THE ADMINISTERED-PRICE THESIS:  
LITERATURE REVIEW 
AND METHODOLOGICAL DISCUSSION 
by 
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SUMMARY

The main purpose of this paper is to discuss the empirical literature pertaining to three administered-price theses. The first is the business-cycle hypothesis which argues generally that administered prices tend to be less flexible than prices determined by competitive forces. The second is the creeping-inflation theory which considers administered pricing a causal factor in the postwar inflation. Finally, the structural change theory argues that the evolution of markets from more competitive to more oligopolistic produces inflationary pressure.

The second purpose of the report is to discuss methodology in terms of testing the three versions of the hypothesis. Data, variable selection and measurement, and the type of analysis employed are considered. The major substantive conclusion of the methodology section is that the degree of sensitivity of empirical results to particular methodological decisions must be ascertained and analyzed.
I. INTRODUCTION

Inflation in general and food price inflation in particular have been major policy issues during most of the postwar years. Figures 1 and 2 show the paths of the food components of the consumer price index and the producer price index, respectively. The four trends are similar, showing steady postwar price increases as well as an increase in the rate of inflation in the 1970s. The food price index has fairly consistently exceeded the CPI since World War II. The more than doubling of food prices since 1967 at both the processing and retailing levels emphasizes the magnitude of the food inflation problem.

Policy initiatives to halt inflation have generally stemmed from Keynesian "demand-side" economics. Monetary and fiscal policy tools have been employed to reduce the level of aggregate demand in the economy. But, particularly in the last decade, a very important question is being asked by economists and policy makers. How sensitive are product prices to changes in the level of aggregate demand? Can monetary and fiscal policies be effective in the fight against inflation?

The different structures of product and input markets may offer a clue to the causes of the continuous rise in the general price level. The basic thesis addressed in this paper is that the concentrated structure of some markets introduces and institutionalizes rigidities in the economy, which cause prices to increase, independently of changes in aggregate demand, and specifically do not easily permit their decrease when aggregate demand falls in a recession or through governmental design. In other words, besides increases in aggregate demand which may affect prices symmetrically, particular market structures as well cause an
Figure 1
POSTWAR PRICE TRENDS: CONSUMER PRICE INDEX AND FOOD COMPONENT.

Index (1967=100)
Figure 2
POSTWAR PRICE TRENDS: PRODUCER PRICE INDEX AND PROCESSED FOODS AND FEEDS
inflationary bias to be built into the economy.

Such bias related to market structure implies that microeconomic policies take on additional importance. Antitrust policies become a possible inflationary remedy, along with wage-price controls or guidelines.

From this microeconomic inflationary perspective, it follows that concern regarding rising food prices does not stem solely from the food-price contribution to the consumer-price-index measure of general inflation, but also because noncompetitive market structures within the food manufacturing and retailing sectors may permit processors and retailers to charge higher prices for their products than would be justified on the basis of rising costs of food production and marketing alone. Monopolistic practices in the food marketing industry, in particular, may be exerting inflationary pressure on the economy, in not allowing the lower prices paid to farmers to be passed quickly through the food manufacturing and retailing system to food-product consumers. Intensified antitrust effort in the food sector was suggested by the Council on Wage and Price Stability in 1979 as one policy option [1] -- acknowledging the role of microeconomic market-structure policies in the control of inflation. The food manufacturing industry group may indeed afford a timely sector-specific data base, in terms of policy interest, for an empirical test of the administered-price-inflation hypothesis.

Before examining the administered-price hypotheses in detail, however, some mention must be made of inflationary studies of a temporal nature -- strictly concerned with prices of particular food products. Heien [9] and Lamm [12] have examined independently the process of
transmission of food price rises through the stages of the food system. The purpose of these studies was to estimate, for various individual food products, the lagged response of retail product price to change in the farm-level price. Lamm's basic estimating equation for each product considered at time $t$ was

$$ P_t = \Theta + \beta \sum_{i=0}^{\bar{r}} \pi(i) r(t-i) d_i + \varepsilon_t, $$

where $P_t$ is the retail price of a particular food; $\beta$ is the technological coefficient which transforms the raw commodity input into food; $r(t)$ is the price of the basic agricultural commodity at time $t$; and $\pi(i)$ assigns weights to raw commodity prices over the time horizon $I$. Lamm's results showed that, in general, increases in commodity prices were quickly passed through the food system.

Heien's model is similar to Lamm's but considers the intermediate wholesale product price. Heien found that price increases at the wholesale level from 1971 to 1975 were passed on more quickly to consumers than they had been in the previous decade. Neither study draws structure-related cross-sectional conclusions, but the point is made that the retail price response lag is longer for the more highly processed foods (in general the more oligopolistic).

Certainly the issue of food-price inflation demands time-series studies for individual food products in order to understand how the inflationary process works at the most microeconomic level. Equally important, however, are cross-sectional studies for food manufacturing industries to determine the nature of the link, if any, between market structure and product price behavior. This latter topic is discussed in the remainder of the paper.

In Section 2, three versions of the administered-price thesis are
discussed. Major empirical studies which test the hypotheses are reviewed briefly, and the general observation is made that empirical results seem to be time-period dependent, and may be dependent as well on the specific cross-sectional sample or level of analysis. In Section 3, data and empirical methodology are discussed. The sensitivity of results to a particular choice of empirical parameters -- including the definition of administered pricing and the extent of disaggregation in choice of sample -- is discussed as well. Finally, general conclusions are offered in Section 4.

2. ADMINISTERED-PRICE THESES

The common theme prevailing in conceptual arguments and empirical studies concerned with the problem of administered pricing in the United States economy is that product market structure impacts on product price change over time. It is generally argued that firms which function in oligopolistic markets, as opposed to a more competitive environment, can exercise discretion in setting and changing prices. They can render governmental fiscal and monetary policies less effective in either controlling inflation or in meeting other national goals such as full employment of the labor force.

Underlying this basic notion of a connection between structure and product price change, however, are various distinct theories regarding the nature of that connection. It is convenient to categorize these views as the business-cycle version of the administered-price thesis (stemming from Gardiner Means' initial work in the 1930s [14]), the creeping-inflation thesis (from the works of DePodwin and Selden [6]
and of Weiss [29] for the 1950s), and a structural-change version (yet to be empirically tested in a thorough fashion, yet originating from the work of Thorp and Crowder [28]).

The Business-Cycle Hypothesis

Perhaps the most general exposition of the business-cycle theory is that administered prices behave differently during the various phases of the business cycle from prices in the market (or auction) sector of the economy. This general proposition was essentially developed by Means in the 1930s in response to the observed behavior of many industrial prices during the Depression. Means found that many prices did not fall significantly during this period in response to the decrease in national demand [14].

