fasteners and fastening systems for automotive, appliance, industrial, and other general applications. Fastex, Automotive Controls, Deltar, and ITW Switches are a few of the operating units included in this

business group. Fastex was established as a result of the development of molded plastic fasteners by the Shakeproof Division. Nexus was created by Fastex to concentrate on plastic fasteners targeted at the sports, luggage and apparel markets. These plastic fasteners are used in a number of back packs, military uniforms, and sports clothing. Automotive controls provide fastening systems that are easy to apply, attractive, and corrosion resistant. These products include interior trim, self drilling screws, aluminum bonding epoxy coatings, and a variety of other fasteners for the automotive industry. ITW Switches produce rotary and slide switches that have a variety of uses in military, communications, and the electronics industry. These products can be found on video games, computers, and other common electronics.

3. ITW Construction Products produce fasteners and fastening systems for wood, metal, and concrete applications. Paslode, Buildex, and Ramset/Red Head are a few of the operating units in this business group. Paslode produces wood fastening products and systems used in construction, pre manufactured housing, industrial crating, and decking. They are the producers of the only cordless power nailer (powered by a gas canister). It is ideal for nailing in places where the use of hoses and air compressors are impractical. Buildex was established in 1967 to market certain products for the construction markets that were developed by the Shakeproof business unit. Since then, Buildex has extended its product line, and now produces a variety of fasteners including: dry wall screws, pre-assembled washers and nuts, thread cutting screws, and plastic anchors. Ramset/Red head manufactures anchoring and fastening systems for commercial construction. These anchoring

systems are used in a number of commercial construction applications, however, a large portion of their product line is devoted to concrete and masonry fastening. ITW Construction Products is one of ITW's most important business groups.

4. ITW Specialty Products develops and manufactures specialty fastening, packaging, and molded plastic products for a variety of uses. Shakeproof-Automotive, Plasticglide, and Anchor Fasteners are a few of the operating units included in the Specialty Products group. Shakeproof-Automotive produces a number of products for the automotive industry including Shakeproof's Sound Seal Stems fastener. Plasticglide manufactures custom injection molded plastic parts and hardware. These products range from wheel coasters to knobs for household appliances. Anchor Fasteners manufacture a number of systems including the anchoring systems for the air bags in Ford and General Motors cars.

IIIB. Industrial Systems and Consumables

Industrial Systems and Consumables (IS&C) include long lead time systems and related consumables for consumer and industrial packaging, finishing, industrial tooling, and quality assurance. There are four main business groups in the Industrial Systems and Consumables Business Segment (see chart #2).

1. ITW Consumer Packaging Products & Systems
2. ITW Industrial Packaging Systems
3. ITW Finishing and Automation Systems
4. ITW Industrial Tools and Quality Assurance Systems

2. Industrial Systems & Consumables

1. ITW Consumer Packaging Products and Systems produce plastic packaging and application systems, resealable packaging, and package printing systems. Hi-Cone and Zip-Pak are two important Operating Units in this Business Group. Hi-Cone is one of ITW's most profitable Operating Segments. They develop and produce plastic packaging for the consumer market. Hi-Cone manufacturers the packaging and application system for the common six, twelve, and twenty four pack plastic ring can fastening system. Anheuser-Busch, Coca Cola, and Green Giant are just a few of the many companies that rely on the packaging of Hi-Cone to carry their products to market. Zip-Pack produces the resealable packaging that allows the consumer to use a portion of a product and then reseal the package for future use. Sargento and Louis Rich are two of twelve companies currently utilizing Zip-Pack resealable packaging. Zip-Pak is the largest manufacturer of resealable packaging in North America.

2. ITW Industrial Packaging Systems consists of steel and plastic strapping, stretch film, and the application equipment for these products. These systems are used in general industry, publishing, steel, lumber, and a variety of other industries. Signode which name means "steel knot" is the main Operating Unit in this Business Group. Signode produces steel and plastic strapping systems that can be found in virtually any corporation that packages product in bulk. Metal strapping fits the needs of heavy duty industrial strapping where the strength of steel is necessary to secure the items. Newspapers and magazines are one of the largest users of plastic strapping. Signode also produces floor and ceiling system plastic wrap mechanisms

that are particularly suited to packaging odd lot or odd shaped loads. Odd lot loads are common when shipping many small packages, an example would be a large wholesaler shipping many different products to a drug store. Illinois Tool Works Industrial Packaging Systems is one of ITW's larger Business Groups.

3. ITW Finishing and Automation Systems include finishing and static control systems for appliance, automotive, electronics, general industrial, and other markets. DeVilbiss Ransburg, DeVilbiss, Gema Volstatic Industrial Powder Systems, and Simco compose the majority of ITW Finishing and Automation Systems. DeVilbiss and Ransburg produce conventional air and electrostatic liquid spray guns. Gema Volstatic Industrial Powder Systems provide powder coating systems that reduce energy consumption and waste. Simco produces static elimination products that compliment the finishing systems in this business group.

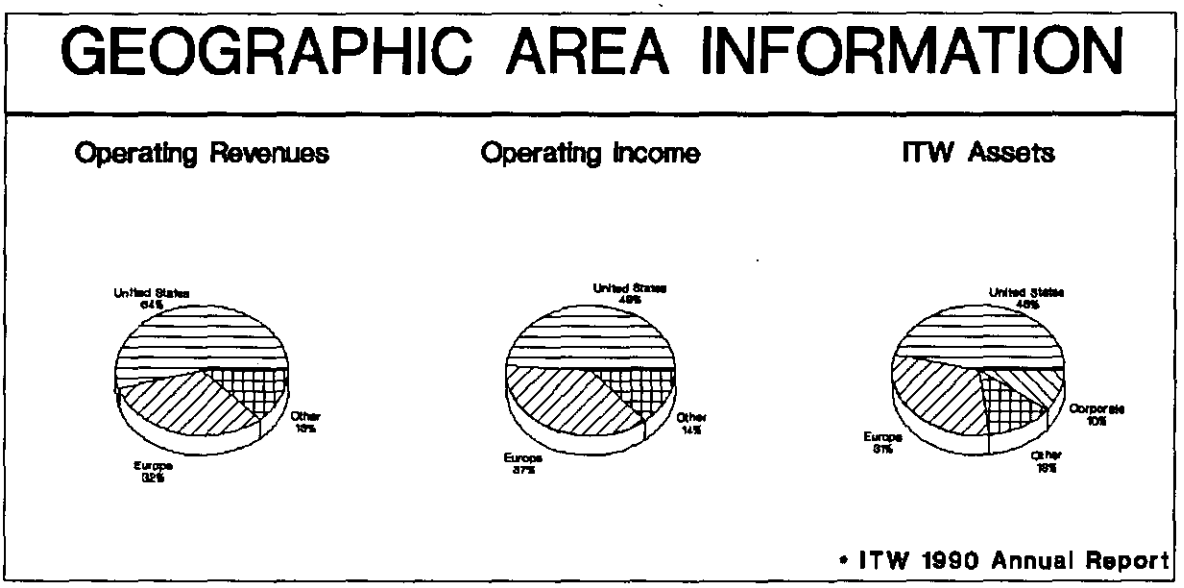
4. ITW Industrial Tools and Quality Assurance Systems produce specialty tooling, gearing, and nondestructive testing systems. These products are used in automotive, aviation, agriculture, and general industrial applications. Spiroid, Magnaflux and Andrex Radiation are a few of the Operating Units included in this Business Group. Spiroid produces a number of products including precision gearing used to control film passing through laser image setters that photo-typeset entire pages of text at a time. Andrex Radiation manufactures x-ray units and real time x-ray systems for non destructive testing (NDT) applications. Magnaflux also manufactures non destructive testing systems, their products include: eddy current, magnetic particle, and ultrasound NDT systems.

IV. Geographic Information

"You are never more than a few feet away from a product of Illinois Tool Works." is on of ITW's slogans. Not only are you never more than a few feet from an ITW product, but you are most likely near an ITW facility.

Illinois Tool Works has large plants in the United States, United Kingdom, Ireland, Germany, Sweden, Singapore, Taiwan, Italy, Spain, France, Australia, Netherlands, Belgium, Malaysia, New Zealand, Hong Kong, Venezuela, Finland, Thailand, Mexico, Japan, Denmark, etc.... This clearly demonstrates that ITW is a multinational corporation with ties to a number of countries around the world.

3. Geographic Area Information

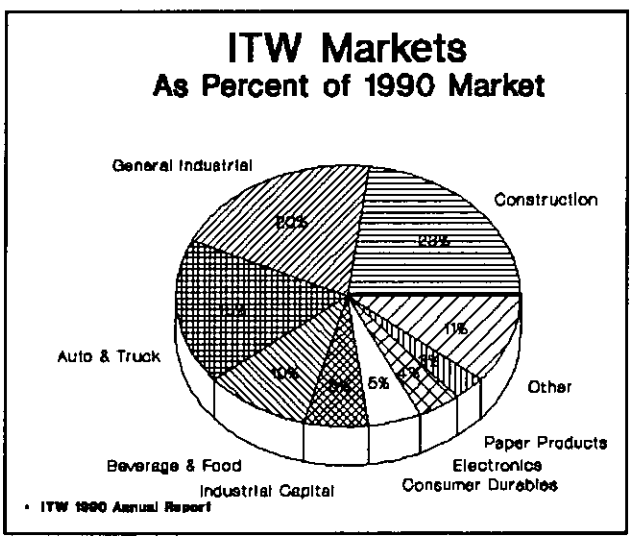


The United States is home to approximately 46% of ITW's two billion one hundred and fifty million dollars of identifiable assets (see chart #3). In addition, 54%

(or $1,383,825,000, excluding intercompany revenues) of ITW's revenues and 49%, approximately $168 million, of ITW's income are attributed to the United States. Europe contains roughly 31% of ITW's assets, 32% of the revenues, and over 37% of the income. Areas other than Europe and the United States accounted for 13% of the assets, 13% of the revenues, and 14% of the income. This reveals that over 51% of Illinois Tool Work's income is derived from places outside of the United States of America. This also infers that some products are produced outside of the United States and are imported for sale in the domestic markets. ITW is a multinational corporation with ties to a number of countries.

V. Segment Information

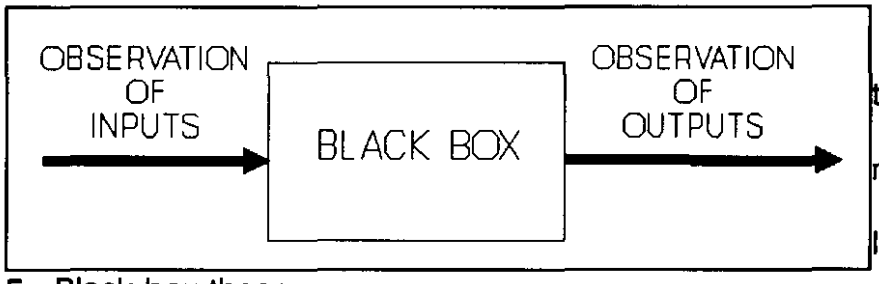
Illinois Tool Works is composed of two business segments: Engineered components, and Industrial Systems & Consumables. During 1990, 55%, or $1.4 billion, of the operating revenues were from Industrial Systems & Consumables and 45%, or approximately 1.1 billion, were from Engineered Components. However, the total income of $344,714,000 was divided 60% and 40% respectively for the same year. Industrial Systems & Consumables account for approximately 54% of the total identifiable assets while Engineered Components account for only 36% (corporate is the remaining 10% of



4. Industry markets as a percent of revenue

assets). This means that the two business segments have comparable operating income when compared to the dollar value of identifiable assets. The operating income to identifiable fixed assets for IS&C is 17.65%, and for Engineered Components it is 18.2% (based on the 1990 annual report). This ratio has varied over the years depending on the market, however, the two segments appear to complement one another. These two segments serve a variety of different markets. These markets are shown in chart #4 as a percentage of revenue.

