

PRICING, PRICE STABILITY, AND POST KEYNESIAN PRICE THEORY

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ABSTRACT

This dissertation contributes to heterodox microeconomics by building a comprehensive and coherent theoretical system for price cyclicalities and stability since they are under-theorized issues in both neoclassical and heterodox microeconomics. In particular, it develops an empirically grounded theory of price cyclicalities and stability from the Post Keynesian perspective by examining the causal mechanisms for price setting which are supported by empirical evidence. By doing so, it sheds light on the mechanisms through which price stability is secured. The dissertation has four major implications for heterodox microeconomics. First, it demonstrates that there is no such thing as a deterministic relationship between sales and prices predicated on the neoclassical supply and demand framework. The relationship can appear to be positive, negative, or nil at all depending on how the cost base responds to the output change. Second, it demonstrates that it is not the profit mark-up but the cost base that works as the key driver of price cyclicalities, which means that all neoclassical explanations for price cyclicalities have no foundation. Third, it refines the heterodox theory of intrinsic price stability by updating Lee's (1998) grounded price theory.

Last but not least, it extends the heterodox price stability theory by differentiating between intrinsic and extrinsic price stability, identifying their roles and implications and incorporating labor hoarding and discipline effects to the theorization of the extrinsic price stability. All these contributions will be of crucial importance for the refinement and development of heterodox microeconomics.

The faculty listed below, appointed by the Dean of the School of Graduate Studies, have examined a dissertation titled “Pricing, Price Stability, and Post Keynesian Price Theory,” presented by Gyun Cheol Gu, candidate for the Doctor of Philosophy degree, and certify that in their opinion it is worthy of acceptance.

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DEDICATION

To my parents Munok Gu and Jungok Park with deep respect and love

The purpose of studying economics is
not to acquire a set of ready-made
answers to economic questions,
but to learn how to avoid
being deceived by economists.

JOAN ROBINSON

CHAPTER 1

INTRODUCTION

Traditional neoclassical microeconomic theory suggests that only marginal cost is relevant for optimal pricing decisions, whereas fixed costs or sunk costs are irrelevant for pricing.¹ In real-world pricing practice, however, most firms around the world set their prices based on full cost or average total cost rather than variable or marginal costs, as a number of surveys and management accounting textbooks show.² Fabiani et al.(2007) found in a large survey among European firms that most firms continue to employ a cost-based method to set their prices. Experimental studies also confirm that supposedly irrelevant fixed costs can have an impact on price formation. That is, experimental subjects take into consideration full cost rather than variable or marginal cost (Waller et al., 1999; Buchheit, 2004; Offerman and Potters, 2006; Friedman et al., 2007; Buchheit and Feltovich, 2011). In the experiment conducted by Offerman and Potters (2006), the average markup over marginal cost is 30% higher once a sunk entry fee is paid than in the baseline treatment with no fixed or sunk costs.

While most economists have continued studying pricing strategies within the marginalist framework following Alchian's (1950) classical argument that learning and imitation would propagate good practices under inter-firm competition pressure

¹Pricing is defined as the process of forming and changing prices; pricing analysis is the discipline of studying and analyzing how prices are formed and adjusted in response to various stimuli (Coutts and Norman, 2011)

²See Appendix C for a list of the survey literature.

thereby reinforcing the optimal pricing, a considerable body of literature has been accumulated on real-world pricing behavior by other disciplines such as cost and management accounting and sociology. It is not until recently that a group of behavioral economists have attempted to explain the “irrational pricing biases” by using game-theoretic modelling. For example, Al-Najjar et al. (2008) suggest a theoretical model to show how the use of full-cost pricing policies might persist in the long-run in oligopoly markets despite the forces of learning and competition. Another group called Post-Keynesian has also been investigating the pricing practices in the field following Keynes’s (1939) argument that “it is rare for anyone but an economist to suppose that price is predominantly governed by marginal cost” and also Hall and Hitch (1939), Oxford-based economists, who interviewed 38 business executives about their methods for setting prices and concluded that “there is a strong tendency among business men to fix prices directly at a level which they regard as their full cost.”

The tradition of Post Keynesian (hereafter, PK) microeconomics has made an important contribution to the understanding of price stability by establishing costing and pricing procedures based on the real-world accounting practices of the business enterprise as a going concern. This dissertation contributes to heterodox microeconomics by building a comprehensive and coherent theoretical system to provide an analytical framework for price cyclicity and stability since they are under-theorized issues in both neoclassical and heterodox microeconomics. In particular, it develops an empirically grounded theory of price cyclicity and stability from the Post Keynesian perspective by examining the causal mechanisms for price setting which are supported by empirical evidence. By doing so, it sheds light on the mechanisms

through which price stability is secured.

Research Questions

The questions that I would like to answer are theoretical and empirical. The following research questions are the main ones that will be dealt with in the present research.

- How have neoclassical economists attempted to rationalize prices' unresponsiveness to output fluctuations within their theoretical framework, which was originally theorized by Gardinar Means as the administered price thesis? Are the neoclassical explanations for the administered price thesis satisfactory to mainstream economists? In other words, are they coherent with neoclassical frameworks in the industrial organization (IO) field?
- How do we build up a Post Keynesian microeconomic theory of the firm in terms of price stability? Lee (1998) provides an empirically grounded foundation for PK price theory based on more than 100 empirical studies conducted before 1990. Given that there have been significant changes in costing and pricing procedures over the last two decades, can we say that his grounded theory of price is still valid by investigating real-world accounting practices of the business enterprise?
- How does a Post Keynesian price theory account for price cyclicity - price movement over the business cycle - and price stability at the industry level? What are possible causal mechanisms for about half of U.S. manufacturing industries' transition from counter-cyclical to a-cyclical price movement in the early 1980s from the heterodox perspective?

Research Scope and Focus

Why is pricing analysis important? Pricing analysis offers rich insights into business behavior, and the understanding of the pricing decision casts light upon the process of inflation, the relative effectiveness of demand management (as opposed to cost-constraint) in limiting inflation, on predictions of price and cost movements over the cycle - that is, price and cost cyclicalities - and on the pass-through to the domestic economy of global pricing forces, such as trade policy and exchange rate changes (Lee, 1998; Coutts and Norman, 2011).

The scope and focus of this dissertation is to investigate neoclassical reactions to Gardiner Means's administered price thesis in the industrial organization field, and to contribute to the previous research on price movement by developing an empirically grounded theory of price cyclicalities and stability from the PK perspective.³ After establishing PK theoretical frameworks, I conduct empirical analysis to show that at the center of the mechanism for some US manufacturing industries' transition from counter-cyclical to a-cyclical price movement in the early 1980s are two key factors. First, more firms and industries started to consider pricing as a strategic variable, which led to changes in their cost pass-through policy. Second, changes in the cyclicalities of the labor productivity are associated with the cost-base stability in the US economy during the post-1984 period.

³New Keynesian economists have proposed several macroeconomic theories concerning price stickiness, such as menu cost theory (costs of adjusting prices), coordination failure, nominal contracting, implicit contracts, and inventories. However, New Keynesians do not deal with the industrial difference in price stability, whereas Post Keynesian price theory can be applied to both macroeconomics and industrial organization field.

Methodology

The general methodological framework to be used in the dissertation is the method of grounded theory. This section underpins the method of theorizing and theory construction that will be followed in the dissertation, as well as provides the basis for the empirical and mathematical models to be used. This dissertation also relies on econometric analysis, which can be used to codify the demi-regularity level of inquiry.

Method of Grounded Theory

There is a consensus among Post Keynesians that their economics has philosophical and methodological foundations that are different from the positivism, empirical realism, and deductivism foundations underpinning neoclassical economics. The ontology and epistemology that have been extensively discussed by Post Keynesians rely on critical realism. Based on critical realism, they advocate various methodological guidelines to be utilized for creating and developing Post Keynesian theory: retroduction, Babylonian method and empirically grounded method.

The method of grounded theory is consistent with critical realism and is a better and more developed set of guidelines for theory creation than the others (Lee 2002, 2005). That method paves the way to economic theories that are historical in structure, content and explanation because:

The method of grounded theory can be described as a process in which researchers, or more specifically economists, create their theory directly developed from data; and in which data collection, theoretical analysis and theory building proceed simultaneously (Lee 2002: 793).

In other words, grounded theory is a method of undertaking economics re-

search that aims at theoretical development and generalization rather than testing established theories; and it encompasses a set of procedures for analyzing data in a systematic and comparative manner (Finch, 2002). A number of specific categories or analytical concepts and their associated properties stem from the relevant theoretical, empirical, and historical literature along with a collection of comparable data from economic events. Since the concepts and relationships are empirically grounded in detail, the researcher develops a theory explaining why and how the sequence of economic events represented in empirical data transpire. Hence, the method allows economists to develop a theory that explains historically contingent economic events analytically; each theory is empirically grounded in its data.

Let us now consider aspects of the grounded theory method in more detail based on Finch (2002), Goulding (2002), and Lee (2002, 2005). First, the collection of data is not only collecting the data themselves but also constantly comparing, analyzing, and interpreting the data collected while simultaneously organizing them into conceptual or generalized categories. The categories that emerge come from the process of collecting them. Consequently each category is tied to or empirically grounded in its data.⁴ Since the data lies in time and history, each category is related to a particular historical setting. The more detailed a category is, the more realistic it is. Once the real, observable categories are delineated and grounded, the economist

⁴It should be noted that there is no such thing as unbiased starting points because of researcher's background knowledge. However, the grounded theorizing allows us to keep learning and updating on the existing reality, which is presupposed by critical realism. We are in a continuous process of learning on and expanding our understanding of the reality; thus it also allows for alternative ways to comprehend how the world works.

classifies some as economic structures and others as components of economic structures. Continuing the practice, other categories that center on human motivation and action and a set of the outcomes will be woven together into a causal mechanism. The resulting structures and causal mechanisms will be real and observable. Then, the economist will select from the causal mechanisms identified, one as the central causal mechanism around which the structures and secondary causal mechanisms with their outcomes are arranged. Criteria for selecting the central causal mechanism are that it appears frequently in the data as a cause of the outcomes, that it has clear implications for a more general theory, and that it allows for complexity. The grounded economic theory that eventually emerges is a complex analytical explanation or interpretation of the actual economic events represented in the data. Economic theory centered on a single central causal mechanism is classified as a substantive economic theory since it is an explanation of a single basic economic process that occurs widely in the economy. From a number of substantive theories, a formal economic theory can be developed into a general or holistic theory where the relationship or pattern among the substantive theories is its analytical explanation. As in the process of grounding the substantive economic theory, the formal theory also has to be grounded.

One property of the method of grounded theorizing is that since the economic world is not static, a formal theory is never complete, but undergoes continual modification with updated data relating to newly emerging patterns or configurations of economic reality. This implies that Lee (1998)'s attempt to build a grounded price theory might now be out of date. That is, since 1990 many studies on costing and pricing procedures have been published which are not part of Lee's coverage. There-

fore, in accordance with the method of grounded theory, they need to be examined to see if his PK price theory needs to be updated and/or modified. This will occur in Chapter 3.

Econometric Analysis

A combination of prior theoretical insight and statistical analysis, firmly grounded in a particular context, underpins the validity of the analysis from a realist methodological perspective (Bhaskar, 1989). This dissertation will use some econometric models to identify a behavioral core of PK pricing theory. With agent decisions being made under conditions of uncertainty, Post Keynesians emphasize that prices are set by firms adding a mark-up to some measure of average costs. The specific way in which the mark-up is determined depends upon circumstances and the precise line of enquiry. Nevertheless, the bottom line is that the mark-up is determined ex-ante in order to set prices and is differentiated from a realized or ex-post mark-up rate. Such a distinction is based on historical time, rather than neoclassical logical time, in which theorists can only investigate possible interactions among economic variables. Since this theoretical insight is firmly grounded in the real world operation of the business enterprise, there is no reason not to utilize some econometric techniques in order to see whether the theory is also in keeping with specific data in hand.

To be sure, the fundamental problems of identification exist in econometrics given its closed-system emphasis and open-system application. This makes it inherently difficult to discriminate between theories. However, allied to an existing body of research of a more diverse empirical character, in the spirit of realist claims, econometrics can have a critical and constructive role to play in economic research (Downward

and Mearman, 2002, 2007; Downward, 2000, 2002). In other words, econometrics can provide not sufficient but supplementary evidence for specific economic context. It is clear then that econometrics potentially can perform many tasks based on critical realism; it could be used to codify the demi-regularity level (Downward and Mearman, 2003).

In this vein, Chapter 4 provides some econometric analyses to estimate the average level of the ex-ante profit mark-up and to show how U.S. industry prices respond to cost and demand factors over the cycle. In particular, it will utilize simple OLS and fixed-effect estimators. The main data comes from NBER-CES Manufacturing Industry Database, which is a balanced panel over 1958-2005 for 459 SIC industries available at <http://www.nber.org/data/nbprod2005.html>.

Narrative Mathematical Model

Economic models based on the mathematical language are useful tools and instruments that can help develop and clarify causal mechanisms and grounded theory. However, their use should be restricted since:

The method of grounded theory prescribes that the type of mathematics used and economic models constructed are derived from (as opposed to being imposed upon via analogy or metaphor) the empirically grounded theories being developed. (Lee 2005: 106)

In other words, the economic model is supposed to reflect the narrative of the grounded theory. The mathematical form of the model is determined and constrained by the empirically grounded structures and causal mechanisms. (Lee 2005)

To translate a grounded theory into an economic model, its structures and causal mechanisms have to be converted into mathematical language where each

mathematical entity and concept is in principle unambiguously empirically grounded. In this manner, mathematical model-based analysis remains subjugated to the study of economic activity. Thus, while mathematics helps illuminate aspects of the grounded theory and making clear what might be obscure, it does not add anything new to the theory, that is, it does not by itself produce new scientific knowledge (Lee 2005). In this vein, a mathematical model has to be a narrative about empirical evidence. In chapter 4, a narrative mathematical model which reflects the empirical evidence on the relationship between labor productivity and unemployment will be developed and delineated.

Outline

This dissertation is structured along with three main themes; neoclassical denial and acceptance of Means's administered price thesis, extended PK price theory reflecting recent costing and pricing practices, and empirical analysis on the mechanism in the transition from counter-cyclical to a-cyclical price movement in the US manufacturing sector. In sum, the dissertation is concerned with an under-theorized area in PK economics: price cyclicity and stability.

Chapter 2 goes through neoclassical reactions to Means's administered price thesis during the 1980-2000 period. Neoclassical attempts to deny and rationalize the thesis are shown to be unsuccessful since their sanitized versions of Means's theory are self-contradictory. Their failure finally led some mainstream economists such as Blinder et al. (1998) and many follow-up studies until the present to ask administrators about how they set prices, which is exactly what Post-Keynesian and Institutional economists usually do to build and test theoretical frameworks.

Chapter 3 is designed to reinforce and update the PK analysis of costing and pricing procedures with new empirical evidence. In particular, it builds an empirically-grounded model of costing and pricing procedures with new survey data. In doing so, it will reaffirm that the PK price theory provides a non-neoclassical explanation for price change. I articulate two taxonomies: one is costing-oriented pricing taxonomy and the other is markup-oriented pricing taxonomy. This two-dimensional division helps gain a far better understanding of the recent pricing practices of a business enterprise as a going concern from the viewpoint of economics, and provides an analytical scheme for various evolutionary processes among industries, countries and cultures.

Chapter 4 discusses the empirical evidence for counter-cyclical prices in the post-1945 period around the world and for a-cyclical prices in the post-1983 period in the US. This chapter shows that at the center of the mechanism for the recent U.S. transition from counter-cyclical to a-cyclical price movement in the early 1980s are two key factors. First, more firms started to consider pricing as a strategic variable, which changes their pass-through policy in such a way that more shocks to input prices and productivity are absorbed in markups. The absorption alleviates the impact of cyclical changes in the cost base on price cyclicity. Second, a structural change in the cyclicity of the labor productivity is associated with the cost-base stability during the post-1984 period. A decline in hiring and firing costs and cutbacks in social security benefits have made labor discipline effect dominate labor hoarding effect, which implies that labor productivity increases as unemployment rate increases, with the result that the cyclicity of the cost base has been weakened and thus prices have

become less cyclical.

Chapter 5 concludes the dissertation by summarizing and pointing out main findings and contributions of the dissertation.

CHAPTER 2

DENIAL AND ACCEPTANCE OF THE ADMINISTERED PRICE THESIS

Introduction

A combination of denial and rationalization is among the major defense mechanisms postulated by Sigmund Freud, in which a person is faced with a fact that is too uncomfortable to accept. That is, on the one hand, one refuses the truth insisting that it is not true in spite of overwhelming evidence; on the other hand, one tries to substitute a safe and reasonable explanation for the true but threatening cause of behavior.¹ In this chapter, I show that neoclassical reactions to Gardiner Means's administered price thesis are analogous to these two psychological defense mechanisms, by tracking and analyzing their theoretical developments during the 1980s and 1990s based mainly on economics journal articles citing Means's major works.²

The most important aspect of the administered price thesis was the coordination and organization of economic activity through the interplay of administrative control and the market (Lee and Downward, 1999). This thesis was already posed in Means's PhD dissertation as follows:

In an engineering economy prices are fixed by administrative action for periods of time. Price is determined before a transaction occurs. In a trading economy prices are developed in the process of trading and price is not determined until the transaction occurs. In an engineering economy supply and demand never equate except by coincidence. (Means 1933: Ch. VI)

¹Source: "defense mechanism" in Encyclopdia Britannica (2008)

²For more detail on the journal articles, see appendix A.