Means' basic philosophy was that over time, individuals, as opposed to an impersonal market, were gradually determining more and more industrial policy. Means saw the growth of aggregate economic concentration in the United States as a threat to the efficiency of the market system and to the laissez-faire government policies of the early 1900s.

Means argued that individual industrial policy makers theoretically could choose between lowering price or output quantity during a recessionary period. Empirically, however, evidence suggested that they usually choose to reduce output, leading to a greater reduction in employment in the macroeconomy. In contrast, the market mechanism would not allow producers a choice in the auction sector; economic adjustment would take place more through price change. Means distinguished between the two types of pricing policy as follows:

The essential difference between the two types of prices is that one represents an equating of supply and demand
by price while the other represents the equating of production and demand at a price [14, p. 25].

Means, in 1935, did not equate administered pricing with monopoly, nor did he argue that the evolution of an administered price sector was not historically logical or even inevitable. His main argument was simply that the government's laissez-faire industrial policy was no longer appropriate for an economy characterized by widespread administered-pricing behavior.

Since the 1930s, Means has continued to present evidence in support of the general dual economy proposition. Specifically, for the 1950s and early 1960s, Means argued that countercyclical behavior demonstrated by industries in the administered-price sector supported the general administered-price thesis [13].

Nevertheless, despite Means' particular empirical decisions, it is difficult to agree on the evidence needed to support or refute such a general proposition of the existence of a dual economy in terms of pricing behavior, let alone the data sets which provide least controversy in terms of accurately reflecting industrial price changes. Stigler and Kindahl have consistently argued against the general business-cycle theory [25], drawing on a distinct set of prices from that of Means and a different sample of industries (due to Means' more stringent selectivity criteria).

The selected empirical parameters required for a test of the general theory serve to define the particular interpretation of the theory, and, hence, have served to allow an evolution of fairly specific and testable "administered-price theses." Perhaps the most important of these empirical dimensions is the selected distinction between an administered price and
an auction or market-determined price. In many early studies, frequency of price change was the distinguishing criterion. A price which changed infrequently was assumed to be administered. The difference between Bureau of Labor Statistics list prices and buyer transaction prices and the suspected sensitivity of price-change frequency to the number of price reporters caused "frequency of price change" to be a controversial criterion; but also controversial has been the basic subsequent criterion -- market power. Most of the empirical studies of the 1960s and 1970s have equated market power with the ability to administer price, and have generally argued that the four-firm (or eight-firm) market-share concentration ratio is a good measure of that market power. Thus, a second criterion evolved to define the dual economy of the administered-pricing literature. Whether concentration is used as a discrete analogue to the frequency-of-price-change division or as a continuous measure of price-setting discretion is yet another subissue used to define more specifically the particular empirical form of the general business-cycle proposition.

Besides the exact distinction between an administered and a market price, a second empirical dimension is the level of analysis. On the one hand, if national policy implications are to be drawn regarding, for example, the control of inflation, an aggregative level of analysis facilitates broad sectoral comparisons between product groups. Means' graphical depictions of the distinction among farm-product price behavior, other "competitive-industry" price behavior, and "concentrated-industry" price behavior (see Beals [2]) are useful in stimulating policy interest in the dual-economy concept of the administered-price
thesis. On the other hand, of course, the concept of market, in general, and market concentration, in particular, is impossible to apply operationally to a major industry group (two-digit SIC) or to a more aggregate grouping of products.

It has been argued, in particular, that industries in Means' "concentrated" industry groups are not typically much more concentrated than those in the "competitive" groups [2]. More detailed studies (at the four-or five-digit SIC levels), then, can serve as analytical tools to determine if aggregate-level policy conclusions can actually be drawn. Thus, although perhaps one step away from the general issue of inflation and appropriate monetary and fiscal policies, microeconomic analyses are more useful than the aggregative approach in addressing the market-power issue, and potentially more useful in suggesting appropriate microeconomic policies which could be used to combat "excessive" product price rise.¹

A third empirical dimension defining a specific version of the business-cycle thesis is the cycle definition. This parameter setting seems to have caused less controversy in the literature than the two mentioned above but still is a subject of some debate, as evidenced, for instance, by the exchange between Means and Stigler-Kindahl. Stigler and Kindahl concluded that prices tended to respond to the economy's general business movement [26]. Means took issue [13]. Stigler and Kindahl responded [27] and argued that Means redated the turning dates of the NBER (National Bureau of Economic Research) business cycles between 1957 and 1962 when drawing empirical conclusions.

Fourth, and finally, exactly what constitutes evidence of administered-pricing behavior is itself an important empirical dimension in
the administered-price business-cycle theory. Must a price actually rise during a recessionary period to be considered administered or simply not fall as much as market-determined prices? Likewise, in recovery periods, an administered price could be distinguished either by countercyclical behavior, by inflexibility, or by relatively less rise than the competitive prices. The interrelated concepts of relative price change and relative price inflexibility have gained increasing recognition in the literature, as regression analysis has become the basic empirical tool.

Relative price inflexibility which characterizes administered-pricing studies cannot be predicted from static classical microeconomic models. However, there have been a number of arguments advanced in support of the theory that administered prices show less price variability than those determined by competitive forces. Transaction costs and consumer and producer uncertainty play a substantial role in the basic argument. Since it is costly, especially in terms of decreased consumer certainty, for producers to change price frequently, producers with discretion over price will not be inclined to change price often and only when a substantial change becomes necessary.

Moreover, a producer in an oligopolistic market is uncertain of rivals' reaction to a price change, which may cause hesitation in frequent price revision. This uncertainty extends to the reaction of potential rivals to a price change. The ever-present possibility of competitive entry into a market may cause an oligopolistic producer, for example, to moderate an otherwise more extreme price rise in an inflationary period.
Secondary arguments, which apply in some cases, involve market interrelationships. Materials and labor prices may be more stable cyclically in the administered sector. With vertical integration back to raw-materials markets, more concentrated industrial producers may be able to moderate fluctuation in their price setting. Furthermore, concentrated industries may be more apt to be unionized than their competitive counterparts. Unions with long-term wage contracts may introduce product-price stability through more wage stability, in a short-term sense, while contributing, at the same time, to a longer-term inflationary bias in the economy.

Numerous empirical studies have been undertaken to examine the business-cycle version of the administered-price thesis -- for various time periods, with various industrial samples, and employing various statistical tools -- and the accumulated wisdom seems to be that the administered-price theory may or may not be supported by empirical evidence. Specifically, support for the theory seems to be particularly sensitive to the time period of interest and sensitive to the chosen sample of industries, variable measures, and method of analysis.

Most of the empirical literature pertaining to the business-cycle theory was reviewed by Beals in a 1975 Council on Wage and Price Stability report [2]. (Also, see Mueller [16].) The studies are divided into those concerned mainly with price behavior during the Depression of the 1930s and those primarily interested in the inflationary postwar period.