VI. Model Fundamentals

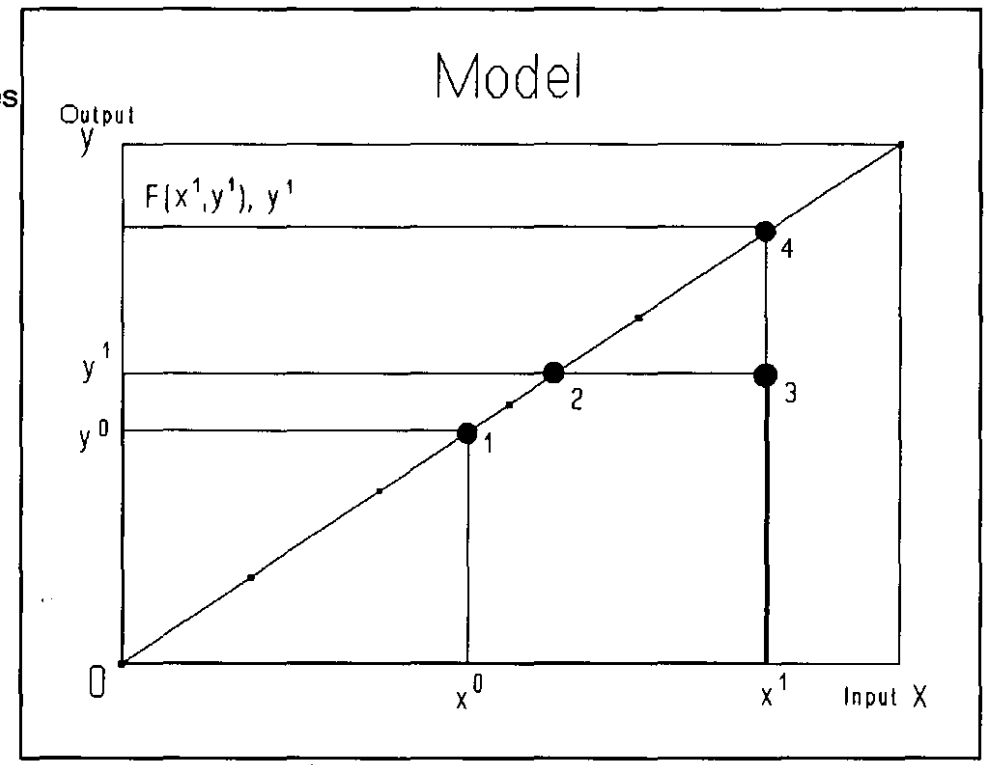


5. Black box theory

The model used in this analysis is the Farrell model of output efficiency. In the Illinois Tool Works model the input variables are dividends, common earnings per share, and cash flows. The output in this model is the stock price. The Farrell model maximizes the output while taking the inputs as given. In chart #5 the black box represents the technology that effects the stock price. The technology could be the quick/slow reaction of the stock market, increased dividends by the corporation, acquisitions along with increased debt, and a variety of other variables that effect the stock price.

The efficiency is measured numerically with one being the most efficient rating. The model will, due to constant return to scale, construct a line that represents the frontier. This frontier is the maximization of the stock price for the given input data.

Observations with data that maximizes the stock price relative to the inputs will fall on the line and will be rated a one. All of the other observations will then be judged against that time



6. Farrell Model of Output Efficiency

period to develop a rating for each quarter. The frontier line represents the maximization for the inputs, and all observations will fall on or below the frontier. Observations that fall below the line represent inefficiency in stock pricing. Graphic #6 depicts the model. X represents the three different inputs which are compared to Y, which is the stock price. The straight line represents the maximized stock price or a one rating for the model (the frontier), an example would be number one in the graph. Number two is the stock price that actually resulted in the market. Number four represents the stock price that should have resulted with the given inputs had the market been working efficiently. The difference between number three and number four is caused by the lack efficiency in the market or by some external force not accounted for in the model.

VII. Model Output & Input

VIIA. Output

The daily stock price for Illinois Tool Works has been used to compute a geometric mean price by quarter. The daily stock price was broken up into the separate quarters for each year beginning in 1985 and ending in the third quarter of 1991. The daily stock prices were then multiplied together for each quarter, and the natural logarithm of the number of market days was then taken. The resulting figure is the geometric mean.

Illinois Tool Works Geometric Stock Price						
Quarter	1985	1986	1987	1988	1989	1990
First	32.73	37.01	64.57	34.16	35.79	45.32
Second	32.83	39.88	56.01	36.94	36.39	52.14
Third	31.22	41.40	42.57	36.02	41.43	47.51
Fourth	30.39	47.65	32.96	33.93	41.49	44.44

A geometric mean is slightly less than an average. This is because a geometric mean reduces the effect of outliers, and thus gives a more accurate view of the actual stock price. The geometric mean will work well with the mathematical model that will be used to analyze Illinois Tool Works.

VIIB. Input

Dividends, Common Earnings Per Share, Cash Flows, and Acquisitions have been chosen as the variables to compare to the geometric mean of the quarterly stock prices. These are variables that Illinois Tool Works has under their control. Internal rather than external (inflation, market conditions, etc..) variables will be used because ITW has these variables under their control, and hence a definable relationship should exist. External variables will effect the internal variables to a certain extent. An example would be if the earnings were low (from external causes) and ITW decided to pay a smaller dividend. This would effect the stock price in some definable way.

VIIB(1). Dividends

Illinois Tool Works Dividends Per Share						
Quarter	1985	1986	1987	1988	1989	1990
First	0.08	0.09	0.09	0.1	0.12	0.15
Second	0.08	0.09	0.1	0.1	0.12	0.15
Third	0.09	0.09	0.1	0.12	0.15	0.18
Fourth	0.09	0.09	0.1	0.12	0.15	0.18

Illinois Tool Works has paid a dividend during every period during 1985 to 1990, and has maintained an average payout ratio of 18.25% of common earning per share. The data above shows that ITW has increased its dividend approximately every 5 years. During the fourth quarter of 1985, ITW incurred a net loss due to the

acquisitions of Magnaflux, International Glide, and Action Fasteners. ITW, however, continued to pay the regular dividend because most of the income costs associated with the acquisition costs were not true "costs", but simply accounting expenses that did not actually use cash.

In May, 1987, ITW declared a two for one split on its common stock. The stock price chart shows the stock during the first quarter of 1987 as being extremely high. This is because prior to the stock split the price of the stock increased dramatically, and then approximately halved after the split. The low stock price is not reflected in the geometric mean stock price because the stock split in May, and the stock price is calculated on quarterly basis. For this reason, only one month of low stock price was calculated into the data for the first period of 1987.

There are a number of factors that effect a firm's dividend policy. All of these factors can be grouped into five general categories:

A. Constraints on dividend payments
B. Investment opportunities
C. Cost and availability of other financing sources
D. Effect of dividend change on the stock price
E. Stock splits

7. Factors effecting dividend policy

Dividend Information

A. Constraints on dividend payments include a variety of scenarios that directly effect the dividend paid. First of all, dividends can only be paid with cash. Thus, if a company is in the midst of a cash flow crises it will be unable to pay dividends (unless it borrows the cash) even if it is a very profitable corporation. Bond indentures also effect the amount of cash that a corporation has to expend on dividends. Bond indentures often limit dividend payments to earnings generated after the loan was granted. Also, these contracts often stipulate that no dividends can be paid unless certain financial ratios exceed stated minimums (current ratio, times interest earned ratio, etc...). Impairment of capital is a legal constraint that protects the creditors of the corporations. This rule prohibits a corporation from distributing its assets to stockholders and leaving the debt holders in the cold. Liquidating dividends can be paid, however, they must be stated as such and can not reduce the capital below stated minimums. These are a few of the constraints that effect the size of dividend that a corporation will declare.

B. Investment opportunities effect the amount of divided to be declared. The possibility of accelerating or delaying projects always exists. When preparing to declare the dividend, the firm should consider whether the cash dividend could be better used to accelerate a project to increase the firms growth (or a larger dividend and decrease the growth). Investment opportunities also effect the dividends paid. If the firm has a chance to invest in a highly profitable project with large capital expenses, it should consider lowering its dividends to meet the needs of the project.

However, if investment opportunities are slim, the firm should pay out a greater portion of its earning to allow the stock holder to invest money were it will earn a greater return.

C. Alternative sources of capital effect the dividend paid out. If a firm needs capital to meet requirements (creditor obligations, investment opportunities, etc..), it can obtain equity by selling stock or by utilizing its retained earnings. If the costs of issuing new stock are high, it would be better for the firm to retain its earnings to finance the investment. However, if the issue costs were low it could raise the equity through the sale of stock, and still maintain a high payout ratio (the firm would probably be better of with debt financing in this situation). Control is another factor that often effects the alternative sources of capital. If a high degree of control is desired by the shareholders, they will be reluctant to issue new stock, and the company may retain a large percent of the earnings. However, the dividend may be increased if a large group of stockholders demand it, and they threaten management with a proxy fight. Alternative sources of financing often effect the size of the dividend declared to the stockholders.

D. The **effect of the dividend policy** on the price of the stock is not readily determinable. A few factors, however, can narrow down the unpredictability of the general public's reaction. If the stockholders are weary of inflation, they may desire current dividends versus promises of future income. If the stockholders perceive the capital gains (retained earnings increases) to be a great deal more risky than dividends, they will demand a large dividend. When a firm decreases or increases its

dividends dramatically it carries a certain amount of information to the general public. The company must first determine how the public will accept such changes before it declares the dividend.

E. Stock splits do not represent a dividend to the shareholder. A stock split simply means that the company doubled the outstanding stock (in a 2 for 1 split) and halved the par value. The owner of the stock, does not own any more "value", and still retains the same proportionate share of the corporation as he held before the stock split. In a stock dividend the same theory prevails, except that additional stock is issued.

A stock dividend and a stock split are treated differently in terms of accounting. In a stock split the outstanding shares are increased and the par value is decreased. Thus, no journal entry is made and the account values remain the same. In a stock dividend, new stock is issued and the par value is not altered. A journal entry transfers cash from the retained earnings account to the common stock and paid in capital accounts to "purchase" the stock. This has the effect of decreasing the retained earnings and increasing the outstanding stock and paid in capital. Neither method provides the stockholder with greater "value", the only difference between them is the accounting treatment.