As a real-world example, Means showed that the Great Depression in the early 1930s caused the prices of agricultural products to fall substantially (63%) whereas those of agricultural implements only decreased moderately (6%). That observation triggered follow-up empirical studies on this issue from the neoclassical point of view. Although numerous empirical investigations on the administered price thesis had been put forward since 1930s, mainstream economists did not succeed in rejecting the administered price hypothesis or supporting the Walrasian auctioneer:

For almost fifty years, the hypothesis of "administered" pricing has exercised economists. During this time, the concept has undergone a variety of interpretations, and has been subjected to numerous empirical tests. Yet the literature presents a patchwork of contradictory findings and is replete with controversy. (Chappell and Addison 1983: 1122)

The inconclusiveness of their studies kept threatening neoclassical price theory, according to which marginal cost and demand conditions determine relative price movements, which led Gordon to admit that full-cost-pricing doctrine associated with Means and Hall-Hitch won wide acceptance although it does not rely on any reasoning about the maximizing behavior of individual economic agents (Gordon 1981: 503). Neoclassical economists had to deal with the fact "that is too uncomfortable to accept" in order to defend themselves whether theoretically, politically, or psychologically.

The remainder of this chapter is organized as follows: Section 2 investigates a series of neoclassical studies on measurement errors as a denial defense mechanism, which was initiated by Stigler and Kindahl (1970); Section 3 makes our way through a thicket of theoretical vulgarizations written in the 1980s and 1990s as a rationalization defense mechanism; Section 5 deals with debates over econometric specifications,

which can be seen as empirical bastardizations, and Section 6 offers some concluding remarks.

The Administered-Price Thesis Denied

There have been repeated attempts to ignore the significant consequence which the administered-price thesis has brought about in terms of the neoclassical relationship between market and price.³ In the earlier period of 1960s and 1970s, Stigler (1962), Stigler and Kindahl (1970), and Weston et al. (1974) tried to refute the administered-price thesis by showing measurement errors in price data. The dual objectives of Stigler and Kindahl (1970), for instance, were to identify biases in the Bureau of Labor Statistics (BLS) price data compared with the National Bureau of Economic Research (NBER) prices, and to test Stigler's long held conviction that the administered price was a fiction created in the sampling procedures of the BLS price data. They argued that the two series of prices were different in their short-run movements; in particular, the BLS price data changed more erratically than the NBER counterparts, and thus there was little evidence for the administered price thesis.

Shortly thereafter, Means (1972), Bohi and Scully (1975), Weiss (1977), Ross and Krausz (1986) and Carlton (1986) challenged these findings and showed the two series of prices were sufficiently similar in behavior so that one could reject the null hypothesis that each was generated by a different stochastic process. This first measurement error controversy was concluded by Carlton (1986), who admitted that

³The title of this section is named after an article title by Weston, Lustgarten and Grottko(1974), who tried to show that their findings are consistent with neo-classical theory in denying the administered-price thesis.

the degree of price rigidity in many industries was significant even using Stigler-Kindahl data. Since this famous controversy is extensively and thoroughly reviewed by Lee (1998, 1999), this section is aimed at showing that despite Stiglers failure, his legacy of the denial-tactic has been succeeded by their contemporary and descendent mainstream IO economists in one or another form through the 1980s and 1990s.

Not surprisingly, it was not very long before the issue of measurement errors was reignited as a probable cause of the “seemingly” apparent failure of market price to coordinate economic activity over demand fluctuations or business cycles. Garber and Klepper (1986) applied a latent variable model to three cross sections of manufacturing industries, in 1961, 1970, and 1975 - all being recessionary years - in order to analyze the determinants of relative price changes for the three post-war recessions and examine the roles of cost and demand shifts, backlogs of unfilled orders, and unanticipated events. The reason why they emphasized and illustrated the critical importance of measurement errors in the empirical pricing literature stemmed from four observations: first, data are crude measures of the theoretical determinants of price; second, empirical pricing literature is voluminous, yet no consensus emerging; third, previous pricing studies reported many anomalous findings for neoclassical theory; finally, if proxies are used for cost and demand, both of which are difficult to measure, the relationship between the proxies and prices may also be biased. What they try to emphasize is possible measurement errors in other variables than price itself, so that they can indirectly reject empirical evidence against the neoclassical price theory. Based on their finding that conventionally employed measures of price and cost contained very substantial measurement errors, they concluded:

Substantial additional information seems necessary to discriminate between competitive and alternative theories of pricing. Our results suggest that such information may not be revealing unless the measurement issue is confronted directly. (Garber and Klepper 1986: 187)

What they argue is that there is no problem with the neoclassical price theory itself, but all sorts of measurement errors prevent any consensus from emerging and leave empirical evidence unconvincing.

Some pointed out the measurement errors in price data directly as with Stigler. Garber (1989) suggested that the problem consisted in discriminating empirically between alternative theories of short-run price determination in the presence of noisy price data. Here he argued that any attempts to verify the administered price thesis cannot be successful nor justified if it is based on whatever empirical evidence is provided in the short run. Moreover, Griliches (1971) and Lichtenberg and Griliches (1989) argued that price-index failure to virtually adjust for quality change was the reason for serious measurement errors even in the long run:

[T]he major source of such errors is unmeasured or imperfectly measured changes in product quality.” (Lichtenberg and Griliches 1989: 1)

Nordhaus (1996) also remarked in this vein:

During periods of major technological change, the construction of accurate price indexes that capture the impact of new technologies on living standards is beyond the practical capability of official statistical agencies. (Nordhaus 1996: 29)

Hence, the official price indexes are not reliable sources for rigorous mainstream economists regardless of whether or not it is short-run.

Siegel (1994), however, found that although the bias may be severe, “biases in the data do not appear to have shifted over time, implying that errors of measure-

ment are not a significant determinant of either the slowdown or recent acceleration in manufacturing productivity.” Nevertheless, Georganta (2003) reminded economists again that the price variables included a large measurement error, and argued that a specific econometric technique such as Latent Variable Modeling (LVM) could be applied to observed price data in order to extract the “true” values of price variables. He also criticized the traditional regression model that was applied to previous studies showing the insignificant effect of demand factors on price change, as conflating random errors and systematic inaccuracies in the measurement of price data. Using the estimated “true” values of prices based on LVM, Georganta (2003) argued that the effect of demand fluctuations on industry price change was statistically significant and much larger than previous studies, suggesting a satisfactory reconciliation of the long-drawn-out conflict between empirical results and neoclassical theory. What he means here is that the traditional neoclassical explanation for price movement along with demand change is still viable.

Note that in the above studies, all the economists attempt to deny the administered price thesis by arguing that the thesis is the unfortunate outcome of measurement errors which are found in major economic variables as well as price data - the same argument as Stigler’s conviction that the notion of the administered price is predicated on illusions.

Theoretical Bastardization of the Administered-Price Thesis

Ostensibly, neoclassical economists can never accept the administered price theory because as George Stigler put it, Means’s theory of price rigidity “was pri-

marily an assertion of an empirical fact, not a practice explicable by ordinary profit-maximizing theory.” (Stigler 1992: 456) Instead, mainstream economists have developed several neoclassical theories that rely on the maximizing behavior of individual economic agents rather than “extraneous assumptions” in order to explain the seeming failure of prices to adjust completely and instantaneously to demand shocks.

In 1981, Robert Gordon wrote a survey paper which covered two approaches to this issue: information barriers with price taking agents (new classical approach) and price adjustment models in a non-market-clearing setting (fledgling new Keynesian approach). However, the choice between these two mainstream approaches seemed an “election between unattractive candidates” (Gordon 1981: 494). Furthermore, Carlton (1979) admitted that

Although Means’s thesis remains shrouded by doubts as to its validity, his notions of rigid prices caught the fancy of economists, not only of his time but also of subsequent generations, and attracted the concern of policymakers (Carlton 1979: 1036)

Neoclassical orthodoxy really needed more persuasive theories based on rationality and optimizing behavior - the essence of neoclassicism; at the same time, they had to have empirical evidence to support their newly-invented theories. Indeed, one can see overwhelming focus on theoretical developments during 1980s, which was accompanied or followed by rich empirical literature to test and support them.

Before investigating how neoclassical economists distort the administered price thesis, it is necessary to review what Gardiner Means means by that term. Means (1935) originally defined an administered price as “a price which is set by administrative action and held constant for a period of time”, whereas a market price is “one which is made in the market as the result of the interaction of buyers and sellers”. As

evidence of the existence of an administered price, he said, “we have an administered price when a company maintains a posted price at which it will make sales or simply has its own price at which consumers may purchase or not as they wish.” (Means, 1935) That is nothing but a clear, simple statement which separates the demand side per se from business enterprises in terms of price determination. The key element of Means’s theory is that price formation or change is determined outside markets and done through strategic decision making processes inside business enterprises within institutional contexts. We can identify four groups of neoclassical alternatives to the institutional determination of prices outside markets. They are investigated in the following four sub-sections.

Administered Price as a Result of Optimization Policy

There had been repeated attempts during 1980s to build neoclassical models to show that price rigidity results from a rational economic agent’s solution to the optimization problem. The earliest attempt to reformulate the administered-price thesis within the neoclassical framework was a model of markets characterized by uncertainty and transaction costs, which may create incentives for firms to use both long-term and short-term fixed-price contracts. Barro (1972) suggested that price changes are costly and balance the benefits of price adjustment against the adjustment cost. Wu (1979) proposed consumer search costs and risk aversion factor as the reason of price rigidity. Based on long-term contracting, Carlton (1979) argued that he could explain a number of empirical facts that had often been described either as evidence

of the failure of markets⁴:

I explain why long-term-contract prices can move by different magnitudes and even in different directions than short-term prices. I explain why reduced-form econometric price equations are likely to be unable to find demand forces mattering. Finally, I explain why "rigid" prices and delivery lags are not necessarily disequilibrium phenomena but, rather, can be perfectly understandable and predictable equilibrium phenomena. Therefore, the paper provides a logically consistent equilibrium explanation of the facts that have been used to support the "administered price thesis" of Gardiner Means (1935) in the voluminous literature on that subject. (Carlton, 1979: 1035)

They all try to show that price inflexibilities are consistent with the conventional microeconomic theory, while they associated Means's administered prices with one or another form of administrative price adjustment cost.

By offering contracts of relatively long period to their customers, what firms really do is to implement price smoothing policy. Mainstream economists started to develop a dynamic framework to show that such a price smoothing policy is optimal one, particularly compared to a conventional optimal policy where price adjusts to demand and supply shocks instantaneously. On the assumption that at each point in time production and sales strategies may differ where inventories play a buffer role, Blinder (1982) and Amihud and Mendelson (1983) suggested that in a dynamic framework price smoothing policy was an optimal solution to maximization problem of a discounted sum of profits over a finite or infinite horizon. The analysis provides an explanation for price rigidity which is consistent with maximizing behavior: prices

⁴Offering contracts of relatively long length to their customers turned out to be one of three ways firms can implement a price smoothing policy, which was developed by Philips (1980) and Blinder (1982). Later, Hubbard and Weiner (1992) extended Carlton (1979)'s model to stress the role of risk in determining commodity market trading arrangements when insurance and futures markets are incomplete.

tend to move slowly in industries whose outputs are inventorable, whereas industries with perishable output are more likely to have flexible prices. In such a case, the conventional policy of equating marginal revenue and marginal cost at each point of time turns out to be less profitable. Moreover, there is an attempt to give the flavor of the market concentration as the differentiating factor to the price smoothing model (Encaoua and Geroski, 1986). They argued that more competition means less power to ensure persistency of market positions, which leads to a greater emphasis on current market condition and less competition means more power to ensure stability of market positions, which allows them to place a greater emphasis on long-term returns. That is, the less competitive an industry is, more rigid its price level is.

However, the key implication of a price smoothing strategy is that it provides a rationale for something strongly reminiscent of normal cost pricing:

Whether it chooses a longer time horizon or offers long-term contracts, a firm which wishes to smooth extensively will calculate a price appropriate to its horizon, and this means that it will smooth out the many transitory fluctuations in costs and demand that occur during the horizon. The extent of such "normalization" depends, *inter alia*, on the length of the horizon involved. Those firms using a long horizon will normalize extensively, and the normal costs and demand used to compute price will, *ceteris paribus*, be more weakly related to current costs and demand at any time within the horizon, than would be the case if a shorter horizon were used (Encaoua and Geroski, 1986: 50).

In other words, "the essence of a price smoothing strategy is the more or less complete divorce between current market events and current prices" (Encaoua and Geroski 1986: 51). These theories turn out to support what contemporary heterodox price theory means - normal cost based price determination - which leads to another attempt to sanitize the notion of the administered price.

Administered Price as a Result of Market Structure

Oligopolistic collusion literature interpreted the empirical study by Means (1935) as suggesting that collusion is associated with a greater tendency toward price rigidity. The best known theory is the kinked demand curve theory offered by Sweezy (1939) and Hall and Hitch (1939). Hall and Hitch provided a non-marginalist explanation for the existence of stable prices. To this end they introduced a kinked demand curve for an oligopolist enterprise in which kink occurred at the predetermined full cost price instead of the marginal cost.⁵

Even though Scherer (1970) and Tirole (1988) criticized the kinked demand theory of price rigidity as having important shortcomings, there had been no neoclassical alternatives based on collusion until 2000s - sixty years after the development of the kinked demand curve.⁶ Criticizing the kinked demand curve theory but suggesting no alternative theory, neoclassical industrial organization economists have kept the informal view that price rigidity is associated with collusive firms, because a rigid-price collusive scheme prevents the risk of a price war (Athey et al. 2004; Carlton 1989; Connor 2005).

The notion of the degree of industrial concentration followed as an attempt to

⁵The businessmen would set his price by adding together direct material and labor costs per unit output plus indirect costs determined at expected or standard volume output plus a predetermined profit margin. Hall and Hitch called the resulting price the full cost price.

⁶Interestingly, it was not until 2000s that many of studies on the organization and conduct of formal cartels have been motivated by the discovery of hundreds of international cartels and the corresponding sanctions imposed by antitrust authorities since the mid-1990s and they have suggested other reasons on price rigidity than what the kinked demand curve theory suggested (Connor, 2005).

model the collusion-free market in this regard. There has been vast literature theorizing the administered price thesis in line with neoclassical market concentration. A new development of this kind in the 1980s was to examine the effect of market concentration on inter-industry variation in the response of prices to monetary shocks, which was influenced by the macroeconomics literature, particularly, by theories linking inflation to relative price variability. Cukierman (1979, 1982) and Fischer (1981), among others, developed a theoretical mechanism through which inflation could increase the variability of relative prices within a rational expectation framework. This literature provided another way to look at the administered price issue. That is, when modeling the relationship between inflation and price variability, a statistically stronger effect should be found for the competitive rather than the concentrated industries. The relationship between concentration and inflation-price variability has been tested and validated in some studies. For example, using a model in which the rate of price change is a function of past rates of change in the money supply, Chappell and Addison (1983) tested the hypothesis that concentrated industries would respond less quickly to monetary stimulus than less concentrated industries. Still, the empirical results seemed mixed and inconclusive, which led some neoclassical economists to seek other explanations for the varying degree of price inflexibility than market concentration.

Administered Price as a Result of Product Characteristics

Conlisk et al. (1984) developed a model for the pricing pattern of a durable-good monopolist over time and showed that price remained high for a certain length

of time.⁷ Tirole (1988) argued that a durable-good monopolist would be generally better off with sticky prices because the producer needs to signal that price would not drop continuously during a recession to consumers with the ability to arbitrage inter-temporally. Caucutt et al. (1994, 1999) tested this theory and found that product durability was an important factor in explaining variation across industries in relative price dispersion. In addition, they argued that their findings rejected the traditional administered pricing hypothesis because they did not find that high seller concentration would lessen the impact of inflation on price variability. What they are trying to do is substitute the durable and nondurable dichotomy for the administered and market price division by Means, which helps them accept the fact that current market price has little to do with current market events or conditions in their framework because the reason for rigid prices lies in product characteristics independently of and outside business enterprises. Even though it seems to be a successful shift of focus, these intertemporal-price-discrimination models are doomed to failure to explain the inflexibility of the regular price for most consumer goods which are non-durable.