**The Depression Years**

Of three major studies undertaken for the time of the Depression, Means' work [15] found results in support of the administered-price
thesis, while the studies of Thorp and Crowder [28] and Neal [17] tended to deny the hypothesis. Utilizing Census of Manufactures four-digit four-and eight-firm concentration ratios to represent market power, Bureau of Labor Statistics producer prices, and a sample of thirty-seven industries, (after four deletion criteria had been applied), Means found a statistically significant positive relationship between price change and concentration for the study period 1929 to 1932. The more concentrated industries in the sample had prices which fell less during the Depression than those of more competitive industries.

In contrast to these results, however, Thorp and Crowder found that, with a sample of 407 seven-digit Census products in 117 four-digit industries, specific product characteristics were of more importance in explaining differences in price behavior over the period 1929 to 1937 than the four-firm concentration ratio. They concluded the following:

Such factors as the durability of the products, the stage of their fabrication, the nature of their markets, or the types of buyers for the products are perhaps more pertinent in an explanation of the price and quantity behavior of the products [28, p. 360].

Their evidence, for example, suggested that the production of durable goods fell much more than that of nondurables from 1929 to 1933. Also, both price and quantity tended to fluctuate less, from 1929 to 1937, for products whose raw materials were mineral products than for those which employed agricultural products. Price and quantity behavior appeared unrelated to the degree of market concentration over this period.

Similarly, Neal found no support for the thesis for the years 1929
to 1933, employing correlation analysis, and considering changes in
direct cost as an important influence on price movement.

Neither price change nor production change ... is to be explained by concentration. Rather, differential price
changes are explicable by differential unit direct cost
changes, and differential production changes are to be explained in terms of demand shifts which are a conse-
quence of the nature of the demands concerned ... Con-
centration does not even explain the difference between
actual price declines and those which could be expected
on the basis of changes in direct cost [17, p. 165].

The Postwar Years

For the years following World War II, there has been even more
diversity of approach and diversity of results in administered-price
studies. Interpretation of postwar results is also complicated due
to the sometimes unclear distinction between the business-cycle version
of the administered-price thesis and the creeping inflation version, to
be discussed in the next section. In this paper, the distinction is
made based on whether or not price behavior during specific business
cycles seems to be of particular interest. Studies which could primarily
be classified as postwar tests of the business-cycle administered-price
thesis include those of Yordon [34], Seilekaerts and Lesage [24], Weston
and Lustgarten [33], Blair [3], Ross [23], Qualls [21], Jones and Laudadio
[10], and Pulling [19]. (See Table 1.)

Yordon pooled monthly BLS price series for fourteen four-digit in-
dustries (from 1947 to 1958), and looked for differences in price behavior
between the concentrated and the unconcentrated industries in the sample
(as determined by the eight-and twenty-firm concentration ratios). Using
constructed industry-specific monthly unit-labor-cost and unit-materials-
cost series as components of the industry price-change equations, Yordon
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<td>1929-1932</td>
<td>Percentage price change</td>
<td>CR₄, CR₈</td>
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<td>Yes</td>
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<td>NBER, Census</td>
<td>No**</td>
<td>No</td>
<td>Maximum 106</td>
<td>UVC³</td>
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<td>Yordon (1961)</td>
<td>1947-1958</td>
<td>Price in time t - price in time t - 1</td>
<td>CR₈, CR₂₀</td>
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<td>BLS, Census, Inter-Industry Relations Study (1947)</td>
<td>No</td>
<td>No</td>
<td>14</td>
<td>UMC, ULC³</td>
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<td>Sellekaerts and Lesage (1973)</td>
<td>1957-1967</td>
<td>Percentage price change</td>
<td>Herfindahl Index, CR₄, CR₈</td>
<td>Three-to-four-digit</td>
<td>Manufacturing Industries of Canada</td>
<td>Yes</td>
<td>No</td>
<td>41</td>
<td>UMC, ULC, QC₄,d</td>
</tr>
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a Type of immediate purchaser; type of ultimate user; degree of durability; degree of fabrication; type of market; source of raw materials; construction materials; and producers' supplies.

b Unit variable cost.

c Unit materials cost and unit labor cost, respectively.

d Output quantity.
<table>
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<th>Time Span of Study</th>
<th>Dependent Variable(s)</th>
<th>Measure(s) of Market Power</th>
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<td>CR$_4$</td>
<td>Four-digit</td>
<td>BLS, Census</td>
<td>No</td>
<td>No</td>
<td>63; 90, depends on data set</td>
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<td>1957-1970</td>
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<td>CR$_4$</td>
<td>Four-digit</td>
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<td>Yes</td>
<td>No</td>
<td>42</td>
<td>3 barriers-to-entry classes</td>
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<td>1958-1969</td>
<td>Price relative for time period</td>
<td>CR$_4$</td>
<td>Three- to four-digit</td>
<td>Canadian, Price info. and Census</td>
<td>Yes</td>
<td>No</td>
<td>77; 53, depends on period</td>
<td>ULC, UMC, Q, dF (degree of foreign comp.)</td>
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<td>Pulling (1978)</td>
<td>1949-1970</td>
<td>Cyclical amplitudes of profit margins</td>
<td>Weighted averages of four-digit (CR$_6$)'s</td>
<td>Two-digit</td>
<td>FTC Profit rates on sales</td>
<td>Yes; 20 two-cycle amplitudes for food and Tobacco groups</td>
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*Note: Census refers to Census of Manufactures as well as to the Annual Survey of Manufactures.

**Except somewhat more margin stability with high concentration levels.
did not detect a statistically significant difference in estimated regression equations based on a difference in concentration. Although the results of this study tend to deny the administered-price thesis, fourteen cross-sectional observations may constitute too small a sample size on which to base this judgment.

On the other hand, Sellekaerts and Lesage found general support for the thesis, employing a sample of forty-one Canadian three- and four-digit industries for the period 1957 to 1967. These researchers controlled for changes in unit materials and unit labor costs and utilized a Herfindahl index, as well as the usual concentration ratio, as a measure of market power. A relatively small cross-sectional sample and a complicated regression strategy, however, call into question these results.

With two separate price series (BLS and NBER) for, respectively, ninety and sixty-three four-digit industries, Weston and Lustgarten did not find support for the business-cycle hypothesis for the years 1957 to 1970. They employed tabular or discrete analysis with three classes based on the four-firm concentration ratio, and examined interclass differences in the percent of industries with price increases or decreases during the business cycles of the studied time period. Their tabular analysis, although useful as a descriptive device, is limited by the lack of complementary data on unit-cost change during the cycles.