VIIB(2). Common Earnings Per Share

Illinois Tool Works Common Share Earnings						
Quarter	1985	1986	1987	1988	1989	1990
First	0.29	0.3	0.47	0.6	0.7	0.76
Second	0.31	0.38	0.56	0.74	0.83	0.92
Third	0.25	0.35	0.51	0.67	0.76	0.84
Fourth	-0.22	0.53	0.52	0.65	0.77	0.83

Common Earnings per share is another input used in the analysis of Illinois Tool Works. This variable is the net income per share, and it was included in this analysis for two reasons. First of all, the net income was used in order to relate the economy, sales, and general business environment to the model. Second, the E.P.S. will include the earnings that the dividends per share does not account for. The E.P.S. includes that amount of income that is earned by ITW, but is used to reinvest in the corporation or to retire outstanding stock or debt.

During the fourth quarter of 1985 ITW incurred a net operating loss. A negative E.P.S. figure could not be included in the Farrell model of output efficiency. For this reason, the fourth quarter of 1985 was not included in the model analysis. This will not effect the remaining data because the loss was caused mainly from restructuring costs and special accounting for acquisitions. The accounting for the acquisition costs are not true costs, but appear due to the adjustments necessary for the

accounting of the acquisition of inventories and other adjustments. The Farrell model could not operate with a negative E.P.S. because of its multiplicative format, for this reason this period has been omitted.

Earnings per share is the net income of the company divided by the number of shares of common stock outstanding. Management of a corporation should concentrate on maximizing earnings per share rather than on total corporate profits. This is because a dilution will effect the stock holders when new stock is issued. For example, suppose you owned 100 shares in a company with 1,000 shares outstanding and $100,000 in profit. The earnings per share (EPS) would be $100, and your shares would have earned of $10,000. Now suppose, the company issued 1000 more shares and invested the money to produce $50,000. The earnings per share would now have dropped to $75, and your shares would have earned only $7,500. Thus, the firm should concentrate on maximizing stockholder income, and not simply higher income.

Based on the above information it follows, that the firm should theoretically only issue new stock when a loss is expected. This would allow the stockholders to share the loss with the new investors. If the firm has a very profitable investment in mind, and it is in need of capital to invest, it should finance the project with debt. This would allow the shareholders to reap the large profits expected from the project, and only pay the cost of the debt. The interest payments on the debt are also deductible for tax purposes (dividend payments are not). The riskiness of a firm is also dependent on how the firm is financed. The use of leverage in a firm exposes the firm to large risk from small fluctuations inherent to the business environment. The use of debt

should be carefully monitored to ensure the going concern of the firm. While the use of debt may increase a companies earnings, it also increases the riskiness of projected earnings.

VIIB(3) Operating Cash Flows

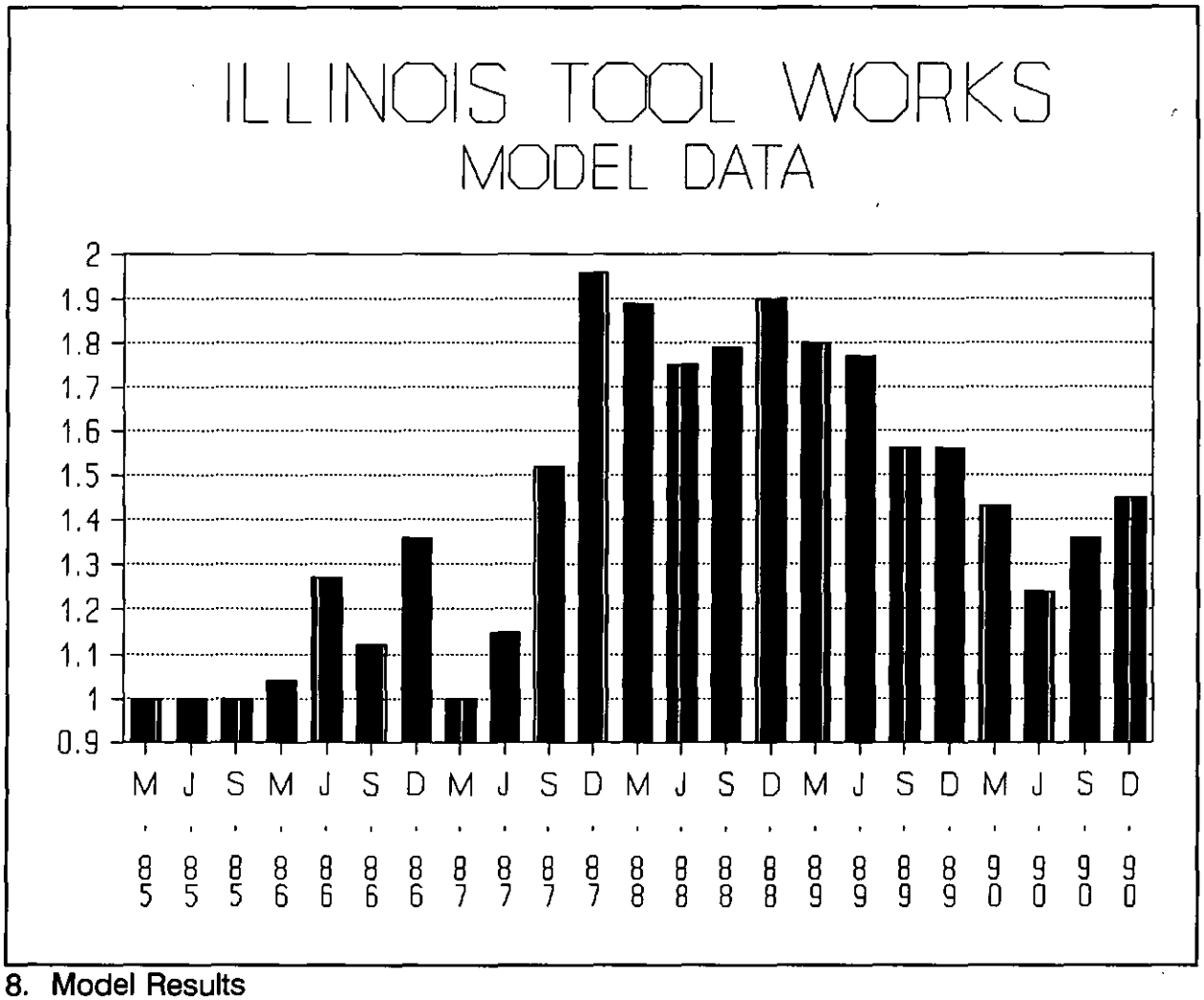
Illinois Tool Works Smoothed Cash Flows (in millions)						
Quarter	1985	1986	1987	1988	1989	1990
First	20616.4	28592.0	42485.8	52957.1	62125.3	68525.5
Second	19635.5	37548.5	47423.0	58491.3	65759.3	71291.8
Third	19635.5	37548.5	47423.0	58491.3	65759.3	71291.8
Fourth	28592.0	42485.8	52957.1	62125.3	68525.5	71291.8

The cash flows from operations represents the actual cash earned from operations after all operating cash expenses have been deducted. This figure has been used to compliment the E.P.S. (a basic net income figure) because the operating cash flow will not include non cash expenses like depreciation. Income from operations gives a true description of the actual cash being earned during the year.

The cash flow from operations of Illinois Tool Works has been adapted for use in this model. Cash flow data is only available to the public in yearly increments. For this analysis, the yearly cash flow was divided into four quarters, and the resulting figure was then smoothed by averaging the last quarter of each of each year with one fourth of the next years cash flow (one fourth of the preceding year cash flow was

used with the first quarter data). The only year that may have misstated information is 1985, however, the cash flows from operations should not be materially misstated because the operating flows should not be effected by the adjustments from the acquisitions. The averaging used does not produce a precise measurement, however, the smoothing is believed to derive a figure close enough for this analysis.

VIII. Model Results



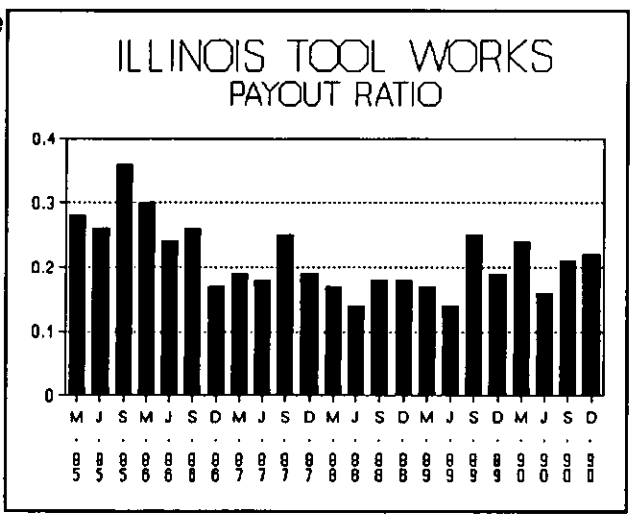
8. Model Results

The analysis of results has been broken down into five different periods:

A. March '85 to September '85
B. March '86 to December '86
C. March 87 to December '87
D. March '88 to December '89
E. March '90 to December '90

VIIIA. March 1985 to September 1985

The stock pricing during this period has been rated efficient by the Farrell model of output efficiency. A possible reason for this is that Illinois Tool Works was preparing for a large acquisition during this period and had lowered its long term debt to total capitalization ratio to 2.4%. This is exceptionally low compared to the ratio after the acquisition of Signode, 49.6%. In addition, during the last period of 1985, ITW posted a net operating loss due to the acquisitions of Magnaflux, International Glide, and Action Fasteners. These acquisitions, however, did not increase the long term debt to capitalization ratio (actually decreased during the period). This caused the stock price to increase because investors knew that ITW was preparing for acquisition and anticipated a large increase in the stock price. A low debt ratio also signifies that the company is a strong investment that is not susceptible



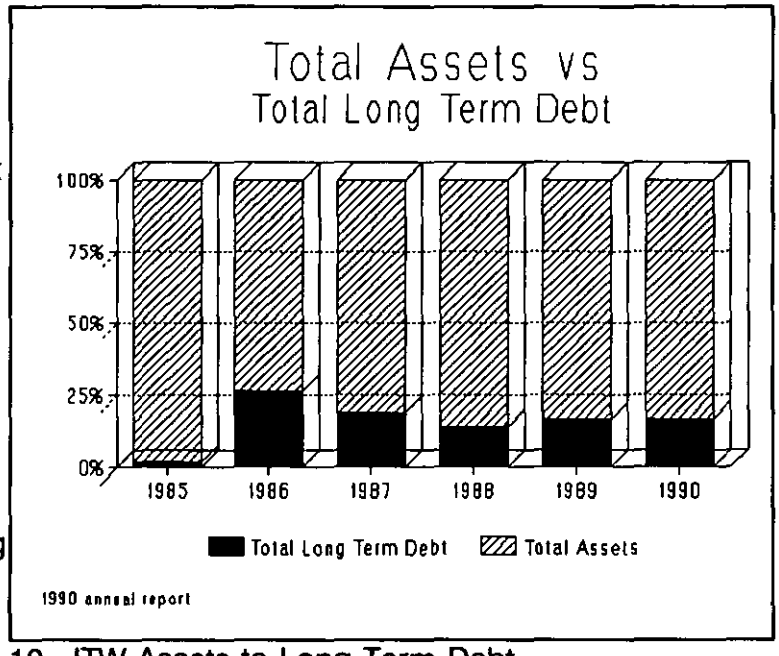
9. Payout Ratio (dividends/E.P.S.)

to swings in the stock market (a very good quality to possess in the 1985 stock market). In addition, the payout ratio was extraordinarily high during this period. ITW was paying out roughly 30% of its earning during this entire period. This is because the corporation was acquisition ready and did not need to conserve a large portion of its (already a low debt to capitalization ratio) cash for investment, and if they held to much cash they may have been vulnerable to a takeover attempt. ITW was waiting for the right moment for a large acquisition. Signode presented this opportunity in December 1986.