A similar approach to the price rigidity issue was to interpret the administered thesis as suggesting that more lagged process of production can increase price stickiness. The intuition behind this explanation is as follows: individual prices depend

⁷In most periods, the price is high and only high-valuation consumers purchase, but there are also periodic temporary price reductions targeted at low-valuation customers. The logic is very simple: as the number of low-valuation consumers in the market rises, the profitability of selling to the low group rises, and each firm thus eventually decreases its price.

not only on wages but also on other input prices, and while each price quickly adjusts to wages and to other input prices, the accumulation of small lags leads to longer lags in some industries. However, this rationalization was also not that satisfactory for neoclassical economists:

If it takes time to produce goods, output prices may react with input prices with a lag. This proposition rests on theoretically weak grounds, as prices should be based on opportunity costs rather than purchase prices for inputs. It nevertheless may have some empirical validity (Blanchard 1987: 83)

In other words, it is not completely compatible with neoclassicism even though it has some empirical validity and explanatory power, which brought further theoretical development to halt. Moreover, Lai and Pauly (1992) showed in a theoretical model, that price inertia should decrease with the length of the production period. That is, when the production lag extends over more than one period, the flexibility of output adjustment is constrained and business enterprises will adjust prices to deal with demand shocks. Afterward, only empirical studies rather than theoretical arguments were provided in this regard.⁸

Administered Price as a Result of Customer Behavior

The last theoretical attempt is concerned with what we presently call behavioral economics. Transaction-cost based arguments attracted a specific criticism that

⁸For instance, Hanes (1999) showed that the difference in price behavior between goods subject to different degrees of processing poses a problem for price comparisons across historical periods; Clark (1999) argued that at early stages of production, a monetary tightening causes input prices to fall more rapidly and by a larger amount than output prices.

they ignored the possibility that firms might face indirect costs of changing their prices, related to the effect of a price change on consumer behavior. In this vein, Okun (1981) can be seen as one of its founding fathers because distinguishing between auction and customer markets, he recognized the indirect cost involved in changing prices, which stems from potential harm to customer relationship and company reputation. The fundamental difference between the auction market and the customer market is the implied continuity of the buyer-seller relationship. A price rise in the customer markets which is clearly seen as unfair may lead the customers to search for alternatives; but if the customer acknowledges that the increase in price is the result of rising costs, eventually he or she will accept the increase as fair, which of course takes some time. Prices, therefore, are characterized by some degree of rigidity. In other words, he attributes the observed rigidity of markups throughout the private business sector to customers' attachment to suppliers rather than to industrial characteristics (Goode, 1994). What Okun (1981) did here is to replace Means's administered market with the notion of the customer markets, shifting the focus back to the consumer choice, that is, the neoclassical demand factor. Not surprisingly, Okun's analysis gained much more acceptance in the academic circles:

Okun's analysis, though it resembles Means's in significant respects, gains by relating inflexible prices to information costs (i.e., shopping costs) and by systematically introducing wage behavior, lags, and certain behavioral norms in accounting for chronic inflation. (Goode 1994: 182)

Likewise, focusing on the importance of company reputation in an uncertain situation, Allen (1988) substituted for Means's administered markets another sanitized one, which is much comfortable to accept:

It can be seen from Table I [Nominal price and production drops in various industries 1929-1933 by Means (1935, p. 8)] that one characteristic of the industries where prices are inflexible is that product quality cannot be easily observed, whereas in those industries where prices are flexible this is more straightforward. [...] This suggests a theory of price adjustment where product quality is unobservable and reputation matters may be consistent with these observations. (Allen 1988: 140)

In particular, when quality is unobservable, the degree of price rigidity depends crucially on the serial correlation of demands. It implies that price flexibility in industries where the producer reputation matters is less than in industries where it does not. Even if the difference between Means's notion of the administered markets and its vulgarized versions above might appear to be immaterial, their theoretical consequences are quite profound because they provide orthodox economists with more comfortable models at the cost of their explanatory power for the real world phenomena.

Empirical Bastardization of the Administered Price Thesis

This section deals with debates over econometric specifications for pseudo administered price hypothesis. Means views administered prices as a threshold phenomenon which becomes operative beyond a certain level of inherent market power but does not necessarily increase with every rise in inherent market power.⁹ Scherer (1970) admitted that there had been a sort of selection process in economics profession, which ended up with investigating what they wanted to see among Means's

⁹Some neoclassical economists (Farber, 1984; McRae and Tapon, 1979) recognized that Means original formulation of administered prices was not simply related to market concentration. But the majority of them interpreted the administered price as being related to the degree of market concentration.

numerous works.

Despite Means's objections, investigators have been forced to test not the broad conjecture, "Market power leads to prices rigid downward and flexible upward," but the narrower and more concrete hypothesis, "The more concentrated an industry is, as reflected by its four-firm concentration ratio, the more its prices will tend to be inflexible downward and flexible upward." (Scherer 1970: 294)

Three conventional specifications for econometric tests called as econometric price equations can be distinguished which are related to establishing a monotonic relationship between market structure and administered price thesis. The first, and oldest, tradition has focused on the frequency of price change, ignoring changes in costs and demand (Stigler and Kindahl, 1970; Weston et al., 1974; Weiss, 1977). Shortly, it came under simple criticism by orthodox economists since "more highly concentrated industries may well exhibit a lower frequency of price change because they have a lower rate of time preference, but their prices may also change infrequently simply because they experience a lower frequency of cost and demand shocks." (Encaoua and Geroski 1986: 52)

It led to the second line of work in this regard, which relates price variation to changes in costs and changes in demand, and then adds additional terms reflecting market structure.¹⁰ A great deal of the empirical literature which tested a pseudo administered price thesis has used a methodology based on this second tradition. For example, Aaronovitch and Sawyer (1981) estimated cross-section equations of the form:

$$\text{price change} = \text{cost change} + \text{demand change} + \text{measure of industrial}$$

¹⁰Dalton and Qualls (1979) wrote a survey paper on empirical studies before 1980 which are based on this tradition.

concentration in an industry.

Jones and Laudadio (1990) added to this specification export and import ratio to total demand. Such a model considers an additional increment in prices arising from a high level of concentration, which is independent of cost and demand changes. Market structure plays no role on the transmission of cost and demand shocks into prices, but exerts an independent effect on prices along with these effects. Still, it was also criticized and dismissed by other neoclassical scholars because of its lack of theoretical foundation. As Encaoua and Geroski put it,

[N]o clear evidence had emerged from this empirical work, since there is no theoretical reason why the value of the rate of change of prices would be directly influenced by market structure variables. (Encaoua and Geroski 1986: 52)

The third way out was to examine the effect of market structure on the transmission mechanism (Domberger 1981; Philips 1980; Weiss, 1993; Shaanan and Feinberg 1995). They interpreted the administered price in terms of the speed of adjustment, which captures not the extent to which changes in costs are transmitted into changes in prices, but how rapidly this happens.

Increased market concentration is expected to prompt a slower price response to changing market conditions. This prediction was initially proposed by Means (1935); more recently, the argument has been made that concentrated industries can afford a long run perspective and hence feel less compulsion to respond to every change in supply and demand with a price change. (Shaanan and Feinberg 1995: 462)

The traditional “administered price” hypothesis states that prices in concentrated industries are less responsive to exogenous changes. (Weiss 1993: 1176)

Means’s administered price thesis has nothing to do with the speed or degree of price adjustment. The issue is not to show how quickly prices change, but where prices are determined; it is clear that Means argued that prices are determined inside firms

and independently of current market conditions, and administered into the market. Note that in the above quotes, the neoclassical economists argue for the proposition that administered price thesis is a result of a temporary observation since the issue is not whether price is determined through markets but when price responds to exogenous changes. They moved the emphasis from theoretical to empirical issues. Even so, many studies appeared to be in conflict with their expectation (Kawasaki et al. 1983; Domberger 1979). Indeed, the results are inconclusive depending on variables used, model specification, and periods. It led some economists to develop a model to analyze the possibility of an ambiguous, non-monotonic relationship between market concentration and pricing behavior (Bedrossian and Moschos 1988; Worthington 1989; Jackson 1997). They explain every possible outcome by setting up arbitrary ranges of values. That means, however, that there is nothing that they can explain for sure about the direct relationship between industrial concentration and price rigidity.

Conclusion

With his administered price thesis, Means developed a non-Keynesian explanation of the Great Depression, and his empirical claims were quickly subjected to statistical tests during 1930s-1960s (Lee and Downward, 1999). This chapter goes through neoclassical reactions to Means's administered price thesis during the 1970-2000 period. Neoclassical attempts to deny and rationalize the thesis are shown to be unsuccessful since their sanitized versions of Means's theory turn out to be self-contradictory in the neoclassical framework. Their failure finally led some mainstream economists such as Blinder et al. (1998) and a great deal of follow-up studies including

Fabiani et al. (2007) to ask administrators about how they set prices and why their prices are stable, which is exactly what Post-Keynesian and Institutional economists usually do to build and test theoretical frameworks.

Although even Stigler and Kindahl, who sharply attacked Means's works, admitted, "We reckon him among the most influential of economists in the history of this country" (Stigler and Kindahl 1973: 717), Means's original administered price thesis gained little acceptance in the economics profession; furthermore his thesis has been continuously denied. At the same time, his original thesis has been transformed through a multiplicity of rationalization processes in one or another bastardized form, and then it has come under severe criticism based on these vulgarized concepts as if they were Means's own hypotheses.

The very reason for their denial and rationalization of the administered price thesis is astonishingly simple: it challenged the vested interests of mainstream economists who advocate market superiority based on coordinating price mechanism (Ware 1992; Lee 1998, 1999).

CHAPTER 3

EXTENDING POST KEYNESIAN PRICE THEORY

Introduction

Managerial accounting textbooks mainly consist of a compilation of common company practices such as costing and pricing. In contrast to the traditional theory of optimal pricing, managerial accounting offers accounting principles used as a guide in day-to-day costing and pricing practices. The most common real-world pricing practices include cost-based pricing, cost-plus pricing, or full-cost pricing. Although they come in a wide range of variations, they all base price on a calculation of an average total cost, which includes variable (direct), overhead (indirect), and sunk costs. The tradition of PK microeconomics has made an important contribution to the behavioral theory of the firm in terms of price stability by investigating and establishing costing and pricing procedures based on real-world accounting practices of the business enterprise as a going concern. In order to establish an empirically grounded pricing procedure, the first thing to do is review new empirical studies which investigate the advances in accounting and managerial techniques. Since the late 1980s, a decreasing number of business researchers have been trying to test the neoclassical pricing theory based on marginal cost and marginal revenue because most surveys and empirical studies have continued to disprove the unrealistic assertion. Instead, they have investigated and classified several pricing strategies in use in the field and also they have identified pricing objectives and pricing strategy determinants. The grow-

ing concern with the subject has provided much empirical literature such as survey, interview, and econometric analysis. Accordingly, since Lee (1998)'s attempt to build the empirically grounded pricing theory, there have been accumulating new empirical evidence not only in the manufacturing sector but also service, export and retailing sectors across the world, which raise the need to update and extend his study; since even the best empirically grounded concepts need more specific grounding, which demands the introduction of additional comparable data. As a result, it requires an updated, comprehensive taxonomy for pricing procedures, which is supposed to provide an analytical scheme.

Grounded on new empirical evidence, I make it clear that we need two different taxonomies in order to make an organized connection between empirical evidence and economic theory: one being predicated on costing process and the other based on mark-up process; thus they occupy different dimensions, respectively. There turn out to be several combinations of component pricing procedures of the two taxonomies, which help in the understanding of the evolutionary path of business enterprises. Section 2 deals with Post Keynesian classification of pricing procedures proposed by Lee (1998) and Lavoie (2001); and shows that their classifications need to be updated to reflect new evidence. Section 3 summarizes the new empirical evidence on costing process and mark-up process reported by management and business researchers since 1990s. Section 4 proposes a newly extended classification of pricing procedures grounded on the empirical data. Section 5 discusses pricing analysis for price stability and cyclicity with the help of the new taxonomy. Lastly, section 6 concludes.

Post Keynesian Classification of Pricing Procedures

Pricing procedures refer to the specific formulas used in order to set a price. These formulas can range from highly sophisticated ones to rather simple ones. Lee (1998) suggests an empirically grounded pricing foundation for Post Keynesian price theory based on over 100 empirical studies conducted until early 1990s on costing and pricing to establish the appropriate analytical exposition of the costing and pricing procedures and price policies of the business enterprise and to delineate the properties of the prices. The essential scheme is that “depending upon the costing procedures used by the enterprise, the pricing procedures used by it will ensure that the costing margin or markup will cover overhead costs and produce a profit” (Lee 1998: 204) with all of the costs estimated at a normal or standard level of output. Lee (1998: 205; 2003) suggests three pricing methods as integrating categories, and formalizes these pricing procedures in the following manner:

- Labor and material-based mark up pricing: $[NADC][1+k] = \text{price}$

- Normal cost pricing:

(i) $[(NADC)(1+g)][1+r] = \text{price}$

(ii) $[(NATC)(1+r)] = \text{price}$

- Target rate of return pricing: $[NATC][1+t] = \text{price}$

where NADC is normal average direct costs;

NATC is normal average total costs;

k is the mark-up for overhead costs and profit;

g is the mark-up for overhead costs;

r is the mark-up for profit;

t is the mark-up for profit which will produce the target rate of return with respect to the value of the enterprises capital assets.

As noted above, the main difference between labor and material-based mark-up pricing and the other procedures stems from different cost accounting systems behind them. Concerning their differentiation in practice, Lee (1994, 1996, 1998) argues that “it is conceptually inappropriate to algebraically reduce normal cost or target rate of return pricing procedures to a mark up pricing procedure, since the latter is used only by enterprises who cannot (or do not) identify, quantify and allocate their overhead costs among their products and who cannot (or do not) separate costs from profits.” (Lee 1998: 206)

Lavoie (2001) suggests cost-plus pricing and mark-up process as essential parts of Post Keynesian price theory. While cost-plus pricing comes in several variants, it is defined to mean that “firms fix prices based on some measure of costs, rather than as a reaction to demand fluctuations.” (Lavoie 2001: 21) He differentiates between some variants of cost-plus pricing procedure as follows:

- Kaleckian markup pricing: $[UDCc][1+m] = \text{price}$

- Normal-cost pricing:

(i) $[UDCn][1+a] = \text{price}$

(ii) $[TACn][1+b] = \text{price}$

(iii) Target-return pricing: $[TACn][1+t] = \text{price}$

where $UDCc$ is unit direct costs assumed as constant regardless of the level of capacity utilization;

$UDCn$ is unit direct costs estimated at normal output;

TAC_n is total average costs estimated at normal output;

m is a gross margin;

a is a gross costing margin;

b is a net costing margin;

t is a target rate of profit.

He concludes that as a variant of the normal-cost approach, the target-return pricing procedure is the most sophisticated approach since the enterprise must know the worth of capital or of the value of newly built plants as well as direct and indirect costs estimated at normal capacity utilization. As he puts it, however, the first normal-cost pricing in which a gross costing margin is set over unit direct costs, has been the most popular with Post Keynesian writers. In addition, he reviews three key determinants of the target rate of return suggested in Post Keynesian literature. A first factor is a mix of competition among entrepreneurs and power struggle involving labor; a second answer is that the target rate of return results from an enterprises compromise between coping with potential competition and maximizing retained earnings for capital accumulation; a third explanation is that it is determined largely by the real rate of interest that arises from the central bank, following suggestions made by Sraffa and Garegnani.

However, both of Lee (1998) and Lavoie (2001) have some limitation that they fail to provide an organized classification of pricing procedures since their taxonomies do not differentiate between the two components of a pricing procedure: costing process and mark-up process. In other words, they presuppose that target rate of return pricing and normal-cost pricing can be posited in the same dimension. Yet,

in fact the former is concerned with mark-up process and the latter is predicated on costing process. In addition, they miss out on recent development of costing and mark-up practices in the field through 1980s onward. In order to revise their classifications, the first thing to do is review new empirical studies which investigate the advances in accounting and managerial techniques; then I will suggest two different taxonomies which can embrace not only the previous pricing taxonomy but also the newly-accumulated empirical studies from the perspective of Post Keynesian microeconomics.

Recent Development of Pricing Procedures in Practice

To set a price of a product, the pricing administrators of the business enterprise first determine its cost-base. Utilizing cost and management accounting, the pricing administrators determine their product's average direct costs, average overhead costs, and average total costs at budgeted output. Since the average costs vary as output changes, it is necessary to choose a particular level of output for budgeting purposes so that the pricing administrators may select a profit mark-up on the budgeted average costs to set the price. This pricing procedure means that the price of the good is set before the good is produced and exchange takes place. The pricing administrators then take the administratively-determined price and administer it to (or impose it on) the market given their information on the market.

Lee (1998) builds up an empirically-grounded price theory, but he includes little data on export industry and service sector, which accounts for approximately two-thirds of the economic activity of an advanced capitalist economy such as the

United States, with almost all of the referred studies conducted prior to 1990; and he excluded a then-burgeoning but now-prevailing costing technique, activity-based costing (ABC). This subsection reviews new evidence accumulated since 1990 in the field of cost and management accounting in order to establish an extended empirically-grounded model of pricing.

Development of New Costing Technique since 1980s

Technological changes in manufacturing and service sectors have made the traditional costing method obsolete in many firms. Traditional unit-based costing systems are often no longer adequate in measuring product costs because overhead costs have increased while direct labor costs have decreased during 1980s and onward. Traditional cost management has become less and less efficient in providing accurate information to the entrepreneurs. In particular, traditional standard costing and variance analyses have been subject to a great deal of criticism within academic circles that they have severe limitations when used to analyze indirect costs. Given the increasing importance of overhead cost and the fact that the limitations of traditional volume-based cost system arise primarily in the calculations and interpretations of the overhead variances, the discussion has been centered on the analysis of the overhead costs.

Activity-based costing (ABC) has attracted high levels of interest from both academics and practitioners since its emergence in the late 1980s (Appendix B3, B6, B7, B9). ABC is a method of assigning costs according to the factors that cause actual costs. The ABC technique tries to identify the real costs associated with production,

and allocates indirect costs like clerical costs, office expenses, supplies, and so on, to the activities that use them, rather than in some proportion to direct costs. The ABC procedure is a multistep method of assigning the cost of resources to activities and then the cost of activities to cost objects, such as products, product lines, and consumers.