Blair's evidence for the specific period December 1969 to December 1971 tended to support the hypothesis. At a disaggregate level, Blair studied 296 five-digit industries using tabular analysis. The weighted average price change by four-firm-concentration-ratio category demonstrated more price flexibility over the cycle for the less concentrated
product classes. As with the study previously discussed, however, failure to take cost fluctuations and other factors into account limits severely any causality implications. Blair employs a selective sample which excludes observations on the basis of four criteria: if they are stabilized by government market intervention; are subnational markets; afflicted by unusual climatic conditions; or if prices are determined in international markets. (For the food manufacturing sector, these criteria are obviously severely restrictive.)

Ross's empirical results also generally support the business-cycle hypothesis for the cycles from 1952 until 1970. Ross used tabular analysis for eighty-eight to 118 four-digit industries (where the sample size depends on the period considered). Costs are implicitly considered in Ross's work as the criterion variable is change in the proportion of the margin in the industry's value of shipments (or unit margin in price). Margins are computed by deducting from value of shipments the sum of wages, salaries, and materials costs.

Again at the four-digit level, and for the time span 1957 to 1970, Qualls' empirical results tend to support the business-cycle theory (but deny the creeping-inflation hypothesis of the next section [20]). Using the variance of the annual percent change in price for an industry as a measure of price flexibility, Qualls found that the high-concentration group demonstrated more price stability than the low-concentration group in his sample.

The final two studies to be mentioned in this section are those of Jones and Laudadio for the period 1958 to 1969 and Pulling for 1949 until 1970. Both tend to support the business-cycle hypothesis. Jones and
Laudadio, with Canadian three-and four-digit industrial data, and fifty-three to seventy-seven cross-sectional observations depending on the period, regressed the industrial price relative on the four-firm concentration ratio, change in unit materials cost, change in unit labor cost, output quantity change, and the degree of foreign competition -- a seemingly important Canadian structural variable.

Pulling's tabular analysis at the two-digit level for the United States also supported the thesis. Using the Federal Trade Commission's profit rates on sales, Pulling looked at cyclical amplitudes of profit margins. The two-digit industry groups with the lowest weighted average eight-firm four-digit concentration ratios did tend to show the most profit-margin fluctuation. These results are obtained at a very aggregative level -- (calling into question the meaning of concentration for a two-digit sector) -- but do implicitly, at least, consider cost fluctuation over a business cycle through utilization of profit-rate fluctuation as the criterion variable.

From this chronology of empirical testing of the administered-price business-cycle hypothesis, it is impossible to draw any definite conclusions. Most of the studies employ a small sample of industries, for which selection bias is not even mentioned as a possibility. Some do not consider cost fluctuation as an element of price flexibility; and most do not consider elements of market structure other than concentration. The price-flexibility question certainly deserves more careful investigation -- of both a theoretical and an empirical nature.

The Creeping-Inflation Hypothesis

Another general version of the administered-price thesis, which stems
from the studies of DePodwin and Selden [6] and Weiss [29], and also from
case-study work (especially for the steel industry) done for the Kefauver
Committee's investigation of administered pricing in the late 1950s, is
concerned with the problem of creeping inflation which has characterized
the postwar period. Broadly, the price-trend hypothesis, as distinguished
from a cyclical thesis, is that administered prices rise more, over the
long term, than competitive or market-determined prices, and, hence, con-
tribute more to inflation. As with testing of the business-cycle version,
the setting of the empirical parameters -- such as, what constitutes
administered pricing and the level of analysis -- defines more particularly
the specific hypothesis to be tested. Now, however, instead of cyclical
definition as an empirical dimension, the beginning and ending dates of
the sample period become important. The fourth empirical dimension dis-
cussed -- what constitutes evidence to support or to deny the thesis --
is also still important with respect to creeping inflation. The time-
independent school of thought suggests that the industries in the adminis-
tered-price sector of the dual economy should demonstrate a greater price
rise than industries in the market sector regardless of the selected
sample years. However, a stronger theoretical argument can be made for
this secular distinction to be more pronounced in some periods than in
others. This is the lag or catch-up hypothesis discussed below.

Kahn [11] provides a dynamic explanation why one might expect such
a distinction among industries in secular price movements. The scenario
suggests that oligopolistic price catch-up periods following periods of
inflation apply additional inflationary pressure on the economy through
a rise in administered prices and through pressure on wages in general,
since workers can be more readily compensated as prices rise. The rise in input costs, in turn, influences both oligopolistic and competitive prices. Specifically, product market power may cause firms to be able and willing to pay workers more -- influencing, in turn, labor costs in more competitive industries. A higher general price equilibrium is introduced from which all prices in the dual economy may again begin their cyclical ascent. This lag-and-ratchet hypothesis suggests that if one examined empirically a long catch-up period, oligopolistic industries should demonstrate greater price increases than competitive ones, as oligopolists may have difficulty increasing prices quickly in response to cost changes during the cyclical inflation. The theory also suggests that the oligopolistic inflationary pressure causes input cost increases throughout the economy. Interdependence between the two major sectors of the dual economy -- in that the outputs of some industries are the inputs of others, and in that completed wage bargains in some industries influence those in others -- provides the major foundation for the hypothesis that inflationary pressure produced in the oligopolistic sector can be passed on through the rest of the economy. Alfred Kohn [11] has discussed these two inflationary pressures -- catch-up and interdependence -- as the temporal and interindustry ratchet effects.

Much of the relevant empirical work discussed below seems to be testing the hypothesis regardless of the time period selected for analysis: that the more concentrated the industry, the greater the expected secular price rise over time. Yet, the inflationary lag or catch-up theory would suggest that the expectation that such a relationship exists depends
on time period of interest. There is certainly more empirical support for the latter version of the creeping-inflation hypothesis.

DePodwin and Selden, in an initial test of the creeping-inflation thesis [6], examined price behavior over the period 1953 to 1959. At both the four-and the five-digit level of analysis (with 155 industries and 322 product classes), they employed a simple-regression framework to test the null hypothesis that price relatives (indices developed from BLS commodity producer price data) were unrelated to either market-share concentration or unpublished Herfindal indices. They were unable to reject the null hypothesis.

Weiss argued, however, that in testing the creeping-inflation hypothesis, one must control for other influences on price change over time -- such as change in unit labor cost or unit materials costs. He tested a version of the hypothesis which was to evolve into the standard testable theory -- that, controlling for unit-labor-cost change over time (perhaps measured separately as both labor productivity change and hourly labor cost change), unit-materials cost change, and quantity change (as a proxy for change in demand), product price rise was positively related to market-share concentration. Utilizing various forms of the regression equation at the four-digit level of analysis, Weiss found evidence in support of the creeping-inflation theory for the period 1953 to 1959 using the price relatives developed by DePodwin and Selden. The same empirical approach failed to support the thesis for either 1959 to 1963 [29] or 1963 to 1969 [31], although Weiss argues that the oligopolistic catching up may have subsided by the late 1950s.