VIIIB. March '86 to December '86:

During the period from March 1986 to December 1986 Illinois Tool Works went through dramatic changes. In January of 1986, ITW continued its acquisition spree with the addition of Olin Corporation's Anchoring and Fastening Systems businesses located in the United States, Europe, and Japan. This acquisition was accounted for as a purchase. In addition, ITW acquired Norwood Marking and Equipment corporation for 284 thousand shares of ITW common stock. These two acquisitions aided in increasing the stock price of ITW slightly during the first half of 1986. The payout ratio was at its second highest position, however, an increase in income caused a slight decrease in the ratio. The model shows the stock price as being relatively efficiently priced during this period. The main cause was the acquisition activity running up the stock price, and thus maximizing the stock relationship to the given inputs.

Illinois Tool Works practically doubled its size with the acquisition of Signode for 524.1 million dollars in September of 1986. During this period the model rated the stock price at 1.35. A probable cause for this is the acquisition of Signode. During this quarter ITW increased its debt by a whopping $458,274,000. During the fourth quarter, the payout ratio increased to 26%, and the E.P.S. increased by 18 cents. These increases were largely due to a 5 million dollar boost by the adoption of FASB 87. This change together with a related change in actuarial assumptions, resulted in a reduction of 1986 pension expense of approximately $7.1 million dollars. This increase was offset by the restructuring and acquisition adjustments related with the acquisition of Signode. During the last period of 1987, the effects of the transaction altered the model results (acquisition occurred in the last month of the third quarter, therefore, the averaging softened the effect of the transaction until the following quarter). The last quarter stock pricing was deemed to be inefficient, however, the true market probably priced the stock lower because of the increased risk of carrying such a large amount of debt. At this point, the future of ITW was not as secure as when the asset to debt ratio was substantially lower.

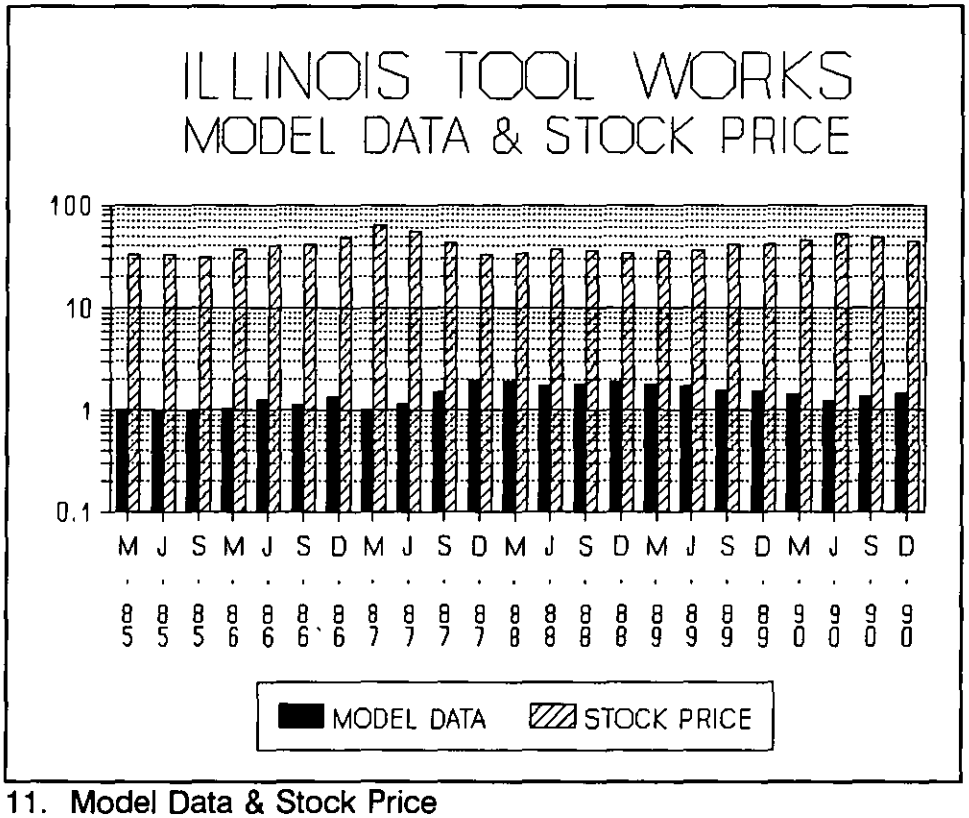


10. ITW Assets to Long Term Debt

VIIIC. March 1987 to December 1987

The first period of 1987 was maximized due to the anticipation of a stock split. The stock price was driven up in anticipation of a stock split, in addition, the market was also bullish at the time. The stock price rose to its highest point during the '85-'90 period during March 1987. (can be graphically seen in the accompanying graphic, note the scale on the side when reading the data). For this reason, the stock price was rated as being the most efficient at this point, because for the given inputs, the stock price was extremely high.

The stock split during the second period of 1987. A possible reason that this period does not show up as being the most inefficient is because of an averaging error in the data. The stock split occurred during May of 1987, this caused only one month of low stock prices to be averaged in with the second quarter. For this reason, the stock price for the second period was



11. Model Data & Stock Price

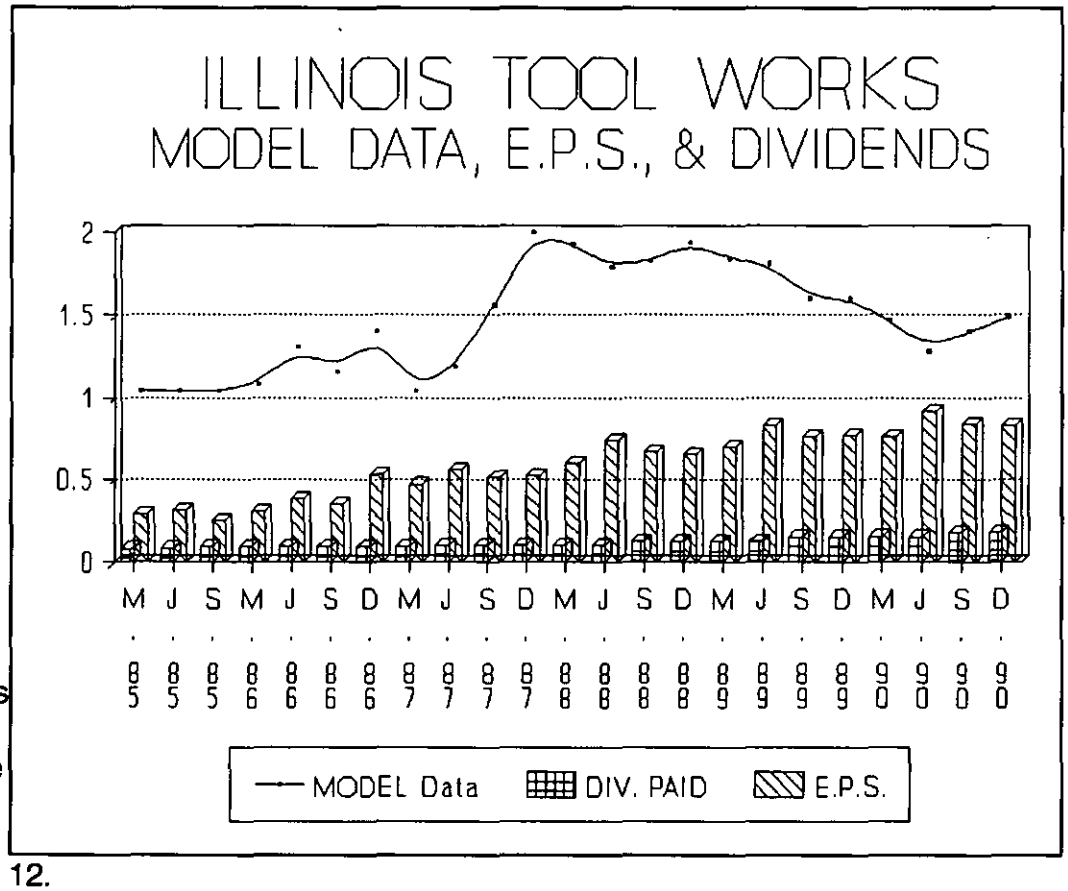
relatively high (the stock price was not substantially lowered due to the geometric mean), and the model rated the second period of '87 a 1.15.

The third quarter of 1987 is rated 1.51. This is the first period where the stock split has effected the model data for the entire period. The stock price and model data chart graphically depict the decline in stock price during the period of March 1987 to December 1987 (See chart #11). The third quarter of 1987 is rated inefficient when compared to the other periods because the corporation earned a relatively large amount of income attributed to the prior acquisition of Signode, and paid a substantial dividend, but the stock price was low due to the recent stock split. The stock price split caused this period to have a low stock price (this is the first period where the stock split was weighted for the full quarter). The combination of high earnings with a low stock price caused the model to rate this an inefficient quarter.

The fourth period of 1987 was one of the worst periods for ITW stock. On black Monday ITW stock dropped thirteen points. This amounted to a 33% decrease in the stock price in just one day. The effect of the disaster on October 19, 1987, followed ITW to the end of the quarter. The Model Data & Stock Price chart clearly show that the stock price of ITW stock was very low during the last period of 1987 (See chart #11). This is the reason that the stock price was not efficiently priced during the quarter (remember that the model maximizes the stock price for the given inputs).

VIIID. March 1988 to December 1989

During the period from March 1988 to December 1989 ITW stock was underpriced. The reasoning is that the stock split had created a stage where the stock price would always appear to be inefficiently priced. The rest of the analysis is altered because the model (as set up) had no way of analyzing the effects of the stock split (the stock split doubled the outstanding stock). This has absolutely no effect on the common earnings per share or the dividends per share data (because it is per share data), but the cash flow information will somewhat distort the data because it is not entered as a per share figure. The reasoning, that the period of March 1988 to January 1989 is deemed to be underpriced, is a combination of the stated theory and the fact that the E.P.S. is growing rapidly (See Chart #12) while the dividends paid is not increasing in such an



12.

explosive fashion. During the second period of 1988 and the second period of 1989, the dividend pay out ratio reaches its '85 to '90 low of 14%. During the second period of 1989 the stockholders equity increased for the first time since the Signode acquisition. This was largely caused by the acquisition of Ransburg. In addition, the payout ratio (.14, .2, & .19 for qtr 2, 3, & 4 respectively) returned to a realistic percentage for the last half of 1989. This caused the stock price to be more realistically priced compared to the model data.

VIIIE. March 1990 to December 1990:

During the first quarter of 1990 the stock price rose approximately 3.5 dollars per share. This was primarily caused by the anticipation of the probable acquisitions of Ransburg and DeVilbiss. The dividends and the earnings per share remained practically unchanged since the prior period. The cause for the efficiently priced stock in 1990 was probably due to the increased stock price from the anticipated acquisitions.

During the second quarter of 1990 ITW acquired Devilbiss (a commercial business of Eagle Industries, Inc.) and Ransburg Corporation. Both of these acquisitions were accounted for as a purchase and they both occurred in April 1990. These acquisitions helped to increase the net income per share. In addition, an 11% increase for the year of 1990 was attributed to favorable foreign currency transactions. The stock price of ITW was at its highest point since the quarter prior to the stock split. This is why the stock price of ITW was relatively efficiently priced during the second quarter of 1990.