The ABC procedure promises greater costing accuracy, improved decision making, enhanced strategic planning, and insight concerning activity management. These benefits, however, are not obtained without costs since the key to effectively employing ABC is to define and judge activities properly. In other words, the traditional costing procedure is easy and inexpensive to implement, but the information obtained could be too raw to be accurate, whereas the ABC procedure solves the problem but is expensive and time-consuming to implement. Given the strengths and weaknesses of the two costing systems, business enterprises rely on both of them with varying degrees of the scope and sophistication of their ABC applications rather than they choose and operate only one of the discrete alternatives (Appendix B8, B10).

With regard to conditions which allow for the rapid proliferation of ABC technique, Friedman and Lyne (Appendix B11) suggests three factors: the development of information technology offered a great opportunity for ABC, which requires complex processes to record its data; the increasing complexity of financial reporting requirements, such as the accounting standards in the UK and US, forced companies to choose a more complex, but accurate method to calculate their overhead; and the growth of cost and management accounting since the 1980s benefited a large number of people who later became accountants or high-level managers and who understood

the importance of implementing a new costing system.

Concerning the reason or motivation for adopting the new system, ABC information was used by a variety of groups of people for different purposes. Among them cost reduction efforts can be seen as the main purpose; the activity analysis upon which ABC and ABM (Activity-Based Management) founded is important in cost reduction in the field because it highlights how processes (and possibly product design) can be made more efficient and cost effective (Appendix B4, B5, B6, B7, B8). That is the reason why accountants tend to call such cost reduction efforts activity based management. Another benefit of ABC included the production of more relevant information for decision making and improved product costing and profitability information (Appendix B1, B2).

Diversification of Pricing Strategies since 1980s

While the controversy over neoclassical price theory that Hall and Hitch (1939) ignited has been ignored by mainstream economists, the management and accounting academics have been investigating and classifying several pricing strategies or policies in practice since Tellis (1986) constructed a unifying taxonomy of the various strategies described in the literature. At the same time, business researchers have been utilizing a new framework of cost-based vis-a-vis market-based pricing methods for interview or survey of firms in order to collect data and publish their papers. They consider the cost-based method as setting the price of a product at a level that provides a specified percentage profit margin over relevant costs; the method is regarded to be conventional and used only when conditions allow, while in other circumstances

it may be only the starting point in price determination. In the market-based pricing method, the mark up rate is supposed to subsequently adjust in response to prevailing or anticipated conditions such as competitors, product life cycle, and consumers' preference.

The empirical evidence in Table 1 clearly indicates that both of the two methods are used by business enterprises. Interestingly, the cost-based method still remains prevalent in most sectors and business type across the world - even in the case of export-oriented or bidding-driven business in which fierce price competition is believed to prevent participant enterprises from setting prices based on costs with conventional and inflexible rate of mark-up. Nevertheless, there is a tendency that the adoption of the market-based method has been increasing and dominating in some business types and sectors since 1980s.

However, it is necessary to modify their classification from the perspective of Post Keynesian economics. As with the cost-based pricing method, all the strategies of the market-based method are supposed to take into consideration the cost information because an enterprise has to be able to reproduce itself, which requires covering at least average total cost of the product (Appendix C20: 437). The fundamental difference between the two methods is just which information is primarily relied on in the pricing procedure, which in turn implies that the distinction can be boiled down to what is the main determinant of the profit markup. Therefore, prices are predicated primarily on cost structures with the resulting markup rates reflecting other decision-making factors. I would suggest new terms: Refined Cost-plus Pricing (RCP) procedure to refer to what the business researchers call market-based pricing

method, and Traditional Cost-plus Pricing (TCP) procedure to indicate what cost-based pricing method refer to. These new terms are to provide much clearer meaning of what the pricing methods are really like for economists.

Table 1. Survey Studies on Pricing Procedures

Study	Country	Year	Obs.	Business Type	Sector	TCP	RCP	Survey Method
C1	South Africa	1985	12	Bidding	Construction	50	50	Multiple/Portion
C13	USA	1998	91	Bidding	Construction	14	86	Single Choice
C18	USA	2003	73	Comprehensive	Comprehensive	47	52	Multiple Choice
C18	Singapore	2003	54	Comprehensive	Comprehensive	43	48	Multiple Choice
C18	India	2003	72	Comprehensive	Comprehensive	51	42	Multiple Choice
C19	Japan	2000	387	Comprehensive	Manufacturing	23	40	Multiple/DI
C19	Japan	2000	213	Comprehensive	Nonmanufacturing	11	27	Multiple/DI
C10	USA	1982	323	Comprehensive	Service	63	36	Multiple Choice
C14	Greece	2000	170	Comprehensive	Service	58	55	Multiple Choice
C6	USA	2004	405	Consumer	Manufacturing	49	35	Multiple Choice
C8	USA	1997	369	Export	Comprehensive	Most	Few	N/A
C8	USA	1995	8	Export	Manufacturing	50	50	Single Choice
C8	Mexico	1995	8	Export	Manufacturing	43	57	Single Choice
C1	South Africa	1985	9	Industrial	Manufacturing	44	56	Multiple/Portion
C2	USA	1988	50	Industrial	Manufacturing	76	24	Single Choice
C4	USA	1994	270	Industrial	Manufacturing	56	30	Multiple Choice
C5	Singapore	1997	75	Industrial	Manufacturing	43	33	Multiple Choice
C11	USA	1989	71	Industrial	Service	1.54	1.93	Scale 1-5
C15	Greece	2009	177	Industrial	Service	3.72	3.65	Scale 5-1
C16	UK	1990	115	Industrial Distributor	Wholesale	60	57	Multiple Choice
C16	UK	1990	80	Industrial Distributor	Wholesale	54	50	Multiple Choice
C7	UK	1980	116	Industrial Export	Manufacturing	38	62	Single Choice
C9	UK	1997	178	Industrial Export	Manufacturing	3.94	2.95	Scale 5-1
C17	USA	2002	169	Industrial Export	Manufacturing	32	68	Single Choice
C12	UK	1995	50	SME	Service	82	18	Single Choice
C3	UK	1998	40	SME		Most	Few	N/A

Refined Cost-plus Pricing (RCP) procedure to refer to what the business researchers call market-based pricing method, and Traditional Cost-plus Pricing (TCP) procedure to indicate what cost-based pricing method refer to. These new terms are to provide much clearer meaning of what the pricing methods are really like for economists. In addition, the studies (C1-C19) refer to those specified in Appendix C.

Extended Classification of Pricing Procedures

The marketing and management literature on pricing has been paying attention to the relationship between several alternative pricing objectives and the pricing strategies. However, in fact all the objectives end up being devised to serve the

business enterprise's ultimate objective: its survival as a going concern. Thus, it is much less relevant to differentiate between several objectives and to associate them with pricing strategies at least in the discipline of microeconomics. Indeed, one of the major microeconomic issues is centered on a business enterprise's evolutionary aspects such as its active reaction and passive adaptation to market or institutional environments.

There are a few integrative grounded theories that analyzed what conditions determine which pricing procedure is more likely to be pursued. There are two types of PK behavioral taxonomy or classification on pricing procedures as discussed in Section 2 of this chapter. Although prices are determined through both costing procedures and profit markup procedures, they incorporate these two idiosyncratic dimensions in their pricing classifications. In other words, one group of the pricing procedures which they identify is predicated on different costing procedures, taking the rate of profit markup simply as given whatever the markup procedure may be, whereas the other group is defined according to the profit markup procedure, taking their relevant cost base as given whatever the costing procedure may be. Thus, it is necessary to differentiate between the two perspectives on pricing procedures and identify them as two different taxonomies: the costing-oriented pricing taxonomy and the markup-oriented pricing taxonomy respectively. It should be noted that this does not mean that the previous pricing classifications are simply falsified; rather they reflect the reality of their own time period in terms of pricing procedures which are supposed to be historically contingent. The two taxonomies suggested here are developed and extended from the previous perspectives, with the intention of taking

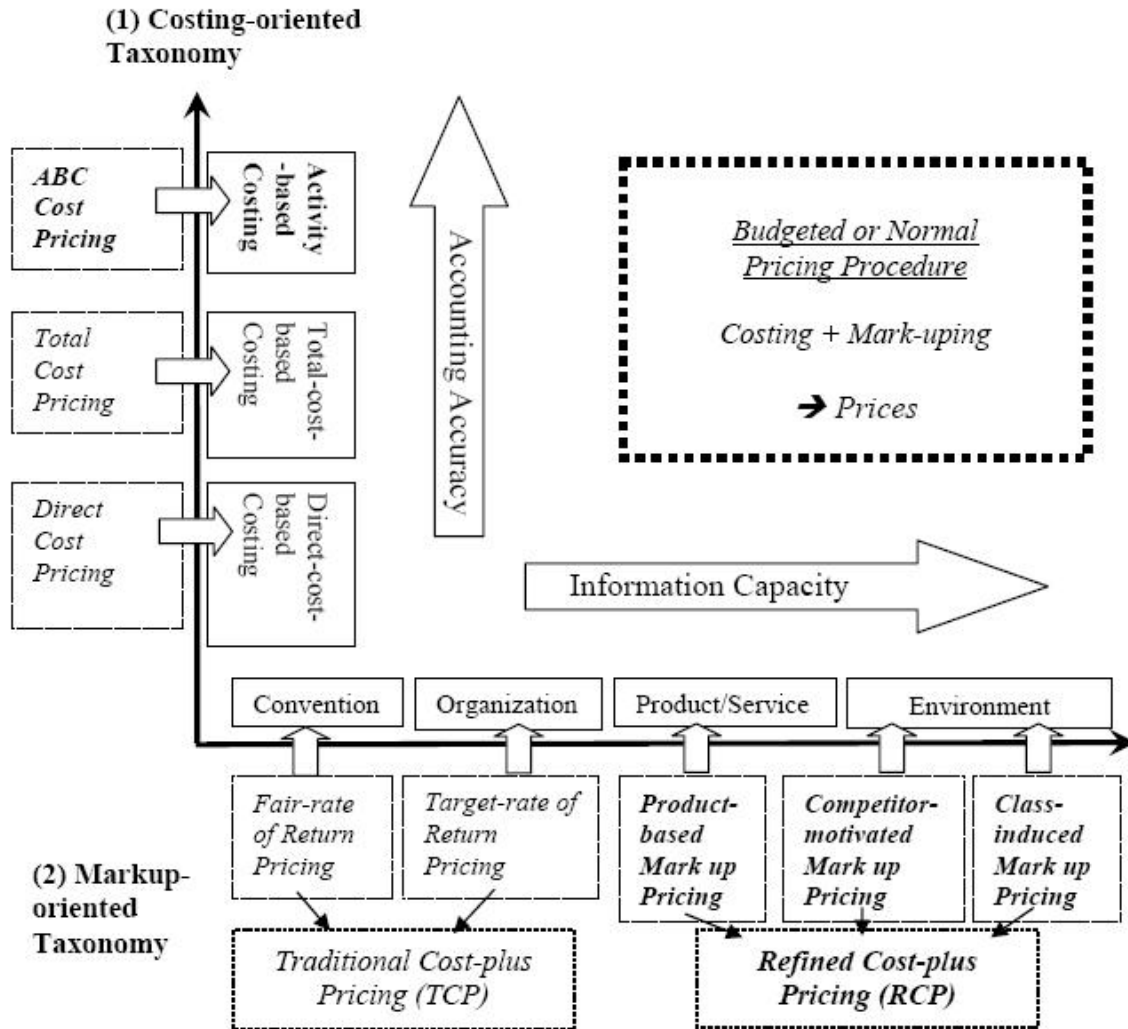


Figure 1. Pricing Procedures according to Two Taxonomy Systems

into consideration recent developments in accounting system and pricing practices in the business world since the early 1990s. In Figure 1, the pricing procedures with a bold style are suggested to incorporate the newly-accumulated empirical data.

Costing-oriented Pricing Taxonomy: Cost Pricing Procedures

The costing-oriented pricing taxonomy is a pricing classification predicated primarily on various costing procedures, including both traditional and newly-invented costing techniques. The pricing procedures in the costing-oriented taxonomy are budgeted direct cost pricing, total cost pricing, and ABC cost pricing. Their cost base always depends on budgeted output instead of actual or realized output. Direct cost pricing consists of marking up average direct cost based on the budgeted volume of output to set the price, with the markup being sufficient to cover overhead costs and produce profits:

$$P = [ADC_b][1 + k] \quad (3.1)$$

where P is price, ADC_b is budgeted average direct cost, and k is the markup for overhead costs and profits. Total cost pricing has two forms: one is to mark up ADC_b to cover overhead costs, which gives budgeted average total cost (ATC_b), and then apply a profit markup to ATC_b to set a price; the other applies the profit markup directly to ATC_b to set the price:

$$P = [ADC_b][1 + g][1 + r] \quad (3.2)$$

$$P = [ATC_b][1 + r] \quad (3.3)$$

where g is the markup for overhead costs based on the budgeted output and r is the markup for profits. As the most advanced pricing procedure, ABC cost pricing can be formulated in the following manner:

$$P = [ADC_b][1 + \sum_{i=1}^n x_i][1 + r] \quad (3.4)$$

where x_i is the mark-up to cover an allocated part of i-th overhead cost according to the product's consumption of the activity that causes the overhead cost. It should be noted that the difference between total cost pricing and ABC cost pricing consists in the specific method by which to determine the mark-up for the overhead costs. With more than one product which a business enterprise produces, total cost pricing allocates the total amount of the overhead costs to each product based on each product's budgeted volume which may be irrelevant to the causes of the overhead costs, whereas ABC cost pricing utilizes each product's relative consumption of each overhead resource to allocate the total amount of the overhead costs among its products.

Markup-oriented Pricing Taxonomy: Cost-plus pricing procedures

The markup-oriented pricing taxonomy is the other pricing classification, in which pricing procedures are differentiated according to a variety of profit mark-up procedures after presupposing a cost base such as ATC_b , regardless of what its costing procedure is. The best-known pricing procedures identified by this taxonomy are fair-rate of return pricing and target-rate of return pricing. In addition, there is also a refined pricing procedure, which can be divided into three sub-groups: product-based mark-up pricing, competitor-motivated mark-up pricing and class-induced mark-up pricing.

Firstly, fair-rate of return pricing is a cost-plus pricing procedure in which the mark-up is predetermined by convention or a fair rate of profit, based on the

industry norms, which are customs and practices established within an industry and with which firms usually comply. These customs and practices are known by the industry, and the industry will expect that all business and trading conform to these customs and practices. In the context of pricing, these customs and practices are manifest as acceptable and expected markups and margins; such margins can be known, particularly where products have little differentiation.

Secondly, target-rate of return pricing is a cost-plus pricing procedure in which the markup is determined exclusively by organizational conditions. Suppose that a new business enterprise installs plant equipment to produce a product, and aims to generate a desired flow of funds from that investment for whatever it wants to achieve. A possible target rate of return pricing consists of marking up ATC_b by a certain percentage to generate a volume of profits at budgeted output that will produce a specific rate of return with respect to the value of the enterprise's capital assets connected with the production of the product. That is, given the value of the capital assets (VCA) associated with the production of the product, the pricing administrators want to obtain a specific target rate of return (TRR) on those assets. Therefore, the profit required to meet the target rate of return is target profits ($TRR \times VCA$). To incorporate the target profit figure into the price, it is first divided by budgeted output (B) to get the targeted margin, and then divided by ATC_b to get the targeted profit markup (t):

$$P = [ATC_b][1 + t] = [ATC_b]\left[1 + \frac{TRR \times VCA}{B \times ATC(b)}\right] \quad (3.5)$$

Given the targeted profit markup, if the business enterprise produces at bud-

geted output, enough profits will be generated to attain the desired target rate of return on the capital assets (Eichner, 1976; Lavoie, 1992; Lee, 1998; Downward, 1999). Because actual output can differ from the budgeted output, the business enterprise will not always achieve its target rate of return or desired profits, sometimes being above it and other times being below it over the business cycle.

Refined cost-plus pricing procedures take into account not only convention and organizational situation but also costly information on characteristics of the organizations products, strategies of its competitors, or the extent of willing-to-pay by a target income class. They can be divided into three sub-groups: product-based, competitor-motivated and class-induced mark up pricing procedures.

First of all, product-based markup pricing is a cost-plus pricing procedure in which the markup rate is predominantly adjusted to reflect characteristics or life-cycle of products. Product characteristics have much to do with the product's life cycle in the market and complementarities between the enterprise's products; business enterprises sometimes use a joint markup rate for a group of products in the existence of complementarity or optional functions between them. This procedure is closely related to real-world pricing practices such as skimming pricing, premium pricing, economy pricing, penetration pricing, experience/learning curve pricing, price bundling, system pricing, complementary product pricing, and razor-and-blade pricing.

Secondly, competitor-motivated markup pricing is a cost-plus pricing procedure in which the markup rate is set mainly to be responsive to the strategies of competitors in the same industry. Relevant information on environment includes

barriers to entry; domestic and foreign competitors; technology differentiation between competitors; activity of industry associations; consumer goodwill; consumer groove-in (lock-in); target income class; and government regulations, which leads to detailed knowledge on price leader-follower relations. Depending on the relations, business enterprises position themselves in setting markup rates and thus prices; they have several options such as leader pricing, parity pricing, low-price supplier, and opportunistic pricing. In the majority of industries, large business enterprises set the rules of the game, leaving smaller ones with small price discretion and no other option than to follow the leaders' pricing initiatives since the price leader tends to maintain its superiority of technology (Heil and Helsen, 2001).