In this same line of empirical research, following the work of Weiss,
other studies may be mentioned: those of PhEp [18], DeSilva [7], Ripley and Segal [22], Weston and Lustgarten [33], Beals [2], and Qualls [20]. These studies are summarized in Table 2. PhEp, for the period 1958 to 1965, found no empirical support for the administered-price hypothesis using European data. WeEp's standard equation was employed, but a very small sample (sixteen, in one case) of three-and four-digit industries makes the credibility of the results open to question. Moreover, DeSilva's study of twenty-six Canadian industries, for the period 1961 to 1967, lent no support to the hypothesis. For the period 1959 to 1969, the empirical results of Ripley and Segal tended as well to deny the time-independent hypothesis. Following an approach distinct from WeEp's standard, with a pooled time-series cross-section sample and accounting for unit variable costs and a nondurable-durable distinction, the rate of change of the BLS producer price index was compared for industries which had an eight-firm concentration ratio of greater than fifty percent and those which did not. For various subperiods between 1959 to 1969, Ripley and Segal could not detect statistically significant differences in price response to cost change between the two groups.

Neither Weston and Lustgarten nor Beals found support for the creeping inflation theory after 1958. The regression analysis of Weston and Lustgarten supports the hypothesis from 1954 until 1958 for 224 four-digit industries, controlling, as Weiss did, for changes in output and unit variable costs. Also, like Weiss, they did not find support for the "time-independent" thesis between the late 1950s and 1970. These results are reinforced in their tabular analysis for the years 1954 to 1973, in which the average annual percentage price changes were not higher in concentrated
<table>
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<tr>
<th>Study</th>
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<tr>
<td>DePodwin and Selden</td>
<td>1953-1959 for time period</td>
<td>Price relative (H) indices for sub-sample, CR$_4$, CR$_8$</td>
<td>Unpublished Herfindahl indices for sample, CR$_4$, CR$_8$</td>
<td>Four-digit; five-digit: grouped &amp; ungrouped</td>
<td>BLS, Census</td>
<td>No</td>
<td>Yes; 41 4-digit: (CR$_4^2$, (CR$_8^2$.</td>
<td>155 5-digit observations</td>
<td>322</td>
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<td>Weiss (1966)</td>
<td>1953-1963 for time period</td>
<td>CR$_4$</td>
<td>Four-digit</td>
<td>Census, DePodwin &amp; Selden price information</td>
<td>Yes until 1959; supports lag hypothesis</td>
<td>No</td>
<td>No</td>
<td>78; 81 ULC, UMC, Q$^a$ depends on period</td>
<td></td>
</tr>
<tr>
<td>Phillips (1969)</td>
<td>1958-1965 for time period</td>
<td>CR$_4$</td>
<td>Three- to four-digit</td>
<td>European Census, U. of Louvain price information</td>
<td>No</td>
<td>No</td>
<td>16-43, ULC, UMC, Q$^a$ depends on country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DeSilva (1971)</td>
<td>1961-1967 for time period</td>
<td>CR$_8$</td>
<td>Three- to four-digit</td>
<td>Canadian price information &amp; Census</td>
<td>No</td>
<td>No</td>
<td>26 UMC, ULC, UFC$^a$ (unit fuel cost)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weiss (1971)</td>
<td>1963-1969 for time period</td>
<td>CR$_4$</td>
<td>Four-digit</td>
<td>BLS, Census</td>
<td>No</td>
<td>No</td>
<td>43; 82, ULC, UMC, Q$^a$ depends on period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ripley and Segal (1973)</td>
<td>1959-1969 for time period</td>
<td>Rate of change of the price index D=1 if CR$_4$&gt;50, =0 otherwise</td>
<td>Three- and four-digit</td>
<td>BLS, Census</td>
<td>No</td>
<td>No</td>
<td>4-digit: ULC, UMC, Q$^a$, durable dummy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a$Unit labor cost, unit materials cost, and output quantity, respectively.

$^b$Unit variable cost.

$^c$One for high entry barriers; one for goods with low income elasticities of demand; and one separating durable goods from nondurables.
<table>
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<tr>
<td>Weston and Lustgarten (1974)</td>
<td>1954-1970</td>
<td>Price relative for time period</td>
<td>CR₄</td>
<td>Four-digit BLS, Census</td>
<td>Yes until 1958; supports lag hypothesis</td>
<td>No</td>
<td>No</td>
<td>224</td>
<td>ULC, UMC, Q⁵</td>
<td></td>
</tr>
<tr>
<td>Beals (1975)</td>
<td>1954-1975</td>
<td>Average annual percentage price change</td>
<td>CR₄</td>
<td>Four-digit BLS, Census</td>
<td>No</td>
<td>No</td>
<td>86-381, depends on period</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualls (1977)</td>
<td>1967-1972</td>
<td>Price relative to entry dummies</td>
<td>CR₄, Barriers-to-entry dummies</td>
<td>Four-digit BLS, Census</td>
<td>No</td>
<td>No</td>
<td>85</td>
<td>(CR₄)², UVC, b product characteristic dummies³</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Note: Census refers to Census of Manufactures as well as to the Annual Survey of Manufactures.
industries than in less concentrated ones.

Beals' extensive literature review for the Council on Wage and Price Stability included a tabular analysis for the entire time span 1954 to 1975. More concentrated industries were not shown to have higher average annual percentage price changes. Cost changes were not considered for this particular table.

Finally, employing regression analysis and a sample of eighty-five industries for various subperiods from 1967 to 1972, Qualls [20] examined the effect on the industrial price relative $P_{it}/P_{i0}$ (where $P_{it}$ is the annual average BLS four-digit producer price index in year $t$) for industry $i$ of change in average variable cost and of four-firm seller concentration $CR^2$ and product-characteristic dummies -- including one for high entry barriers, one distinguishing between consumer and producer goods, one separating durable from nondurable goods, and one for goods with particularly low income elasticities of demand -- were other independent variables considered. Qualls argued that the use of product-characteristic dummies could be used empirically as a proxy for change in demand in lieu of a change-in-quantity variable and, hence, limit suspected simultaneity bias introduced when both price and quantity change are in the same equation. Qualls also argued strongly for the implicit weighting by industry of unit labor cost and unit materials cost by employing one cost index only in a regression framework. This technique allows fewer parameters to be estimated while implicitly accounting for interindustry differences in the importance of labor cost or materials cost in total shipments value. For the entire period 1967 to 1972, Qualls found a significantly negative relationship between concentration and product price change.
If a common thread exists through the creeping-inflation study results, it is that the hypothesis is time-dependent. The 1950s seem to constitute the only postwar time span for which a significant positive relationship can be found between market-share concentration and product price rise. This empirical fact lends support to the oligopolistic catch-up hypothesis, as opposed to a time-independent theory.