The second and third quarters of 1990 have a lower net income because the acquisitions and one time changes associated with them were completed in April 1990. In addition, the stock price decreased to a more realistic number after the artificial run up caused by the acquisitions. The dividend paid was also increased by three cents during the last half of 1990. All this points to an inefficiently priced stock, a high dividend combined with a lower stock price (price just lower based relative to the acquisition period of 1990).

IX. Conclusion

The Farrell model of output efficiency worked fairly well with this analysis of Illinois Tool Works. The data, however, should have been altered. The main problem was the stock split. The model was unable to recognize the stock split due to the type of data that was entered as variables. The cash flow data was entered as a total, and not as a per share figure. This error had the effect of skewing the data for the entire period following the stock split because the per share data was correct (changed with the number of shares outstanding), but the cash flow remained unchanged. This could have been avoided by dividing the cash flow figure by the average number of shares outstanding for the period. This would have corrected the problem, and resulted in more accurate results for the period following the stock split.

The second problem encountered with the data in this specific application was the result of averaging. The averaging caused a delay in recognition of significant changes in inputs and outputs. If the averaging (or geometric mean) was over a smaller time period the results would not have been materially misstated. For

instance, if a month was used as the time increment, the stock split, acquisitions, etc.. would have been substantially noticeable in the month in which they occurred. The quarter period that was used caused a delay when the event occurred during the last month of a quarter. The result would then not be noticeable until the end of the following period because of the averaging (the affect was softened because of the averaging of three months). A smaller time period was not used was because the data was available only at quarterly increments (cash flow was only available yearly).

With these two errors, a stock investment strategy is not recommended based on this analysis. The model did choose a few good periods for investment, however, the results are not believed to be very accurate due to the errors in data input. The model chose the final quarter of 1987 as the best period to invest. This is true, the stock market crash lowered the prices substantially and the market rebounded rather quickly. This conclusion, however, may have been reached through incorrect analysis based on the stock split. As a method of stock investment, the model developed must be altered to include a different cash flow variable, and the time increment needs to be shortened to reduce the effect of averaging.

Illinois Tool Works
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University Honors

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Appendix

Illinois Tool Works
Appendix

I. Observations
II. Measurement

I. Observations

$T = t^1$ to t^l time
$Y = y^1$ to y^n output vectors
$X = x^1$ to x^m input vectors
$Z = z^1$ to z^k intensities

Observation of output (stock price) y^t, $t=1...t$

Observation of inputs

(Dividends) x^{t1}, $t=1...t$
(EPS) x^{t2}, $t=1...t$
(Cash Flow) x^{t3}, $t=1...t$

II. Measurement

The measuring model used was the Farrell output measure of technical efficiency; which is computed as:

For each $t^1=1...t$ solve

$$F(x^{t1}, y_{t1}) = \text{Max theta}$$

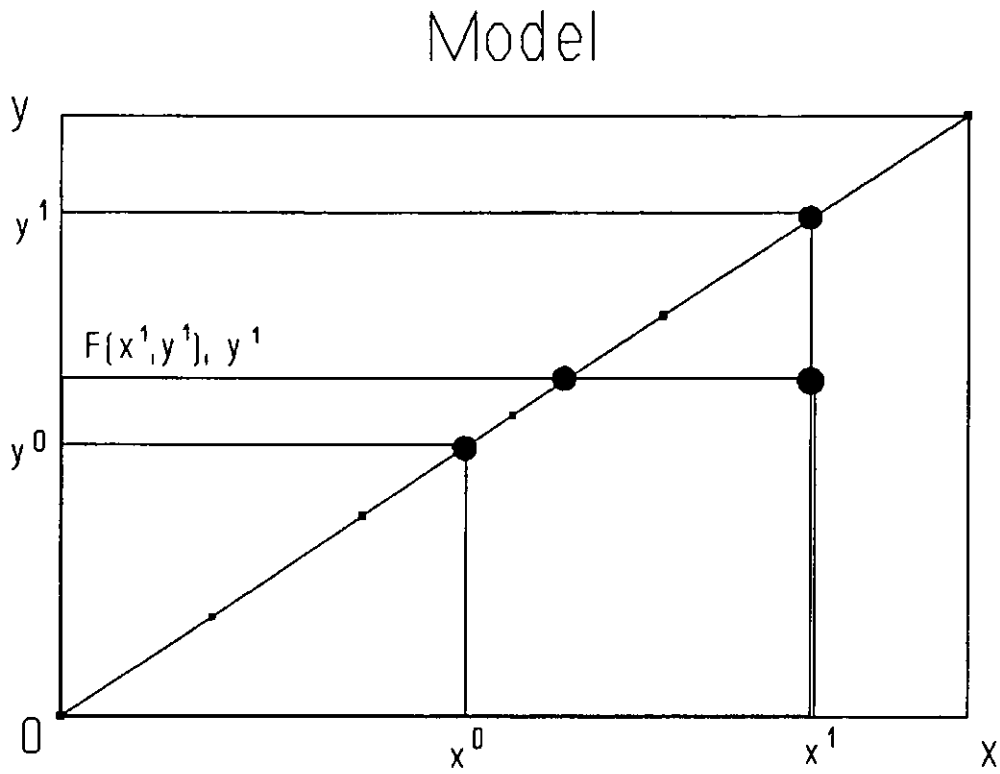
subject to:

$$\text{summation } (t=1) \text{ to } T,\ z^t y^t \geq \text{theta } yt^t$$

$$\text{summation } (t=1) \text{ to } T,\ z^t x^{t1} \leq x^{t1}$$

$$Z^t \geq 0,\ t=1...T$$

Properly illistrated in graphic #1



1. Farrell out put measure of technical efficiency

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Data

Illinois Tool Works

	Year	Dividends Per Share	Common Share Earnings	Cash Flows Annualized	Smoothed Cash Flows	Stock Price
D	1984			21597.3		
M	1985	0.08	0.29	19635.5	20616.4	32.73
J	1985	0.08	0.31	19635.5	19635.5	32.83
S	1985	0.09	0.25	19635.5	19635.5	31.22
D	1985	0.09	−0.22	19635.5	28592.0	30.39
M	1986	0.09	0.3	37548.5	28592.0	37.01
J	1986	0.09	0.38	37548.5	37548.5	39.88
S	1986	0.09	0.35	37548.5	37548.5	41.40
D	1986	0.09	0.53	37548.5	42485.8	47.65
M	1987	0.09	0.47	47423.0	42485.8	64.57
J	1987	0.1	0.56	47423.0	47423.0	56.01
S	1987	0.1	0.51	47423.0	47423.0	42.57
D	1987	0.1	0.52	47423.0	52957.1	32.96
M	1988	0.1	0.6	58491.3	52957.1	34.16
J	1988	0.1	0.74	58491.3	58491.3	36.94
S	1988	0.12	0.67	58491.3	58491.3	36.02
D	1988	0.12	0.65	58491.3	62125.3	33.93
M	1989	0.12	0.7	65759.3	62125.3	35.79
J	1989	0.12	0.83	65759.3	65759.3	36.39
S	1989	0.15	0.76	65759.3	65759.3	41.43
D	1989	0.15	0.77	65759.3	68525.5	41.49
M	1990	0.15	0.76	71291.8	68525.5	45.32
J	1990	0.15	0.92	71291.8	71291.8	52.14
S	1990	0.18	0.84	71291.8	71291.8	47.51
D	1990	0.18	0.83	71291.8	71291.8	44.44
M	1991	0.18	0.75	N/A	N/A	52.51
J	1991	0.18	0.86	N/A	N/A	57.86
S	1991	0.18	0.81	N/A	N/A	62.53
D	1991	N/A	N/A	N/A	N/A	

Illinois Tool Works

Data

	1985	1986	1987	1988	1989	1990
Bk. Value	7.71	4.59	7.47	10.04	10.23	13.6
Cash Flow	1.17	2.43	3.47	4.07	4.61	5.18
Earnings	0.63	1.56	2.06	2.66	3.06	3.35
Dividends	0.34	0.36	0.39	0.44	0.54	0.66
Payout Ratio	54.0%	23.1%	18.9%	16.5%	17.6%	19.7%
Stock Price						
High	18.13	26.88	49.5	43.75	47.5	57.38
Low	13.63	15.5	25.25	30.25	33	39.25
P/E Ratio	29 – 22	17 – 10	24 – 12	16 – 11	16 – 11	17 – 12

Return on Equity

1986	1987	1988	1989	1990	1991
18.1%	19.6%	20.7%	20.3%	18.6%	N/A

Acquisitions and Spinoffs

May 1986 Acquired stock of Norward company for stock.

Sep. 1986 Acquired Signode -- largest acquisition to date
Paid $524,100,000 cash
Including refinancing existing debt and red. of pfd stock

Feb 1988 Philips Drill company for cash

Mar. 1988 Sold Cortron Division of Elmhurst, Illinois

Apr. 1988 Stock acquisition of Ransburg Corp for 192,000,000

March 1990 Purchased Arkon Standard Division fo 39 million

Dec. 1990 Purchased Dow Chemical's interest in Zip–Pak

Stock splits: The stock split 2 for 1 on May 27, 1987

Illinois Tool Works

Net Income

	1985	1986	1987	1988	1989	1990	1991
March	13938	15296	26355	30913	37028	40618	41208
June	15629	19526	28679	38942	44404	49878	47277
September	12722	17492	26426	34508	40887	46212	44990
December	−10742	27269	24724	35649	41503	45675	N/A
Total	31547	79583	106184	140012	163822	182383	N/A

* 1988 data not restated to include Cumberland Leasing Co., a wholly owned subsidiary

Operating Income

	1985	1986	1987	1988	1989	1990	1991
March	23308	25498	53223	64176	69659	76882	71945
June	23894	30501	65716	74687	82870	90203	86321
September	19001	29362	59246	66465	76180	88328	80183
December	15838	26623	61412	67345	74449	89301	N/A
Total	82041	111984	239597	272673	303158	344714	N/A

Dividends Per Share

	1985	1986	1987	1988	1989	1990	1991
March	0.08	0.09	0.09	0.1	0.12	0.15	0.18
June	0.08	0.09	0.1	0.1	0.12	0.15	0.18
September	0.09	0.09	0.1	0.12	0.15	0.18	0.18
December	0.09	0.09	0.1	0.12	0.15	0.18	N/A

ABOVE IS RESTATED TO COMPENSATE FOR SHARES ISSUED IN 1987

Common Share Earnings

	1985	1986	1987	1988	1989	1990	1991
March	0.29	0.3	0.47	0.6	0.7	0.76	0.75
June	0.31	0.38	0.56	0.74	0.83	0.92	0.86
September	0.25	0.35	0.51	0.67	0.76	0.84	0.81
December	−0.22	0.53	0.52	0.65	0.77	0.83	0.83 E
Total	0.63	1.56	2.06	2.66	3.06	3.35	3.2 E