Lastly, class-induced markup pricing is a cost-plus pricing procedure in which the markup rate differs primarily according to the primary target class based on the same information on environment as the competitor-motivated one. Business enterprises can create markets for and set desirable markup rates on their products by manipulating preferences of their consumers in the case of perceived-value pricing, price signaling, reference pricing or image pricing and by isolating their customers in the case of second-market discounting. Interestingly, the role of class-induced markup pricing is marginalized even in the service sector; it is paradoxical given the fundamental role of customer interaction in that sector. It might be attributed to the difficulty associated with determining customers' demands and needs along with the value that they attach to the service in practice (Zeithaml et al., 2006).

To recap, Table 2 summarizes the new system of two pricing taxonomies and the relations between the pricing procedures suggested from the perspective of PK

behavioral economics as applied to firms and the pricing strategies reported in business literature. It should be noted that the complexity of pricing decisions imposes the need to adopt more than one pricing procedure. For example, a particular pricing strategy can be used in everyday pricing decisions, while another one may be adopted in some special circumstances (Monroe, 2003). Moreover, it should be emphasized that sophistication of the pricing procedures does not imply that price change become more frequent; and that prices grow more flexible than with traditional procedures.

Table 2. An Extended PK Pricing Taxonomies, Pricing Procedures, and Pricing Strategies

Taxonomy	Pricing Procedure		<i>Pricing Strategy in the Field</i>
(1) Costing-oriented Taxonomy	Traditional Cost Pricing	Direct Cost Pricing	<i>full-cost pricing</i>
	Refined Cost Pricing	Total Cost Pricing	<i>full-cost pricing</i>
		ABC Cost Pricing	<i>full-cost pricing</i>
(2) Markup-oriented Taxonomy	Traditional Cost-plus Pricing	Fair-rate of Return Pricing	<i>cost plus pricing</i>
			<i>fair return pricing</i>
		Target-rate of Return Pricing	<i>target return pricing</i>
	Refined Cost-plus Pricing	Product-based Markup Pricing	<i>break-even pricing</i>
			<i>skimming pricing</i>
			<i>premium pricing</i>
			<i>economy pricing</i>
			<i>penetration pricing</i>
			<i>experience/learning curve pricing</i>
			<i>price bundling or system pricing</i>
		Competitor-motivated Markup Pricing	<i>complementary product pricing</i>
			<i>leader pricing</i>
			<i>parity pricing</i>
		Class-induced Markup Pricing	<i>low price supplier</i>
			<i>opportunistic pricing</i>
			<i>perceived-value pricing</i>
			<i>second-market discounting</i>
			<i>price signaling</i>
			<i>image pricing</i>
			<i>reference pricing</i>

Taxonomies as an Analytic Scheme of Industrial Evolution

The two-taxonomy system may help explore a possible evolutionary track or path which an industry in a specific culture and time tends to go through. The

combination of direct cost pricing and traditional cost-plus pricing (a in Table 3) can be seen the simplest form of pricing procedures, while the pair of ABC cost pricing and refined cost-plus pricing (f in Table 3) can be considered as the most sophisticated formula which a business enterprise can take as a going concern. A transition path from one cell to another may indicate the order in which evolution has been taking place in the economy. For example, there can be three alternative paths from a to f since the movement may be allowed only either to the right or upward of each cell.

Table 3. Examples for Alternative Evolution Paths in an Industry

	Traditional Cost-plus Pricing (TCP)	Refined Cost-plus Pricing (RCP)
ABC Cost Pricing	c	f
Total Cost Pricing	b	e
Direct Cost Pricing	a	d

Note: The figures in the cells mean the order in which evolution may take place; this table exemplifies three alternative paths through 1-4; the movement may be allowed only either to the right or upward of each cell. This table is a simplified version of Figure 1.

In other words, there can be three reasonable paths in the evolutionary process of an industry or economy.

The routes may vary along industry, country, culture and other socio-economic environment. For example, Lee (1994, 1996) shows that it is conceptually inappropriate to algebraically reduce total cost pricing to direct cost pricing, since the latter is used only by enterprises who cannot or do not identify, quantify, and allocate

their overhead costs among their products and who cannot or do not separate costs from profits. Thus, utilizing total cost pricing requires a firm to have more specific and detailed information on its cost structure, which can be affected by accounting standards - the government regulation on financial accounting process. In addition, thinking back to the emergence of ABC cost pricing illuminates the possible effect of industrial characteristics on the evolutionary paths. ABC cost pricing was initially developed and adopted in the manufacturing sector, given that activity-based costing was named and became a formal discipline in 1986 as a result of a project initiated by the Consortium of Advanced Manufacturing-International (CAM-I) working in conjunction with the National Association of Accountants (NAA). It implies that firms in the manufacturing sector are more likely to go through a-b-c-f than service providers.

Moreover, it would be an interesting question to ask why some countries or industries are more likely to reach the final step than others. Since the extended taxonomies can embrace recent business research, they may allow us to exploit the relevant empirical data from various sources and thus provide us with some hints or clues to the questions. Further studies are needed on this issue.

Pricing Analysis for Price Stability and Cyclicity

Except for the case of a dramatic change in the prices of inputs such as energy costs, prices are stable at least during a pricing period, that is, remain unchanged, since they are determined along with the firm's routine budgeting process and then are administered to the market during that period, as is shown in the previous section. In other words, price stability is inherent to the price-setting mechanism, which I call

“intrinsic price stability”. At the same time, it is obvious that prices may change for the next pricing period. The number of the consecutive pricing periods during which prices remain unchanged varies across products, industries and countries. However, that difference cannot be explained by intrinsic price stability since the routine accounting and budgeting process is common to all the firms no matter what and where they produce. Rather, the persistence of the unchanged prices beyond a pricing period depends on the frequency and magnitude of the changes in its profit markup and cost base. This form of price stability is named as “extrinsic price stability”, which is a stability induced by a low degree of volatility of the cost base and/or a high rate of the profit markup’s absorption of shocks and changes to the cost base as well as the change in the profit markup itself.¹ In other words, extrinsic price stability reinforces and extends intrinsic price stability.

Now that we have a clearer understanding of how firms set their prices and why prices are stable at least during a pricing period, we are also capable of analyzing why some US industrial prices have become a-cyclical, that is, more stable over the cycle since the early 1980’s. The reason is that when the extrinsic price stability is weakened over the cycle, we have more cyclical price movement. Extrinsic price stability is affected theoretically by changes in profit markup, cost base and/or demand shock.

The change in the profit markup can be caused by long-term structural fac-

¹Dhyne et al.(2009) made a similar-looking, yet different distinction between intrinsic and extrinsic price rigidity, where a price is intrinsically rigid when it does not adjust, or only partially adjusts, to changes in demand and costs that have significant effects on the optimal price whereas a price is extrinsically rigid when the price does not adjust because demand and costs are stable and the optimal price does not vary much.

tors and short-term strategic factors. First, the most influential long-term factor is heterogeneous industry life cycle. Some research on firm dynamics tracks entrants to determine their subsequent growth and mortality rates along the industry life cycle. Klepper (1996) lists the empirical regularities concerning how firms' entry-and-exit decisions vary along the degree of maturity of a technologically progressive industry. One of the stylized facts on the long run effect of industry life cycle on firm dynamics is that the rate of change of the market shares of the largest firms declines and the leadership of the industry stabilizes, which implies that the profit markup is also stabilized within a certain range of percentage in the long-run. As an industry matures, it establishes different kinds of market governances, which allows the price leader in the industry to stabilize its profit markup rate through implicit collusion. Second, the most decisive short-term factor to determine the profit markup is firm dynamics over the cycle. The profit markups can fall because of new entry or the threat of entry in booms (Chatterjee et al., 1993). It is undoubtedly true that more new firms incorporate in booms. Net entry (measured as net business formation, i.e., the difference between new incorporations and failures) and realized total profits comove, and both are strongly procyclical (Bilbiie et al., 2007). The contemporaneous correlation coefficient between net entry and output (measured by real GDP) ranges over the interval 0.70-0.73 (Lewis, 2006; Bergin and Corsetti, 2005; Devereux et al., 1996).

The difference of the cost base between two successive pricing periods depends on changes not only in the prices of labor, material inputs, and overhead costs, but also changes in the material and labor productivity. The wages of most workers - at least those who do not switch jobs - typically change only annually and are mediated

by a complex set of institutions. Barattieri et al. (2010) find that the probability of a wage change is about 18 percent per quarter, thus implying an expected duration of wage contracts of 5.6 quarters in the U.S. economy. Moreover, examining longitudinal microeconomic data (PSID dataset) on the distribution of annual nominal wage and salary changes of U.S. workers who remain on the same job, Kahn (1997) finds that 11% of wage earners receive the same nominal wage/salary in consecutive years and that there is also evidence of downward nominal wage stickiness.² More recently, the International Wage Flexibility Project (IWFP) - a consortium of over 40 researchers with access to individual workers' earnings data for 16 countries including the United States (during 1970-1997) - finds a high incidence of wage freezes and a lack of nominal wage cuts and a tendency for workers' wage changes to clump in the vicinity of the expected rate of price inflation, which are taken evidence of downward rigidity in nominal wages and downward real wage rigidity, respectively (Dickens et al., 2007). Using data for hourly nominal wages at industry level, Holden and Wulfsberg (2008) also show the prevalent existence of downward nominal wage rigidity on industry wages in 19 OECD countries over the period 1973-1999. Those studies imply that there is little empirical evidence of cyclical ups and downs of nominal wages. In addition, since intermediate goods are seen as products by other firms in the input-output framework, the price cyclicity of intermediate goods is a result from some other factors which drive price cyclicity. Thus, the change in the cost base over the business cycle is accounted for much more by the change in productivity measures

²Between 1977 and 1988, on average only 10.56 percent of wage earners received a nominal pay cut from their current employer, while 24.34 percent of salary earners received a nominal cut.

than the differences in wage rates and material input prices. Given that the profit markup absorbs only part of changes in the budgeted average total cost, the lower cost base leads the price to drop while the degree of the price cut depends on the firm's pass-through policy. If the budgeted total average cost is counter-cyclical, then the price will also be counter-cyclical. Furthermore, most of the variation in the average total cost over the cycle stems from labor productivity fluctuations since material inputs tend to vary proportionally along with output changes.

Price a-cyclicalities are also associated with incomplete cost pass-through policy. A firm's pass-through policy is a strategic variable where an agency can play its clear role. It is an interaction between changes in markups and shocks to input price and productivity. A number of empirical studies document that shocks to input prices and productivity are not fully passed through to prices at the industry level.³

Figure 2 shows possible causal mechanisms which have an effect on markups, cost base, and/or cost pass-through policy from both neoclassical and PK behavioral perspectives. According to neoclassicism, price cyclicalities depend on the cyclicalities of price elasticity of demand and/or the competitive condition associated with market structure, since cost base is simply marginal cost, which should be either increasing or constant. It is the cyclical movement of the profit markup that determines price cyclicalities in an industry while the cost base has no role in the process. Contrariwise, the PK behavioral approach shifts the emphasis back to the cost base. True,

³See, for example, Goldberg (1995) for the automobile industry, Kadiyali (1997) for the photographic film industry, Hellerstein (2004) for the beer industry, Nakamura and Zerom (2009) for the coffee industry, and Atesoglu (1997) for US economy as a whole.

profit markup itself can respond to demand shocks or changes by a limited degree for the strategic short-term purpose as is discussed above. However, most of the profit markup fluctuation comes from the changes in incomplete cost pass-through policy. In other words, even if profit markup appears to change significantly over the business cycle, there are two aspects or factors of the appearance: one being pure markup change per se while the other being cost pass-through policy change. Which factor dominates is an empirical question and will be addressed in the following chapter where we will also discuss on labor hoarding and discipline effects - the two countervailing determinants of labor input adjustment and productivity over the cycle.⁴

Conclusion

The tradition of PK pricing research has made an important contribution to the behavioral theory of the firm in terms of price stability by investigating and establishing costing and pricing procedures based on real-world accounting practices of the business enterprise as a going concern. Lee (1998) provides an empirically grounded foundation for PK price theory based on more than 100 empirical studies conducted until early 1990s on costing and pricing, which allowed him to establish the appropriate analytical exposition of the costing and pricing procedures and price policies of the business enterprise and price-setting market institutions and to delineate the

⁴It is obvious that the level of labor productivity is determined by long-term factors such as technology improvement represented by input-output production coefficients. Still, labor productivity fluctuates around its trend over the cycle, which is enabled by short-term labor input adjustment.

properties of the prices. The essential scheme is that depending upon the costing procedures used by the enterprise, the pricing procedures used by it will ensure that the costing margin or markup will cover overhead costs and produce profits with all of the costs estimated at a budgeted or standard level of output. Lavoie (2001) suggests cost-plus pricing and markup process as essential parts of PK price theory. While cost-plus pricing comes in several variants, firms fix prices based on some measure of full-costs, rather than as a reaction to demand fluctuations.

Post Keynesians rely on a pricing theory with strong links to the real world. In order to maintain the links, continuing investigation into the business practices is strongly required to update and extend earlier version of schemes and formulas. This chapter is one of the attempts to do so even if future research still needs to ascertain several issues.

I articulate two taxonomies: one is costing-oriented pricing taxonomy and the other is markup-oriented pricing taxonomy; in other words, “cost pricing procedure” and “cost-plus pricing procedure”. This two-dimensional division helps gain a far better understanding of the recent pricing practices of a business enterprise as a going concern from the viewpoint of economics, and provides an analytical scheme for possible evolutionary paths among industries, countries and cultures, and for price stability and cyclicity.

PK Behavioral Approach to Pricing							Neoclassicism		
Long-term Horizon			Business Cycle		Pricing Procedure	Price	Business Cycle	Long-term Horizon	
Heterogeneous Industry Life Cycle →	Investment Policy →	Market Governance →	→ → <i>(The long-term mark-up policy dictates the contemporary policy)</i>		Strategic Short-Term Mark-up for Profit →	Cost Pass-Through Policy →	← Price Elasticity of Demand	← Demand Function Preference	
	Market Share Dynamics →	(1) Demand Trend →	Demand Fluctuation →	Firm Dynamics →			← Firm Dynamics		
		Goodwill & Consumer Antagonism	(2) Demand Trend ↓	→ Investment Timing Adjustment →			→ →	← Implicit Collusion	← Market Structure
				Output Fluctuation →	Labor Hoarding Effect →			Labor Input Adjust -ment →	Labor Productivity (Q/L) →
Custom →	Lobbying → Market Openness →	Workplace Institutions →	Cyclical Unemployment →	Labor Discipline Effect →		Budgeted Average Direct Cost	← Real Marginal Cost	← Production Function with Variable Physical Capital	
Material Input's Degree of Processing →			Material Input Prices and Rigid Wages →			$\frac{wL}{Q_b} + \frac{P_v M}{Q_b}$	Cost Base		
Wage Bargaining Process and/or Vertical Integration →									
Realized Investments →	Labor Process Control →	Input-Output Production Coefficients →		→ →		Production Fluctuations →	Markup for Overhead Costs →		
Lobbying →	Political Elite →		Taxes →		Sales Taxes →				
Advertising, Lobbying, and Financing →	Supervisory Structure →		Other Overhead Costs →		Overhead Labor Costs →				

Note: The two-arrow symbol (→→) means direct influences of long-term factors regardless of cyclical output movements.

Figure 2. Causal Mechanisms for Traditional and Behavioral Approaches to Pricing

CHAPTER 4
HOW U.S. INDUSTRY PRICES RESPOND TO COST AND DEMAND
FACTORS OVER THE CYCLE

Introduction

Traditional neoclassical microeconomic theory suggests that only marginal cost is relevant for optimal pricing decisions, whereas fixed costs or sunk costs are irrelevant for pricing. In particular, while mainstream economists continue to explain price movement over the cycle predicated on cyclical profit mark-up or elasticity of demand with the marginal cost constant or increasing, PK economists argue that constant average direct costs and fixed indirect costs cause average costs to fall as the output increases, while the ex ante profit mark-up does not vary significantly within the business cycle. In other words, they consider the counter-cyclical cost movement with the quasi-constant mark-up as the implicit reason for counter-cyclical price movement, with the labor hoarding effect lying at the center of their exposition of counter-cyclical productivity and prices.

In real-world pricing practice, however, most firms around the world set their prices based on full costs rather than variable or marginal costs, as a number of surveys and management accounting textbooks show.¹ Fabiani et al.(2007) found in a large survey among European firms that most firms continue to employ a cost-based method to set their prices. Experimental studies also confirm that supposedly irrelevant fixed

¹See Appendix B and C for a list of the survey papers cited.

costs can have an impact on price formation. That is, experimental subjects take into consideration full costs rather than variable or marginal cost (Waller et al., 1999; Buchheit, 2004; Offerman and Potters, 2006; Friedman et al., 2007; Buchheit and Feltovich, 2008). In the experiment conducted by Offerman and Potters (2006), the average markup over marginal cost is 30% higher once a sunk entry fee is paid than in the baseline treatment with no fixed or sunk costs.