The Structural-Change Hypothesis

Critics of both the business-cycle and the creeping-inflation versions of the administered-price hypothesis often argue, on the basis of static, classical microeconomic models, that there is no reason to expect oligopolistic prices to be more inflexible over the business cycle than competitively based prices; nor is there a theoretical argument that long-term secular price rises for oligopolistic markets should exceed those in competitive ones. Even though the two hypotheses are interesting questions to which empirical answers are deserved, the hypotheses' predictions are not as theoretically grounded in terms of basic behavioral assumptions of the firm.

However, stronger theoretical arguments and accumulated empirical evidence (see Weiss [30]) do suggest a static structure-performance relationship. Controlling for cost differences among industries, one may expect a "higher product price," the higher the seller market-share concentration. From this structure-performance relationship, the comparative-static administered-price hypothesis would suggest a structural-change impact over time on product-price change. As concentration increases over time, one would expect pricing behavior to change from more
competitive to oligopolistic. Then, from the structure-performance predictions, a greater price rise would be expected than, for example, in an industry which demonstrates structural stability over time. The structural-change hypothesis has not, as yet, been as thoroughly tested as the business-cycle and creeping-inflation theses. One exception, however, is a study by Cowling and Waterson [5]. (Thorpe and Crowder [28] devoted some attention to this structural-change issue in their Depression study.)

With ninety-four industries from the British Census of Production for the period 1958 to 1963, Cowling and Waterson found a significant positive relationship between changes in a Herfindahl index and change in the price-cost margin. When the industry sample was divided so that durable goods and nondurables were considered separately, empirical evidence suggested that a significant relationship existed for durable goods only. This version of the administered price thesis may be superimposed on the creeping-inflation hypothesis in that both structure and structural change may impact on product price change over time.
3. DISCUSSION OF METHODOLOGY

It is not easy to test well any of the versions of the administered-price hypothesis. Difficulties are numerous and may be classified as involving data sources, variable measurement, and type of analysis.

Data Sources

The two major sources of data for administered-price studies are the BLS producer price series and the Census of Manufactures (including the Annual Survey of Manufactures). Occasionally other data have been employed, such as the Stigler-Kindahl NBER price data. BLS producer price series are criticized on a number of counts including the general critique of price indices that they fail to take account of product quality changes over time. The most common accusation is that BLS prices are list prices, as opposed to buyer transaction prices. As such, they fail to take discounting into consideration.

It may be that, across industries, discounting as a practice has become more common. To argue against the use of this data, change in the use of discounting must differ systematically across concentration lines. In other words, if, in the more concentrated industries, discounting is becoming more prevalent relative to more competitive industries, the concentrated-industry price rise indicated by list prices will tend to be overstated relative to competitive price increases. Empirical results would tend to be biased to support the creeping-inflation administered-price hypothesis. Moreover, list prices may lead to empirical results which tend to support the business-cycle hypothesis. In a downswing, concentrated industries may discount more heavily than usual, and list prices will underestimate price flexibility. Likewise, in an upswing, the expected decline in discounting is not captured in
list prices. However, if the practice of discounting is becoming more prevalent across the board and cycles similarly across industries or product classes, these facts alone would not suggest that BLS data are useless.

It is also argued that, with respect to the business-cycle theory, measured price flexibility over a cycle is sensitive to the number of seller-reporters. In Stigler and Kindahl [25], evidence concerning the relationship between the number of reporter companies and the frequency of price changes per month (from December 1953 to December 1956) is presented. Data show, for various commodity types, that the fewer the reporters for BLS, the smaller the average number of price changes per item. If more concentrated industries tend to have fewer reporters, bias again is towards support of the administered-price hypothesis. It must be noted, however, that it is possible to finesse the number-of-reporters issue by developing a price flexibility measure based on price deviation from a secular trend as opposed to the absolute number of times which the product price changes.

A final critique of BLS price data as employed in administered-price studies concerns the imperfect matching of BLS product categories with Census product classes. BLS itself undertakes this matching task to a degree in constructing four- and five-digit price series for some Census industries and product classes, in general back through 1967. In order to be tracked, BLS requires that there be represented, in PPI commodities sampled, at least fifty percent of a product class's value of shipments. And, the target of eighty-five percent representation is set for the value of primary and secondary products in order to publish an industry series.

The BLS industry and product class samples seem to be biased towards excluding high-concentration and high-product-differentiation observations.
For example, in the two major industry groups, Food and Kindred Products and Tobacco Products, of sixty product classes in the 1978 BLS sample which can be tracked through time back to 1967, only eleven have a 1972 four-firm concentration ratio of sixty percent or greater (18%), whereas close to 30% for all product classes in these two major groups had 1972 four-firm concentration of 60 or more. It is possible to extend somewhat the BLS four-and five-digit samples cross-sectionally as well as temporally by either employing a price indexing procedure with a value-of-shipments representation criterion of less than the required eighty-five or fifty percent or by a "best-match" procedure whereby a specific BLS commodity is selected to represent the product class. Nevertheless, at least with respect to food and tobacco, the sample cannot be greatly extended since many Census product classes are not represented by even one commodity producer price series. It should not be concluded from this discussion that the empirical situation is hopeless, but rather that cautious empirical conclusions may be necessary both in view of the above comments and due to the small sample of industries or product classes available from BLS data. There is some cause for optimism in the use of BLS price series from Weiss's 1977 study [32]. This study showed a strong positive correlation between the BLS and NBER price series for a sample of industries for which both sets of price data were available. (Both of these series were also correlated, but less strongly, with Census unit values.)

The second major source of data for administered-price studies is the Census of Manufactures. It is the source of market-share-concentration data at the four-or five-digit level; it and the Annual Surveys are the source of unit cost data, shipments value, and implicit (or possibly explicit) physical quantity data. In utilizing Census data, there is a tradeoff between cross-sectional and temporal detail; yearly data are generally unavailable
at the five-digit level. If the more disaggregate five-digit level of analysis is chosen, data are available only for Census years. This constraint may not be too important for long-term creeping-inflation studies, but certainly limits a disaggregate examination of price behavior during a specific short recessionary period. Another problem—particularly at the five-digit product-class level—is that concentration-ratio data are constructed on a commodity basis, while total-cost data are on a product-class base—creating yet another data match problem. 4

Finally, as has been widely recognized in the literature, the Census product-class or industry classifications do not correspond in every case to an economist's conception of a market. It is, of course, possible to substitute a four-digit observation for economic markets defined too narrowly by the Census at the five-digit level. However, concentration data and cost data are unavailable at the seven-digit product level, and it is sometimes argued that even some seven-digit categories really capture several economic markets whose goods could not be considered close substitutes. 5

Nevertheless, although Census implicit-realized prices (value of shipments divided by physical quantity) can, in some industries and product classes, be substituted for BLS producer price series, there exist no real alternatives for Census cost and concentration data. Thus, the small samples employed for most administered-price studies are not surprising. BLS data must be matched with Census data, and cost and concentration data must be available as well. Moreover, Census data must be matched with Census data over time. As definitional changes occur over the studied time period at the relevant level of analysis, more sample observations are lost.