Illinois Tool Works

Payout Ratio

	1985	1986	1987	1988	1989	1990	1991
March	27.59%	30.00%	19.15%	16.67%	17.14%	19.74%	24.00%
June	25.81%	23.68%	17.86%	13.51%	14.46%	16.30%	20.93%
September	36.00%	25.71%	19.61%	17.91%	19.74%	21.43%	22.22%
December	−40.91%	16.98%	19.23%	18.46%	19.48%	21.69%	N/A
Total	12.12%	24.09%	18.96%	16.64%	17.70%	19.79%	22.38%

Cash Flows from Operations

	1984	1985	1986	1987	1988	1989	1990
Year End	86389	78542	150194	189692	233965	263037	285167

FIRST QTR 1991

Date	stock
02-Jan	48.02
03-Jan	47.06
04-Jan	47.02
07-Jan	46.03
08-Jan	45.06
09-Jan	45.07
10-Jan	46.02
11-Jan	46.02
14-Jan	46
15-Jan	46.01
16-Jan	46.03
17-Jan	48.03
18-Jan	50.04
21-Jan	50.01
22-Jan	49.06
23-Jan	49.06
24-Jan	50.03
25-Jan	50.04
28-Jan	50.07
29-Jan	51.04
30-Jan	53.05
31-Jan	53.06
01-Feb	53.04
04-Feb	53.05
05-Feb	55.02
06-Feb	55.04
07-Feb	55.05
08-Feb	54.07
11-Feb	55.06
12-Feb	56
13-Feb	56.01
14-Feb	56.04
15-Feb	56.02
19-Feb	55.05
20-Feb	54.06
21-Feb	54
22-Feb	54.02
25-Feb	54.07
26-Feb	54.07
27-Feb	55.03
28-Feb	55.01
01-Mar	56
04-Mar	55.02
05-Mar	56
06-Mar	55.07
07-Mar	55.04
08-Mar	55.04
11-Mar	55.06
12-Mar	55.05
13-Mar	56.02
14-Mar	56.06
15-Mar	57.02
18-Mar	57.01
19-Mar	57
20-Mar	56
21-Mar	54.04
22-Mar	54.03
25-Mar	55.02
26-Mar	55.04
27-Mar	55.02
28-Mar	55.01

SECOND QTR 1991

Date	stock
01-Apr	54.07
02-Apr	56
03-Apr	56.02
04-Apr	56
05-Apr	53.07
08-Apr	53.03
09-Apr	52.02
10-Apr	52.01
11-Apr	53.02
12-Apr	54.02
15-Apr	53.02
16-Apr	52.06
17-Apr	54.01
18-Apr	57.04
19-Apr	55.06
22-Apr	55.04
23-Apr	56.04
24-Apr	56.01
25-Apr	56
26-Apr	55.05
29-Apr	54.06
30-Apr	55.04
01-May	56.01
02-May	56.04
03-May	56.03
06-May	56.02
07-May	56
08-May	55.04
09-May	55.05
10-May	55.01
13-May	55.03
14-May	55.03
15-May	53.05
16-May	54.02
17-May	55.01
20-May	55.04
21-May	55.07
22-May	56.02
23-May	57
24-May	58.05
28-May	61
29-May	60.06
30-May	63
31-May	63.04
03-Jun	63.06
04-Jun	65.02
05-Jun	65
06-Jun	65.06
07-Jun	65.03
10-Jun	65.04
11-Jun	64.05
12-Jun	63.06
13-Jun	64.01
14-Jun	64.03
17-Jun	63.07
18-Jun	63.05
19-Jun	63.06
20-Jun	63.04
21-Jun	63.05
24-Jun	62
25-Jun	62.04
26-Jun	63
27-Jun	62.06
28-Jun	62.07

FIRST QTR 1990

Date	Stock Price
02-Jan	47
03-Jan	45.07
04-Jan	45
05-Jan	44.06
08-Jan	44.05
09-Jan	44.04
10-Jan	44.04
11-Jan	44.04
12-Jan	43.04
15-Jan	42.05
16-Jan	42.04
17-Jan	42.03
18-Jan	43
19-Jan	42.05
22-Jan	41.03
23-Jan	41.04
24-Jan	41.06
25-Jan	41.03
26-Jan	41.04
29-Jan	41.05
30-Jan	41
31-Jan	41.05
01-Feb	41.04
02-Feb	42.04
05-Feb	43.01
06-Feb	43.05
07-Feb	46
08-Feb	45.07
09-Feb	45.07
12-Feb	45.02
13-Feb	45.05
14-Feb	46
15-Feb	45.05
16-Feb	46.03
20-Feb	45.06
21-Feb	44.07
22-Feb	45
23-Feb	45.04
26-Feb	46
27-Feb	46.02
28-Feb	48
01-Mar	47.07
02-Mar	47.07
05-Mar	50
06-Mar	49.03
07-Mar	49
08-Mar	48.05
09-Mar	49
12-Mar	48.04
13-Mar	48
14-Mar	48.04
15-Mar	48.06
16-Mar	49.04
19-Mar	49
20-Mar	48.03
21-Mar	48.02
22-Mar	48.03
23-Mar	48.07
26-Mar	49.02
27-Mar	49.05
28-Mar	50
29-Mar	50.07
30-Mar	50.04

SECOND QTR 1990

Date	Stock Price
02-Apr	49.05
03-Apr	50.01
04-Apr	50.03
05-Apr	51.02
06-Apr	51.05
09-Apr	51.03
10-Apr	50.01
11-Apr	50
12-Apr	50.03
16-Apr	50.01
17-Apr	49.06
18-Apr	49.01
19-Apr	48
20-Apr	48.01
23-Apr	48.07
24-Apr	49.01
25-Apr	49.05
26-Apr	51
27-Apr	50.02
30-Apr	50.05
01-May	50.07
02-May	50.06
03-May	50.07
04-May	50.06
07-May	52
08-May	53.01
09-May	52.06
10-May	52
11-May	52.06
14-May	55.04
15-May	54.07
16-May	54.07
17-May	54.06
18-May	55.02
21-May	56.02
22-May	56.03
23-May	55.06
24-May	55.03
25-May	55.01
29-May	55
30-May	55
31-May	54.07
01-Jun	55.01
04-Jun	55.03
05-Jun	54.07
06-Jun	54.04
07-Jun	53.05
08-Jun	53
11-Jun	53.01
12-Jun	55.02
13-Jun	55.02
14-Jun	54.04
15-Jun	53.07
18-Jun	53
19-Jun	53.01
20-Jun	53.03
21-Jun	53
22-Jun	52.04
25-Jun	51.02
26-Jun	52.03
27-Jun	52.05
28-Jun	53.01
29-Jun	53.07

THIRD QTR 1990

Date	Stock Price
02-Jul	53.07
03-Jul	54.02
05-Jul	53.07
06-Jul	54.03
09-Jul	54.02
10-Jul	55.04
11-Jul	54.05
12-Jul	56.06
13-Jul	56.06
16-Jul	57
17-Jul	57.02
18-Jul	56.02
19-Jul	56.02
20-Jul	55.01
23-Jul	53.04
24-Jul	51.06
25-Jul	52.01
26-Jul	52.03
27-Jul	51.06
30-Jul	51.05
31-Jul	51.07
01-Aug	52
02-Aug	52.03
03-Aug	50.02
06-Aug	48
07-Aug	46.02
08-Aug	46.03
09-Aug	45.06
10-Aug	45.05
13-Aug	45.01
14-Aug	45.02
15-Aug	45.02
16-Aug	43.05
17-Aug	43.05
20-Aug	44.03
21-Aug	43.02
22-Aug	42.03
23-Aug	42.02
24-Aug	42.07
27-Aug	44.04
28-Aug	44.03
29-Aug	45.01
30-Aug	44.06
31-Aug	47
04-Sep	46.07
05-Sep	46.04
06-Sep	46
07-Sep	45.03
10-Sep	44.06
11-Sep	44.05
12-Sep	45
13-Sep	44.06
14-Sep	44.04
17-Sep	44
18-Sep	44.04
19-Sep	44.02
20-Sep	43
21-Sep	43
24-Sep	42.06
25-Sep	43
26-Sep	43
27-Sep	41.05
28-Sep	44.06

FOURTH QTR 1990

Date	Stock Price
01-Oct	45
02-Oct	46.02
03-Oct	46.02
04-Oct	46
05-Oct	45.07
08-Oct	46.03
09-Oct	44.07
10-Oct	44
11-Oct	43.05
12-Oct	44
15-Oct	43.06
16-Oct	43.03
17-Oct	42.04
18-Oct	42.03
19-Oct	43.02
22-Oct	43.04
23-Oct	42.04
24-Oct	41.07
25-Oct	42
26-Oct	42.06
29-Oct	42.04
30-Oct	42.01
31-Oct	41.06
01-Nov	39.04
02-Nov	41
05-Nov	41.04
06-Nov	41.04
07-Nov	41.04
08-Nov	41.06
09-Nov	43.04
12-Nov	44.01
13-Nov	43.03
14-Nov	43.03
15-Nov	43.02
16-Nov	43.05
19-Nov	45.02
20-Nov	44.02
21-Nov	44.06
23-Nov	44.03
26-Nov	44
27-Nov	44.03
28-Nov	45
29-Nov	45
30-Nov	45.06
03-Dec	46
04-Dec	46.03
05-Dec	46
06-Dec	47.04
07-Dec	47.01
10-Dec	47.02
11-Dec	47.07
12-Dec	48.04
13-Dec	48.01
14-Dec	48.02
17-Dec	47.06
18-Dec	47.04
19-Dec	47.02
20-Dec	47.03
21-Dec	48.03
24-Dec	48.01
26-Dec	48.05
27-Dec	48.04
28-Dec	48.04
31-Dec	48.02

FIRST QTR 1989

Date	Stock Price
03-Jan	33.07
04-Jan	34.04
05-Jan	35.02
06-Jan	36.03
09-Jan	35.06
10-Jan	35.03
11-Jan	35.05
12-Jan	35
13-Jan	35.03
16-Jan	35.03
17-Jan	35.01
18-Jan	35.02
19-Jan	35
20-Jan	34.06
23-Jan	34.02
24-Jan	34
25-Jan	34.01
26-Jan	35
27-Jan	35.03
30-Jan	35.03
31-Jan	36.04
01-Feb	36.05
02-Feb	36.07
03-Feb	37.04
06-Feb	37
07-Feb	36.07
08-Feb	36.06
09-Feb	36.05
10-Feb	36.01
13-Feb	36.01
14-Feb	35.04
15-Feb	35.07
16-Feb	358.05
17-Feb	36
21-Feb	35.01
22-Feb	34.06
23-Feb	34.04
24-Feb	33.06
27-Feb	33.07
28-Feb	34.02
01-Mar	33.05
02-Mar	33.07
03-Mar	34.03
06-Mar	34.03
07-Mar	34.01
08-Mar	33.06
09-Mar	34.02
10-Mar	33.07
13-Mar	33.07
14-Mar	33.01
15-Mar	33.03
16-Mar	34.04
17-Mar	33.05
20-Mar	33.03
21-Mar	33.03
22-Mar	33.07
23-Mar	34
27-Mar	34
28-Mar	34.04
29-Mar	34.01
30-Mar	34.01
31-Mar	33.07