Section 2 shows that the correlations of detrended price and output for most 4-digit industries have turned to be close to zero since the early 1980s. The other sections analyze economic and structural factors behind the change, which is motivated by the PK behavioral model developed in the previous chapter.

Evidence on Changes in Price Cyclicalities

For most of the 20th century, economists believed that prices were clearly pro-cyclical. Most of the development of business cycle theories were predicated on the assumption that the overall price level is pro-cyclical, meaning that output and prices move in the same direction. In particular, New Classical economists as well as Bastard Keynesians often interpret it as strong evidence for the importance of demand shocks in the aggregate supply and demand framework. Based on these studies, Lucas (1977) considers that prices are pro-cyclical variables, leading to the monetary misperceptions model.

Some economists, however, started to suggest that prices turned out to be counter-cyclical after the Korean War, whereas they used to be pro-cyclical during the period prior to World War I (Friedman and Schwartz, 1982; Kydland and Prescott,

1990; Backus and Kehoe, 1992; Cooley and Ohanian, 1991). The counter-cyclical-ity of prices has become a stylized fact since there is a great deal of aggregate and dis-aggregate empirical evidence that prices are decreasing as outputs are increasing. Consider the aggregate evidence. Barro and Tenreyro (2006) show prices in 4-digit manufacturing industries are negatively correlated with GDP per capita. Konstantakopoulou et al. (2009) observes that there is a negative correlation between prices and real output at both leads and lags for the majority of OECD countries using quarterly data from 1960 to 2004. The countercyclical behavior of price level is also shown in Webb (2003), Agresti and Mojon (2001), Stock and Watson (1999), Chadha and Prasad (1994), Fiorito and Kollintzas (1994). Consider the microeconomic case studies. Chevalier et al. (2003) demonstrate that prices tend to fall in response to a positive demand shock for consumption goods such as beer, crackers, and tuna in a supermarket chain in Chicago. MacDonald (2000) finds that prices of groceries exhibit countercyclical behavior. Warner and Barsky (1995) show that appliances fall in price during Christmas. Indeed, the famous price wars in automobiles (Bresnahan, 1987) and railroads (Porter, 1983) occurred when demand was high.

The counter-cyclical pricing is inconsistent with the standard neoclassical model of production and cost since a price should be pro-cyclical as the marginal cost is increasing. Thus, some economists have been trying to reconcile the anomaly and their theoretical frameworks based on supply shock. Kydland and Prescott (1990) exploit the counter-cyclical-ity of prices to argue that supply shocks (not demand shocks) must account for business cycle fluctuations as the counter-cyclical prices could not be reconciled with a model driven by demand shocks, leading to the real business

cycle (RBC) models. Other studies have tried to address this issue predicated on the neoclassical monopoly model, particularly, possible changes in demand elasticity. For example, Plehn-Dujowich (2008) shows that the counter-cyclical movement stems from changes in the extent of competition if the income effect is decreasing in the price, as occurs when preferences are homothetic or demand is isoelastic. The controversy over price cyclicity is still among the most unsettled issues in economics.

Behavioral economists have also attempted to explain the counter-cyclical prices based on cost-base pricing procedure. While neoclassical economists continue to explain price movement over the cycle predicated on cyclical profit markup or elasticity of demand with the marginal cost constant or increasing, PK economists argue that constant average direct costs and fixed indirect costs cause average total cost to fall as the output increases, while the ex ante profit markup does not vary significantly within the business cycle. In other words, they consider the counter-cyclical cost movement and the quasi-constant markup as the implicit reason for counter-cyclical price movement, with the labor hoarding effect lying at the center of their exposition of counter-cyclical productivity and prices. For instance, Blair (1974) proposes a short-run target return model to see whether prices move pro-cyclically or counter-cyclically over the business cycle. He argues that prices tend to be counter-cyclical since unit labor and fixed costs are decreasing in the operating rate. That is, unit labor cost is decreasing in the output level due to the existence of hoarded labor, while fixed costs are spread out over the increased quantity produced thereby reducing average fixed costs. Prices tend to fall in expansion and rise in recession.

Prices can be, however, a-cyclical even if there are still the labor hoarding

practice and/or fixed costs, as shown in the U.S. during the post-1984 period. The price-output relationship began to change again in the US economy around the early 1980s onward. Based on monthly industrial production and the consumer price index, and quarterly GDP and its deflator, Haan and Sumner (2004) observe that the correlation between price index and output gap has become much less negative - nearly zero - during the last two decades for the United States, while no substantial change is observed for the other G7 economies. Mumtaz et al. (2011) also find that annual consumer price index has become significantly less countercyclical along GDP from the pre-1984 to the post-1984 sample

This macroeconomic change in the business cycle behavior of price into acyclical movement is substantiated by correlation coefficients between industry-level price and output for the periods before and since 1984. The data used in this study are based on the annual NBER manufacturing database. The database contains information on 459 four-digit US manufacturing industries for the period 1958 through 2005. I split the sample period into two sub-periods, that is, pre-84 and post-84. The choice of the break date has been made with the help of existing evidence on the reduced US price counter-cyclicalty at the aggregate level in the post-1984 period (Mumtaz et al., 2011; Haan and Sumner, 2004), the decline in variance of U.S. output growth, known as the Great Moderation in the post-1984 (McConnell and Perez-Quiros, 2000), and the vanishing procyclicality of labor productivity around 1984 (Barnichon, 2010; Gali and Rens, 2010).

Given that most of firms review and change their prices once a year (Blinder et al. 1998; Fabiani et al., 2007), by price cyclicity I mean price changes over more than

one year based on annual data. First of all, correlation coefficients were calculated first for each 2-digit industry for two sample periods. I correlated detrended real output and detrended price index using two common detrending methods to remove, or filter out, long-term trends. One method is to use growth rates of price and output. The second is to use statistical filters, such as Hodrick and Prescott filter that rely on long, weighted averages to remove trend influences, which allow for the possibility of gradual movements in trend growth rates over time.² The cyclical components of price and real output moved in the opposite direction over the business cycle until the early 1980s. Table 1 shows the correlations of price and real output for 20 two-digit industries. The variables are either expressed as deviations from HP trend (the first two columns) or growth rates (the last two columns). The correlation coefficient between output and price falls sharply after 1983 regardless of a detrending method used. Based on two-tailed t-tests, Table 4 reveals that the correlations are significantly different from zero before 1984 except for Tobacco products (SIC 21) and Lumber and wood products (SIC 24), whereas the correlations of six (in the case of HP filtering) or nine (in the case of growth rate filtering) out of 20 manufacturing industries have become insignificant since 1984 in terms of whether they are statistically different from zero or not.

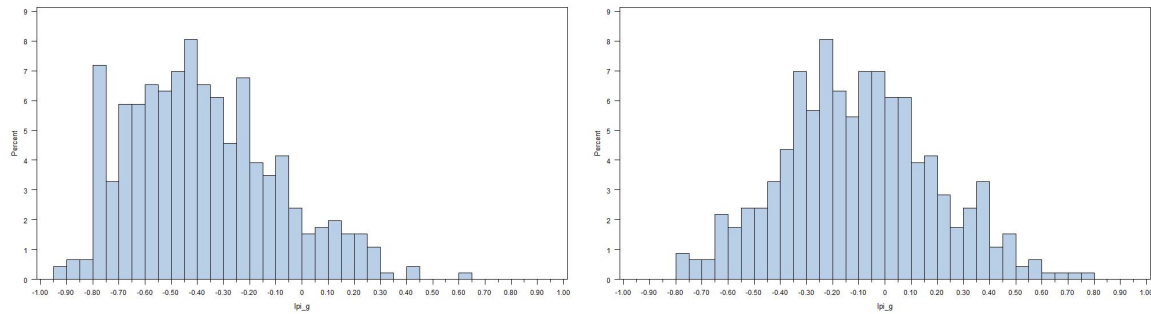
²It should be noted that it is well known that the HP filter may induce spurious cyclicity, and there is no way of knowing if too little or too much of the low-frequency movement in the series is removed.

Table 4. Correlations between Output and Price

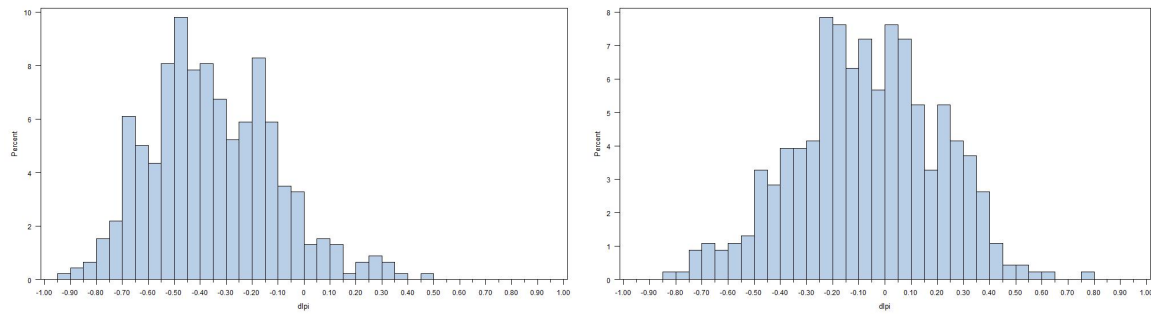
SIC	HP filter					Growth rates				
	Before 1984		Since 1984		Change	Before 1984		Since 1984		Change
20	-0.45	***	-0.31	***	0.13	-0.44	***	-0.33	***	0.12
21	0.05		-0.05		-0.10	0.06		0.00		-0.06
22	-0.37	***	-0.06		0.31	**	-0.35	***	0.00	0.36
23	-0.27	***	-0.13	***	0.13		-0.28	***	-0.04	0.24
24	-0.07		-0.08		0.00		-0.17	***	-0.19	-0.02
25	-0.42	***	-0.16	***	0.27		-0.23	***	-0.08	0.16
26	-0.24	***	-0.11	**	0.13		-0.25	***	-0.11	0.14
27	-0.45	***	-0.15	***	0.30	*	-0.30	***	0.03	0.32
28	-0.45	***	-0.14	***	0.31	***	-0.43	***	-0.16	0.27
29	-0.50	***	-0.11		0.39		-0.35	***	-0.04	0.31
30	-0.74	***	-0.09	*	0.65	***	-0.65	***	-0.15	0.50
31	-0.37	***	-0.06		0.30		-0.37	***	-0.07	0.30
32	-0.33	***	-0.12	***	0.21	*	-0.30	***	-0.10	0.20
33	-0.28	***	0.01		0.29	**	-0.28	***	0.00	0.28
34	-0.31	***	-0.01		0.30	***	-0.31	***	-0.08	0.23
35	-0.24	***	-0.21	***	0.03		-0.41	***	-0.33	0.08
36	-0.38	***	-0.19	***	0.19	*	-0.38	***	-0.32	0.06
37	-0.26	***	-0.08	*	0.18		-0.25	***	-0.06	0.19
38	-0.27	***	-0.15	***	0.12		-0.13	***	-0.11	0.03
39	-0.56	***	0.04		0.60	***	-0.54	***	0.01	0.55

Note: Variables are expressed in logarithms and growth rates are approximately by first log-differences. Test of equality of correlations across the two subsamples is based on Fisher's Z-transformation. Significance at the 10, 5, and 1 percent level is denoted by *, **, and ***, respectively.

I repeated the estimation of correlation coefficients between output and price at the 4-digit industry level. Figure 3 summarizes the distributions of the correlation coefficients between price index and real output for the two time period. The two methods produce similar distribution and show the same change in price cyclicity around 1984. It reflects the robust weakening of the price countercyclicity since 1984. Furthermore, the number of significantly countercyclical, acyclical, and procyclical industries under each 2-digit SIC heading are reported in Table 5. With



(a) Distribution of correlation between HP-filtered price and output for the two time periods



(b) Distribution of correlation between growth rates of price and output for the two time periods

Note: The left figures are histograms for the first time period (1958-1983), while the right figures are for the second time period (1984-2005).

Figure 3. Industry Bivariate Correlations: Difference between the Two Time Periods

respect to the 1958-83 time period, most 4-digit industries were countercyclical along the fluctuation of output level. It is immediately obvious that prices in the majority of industries have become acyclical since 1984. A clear understanding of the recent US experience would be obtained by more comprehensive theories of price cyclicity, one of which is empirically-grounded behavioral economics.

Table 5. The Price Cyclicity of Four-Digit SIC industries Grouped by 2-Digit Industry Headings

2-digit SIC	2-digit Industry	No. of 4-digit Industries	HP filter						Growth rates					
			Before 1984			Since 1984			Before 1984			Since 1984		
			C	P	A	C	P	A	C	P	A	C	P	A
20	Food and kindred products	49	31	0	18	18	2	29	31	0	18	19	0	30
21	Tobacco products	4	1	0	3	0	1	3	1	0	3	0	1	3
22	Textile mill products	23	12	0	11	1	0	22	9	0	14	0	0	23
23	Apparel and other textile products	31	12	0	19	4	0	27	12	0	19	3	1	27
24	Lumber and wood products	17	3	0	14	2	1	14	5	0	12	3	0	14
25	Furniture and fixtures	13	10	0	3	2	0	11	6	0	7	0	0	13
26	Paper and allied products	17	8	0	9	3	0	14	8	0	9	2	0	15
27	Printing and publishing	14	10	0	4	4	1	9	5	0	9	1	1	12
28	Chemicals and allied products	29	18	0	11	7	1	21	19	0	10	5	1	23
29	Petroleum and coal products	5	4	0	1	0	0	5	2	0	3	0	0	5
30	Rubber and misc. plastics products	15	14	0	1	1	0	14	15	0	0	0	0	15
31	Leather and leather products	11	4	0	7	0	0	11	4	0	7	0	0	11
32	Stone, clay, and glass products	26	12	1	13	5	0	21	11	0	15	5	1	20
33	Primary metal industries	26	11	0	15	1	2	23	10	0	16	0	1	25
34	Fabricated metal products	38	22	0	16	2	3	33	17	0	21	2	1	35
35	Industrial machinery and equipment	51	16	2	33	3	4	44	15	1	35	3	3	45
36	Electronic & other electric equipment	37	24	0	13	2	0	35	23	0	14	1	0	36
37	Transportation equipment	18	8	0	10	3	1	14	3	0	15	2	1	15
38	Instruments and related products	17	10	0	7	1	0	16	8	0	9	3	0	14
39	Miscellaneous manufacturing	18	10	0	8	0	2	16	10	0	8	0	0	18
	Total	459	240	3	216	59	18	382	214	1	244	49	11	399

¹ The fourth through ninth columns consists of the numbers of industries under each SIC heading exhibiting countercyclical (C), Procyclical (P), and A-cyclical (A) that is statistically significant at the 5% significance level. I correlated detrended price index and detrended real output since we are interested in the co-movement of the cyclical components of these series. The correlations are based on deviations from a Hodrick-Prescott (HP) trend.

² The tenth through fifteenth columns represent price cyclicity based on detrending using logged first differences.

³ All variables are in logs.

⁴ The number of all the 4-digit industries is 459.

Effects of Changes in Pass-through Policy in Price Cyclicalities

Following the PK pricing models in the previous chapter, I present a price equation to be estimated.

$$P \equiv \frac{(WL + P_M M)R}{Q}, \quad (4.1)$$

where P is industrial price, W is wage rate, L is total labor input, P_M is the price index of materials, M is total material input including energy, R is profit markup, and Q is level of output.

Now take logs and differentiate with respect to time:

$$\hat{p} + \hat{q} \equiv s_M(\hat{p}_M + \hat{m}) + s_L(\hat{w} + \hat{l}) + \hat{r} \quad (4.2)$$

where a lower case variable with a hat denotes that variable's rate of growth, $s_M \equiv \frac{P_M M}{WL + P_M M}$ and $s_L \equiv \frac{WL}{WL + P_M M}$. That is, s_M equals the cost of materials as a share of total cost, while s_L is labor cost share in total cost.

Rearranging gives us:

$$\hat{p} \equiv (s_M \hat{m} + s_L \hat{l} - \hat{q}) + s_M \hat{p}_M + s_L \hat{w} + \hat{r} \quad (4.3)$$

$$\equiv -s_M \hat{z}_M - s_L \hat{z}_L + s_M \hat{p}_M + s_L \hat{w} + \hat{r} \quad (4.4)$$

where \hat{z}_M equals the growth rate of inverse of the material input ratio (Q/M), and \hat{z}_L is the growth rate of labor productivity (Q/L).

Chapter 3 showed that the profit markup can be affected by the firm's cost pass-through policy since the firm would absorb part of shocks to input price and

productivity.³ In addition, the profit markup itself could vary with cyclical net-extry since new firms tend to reduce their initial profit markup rates and more entering firms tend to result in more innovation in the industry, which means that the profit mark-up is also affected by the level of output (Q) in the industry. Considering these factors, a general formulation of the profit markup is expressed as:

$$R = CZ_M^{a_1}Z_L^{a_2}P_M^{a_3}W^{a_4}Q^{a_5} \quad (4.5)$$

where C is a constant, Z_M equals inverse of the material input ratio (Q/M), and Z_L is labor productivity (Q/L); $a_1 > 0$, $a_2 > 0$, $a_3 < 0$, $a_4 < 0$, and a_5 has any sign. Taking log of, differentiating w.r.t. time, and substituting equation (4.5) into \hat{r} in (4.4) give us

$$\hat{p} = (a_1 - s_M)\hat{z}_M + (a_2 - s_L)\hat{z}_L + (s_M + a_3)\hat{p}_M + (s_L + a_4)\hat{w} + a_5\hat{q} \quad (4.6)$$

where \hat{q} equals the output growth rate.