Variable Selection and Measurement

The three general forms of the model to be estimated are as follows:

1. $\Delta P_i = f(\Delta UVC_i, \Delta D_i, S_i)$ for the creeping-inflation version;
2. \( \text{VAR}(P_i) = g(\text{VAR}(UVC_i), \text{VAR}(D_i), S_i) \) for the business-cycle version; and

3. \( \Delta P_i = h(\Delta UVC_i, \Delta D_i, \Delta S_i) \) for the comparative-static version, where

\( P_i \) is the price index for the industry or product class \( i \); \( UVC_i \) is the unit variable cost for the \( i \)th industry or product class; \( D_i \) is demand for \( i \); \( S_i \) is a variable representing market structure for \( i \); and \( \Delta \) and \( \text{VAR} \) are change in and variability of, respectively. Each variable-component will be discussed below.

As indicated above, it is possible to construct the dependent price variable in at least two ways. BLS explicit price data may be used, or \textit{Census} implicit prices (value of shipments divided by physical quantity) may be utilized. BLS prices do not capture the discounting practice and do not always directly correspond to \textit{Census} classes. On the other hand, \textit{Census} implicit prices are not always available as, for example, when physical quantities are lacking. Both ignore quality changes over time. A second decision regarding the dependent variable concerns its form, which also determines the form of the independent variables. The ratio form \( \text{Pit}/\text{Pio} \) and the percentage price-change form \( (\text{Pit}/\text{Pio} - 1) \), for the creeping-inflation and structural-change hypotheses, do not ensure the same regression coefficient estimates for all permutations of the independent variables (see [2]).

The percentage-price-change variable is generally preferred for statistical reasons (see [2]), although in practice the ratio form may have been employed most often in empirical studies. There is no established measurement rule for the business-cycle hypothesis. If cyclical variance around a price trend is the conceptual notion to be captured and a price time series is available for each cross-sectional observation, a useful measure, depending on the actual secular time trend, would be either the variance or standard deviation of first differences in price, or of yearly percentage price change [21, 8].
The Census is the only viable data source for unit-variable-cost data
for large cross-sectional studies. However, there are many possible UVC_i
permutations. Most studies separate UMC_i (unit materials cost) and ULC_i
(unit labor cost). Both cost components, in turn, may be measured in several
different ways. For example, either i's total production-worker wage bill
(W_i) or total salary-and-wages payroll (PAY_i) may serve as the numerator in
ULC_i's measurement. It has been argued that the separation of UMC_i and
ULC_i is unnecessary in examining the relationship between market structure
and product-price change. Nevertheless, the division may be interesting in
its own right, depending on whether one is interested in which cost change
impacts most strongly on price change. If the cost distinction is made, it
may be necessary to weight the two types of costs by their importance in that
particular industry's or product class's cost structure. However, weighting
may cause or worsen a multicollinearity problem. (One single UVC_i variable
in a regression implicitly weights the two factors.) ULC_i can also be broken
down into its two components, production-worker productivity and hourly labor
cost, since W_i/Q_i = (W_i/H_i)/(Q_i/H_i), where Q_i is quantity of output in i,
and H_i is the total number of production-worker hours in i annually. Weiss
[29] experimented with some of these measurement possibilities and found
some result sensitivity to changes in this empirical parameter.

D_i, the demand for good i, is proxied in most postwar studies by the
physical quantity shipped of that good--measured explicitly or implicitly
as value of shipments deflated by a (BLS) price index. This Q_i variable
rarely has been statistically significant in a regression model. Qualls
suggested replacing this proxy by product-characteristic dummies, such as
product durability or income elasticity of demand. The demand variable
introduces potential simultaneity bias in estimating a price-change
price-flexibility equation independently of a quantity change or flexibility relationship. Qualls argued that the simultaneity problem could be avoided by substituting product-characteristic variables for quantity [20]: this approach may indeed mask the problem, but hardly solves it if indeed price and quantity changes are determined simultaneously.

Finally, the usual measure of industry or product class market structure is the four-or eight-firm concentration ratio. In general, no other measure of market structure is considered—although Qualls did consider the impact of high or medium entry barriers on product price change [20], but not in a continuous manner. For studies of the food and tobacco industries, an advertising intensity variable (total advertising divided by the value of shipments) is an important additional market structure variable to consider in administered-pricing studies. In a few studies, nonlinearity has been introduced in the form of a squared concentration term [6, 20].

Thus, many variable selection and measurement decisions and problems discourage empirical research on administered pricing. A thorough sensitivity analysis of a qualitative nature, albeit complicated to undertake, may serve to mitigate the problem of setting empirical parameters. In particular, the theory of experimental design as elaborated by Box et al. in [4] suggests the use of a fractional factorial design to determine which dimensions influence most a particular response variable such as the $R^2$ value. The factorial design must be specified prior to empirical regression runs, and design results used as descriptive information only. A fractional factorial design not only permits testing for result sensitivity to specific parameter settings but allows this to be accomplished without running, for example, $2^k$ regressions where there are two settings for each parameter (e.g. weighting $UMC_i$ and $ULC_i$ or not) and $k$ factors.
Type of Analysis

The discussion of empirical studies for the administered-pricing question mentioned the two basic statistical tools used. One is tabular correlation analysis, and the other is the regression model. Simple tabular analysis (e.g. where average price change is classified by concentration-ratio class) has been frequently criticized for ignoring cost changes. (Of course, it is possible also to construct tables of average variable cost change by concentration category.) However, tables can avoid the little recognized problem of estimation of a near-identity. Suppose one is examining a true identity: i.e., suppose, definitionally, \( V_i = V_1 + V_2 + V_3 \). If one considers the estimating equation \( V_i = \beta_0 + \beta_1 V_{1i} + \beta_2 V_{2i} + \beta_3 V_{3i} + \beta_4 X_i + \varepsilon_i \), where \( \varepsilon_i \) is the stochastic error term, the regression problem of minimizing \( \sum \varepsilon_i^2 \) (the sum of squared residuals) becomes \( \text{Minimize } \sum_{i=1}^{n} (V_i - \hat{\beta}_0 \hat{\beta}_1 V_{1i} - \hat{\beta}_2 V_{2i} - \hat{\beta}_3 V_{3i} - \hat{\beta}_4 X_i)^2 \geq 0 \). This expression can take on the minimum value of 0 if \( \hat{\beta}_1 = \hat{\beta}_2 = \hat{\beta}_3 = 1 \), and \( \hat{\beta}_0 = \hat{\beta}_4 = 0 \). In other words, the coefficient estimate for the "unrelated variable" is constrained to be zero. It is true that sampling and measurement error may not absolutely constrain the coefficient estimates. Nevertheless, the theoretical constraints are clear.