SECOND QTR 1989

Date	Stock Price
03-Apr	34
04-Apr	34.03
05-Apr	34.07
06-Apr	34.05
07-Apr	34.02
10-Apr	34
11-Apr	34.01
12-Apr	34.02
13-Apr	34.01
14-Apr	34.03
17-Apr	34
18-Apr	34.04
19-Apr	34.03
20-Apr	34.05
21-Apr	35.03
24-Apr	35.03
25-Apr	35.01
26-Apr	35
27-Apr	35.03
28-Apr	35.01
01-May	35
02-May	35.06
03-May	36
04-May	36.01
05-May	36.03
08-May	36.04
09-May	36.02
10-May	36.07
11-May	37
12-May	38
15-May	38.01
16-May	37.04
17-May	37.06
18-May	38.05
19-May	39.03
22-May	39.02
23-May	37.06
24-May	38
25-May	37.06
26-May	38
30-May	37.04
31-May	37
01-Jun	37.02
02-Jun	38.01
05-Jun	38.04
06-Jun	39.02
07-Jun	39
08-Jun	38.05
09-Jun	38.06
12-Jun	38
13-Jun	38
14-Jun	37.06
15-Jun	36.06
16-Jun	37
19-Jun	37.06
20-Jun	37.01
21-Jun	38
22-Jun	38.04
23-Jun	39.04
24-Jun	39.02
27-Jun	39
28-Jun	38.02
29-Jun	37
30-Jun	36.07

THIRD QTR 1989

Date	Stock Price
03-Jul	37
05-Jul	36.04
06-Jul	37
07-Jul	37.06
10-Jul	38.02
11-Jul	38.04
12-Jul	38
13-Jul	38
14-Jul	39
17-Jul	38.07
18-Jul	38
19-Jul	38.05
20-Jul	38.04
21-Jul	39.01
24-Jul	38.04
25-Jul	39.01
26-Jul	39.03
27-Jul	40
28-Jul	40.01
31-Jul	40.03
01-Aug	40.05
02-Aug	41
03-Aug	40.04
04-Aug	41.02
07-Aug	43
08-Aug	42.06
09-Aug	42.04
10-Aug	41.07
11-Aug	42.05
14-Aug	42.04
15-Aug	42.07
16-Aug	42.06
17-Aug	43
18-Aug	43.06
21-Aug	42.05
22-Aug	42.04
23-Aug	43
24-Aug	45
25-Aug	43.05
28-Aug	44.05
29-Aug	44.07
30-Aug	44.06
31-Aug	45.01
01-Sep	47.01
05-Sep	46.05
06-Sep	45.06
07-Sep	45.06
08-Sep	44.04
11-Sep	43.06
12-Sep	43.06
13-Sep	43.05
14-Sep	43.04
15-Sep	43.06
18-Sep	43.04
19-Sep	43.01
20-Sep	43.01
21-Sep	43
22-Sep	43.01
23-Sep	43
26-Sep	43
27-Sep	43.02
28-Sep	43
29-Sep	43.01

FOURTH QTR 1989

Date	Stock Price
02-Oct	43.06
03-Oct	44.04
04-Oct	45.04
05-Oct	45.06
06-Oct	45.05
09-Oct	45.03
10-Oct	45.05
11-Oct	46.03
12-Oct	46.01
13-Oct	43.01
16-Oct	41.06
17-Oct	42.01
18-Oct	41.07
19-Oct	42.03
20-Oct	42.06
23-Oct	42.07
24-Oct	42.03
25-Oct	41.04
26-Oct	40.06
27-Oct	38.06
30-Oct	39.04
31-Oct	40.04
01-Nov	40.02
02-Nov	39.06
03-Nov	39.06
06-Nov	39.04
07-Nov	39.07
08-Nov	40.02
09-Nov	39.07
10-Nov	40
13-Nov	40
14-Nov	40
15-Nov	41.06
16-Nov	42.03
17-Nov	42
20-Nov	41.01
21-Nov	40.07
22-Nov	40
24-Nov	40.04
27-Nov	40.04
28-Nov	40.06
29-Nov	41
30-Nov	41.01
01-Dec	41.02
04-Dec	41.02
05-Dec	40.07
06-Dec	41.01
07-Dec	41.01
08-Dec	41.03
11-Dec	41.06
12-Dec	42.06
13-Dec	42.04
14-Dec	42.05
15-Dec	42.05
18-Dec	42.01
19-Dec	41.07
20-Dec	41.03
21-Dec	41.06
22-Dec	42
26-Dec	42.02
27-Dec	43.04
28-Dec	44.05
29-Dec	44.07

FIRST QTR 1988

Date	Stock Price
04-Jan	33.07
05-Jan	35.03
06-Jan	36
07-Jan	37
08-Jan	33.06
11-Jan	33.07
12-Jan	34.06
13-Jan	33
14-Jan	33.02
15-Jan	34
18-Jan	33.04
19-Jan	33.02
20-Jan	32.05
21-Jan	32
22-Jan	32.02
25-Jan	34.03
26-Jan	33.06
27-Jan	33
28-Jan	32.05
29-Jan	33.02
01-Feb	33
02-Feb	32.06
03-Feb	30.06
04-Feb	31.04
05-Feb	31
08-Feb	31.02
09-Feb	32.04
10-Feb	32.06
11-Feb	32.02
12-Feb	34.04
16-Feb	34.04
17-Feb	33.06
18-Feb	32.06
19-Feb	34.04
22-Feb	35.04
23-Feb	35
24-Feb	35
25-Feb	34.05
26-Feb	35
29-Feb	36.03
01-Mar	36.04
02-Mar	37.02
03-Mar	37.03
04-Mar	37.02
07-Mar	37
08-Mar	36
09-Mar	35.04
10-Mar	34.04
11-Mar	35
14-Mar	36.02
15-Mar	36.04
16-Mar	37.06
17-Mar	37.05
18-Mar	38
21-Mar	36.06
22-Mar	36.03
23-Mar	36.07
24-Mar	35.02
25-Mar	35.02
28-Mar	35
29-Mar	35.02
30-Mar	34.07
31-Mar	34.07

SECOND QTR 1988

Date	Stock Price
04-Apr	33.06
05-Apr	34.03
06-Apr	35
07-Apr	35
08-Apr	35.05
11-Apr	36.04
12-Apr	37.06
13-Apr	37.04
14-Apr	35.06
15-Apr	35
18-Apr	34
19-Apr	34.06
20-Apr	34.03
21-Apr	34.01
22-Apr	35.04
25-Apr	36
26-Apr	37.03
27-Apr	37.04
28-Apr	37.05
29-Apr	37.06
02-May	37.04
03-May	37.05
04-May	36
05-May	36.01
06-May	35.06
09-May	35.05
10-May	36.07
11-May	36
12-May	36.03
13-May	36.04
16-May	36.04
17-May	36.05
18-May	35.06
19-May	36.02
20-May	36.01
23-May	36.02
24-May	36.05
25-May	36.01
26-May	36.02
27-May	35.05
31-May	36.04
01-Jun	39
02-Jun	37.05
03-Jun	38.02
06-Jun	38.06
07-Jun	38
08-Jun	40
09-Jun	39.04
10-Jun	39.04
13-Jun	39.05
14-Jun	40.02
15-Jun	40.01
16-Jun	39.02
17-Jun	39.05
20-Jun	39.07
21-Jun	40.01
22-Jun	40.06
23-Jun	40.04
24-Jun	40.05
27-Jun	40.04
28-Jun	40.06
29-Jun	41.01
30-Jun	43.03

THIRD QTR 1988

Date	Stock Price
01-Jul	41
05-Jul	42
06-Jul	41.02
07-Jul	41
08-Jul	40
11-Jul	40
12-Jul	39.05
13-Jul	40.05
14-Jul	40.05
15-Jul	40.02
18-Jul	40
19-Jul	39.04
20-Jul	39.07
21-Jul	38.04
22-Jul	36.06
25-Jul	37.01
26-Jul	38
27-Jul	37.02
28-Jul	38
29-Jul	39
01-Aug	39.04
02-Aug	39.03
03-Aug	39.04
04-Aug	38.06
05-Aug	38.04
08-Aug	38.04
09-Aug	37.04
10-Aug	36
11-Aug	36.06
12-Aug	36
15-Aug	35.03
16-Aug	34.06
17-Aug	34.07
18-Aug	34
19-Aug	34.03
22-Aug	33
23-Aug	32.04
24-Aug	33.03
25-Aug	34.02
26-Aug	34.04
29-Aug	34.02
30-Aug	34.02
31-Aug	34.02
01-Sep	33.01
02-Sep	33.02
06-Sep	33.06
07-Sep	33.06
08-Sep	33.04
09-Sep	33.04
12-Sep	33.01
13-Sep	33.04
14-Sep	34.02
15-Sep	34.06
16-Sep	34.05
19-Sep	34.02
20-Sep	34.04
21-Sep	34.02
22-Sep	34.02
23-Sep	34.06
26-Sep	34.07
27-Sep	35.01
28-Sep	35
29-Sep	35.01
30-Sep	35.01

FOURTH QTR 1988

Date	Stock Price
03-Oct	36.02
04-Oct	35.02
05-Oct	35.04
06-Oct	35.04
07-Oct	36.04
10-Oct	36.05
11-Oct	36.05
12-Oct	34.06
13-Oct	35.04
14-Oct	35.03
17-Oct	35.04
18-Oct	35.07
19-Oct	35.07
20-Oct	36.01
21-Oct	36.02
24-Oct	36.01
25-Oct	36.01
26-Oct	36.02
27-Oct	35.05
28-Oct	34.07
31-Oct	34.06
01-Nov	34.01
02-Nov	34.03
03-Nov	33.04
04-Nov	33
07-Nov	32.05
08-Nov	32.03
09-Nov	32.02
10-Nov	32
11-Nov	31.04
14-Nov	32
15-Nov	32.05
16-Nov	32.05
17-Nov	32.06
18-Nov	32.06
21-Nov	33
22-Nov	32.06
23-Nov	32.06
25-Nov	32.01
28-Nov	32.03
29-Nov	33
30-Nov	33.02
01-Dec	33.05
02-Dec	33.04
05-Dec	33.07
06-Dec	34.04
07-Dec	35.02
08-Dec	34.05
09-Dec	35
12-Dec	34.07
13-Dec	34.05
14-Dec	34.07
15-Dec	34.07
16-Dec	35
19-Dec	34.07
20-Dec	34.06
21-Dec	34.04
22-Dec	34.05
23-Dec	35
27-Dec	34.05
28-Dec	34.05
29-Dec	35
30-Dec	34.06

FIRST QTR 1987

Date	Stock Price
02-Jan	52.02
05-Jan	54.06
06-Jan	55
07-Jan	55
08-Jan	57.01
09-Jan	56.05
12-Jan	57.04
13-Jan	57.06
14-Jan	58.02
15-Jan	59.07
16-Jan	59.07
19-Jan	59.05
20-Jan	59.05
21-Jan	59
22-Jan	60
23-Jan	58.06
26-Jan	58
27-Jan	59.03
28-Jan	60.06
29-Jan	61.06
30-Jan	62.06
02-Feb	65
03-Feb	64.01
04-Feb	64.03
05-Feb	64.02
06-Feb	64
09-Feb	62.02
10-Feb	62.07
11-Feb	61.02
12-Feb	60.07
13-Feb	63.02
16-Feb	65.06
17-Feb	65
18-Feb	65.04
19-Feb	65.04
20-Feb	66.04
23-Feb	68.04
24-Feb	68
25-Feb	67.02
26-Feb	66.04
27-Feb	67
02-Mar	66.03
03-Mar	67.04
04-Mar	69.02
05-Mar	68.06
06-Mar	69.04
09-Mar	70.02
10-Mar	70.06
11-Mar	71.04
12-Mar	71.06
13-Mar	72
16-Mar	72.04
17-Mar	74.04
18-Mar	74.04
19-Mar	75.04
20-Mar	77.04
23-Mar	78.02
24-Mar	76.02
25-Mar	74.06
26-Mar	74.04
27-Mar	73.04
30-Mar	71.06
31-Mar	69.04