To estimate the price equation, I use a comprehensive, detailed panel of manufacturing industries that provides significant cross-sections and time series: the NBER-CES Manufacturing Industry Database from 1958 to 2006, which includes 459 industries at the 4-digit SIC code level (1987 SIC codes). Material cost includes

³Sen and Vaidya (1995) empirically show that markup can be affected by the wage and productivity since a firm might absorb a part of the increase in money wages by reducing the markup; and the firm also has a strong incentive to maintain productivity gains without price reductions.

expenditures on energy; and the industry price deflator for materials reflects changes in energy costs for the industry. The variables used are described in Table 6. All the panel data regressions incorporate a term for the time effect only since the F test for fixed time effects is significant at 5 percent level whereas the F test for fixed group effects is not significant. The reason behind the lack of fixed group effects is because all the variables are expressed in log-difference form, which eliminates the industry-specific time-invariant effects. However, in practice, the results are quite similar regardless of the inclusion of fixed group effects.

Table 6. Variables from the NBER Productivity Database

Variable	Description
EMP (= L)	Number of employee (thousands)
PRODH(=H)	No. of production worker hours (millions of hours)
MATCOST (= $P_M M$)	Cost of materials (millions of dollars)
PAY	Total payroll (millions of dollars)
PIMAT (= P_M)	Price deflator for materials (equals 1 in 1987)
PISHIP (= P)	Price deflator for value of shipments (equals 1 in 1987)
VSHIP (= PQ)	Value of industry shipments (millions of dollars)
Transformations	Description
$M = \text{MATCOST}/\text{PIMAT}$	Real material costs
$Q = \text{VSHIP}/\text{PISHIP}$	Real shipments as real output measure
PAY1987	Total payroll in the base year 1987
$W = \text{PAY}/\text{PAY1987}$	Real wage rate
$Z_L = Q/\text{EMP}$	Employment-based measure of labor productivity
$Z_H = Q/\text{PRODH}$	Hour-based measure of labor productivity
$Z_M = Q/M$	Output-material input ratio

¹ The data used to construct the variables employed in this study are from the NBER manufacturing database compiled by Eric J. Barterlsman and Wayne B. Gary. The database contains annual United States production and cost data for 450 four-digit US manufacturing industries for the period 1958 through 2006 and is classified according to 1987 SIC. The table shows the particular variables used from this database, the corresponding notation employed in the paper (in barckets).

Following Equation (4.6), I propose a panel specification to estimate for four-digit industry in the United States as follows:

$$\hat{p}_{it} = c + \theta_t + \beta_{1i}\hat{z}_{Mit} + \beta_{2i}\hat{z}_{Lit} + \beta_{3i}\hat{p}_{Mit} + \beta_{4i}\hat{w}_{it} + \beta_{5i}\hat{q}_{it} + \epsilon_{it} \quad (4.7)$$

where β 's are estimates of the pricing equation on material ratio, labor productivity, material price, wage rate and production, t denotes the time of an observation by

year, i denotes a cross-sectional industry unit, θ_t is the unobserved heterogeneity, which may differ year-to-year but does not vary across the cross-sectional units, and ϵ_{it} is an error term.

Table 7. Estimations for the Three Subsamples during 1958-2006

Entire group: 459 4-digit industries					R-Square	s_M	s_L
β_1	β_2	β_3	β_4	β_5			
-0.3091 (0.0034) (-91.4)	-0.1382 (0.0038) (-36.58)	0.7276 (0.0061) (120.02)	0.1419 (0.0062) (22.74)	-0.0137 (0.0026) (-5.37)	0.6862	0.6957	0.3043
a_1	a_2	a_3	a_4	a_5			
0.3866	0.1661	0.0319	-0.1624	-0.0137			
C-A subgroup: 197 4-digit industries					R-Square	s_M	s_L
β_1	β_2	β_3	β_4	β_5			
-0.3361 (0.0052) (-64.9)	-0.1509 (0.0059) (-25.76)	0.6885 (0.0089) (77.05)	0.1483 (0.009) (16.41)	-0.0152 (0.004) (-3.81)	0.7235	0.7043	0.2957
a_1	a_2	a_3	a_4	a_5			
0.3682	0.1448	-0.0158	-0.1474	-0.0152			
A-A subgroup: 184 4-digit industries					R-Square	s_M	s_L
β_1	β_2	β_3	β_4	β_5			
-0.2176 (0.0048) (-45.3)	-0.1107 (0.0052) (-21.46)	0.7708 (0.0109) (70.89)	0.1200 (0.0089) (13.51)	-0.0047 (0.0034) (-1.37)	0.6499	0.6764	0.3236
a_1	a_2	a_3	a_4	a_5			
0.4588	0.2129	0.0945	-0.2037	-0.0047			
C-C subgroup: 37 4-digit industries					R-Square	s_M	s_L
β_1	β_2	β_3	β_4	β_5			
-0.5038 (0.0144) (-34.92)	-0.1506 (0.0168) (-8.96)	0.7925 (0.0173) (45.92)	0.1412 (0.0282) (5)	-0.0662 (0.0126) (-5.26)	0.7944	0.7374	0.2626
a_1	a_2	a_3	a_4	a_5			
0.2336	0.1120	0.0551	-0.1214	-0.0662			

¹ Standard errors and t-values are given below estimates, respectively. All of the estimates are significantly different from 0 at the 1 percent significance level except for β_5 of A-A subsample.

² C-A subsample is a group of 4-digit industries which show counter-cyclical price movement in pre-1984 period and a-cyclical price in post-1984 period. A-A subsample is a group of 4-digit industries which are a-cyclical both in pre-1984 and post-1984 period. C-C subsample includes 4-digit industries which are counter-cyclical both before and since 1984.

I report the results of fixed effect (FE) estimation for Equation (4.7) in Table 7 and 8 for entire group and subgroups in different time periods.⁴ In order to investigate the change in price cyclicalities in some industries, I divide our 4-digit group of 450 industries into three subgroups according to their price cyclicalities, and I estimate the price equation for each of these subgroups for the whole period, pre-1984 and post-1984 periods, respectively. All signs of the estimated coefficients of the variable sets are in line with the PK behavioral model developed in the previous chapter. In other words, more firms started to consider pricing as a strategic variable due to the diversification of pricing strategies, which changes their pass-through policy in such a way that more shocks to input prices and productivity are absorbed in the profit markup. The more absorption causes cyclical changes in the cost base to have less impact on price cyclicalities. For instance, the estimates of a_1 , a_2 , a_3 , and a_4 for C-A subgroup rose much more than other subgroups in the post-1984 period as shown in Table 8. Moreover, those for C-C subgroup increased the least among the three subgroups. The values of a 's represent the degree to which the profit markup

⁴I rely on the FE estimation, as the OLS estimator does not take into consideration individual heterogeneity and statistical tests indicate that the preferred specification is the FE rather than the RE model; yet, the three estimation methods produce similar estimates. In particular, the Breusch and Pagan Lagrange Multiplier test and the Hausman Specification tests were conducted to determine whether a random effect or a fixed effect should be used for the data. The null hypothesis of the LM test is not rejected for most of the estimations. Moreover, for all the estimations, we can reject the Hausman's null hypothesis that the unobserved heterogeneity subject-specific effects are uncorrelated with the observed explanatory variables. Given that under the alternative hypothesis, only FE estimator is consistent, we would conclude that the FE model is more appropriate.

responds to changes in each variable. The higher their estimates become, the more of the shocks to input prices and/or productivity the profit markup absorbs. It implies that the pass-through policy of C-A subgroup has changed in such a way that more shocks are absorbed in the profit markup thereby reducing their influence on prices. That policy change is one of the two key factors that allows C-A subgroup industries to make their prices a-cyclical in the post-1984 period.

In addition, it is a consistent result with previous studies that demand pressure as such still never plays any significant role in the pricing process. β_5 is interpreted as the percentage change in profit markup responding to 1% increase in output or demand. Table 7 shows that A-A subgroup responds to demand shock the least throughout the whole time period, while C-A and C-C subgroups follow. Even if all the values of β_5 are statistically significant, the responsiveness of markups to quantity changes is quite weak compared to markup changes associated with input price and productivity pass-through policy.

Table 8. Estimations for the Three Subsamples in the Pre-1984 and Post-1984 Period

	C-A		Post84		A-A		Post84		C-C		Post84	
	Pre84		(2)		Pre84		(4)		Pre84		(6)	
	(1)				(3)				(5)			
β_1	-0.4091	***	-0.2384	***	-0.2509	***	-0.1819	***	-0.5724	***	-0.3839	***
	(0.0071)		(0.007)		(0.0067)		(0.0068)		(0.0186)		(0.0213)	
β_2	-0.2053	***	-0.0959	***	-0.1397	***	-0.0841	***	-0.1653	***	-0.1553	***
	(0.0082)		(0.0077)		(0.0075)		(0.007)		(0.0229)		(0.0229)	
β_3	0.7124	***	0.5995	***	0.8097	***	0.6987	***	0.9244	***	0.5405	***
	(0.0113)		(0.0134)		(0.0144)		(0.0163)		(0.0209)		(0.0276)	
β_4	0.1982	***	0.0914	***	0.1601	***	0.0848	***	0.1741	***	0.1319	***
	(0.013)		(0.0117)		(0.0134)		(0.0117)		(0.0363)		(0.0409)	
β_5	-0.0288	***	0.0121	**	-0.0145	***	0.0082	*	-0.0343	**	-0.1082	***
	(0.0053)		(0.0055)		(0.0046)		(0.0049)		(0.0169)		(0.0174)	
R^2	0.8145		0.4877		0.7192		0.4701		0.8541		0.6837	
i	197		197		184		184		37		37	
t	25		22		25		22		25		22	
s_M	0.6844		0.7270		0.6547		0.7010		0.7172		0.7613	
s_L	0.3156		0.2730		0.3453		0.2990		0.2828		0.2387	
a_1	0.2753		0.4886		0.4039		0.5191		0.1448		0.3774	
a_2	0.1103		0.1771		0.2056		0.2150		0.1175		0.0834	
a_3	0.0280		-0.1275		0.1549		-0.0023		0.2071		-0.2208	
a_4	-0.1175		-0.1816		-0.1852		-0.2142		-0.1086		-0.1068	
a_5	-0.0288		0.0121		-0.0145		0.0082		-0.0343		-0.1082	

¹ C-A is a group of 4-digit industries which show counter-cyclical price movement in pre-1984 period and a-cyclical price in post-1984 period. A-A refers to a group of 4-digit industries which are a-cyclical both in pre-1984 and post-1984 period. C-C indicates 4-digit industries which are counter-cyclical both before and since 1984.

² Standard errors are given in parentheses. ***, **, and * indicate statistical significance at a 1%, 5% and 10% level, respectively.

Effects of Neoliberal Labor Market Reform on Price Cyclicity

The difference of the cost base between two successive pricing periods depends on changes not only in the prices of labor and material inputs but also in normal or estimated flow rate of output. Wages change little throughout two or three successive pricing periods. For example, the probability of a wage change is about 18 percent per quarter, thus implying an expected duration of wage contracts of 5.6 quarters in

the U.S. economy (Barattieri et al., 2010). Therefore, the difference of the cost base is accounted for much more by the change in the normal rate of output, the labor input, and the material input prices than by that of wages. Normal or budgeted output is not an actual amount of production but an estimated amount predicated basically on past experience. When a boom is forecast, budgeted output is increased, thereby reducing the cost base for setting the price, that is, budgeted average total cost defined as the average total cost at the budgeted output. Given that the profit mark-up that firms add to the budgeted average total cost does not vary significantly with output fluctuations as is shown in the previous section, the decrease in the cost base will lead the price to drop with the degree of the price cut depending on their competition environment such as firm dynamics and market governance. Hence prices are counter-cyclical. In other words, if the cost base is counter-cyclical, then prices will also be counter-cyclical. This implies that the issue of extrinsic price stability is closely tied up with that of price cyclicalities (price movement along the change in output). If one can explain why prices are decreasing during two or three years of an expansion, they can also explain the small variation of prices over the cycle. In addition, most of the variation in the average total cost over the cycle stems from labor productivity fluctuations since material inputs vary proportionally along with output changes, while unit labor cost changes with constant wage rates. Therefore, it is labor productivity that exists at the center of the mechanism which determines the direction and degree of price cyclicalities.

Labor productivity in manufacturing has been a topic of interest in recent decades. Research has been directed at different issues at different times. For in-

stance, after 1973, discussion focused on whether there was a historical slowdown in productivity growth in industrialized countries. Currently, the issue has focused on whether and how the introduction of information technology is affecting manufacturing productivity. Most of mainstream economists tend to take labor productivity as given by technological advance or economic fundamentals.⁵ True, labor productivity measures literally reflect some technical productivity of the economy. However, labor productivity is, perhaps, more significantly affected than any other economic variable by socioeconomic factors, such as the social security system and labor market flexibility.⁶ For instance, it has become a stylized fact that the cyclical behavior of labor productivity has changed since the mid-1980s in the U.S. Moreover, if labor productivity is as much socially determined as technologically constructed, it can be utilized by the capitalist class for its own interests. In other words, capitalists/business enterprises can manage labor productivity over the business cycle as a mechanism through which they can attain less price cyclicalities and therefore price stability in recession.

In order to figure out how the cost base, particularly labor productivity, can affect price cyclicalities, I decompose price itself as follows:

$$P \equiv ATC(1 + r) \equiv \frac{\frac{P_M}{Z_M} + \frac{W}{Z_L}}{\Theta_M + \Theta_L} \quad (4.8)$$

where ATC is average total cost, r is profit markup, Θ_M is the share of material cost

⁵Increases in labor productivity supposedly reflect the joint effects of many influences, including fixed investment, advances in technology, and organizational efficiencies, as well as improved skill levels of the workforce.

⁶This idea is traced back to Karl Marx who differentiated labor from labor power.

in total revenue, and Θ_L is the share of labor cost in total revenue.⁷ With other things equal, less pro-cyclical labor productivity in terms of the output level weakens the price counter-cyclicality.

I extended the previous literature by providing the contemporaneous correlation coefficients between output and labor productivity for two digit U.S. manufacturing industries. I applied two alternative transformations on the logarithms of all variables in order to render the original time series stationary. To isolate business cycle components, the variables are either expressed as deviations from the HP trend (the first two columns) or growth rates (the fourth and fifth columns) in Table 9. Table 9 shows that the change in the business cycle behavior of labor productivity (output per worker) is shown statistically significantly in some of the U.S. industries for the periods before and since 1984, which reflects their idiosyncratic development and evolution. The correlation between productivity and output falls significantly between the two periods for SIC 20, 26, 28, 30, 33, 34, 35, 38, and 39. The fall-off in the productivity-output correlation reflects a decline in the correlations between productivity and labor inputs. Indeed, Table 10 reports that the correlation of productivity with employment in the post-1984 is significantly more counter-cyclical than in the pre-1984 period for SIC 26, 28, 30, 31, 33, 34, 35, and 39.

⁷The most common measures of marginal cost in the neoclassical literature consider the cost of increasing output through an increase in the labor cost or intermediate input cost. Either way, the markup is given by $\alpha\Theta_M^{-1}$ or $\alpha\Theta_L^{-1}$ where α is the parameter of an aggregate production function and greater than 1. Under these set-ups, markup variations are simply the inverse of the variations observed in the labor share or intermediate goods share. For details, see Rotemberg and Woodford (1999).

Table 9. Correlations between Detrended Productivity and Output by 2-digit Industry

SIC	HP filter				Growth rates			
	Before 1984	Since 1984	Change		Before 1984	Since 1984	Change	
20	0.73	0.61	-0.12	**	0.73	0.60	-0.13	***
21	0.44	0.86	0.42	**	0.40	0.86	0.46	***
22	0.55	0.54	-0.01		0.55	0.47	-0.08	
23	0.54	0.60	0.06		0.55	0.56	0.01	
24	0.35	0.51	0.16		0.42	0.52	0.09	
25	0.47	0.60	0.13		0.45	0.54	0.09	
26	0.74	0.52	-0.22	**	0.77	0.47	-0.30	***
27	0.34	0.26	-0.08		0.33	0.26	-0.07	
28	0.68	0.54	-0.14	*	0.65	0.54	-0.11	
29	0.64	0.68	0.05		0.58	0.66	0.08	
30	0.62	0.47	-0.15		0.63	0.42	-0.21	*
31	0.47	0.67	0.20		0.49	0.65	0.16	
32	0.50	0.59	0.09		0.53	0.55	0.02	
33	0.77	0.60	-0.17	**	0.74	0.52	-0.22	***
34	0.66	0.48	-0.18	**	0.63	0.42	-0.22	***
35	0.67	0.64	-0.04		0.74	0.65	-0.10	**
36	0.65	0.65	0.01		0.66	0.67	0.01	
37	0.64	0.70	0.06		0.63	0.65	0.02	
38	0.44	0.64	0.20	*	0.45	0.60	0.16	
39	0.65	0.49	-0.17		0.64	0.46	-0.18	*

Note: Variables are expressed in logarithms and growth rates are approximately by first differences. Test of equality of correlations across the two periods is based on Fisher's z-transformation. Significance at the 10, 5, and 1 percent level is denoted by *, **, and ***, respectively.