Considering the economic questions of this discussion, it is also true that in an ex post and definitional sense \( p_i = UVC_i = U_{\pi_i} \), where \( U_{\pi_i} \) is unit profits. This does not resemble the administered-price regression relationship which is actually tested, since a structural variable, not unit profit, appears on the RHS of the equation. Moreover, this relationship does not hold ex ante. However, the potential statistical constraints imposed by a "partial identity" (UVC as an element of \( p_i \)) are important. The suspected bias on the concentration ratio coefficient, and any other market structure
coefficients if UVC$_i$ is included in the regression equation, is towards zero.

Nevertheless, unit-variable-cost movement is certainly an important influence on price behavior, and the relevant dependent variable is some price-change variable. For these reasons, regression analysis is the primary tool of investigation of the administered-price hypotheses.

Besides the partial-identity issue for this particular type of model, there are other statistical issues which bring into question the sole use to date of ordinary least squares. Some test for heteroscedasticity should be conducted since these studies are all basically cross-sectional in nature. (It should be noted, however, that weighting observations without evidence of heteroscedasticity is generally inappropriate for testing the relationship between structure and $\Delta P_i$ (see [2])). Moreover, potential simultaneity bias introduced by the quantity-price relationship should at least be mentioned.

The Zellner seemingly-unrelated-regressions approach may be the appropriate theoretical estimation technique—if one is observing multiple time periods. If time-period cross-sectional regressions are pooled, one possible relevant regression equation is $\Delta P_{it} = \beta_0 + \beta_1 \Delta UVC_{it} + \beta_2 \Delta Q_{it} + \beta_3 C R_{it} + \beta_4 A_{it} + \epsilon_{it}$ for $i=1,..., N$, $t=1,..., T$, where $N$ is the number of cross-sectional observations; $T$ is the number of transitions or time periods considered; and $A_{it}$ is advertising intensity for the $i$th industry or product class for time period $t$. It is assumed that $E(\epsilon_{it}) = 0$, but that the true covariance matrix of the error term shows error-term correlation between temporal observations for the same product class, but no correlation across cross-sectional observations (assuming one has taken account of heteroscedasticity). Although this is the error-term structure to employ usefully the Zellner technique, it does imply that
the study follow the same cross-sectional sample over time. Since definitional changes render difficult the tracking over time of many industries and product classes, certainly an empirical tradeoff exists: either ordinary least squares may be employed with as many observations as are available for a given time period, or Zellner estimation may be undertaken with those observations which can be followed over time. (An additional factor could conveniently be introduced in a factorial design which could take on the qualitative values of "ordinary least squares" or "seemingly unrelated regressions.")

**Empirical Conclusions**

This discussion of data sources, variable selection, and techniques of analysis is meant more as an explanation of empirical difficulties faced in administered-price studies than as a critique of such studies. It is more to encourage the exercising of the same care in research design as has gradually been exercised in other areas of industrial organization (structure-performance) study.

4. **GENERAL CONCLUSIONS**

A first concluding remark is that despite a long list of criticisms of both conceptual arguments regarding and empirical work concerned with administered-pricing behavior, the administered-price hypotheses do not die. To the contrary, with the seeming inability of governmental fiscal and monetary policies to combat stagflation effectively, there is renewed policy interest in the supply side and structure of the economy. In other words, the hypotheses will not be put to rest, not because of "a confusion over what the thesis means" (Jones and Laudadio [10]), but because the economic questions are of too much policy interest.
Empirical results based on twenty or thirty observations may not possess much statistical meaning but do serve to remind policy makers of the market-power and microeconomic inflation issues.

Secondly, it is to be emphasized that some data and estimation problems may be minimized through a careful fractional factorial design to determine the sensitivity of empirical results to particular assumptions about variable measurement or estimation technique. The purpose of the design is to insulate the results from multiple charges of arbitrary decision making in setting particular empirical parameters at particular levels. The data are not nearly so discouraging as the potentially arbitrary decisions which must be made for empirical implementations of administered-pricing models.

Finally, it is important to put into general perspective administered pricing in the food sector. The food group is a major component of the overall accepted inflation statistics--the PPI and CPI--and deserves careful study as such. But, in all aggregate administered-pricing studies (in particular, Means'), food is always grouped with the competitive industries. The level of analysis remains very important to the conclusions obtained.
FOOTNOTES

1 It should be noted that the literature has not suggested a firm-level analysis despite the firm's being the relevant theoretical behavioral unit. The variables of interest are all product specific, particularly the dependent price-change variable. Theoretically, a multi-product firm, with multiple cost and price structures, could be represented by sales- or shipments-weighted variable values.

2 Blair argued that a selective sample of product classes was appropriate. He deleted products the price of which the government was required to stabilize. These were milk and refined sugar prices. Most were "low-concentration" products which were artificially constrained to have stable or more stable prices. He deleted local and regional product classes whose concentration ratios could not be conveniently corrected. Third, if weather conditions in Blair's study period substantially reduced the supply of a product, it and dependent product classes were deleted. Finally, some nonferrous metals, such as copper, lead, and zinc, were deleted since their domestic concentration ratios overstated control in essentially international markets.

3 These eleven are 20232 (Canned Milk); 20335 (Canned Vegetable Juices); 20415/20455 (Prepared Flour and Mixes—milled or not milled in the same plant); 20521 (Biscuits, Crackers, and Pretzels); 20630 (Refined Beet Sugar and Byproducts); 20670 (Chewing Gum); 20873 (Flavoring Syrups, for use by Soft Drink Bottlers); 20742 (Refined Cottonseed Oil); 20952 (Concentrated Coffee); 21110 (Cigarettes); and 21310 (Chewing and Smoking Tobacco and Snuff). 20415 and 20455 have a combined 1972 four-firm concentration of 61.

4 This particular data-match criticism does not seem to be too severe for the food and tobacco product classes. The extent of damage from this source depends on the primary product specialization ratio. For a price-change model, the problem's severity is directly related to the difference in price behavior between primary and secondary products involved. Values reported on the commodity basis include reporting not only by establishments classified "in" the product class, but also by establishments classified "in" other product classes. Values reported on the product-class basis include all reporting by establishments classified as primary producers of the particular product class.

5 Spencer and Kyle [25] argue that shifting product weights within an industry or product class cause the registered price change to be a combination product price change and product weight shift. This is not a convincing argument, however, if one considers an industry or product class per se as the relevant unit of observation.
REFERENCES