SECOND QTR 1987

Date	Stock Price
01-Apr	70.06
02-Apr	70.03
03-Apr	74.04
06-Apr	75
07-Apr	74.04
08-Apr	74.02
09-Apr	72
10-Apr	72.04
13-Apr	71
14-Apr	65.06
15-Apr	68.06
16-Apr	70.02
20-Apr	69.06
21-Apr	72.04
22-Apr	72
23-Apr	71.06
24-Apr	70.01
27-Apr	71
28-Apr	71.02
29-Apr	72.02
30-Apr	74.06
01-May	75
04-May	75.06
05-May	76.04
06-May	77
07-May	76.03
08-May	77
11-May	76.02
12-May	77.02
13-May	76.02
14-May	77
15-May	73.07
18-May	74.04
19-May	72.02
20-May	72.06
21-May	73
22-May	74
26-May	74.04
27-May	37.03
28-May	35.04
29-May	36.04
01-Jun	35.06
02-Jun	35.06
03-Jun	35.06
04-Jun	35.06
05-Jun	34.04
08-Jun	35.04
09-Jun	35.05
10-Jun	36.05
11-Jun	36.06
12-Jun	39
15-Jun	38.04
16-Jun	38.04
17-Jun	39.02
18-Jun	39.05
19-Jun	41
22-Jun	42.06
23-Jun	41
24-Jun	39.04
25-Jun	40.04
26-Jun	40
29-Jun	40.06
30-Jun	39.02

THIRD QTR 1987

Date	Stock Price
01-Jul	39.06
02-Jul	40.04
06-Jul	39.03
07-Jul	37.06
08-Jul	39.04
09-Jul	40.04
10-Jul	41.02
13-Jul	41
14-Jul	41.04
15-Jul	41.05
16-Jul	41.02
17-Jul	42
20-Jul	41.02
21-Jul	40.04
22-Jul	40.02
23-Jul	41.06
24-Jul	41.04
27-Jul	41
28-Jul	40.04
29-Jul	41.03
30-Jul	42.04
31-Jul	43.03
03-Aug	42.06
04-Aug	41.04
05-Aug	41.05
06-Aug	44.04
07-Aug	46
10-Aug	47.02
11-Aug	49
12-Aug	47.06
13-Aug	47.06
14-Aug	47.03
17-Aug	47.06
18-Aug	45
19-Aug	45.02
20-Aug	47.02
21-Aug	46.04
24-Aug	44.07
25-Aug	46.02
26-Aug	44.04
27-Aug	43.02
28-Aug	41.02
31-Aug	41.06
01-Sep	40.06
02-Sep	41.06
03-Sep	42.05
04-Sep	43.04
08-Sep	42.06
09-Sep	41.01
10-Sep	42.01
11-Sep	43.04
14-Sep	42.07
15-Sep	41.06
16-Sep	40.05
17-Sep	41.06
18-Sep	42.04
21-Sep	42
22-Sep	43.06
23-Sep	46
24-Sep	45
25-Sep	44.06
28-Sep	45.06
29-Sep	44.06
30-Sep	47

FOURTH QTR 1987

Date	Stock Price
01-Oct	48.00
02-Oct	47.07
05-Oct	47.02
06-Oct	46.04
07-Oct	45.04
08-Oct	44.00
09-Oct	43.00
12-Oct	41.00
13-Oct	43.00
14-Oct	43.00
15-Oct	41.04
16-Oct	39.04
19-Oct	26.04
20-Oct	25.06
21-Oct	32.06
22-Oct	30.02
23-Oct	29.03
26-Oct	27.02
27-Oct	26.04
28-Oct	26.00
29-Oct	28.04
30-Oct	34.04
02-Nov	34.00
03-Nov	32.07
04-Nov	32.06
05-Nov	31.03
06-Nov	30.02
09-Nov	29.00
10-Nov	27.05
11-Nov	30.04
12-Nov	31.02
13-Nov	30.00
16-Nov	30.06
17-Nov	30.03
18-Nov	31.04
19-Nov	30.04
20-Nov	31.00
23-Nov	31.06
24-Nov	32.01
25-Nov	32.02
26-Nov	31.02
27-Nov	39.03
30-Nov	29.06
01-Dec	31.00
02-Dec	30.04
03-Dec	28.04
04-Dec	28.02
07-Dec	28.04
08-Dec	31.02
09-Dec	31.07
10-Dec	31.04
11-Dec	32.02
14-Dec	33.04
15-Dec	33.04
16-Dec	33.04
17-Dec	33.02
18-Dec	34.00
21-Dec	34.02
22-Dec	34.00
23-Dec	35.04
24-Dec	35.06
28-Dec	34.04
29-Dec	33.04
30-Dec	33.04
31-Dec	33.00

FIRST QTR 1986

Date	Stock Price
02-Jan	35.01
03-Jan	34.04
06-Jan	34
07-Jan	34.04
08-Jan	34
09-Jan	33.04
10-Jan	33.06
13-Jan	33.02
14-Jan	33.07
15-Jan	34.04
16-Jan	34.03
17-Jan	34.04
20-Jan	31.06
21-Jan	32.06
22-Jan	32.07
23-Jan	32.04
24-Jan	32.06
27-Jan	33
28-Jan	32.05
29-Jan	33.01
30-Jan	33.03
31-Jan	33.05
03-Feb	34
04-Feb	34.06
05-Feb	34.06
06-Feb	35.03
07-Feb	35.03
10-Feb	35.02
11-Feb	35
12-Feb	35
13-Feb	37.02
14-Feb	38
18-Feb	39.02
19-Feb	38.05
20-Feb	38.06
21-Feb	39.07
24-Feb	39.05
25-Feb	39.02
26-Feb	39.07
27-Feb	40.07
28-Feb	41.06
03-Mar	41.07
04-Mar	72.03
05-Mar	42.02
06-Mar	42.06
07-Mar	42.01
10-Mar	41.03
11-Mar	42
12-Mar	40.04
13-Mar	40.07
14-Mar	40.06
17-Mar	40.07
18-Mar	40.02
19-Mar	40
20-Mar	40
21-Mar	41.04
24-Mar	41.06
25-Mar	42
26-Mar	41.02
27-Mar	40.05

SECOND QTR 1986

Date	Stock Price
01-Apr	39.07
02-Apr	39.07
03-Apr	39.05
04-Apr	38
07-Apr	37.03
08-Apr	38
09-Apr	38
10-Apr	37.03
11-Apr	36.06
14-Apr	37.03
15-Apr	37.07
16-Apr	37.07
17-Apr	37.07
18-Apr	38.03
21-Apr	39
22-Apr	38.07
23-Apr	38
24-Apr	38.01
25-Apr	38.02
28-Apr	39.03
29-Apr	39.07
30-Apr	39.06
01-May	39.03
02-May	39.04
05-May	39.04
06-May	39.04
07-May	39.02
08-May	39.07
09-May	40.02
12-May	39.04
13-May	40
14-May	40
15-May	40.03
16-May	40.03
19-May	39.07
20-May	40.01
21-May	40.03
22-May	41.04
23-May	41.07
27-May	42
28-May	43.03
29-May	44.07
30-May	45
02-Jun	43.02
03-Jun	42.04
04-Jun	42.05
05-Jun	42.04
06-Jun	42.03
09-Jun	40.05
10-Jun	40.01
11-Jun	40.07
12-Jun	40.07
13-Jun	41.07
16-Jun	43.02
17-Jun	42.04
18-Jun	42.04
19-Jun	42.02
20-Jun	43
23-Jun	42
24-Jun	41.06
25-Jun	41.04
26-Jun	40.06
27-Jun	41.02
30-Jun	41.07

THIRD QTR 1986

Date	Stock Price
01-Jul	42.01
02-Jul	42.02
03-Jul	41.03
07-Jul	39.04
08-Jul	39.06
09-Jul	39.01
10-Jul	38.05
11-Jul	38.04
14-Jul	37.05
15-Jul	37
16-Jul	37.06
17-Jul	39.03
18-Jul	39
21-Jul	38.07
22-Jul	39.04
23-Jul	39.02
24-Jul	38.07
25-Jul	39.04
28-Jul	38.06
29-Jul	39
30-Jul	39.05
31-Jul	39.05
01-Aug	39
04-Aug	39.06
05-Aug	39.02
06-Aug	39.06
07-Aug	40
08-Aug	41.07
11-Aug	41.04
12-Aug	47.04
13-Aug	43.04
14-Aug	43
15-Aug	43.02
18-Aug	43.07
19-Aug	43
20-Aug	42.06
21-Aug	42.06
22-Aug	43
25-Aug	42.05
26-Aug	43.02
27-Aug	44.04
28-Aug	44.06
29-Aug	45.03
02-Sep	46.03
03-Sep	45.06
04-Sep	47.06
05-Sep	46.04
08-Sep	46
09-Sep	46.01
10-Sep	45.02
11-Sep	43
12-Sep	41.05
15-Sep	41.02
16-Sep	41.02
17-Sep	42
18-Sep	42.02
19-Sep	42.04
22-Sep	43.04
23-Sep	44.04
24-Sep	44.03
25-Sep	43
26-Sep	42.07
29-Sep	42.01
30-Sep	42.01

FOURTH QTR 1986

Date	Stock Price
01-Oct	43
02-Oct	42.03
03-Oct	42.04
06-Oct	42.05
07-Oct	43.00
08-Oct	43.01
09-Oct	43.02
10-Oct	42.04
13-Oct	42.05
14-Oct	42.04
15-Oct	43.00
16-Oct	43.02
17-Oct	43.05
20-Oct	44.02
21-Oct	44.04
22-Oct	45.01
23-Oct	44.05
24-Oct	44.04
27-Oct	44.05
28-Oct	45.02
29-Oct	46.06
30-Oct	47.04
31-Oct	48.01
03-Nov	48.07
04-Nov	48.04
05-Nov	49.02
06-Nov	49.06
07-Nov	49.04
10-Nov	50.01
11-Nov	50.06
12-Nov	49.07
13-Nov	49.06
14-Nov	49.07
17-Nov	49.05
18-Nov	47.05
19-Nov	48.00
20-Nov	47.06
21-Nov	49.06
24-Nov	49.07
25-Nov	49.06
26-Nov	49.05
28-Nov	49.07
01-Dec	49.07
02-Dec	49.07
03-Dec	50.02
04-Dec	50.04
05-Dec	50.04
08-Dec	51.06
09-Dec	51.05
10-Dec	52.03
11-Dec	51.02
12-Dec	51.03
15-Dec	52.06
16-Dec	52.04
17-Dec	51.04
18-Dec	51.03
19-Dec	53.04
22-Dec	53.04
23-Dec	52.02
24-Dec	51.07
26-Dec	52.00
29-Dec	52.00
30-Dec	51.07
31-Dec	51.07

Illinois Tool Works
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