Table 10. Correlations between Detrended Productivity and Employment by 2-digit Industry

SIC	HP filter				Growth rates			
	Before 1984	Since 1984	Change		Before 1984	Since 1984	Change	
20	-0.25	-0.31	-0.06		-0.22	-0.32	-0.10	
21	-0.48	0.16	0.63	**	-0.45	0.20	0.65	**
22	-0.15	-0.20	-0.05		-0.11	-0.24	-0.13	
23	-0.27	-0.31	-0.04		-0.26	-0.32	-0.06	
24	-0.35	-0.18	0.17		-0.29	-0.24	0.05	
25	-0.09	-0.21	-0.12		-0.12	-0.25	-0.13	
26	0.00	-0.57	-0.56	***	0.05	-0.58	-0.63	***
27	-0.32	-0.32	-0.01		-0.31	-0.34	-0.03	
28	-0.19	-0.40	-0.21	*	-0.19	-0.38	-0.19	*
29	-0.34	-0.38	-0.04		-0.38	-0.39	-0.02	
30	0.24	-0.34	-0.57	***	0.20	-0.29	-0.49	***
31	-0.42	-0.10	0.32	*	-0.39	-0.13	0.26	
32	-0.11	-0.09	0.02		-0.07	-0.12	-0.05	
33	0.16	-0.23	-0.39	***	0.09	-0.29	-0.38	***
34	0.08	-0.28	-0.37	***	0.02	-0.29	-0.32	***
35	-0.01	-0.16	-0.15	*	0.03	-0.21	-0.24	***
36	-0.01	-0.11	-0.10		0.03	-0.10	-0.13	
37	0.20	0.17	-0.03		0.17	0.07	-0.10	
38	-0.11	-0.18	-0.08		-0.01	-0.20	-0.19	
39	-0.16	-0.38	-0.23		-0.17	-0.42	-0.25	*

Note: Variables are expressed in logarithms and growth rates are approximately by first differences. Test of equality of correlations across the two periods is based on Fisher's z-transformation. Significance at the 10, 5, and 1 percent level is denoted by *, **, and ***, respectively.

In order to show its relevance for the price cyclicalities through the cost base cyclicalities, I also report the contemporaneous correlations for productivity, output, and labor inputs for C-A and A-A sub-sample in the pre-1984 and post-1984 period, respectively. Table 11 shows that C-A industries have experienced greater fall in the

labor productivity cyclicalities than A-A industries. When the HP filter is used, the correlations of productivity with employment and hours fell significantly by 0.16 and 0.20, respectively in C-A subsample, compared to the other group's smaller decreases by 0.09 and 0.08. In the case of the growth rate detrending, the correlations between productivity and the three cyclical variables (output, employment, and hours) decreased by 0.10, 0.17, and 0.19, respectively in C-A subsample, while the correlations coefficients dropped by 0.03, 0.16, and 0.18, respectively, for the other group of industries. This implies that the industries which have turned from countercyclical to a-cyclical price movement tend to have had experienced more drastic transition to countercyclical labor productivity in the post-1984 period than the industries which have maintained a-cyclical price movement through 1958 through 2005, as is expected in the decomposition above.

Table 11. Correlation Coefficients for C-A and A-A Subgroup

	HP filter				Growth rates			
C-A Subgroup	Before 1984	Since 1984	Change		Before 1984	Since 1984	Change	
Productivity-Output	0.63	0.61	-0.02		0.66	0.56	-0.10	***
Productivity-Employment	-0.05	-0.21	-0.16	***	-0.07	-0.24	-0.17	***
Productivity-Hours	0.10	-0.10	-0.20	***	0.05	-0.14	-0.19	***
Output-Employment	0.74	0.64	-0.10	***	0.71	0.67	-0.03	*
Output-Hours	0.78	0.60	-0.17	***	0.73	0.65	-0.09	***
Employment-Hours	0.92	0.85	-0.07	***	0.92	0.88	-0.04	***
A-A Subgroup	Before 1984	Since 1984	Change		Before 1984	Since 1984	Change	
Productivity-Output	0.57	0.59	0.02		0.58	0.55	-0.03	
Productivity-Employment	-0.11	-0.20	-0.09	**	-0.07	-0.23	-0.16	***
Productivity-Hours	-0.02	-0.10	-0.08	*	0.03	-0.15	-0.18	***
Output-Employment	0.75	0.67	-0.08	***	0.77	0.69	-0.09	***
Output-Hours	0.75	0.64	-0.12	***	0.78	0.64	-0.13	***
Employment-Hours	0.93	0.87	-0.07	***	0.92	0.88	-0.05	***

Note: Variables are expressed in logarithms and growth rates are approximately by first differences. Test of equality of correlations across the two subsamples is based on Fisher's z-transformation. Significance at the 10, 5, and 1 percent level is denoted by *, **, and ***, respectively.

Table 12. Cross-Industry Relationship between Price Cyclicalilty and Labor-Productivity (Output per Worker) Cyclicalilty

Model: $r_{p,q}^f = \delta_1 + \delta_2 r_{q,l}^f + \delta_3 r_{l,z_L}^f + u_i$			
Model 1: HP-Detrended Correlations		Model 2: Growth-Rate-Detrended Correlations	
Summary of Model Fit			
R^2	\bar{R}^2	R^2	\bar{R}^2
0.0278	0.0256	0.0461	0.0440
F-statistic		F-statistic	
13.06***		22.1***	
Coefficient Estimates			
Unstandardized		Unstandardized	
δ_1	-0.4436***	δ_1	-0.4627***
δ_2	0.1454***	δ_2	0.1998***
δ_3	-0.1853***	δ_3	-0.2041***
Standardized		Standardized	
0.1807		0.2530	
-0.2036		-0.2271	
t-statistic		t-statistic	
-11.66		-12.83	
4.31		6.24	
-4.85		-5.6	
Residual Based Diagnostic Tests			
RESET(2)	RESET(3)	RESET(4)	RESET(3)
0.2113	0.2922	1.4973	4.2796**
		3.3234	4.5339***
		JB	JB
		1.498	1.8684

¹ ** and *** refer to significance at the 5 % and 1% levels, respectively.

² The standardized regression coefficients are the regression coefficients when all variables are expressed in z-score form.

³ RESET is the Ramsey test for functional form misspecification; JB is the Jarque-Bera test for normality of the errors.

⁴ $r_{p,q}^f$, $r_{q,l}^f$, and $r_{l,zL}^f$ are Fisher transformed correlation coefficients of price and output, output and employment, and employment and labor productivity (output per worker), respectively.

Furthermore, a basic cross-section regression model is also estimated in order to assess the influence of the negative correlation coefficient between labor productivity and labor input on the observed 459×2 correlations of HP-filtered and log-differenced price index and output during the two sub-periods, pre-1984 and post-1984 era. The (918×1) column vector comprises Fisher transformed correlation coefficients, i.e. $z_i = 0.5 \ln[(1 + r_i)/(1 - r_i)]$. The transformation is required since the regression analysis needs variables to be unbounded. The (918×3) independent variable matrix consists of a unit vector, and two columns to represent Fisher transformed correlation coefficients of output and employment, and that of labor productivity (defined as output per worker) and employment. The correlation of output and employment is included to control for its change since the cyclicalness of labor productivity is defined along the change in employment in this specification. Results for the model and diagnostic tests are presented in Table 12. The residual based diagnostics pertaining to the distribution of the error term and its variance are given by the JB statistic. The RESET test for general misspecification is also reported. The two estimations pass all diagnostic tests. Examination of Table 12 indicates that the explanatory variables have the expected signs, that is, the price cyclicalness is related negatively to the cyclicalness of labor productivity.

The result is also robust independently of the definition of labor productivity. When it comes to an hour-based measure of labor productivity (output per hour), the investigation of Table 13 leads to the same conclusion that more countercyclical labor productivity tends to drive price more strongly in the opposite direction.

Table 13. Cross-Industry Relationship between Price Cyclicalilty and Labor-Productivity (Output per Hour) Cyclicalilty

Model: $r_{p,q}^f = \delta_1 + \delta_2 r_{q,h}^f + \delta_3 r_{h,z_H}^f + u_i$							
Model 3: HP-Detrended Correlations				Model 4: Growth-Rate-Detrended Correlations			
Summary of Model Fit							
R^2	\bar{R}^2	F-statistic	R^2	\bar{R}^2	F-statistic		
0.0094	0.0072	4.34**	0.0179	0.0158	8.36***		
Coefficient Estimates							
	Unstandardized	Standardized	t-statistic	Unstandardized	Standardized	t-statistic	
δ_1	-0.3515***		-9.43	δ_1	-0.3703***	-10.31	
δ_2	0.0389	0.0511	1.36	δ_2	0.0890***	0.1197	3.2
δ_3	-0.1045 ***	-0.1105	-2.95	δ_3	-0.1295***	-0.1415	-3.78
Residual Based Diagnostic Tests							
RESET(2)	RESET(3)	RESET(4)	JB	RESET(2)	RESET(3)	RESET(4)	JB
0.4912	0.5036	2.738**	2.8491	0.3008	1.7963	1.271	2.9781

¹ ** and *** refer to significance at the 5 % and 1% levels, respectively.

² The standardized regression coefficients are the regression coefficients when all variables are expressed in z-score form.

³ RESET is the Ramsey test for functional form misspecification; JB is the Jarque-Bera test for normality of the errors.

⁴ $r_{p,q}^f$, $r_{q,h}^f$, and r_{h,z_H}^f are Fisher transformed correlation coefficients of price and output, output and hours, and hours and labor productivity (output per hour), respectively.

Mechanism for Labor Productivity Stabilization in the U.S. Industries

As long as there is a strong employment protection law, labor input will be varied, in part, through cyclical changes in working rules and thus effort level. Labor productivity will fall with output during downturns (labor hoarding) and rise with output during upturns (labor dishoarding). During the expansion (recession), output per measured hour or worker may appear relatively high (low) due to unobserved increases (decreases) in hourly effort. As a consequence, output will change more than proportionately to total hours. True, until mid-1980s, productivity growth rose and fell with output growth and labor input growth in the U.S. But some studies start to note that since then the procyclical labor productivity has weakened, and it has even moved in different directions in the mid-1980s from the macroeconomic perspective (Gali and Rens, 2010; Zandweghe, 2009; Barnichon 2010). That is, the cyclical behavior of labor productivity has changed since the mid-1980s. In about a year's time, for instance, the rolling correlation between labor productivity and unemployment switches swiftly from negative to positive values; quantitatively, a 0.5% rise in productivity is associated with a 0.2 percentage point increase in cyclical unemployment (Barnichon 2010).

A common explanation that does not involve supply shocks is the absence of labor hoarding caused by two structural changes. The first change is a decline in labor adjustment costs, that is, a decline in hiring and firing costs; and the second change pertains to firm-level uncertainty on firms' product demand, which has brought about intensified employment reallocation instead of temporary declines in employment in

the recessions since the early 1980s (Zandweghe, 2009). Another interpretation is that the neoliberal labor market reform has raised workers' effort during recession since unemployment plays as a discipline on workers and raises their work intensity as the structural change increases job insecurity and reduces unemployment benefits (Shapiro and Stiglitz, 1984; Bowles, 1985).

Both neoclassical and Marxian versions of theoretical models are based on optimization by an individual worker and a representative firm, where the worker determines his or her level of work effort according to the expected income loss. Consider Bowles's model (Bowles, 1991), one of the traditional models. The worker seeks to maximize the present value of the expected future stream of income, which depends on the wage level received (w), the level of labor effort expended (e), the workers rate of time preference (i), the likelihood that the worker will be dismissed (t), and the workers fallback position (Z) if dismissed:

$$V = V(U(w, e), t(e), Z, i) \quad (4.9)$$

For any given wage offer and dismissal function adopted by the employer, the worker maximizes V by varying e so that $V_e = 0$ or $U_e - t_e(V - Z) = 0$, which simply requires that in selecting the level of work effort the worker balances the disutility of labor on the margin with the beneficial effect of greater labor effort on avoiding dismissal and thus retaining the employment rent ($V-Z$). The fallback position (Z) consists of alternative wages and unemployment benefit:

$$Z = hw_a + (1 - h)w_u \quad (4.10)$$

where h is the fraction of a given level of labor supply that is employed, w_a is the worker's expected income in alternative employment and w_u is the level of income-replacing social benefits that the worker may expect to receive should the job be terminated.

True, the model includes the effect of unemployment rate on the level of worker effort in the fallback position Z . However, the critical theoretical limitation of a representative individuals decision making model is that it ignores the constraining effect of aggregate variables on the workers decision process the very limitation to methodological individualism. There is no channel through which the sum of workers efforts can affect the exogenous variable Z ; it ignores the indirect effect of the level of individual work effort on the aggregate number of employed. It is a kind of fallacy of composition to say that if one works harder and harder then their risks of being fired are less and less; because everyone's higher level of work efforts means less demand for workers as the aggregate, leading to a higher unemployment rate, which increases the odds of the loss of their jobs: exactly the opposite result. In previous studies, overall risk of job loss due to aggregate unemployment rate has no influence on the labor extraction, or the unemployment rate and work effort are independent of each other.

I develop an analytic tool to explain the positive relationship between unemployment and labor productivity in the aggregate level.⁸ Consider a simple aggregate

⁸It should be noted that the results of regressions purporting to estimate an aggregate production function (whether it is a Cobb-Douglas or a more flexible functional form) must be treated with caution. (Felipe and McCombie, 2005) We do not try to estimate the parameters of an aggregate production function. Instead, we utilize an aggregate engineering production function to show that higher labor effort level itself

production function defined as follows:

$$q = q(l, v(l, s)) \quad (4.11)$$

where q is GDP, v is labor effort level, l is the number of workers, s is supervisory efforts assumed to be fixed over the business cycle, $q_1 > 0$, $q_2 > 0$, $v_1 < 0$, and $v_2 > 0$. More production needs more labor input (l) and/or the greater labor effort level (v), which is affected negatively by the level of employment (l) and positively by the level of supervisory efforts (s), respectively. Labor productivity (z_L) is defined as output per worker (q/l). To investigate the effect of increase in labor input on labor productivity, I differentiate it with respect to l to get

$$\varepsilon_{z_L, l} = (\varepsilon_{q, l} - 1) + \varepsilon_{q, v} \varepsilon_{v, l} \quad (4.12)$$

where $\varepsilon_{z_L, l}$ is labor elasticity of productivity, $\varepsilon_{q, l}$ is labor elasticity of output, $\varepsilon_{q, v}$ is effort elasticity of output, and $\varepsilon_{v, l}$ is labor elasticity of effort. Moreover, I define $(\varepsilon_{q, l} - 1)$ as labor hoarding effect and $\varepsilon_{q, v} \varepsilon_{v, l}$ as labor discipline effect on labor productivity.⁹ Suppose that there is no labor discipline effect, that is, $v_1 = 0$ and $q_2 = 0$. Then the labor elasticity of productivity ($\varepsilon_{z_L, l}$) is simply $\varepsilon_{q, l} - 1$. The existence of labor hoarding renders the labor elasticity of output ($\varepsilon_{q, l}$) greater than 1. If there exists labor hoarding effect alone, labor productivity should be an increasing

could increase physical output without any change in the number of workers.

⁹It should be noted that the notion of the labor discipline effect have been redefined by many Marxian and neoclassical scholars in one or another mathematical form for their modelling purposes in the literature.

function of employment. The more the hoarded labor is, the greater the value of $\varepsilon_{q,l}$ should be. However, we have the opposite relationship between employment and labor productivity since 1984 in the United States. In other words, it is impossible to reconcile the labor hoarding effect and the empirical relationship, which leaves room for a possible countervailing factor.

Considering the labor discipline effect as the other determining factor of their relationship can solve the conundrum.

$$\frac{\Delta z_L}{\Delta l} < 0 \Leftrightarrow \varepsilon_{q,l} - 1 < |\varepsilon_{q,v}\varepsilon_{v,l}| \quad (4.13)$$

When this condition holds, labor productivity growth has a negative correlation with labor input, implying a positive relationship between unemployment rate growth and labor productivity growth. Thus, the dominance of the labor discipline effect over the labor hoarding effect allows for the positive relationship between unemployment rate growth and labor productivity growth.

A two-sector price-output-employment model can also be utilized to explain the relationship. Consider the following two-industry model of the economy:

$$Q_m(l_m w_m)(1 + r_m) = Q_m p_m \quad (4.14)$$

$$Q_c(l_c w_c)(1 + r_c) = Q_c p_c \quad (4.15)$$

where Q_m is the output of machines; Q_c is the output of the consumption good; l_m is the labor production coefficient for the machine industry; l_c is the labor production coefficient for the consumption good industry; w_m and w_c is the wage

rate in the machine and the consumption good industry; r_m and r_c is the profit mark up in the machine and the consumption good industry; and p_m and p_c is the price of machines and the consumption good, respectively. Production in the model consists of machines with labor producing machines and machines with labor producing consumption goods. In order for the economy to be productive, that is to produce more machines than are used up in the production of machines so that the surplus machines could produce consumption goods, the output-machine ratio for the machine industry, q_{mm} , must be greater than one. On the other hand, the output-machine ratio for the consumption goods industry, q_{cm} , needs only to be greater than zero. Finally, total employment, L , is proportional to the output of machine and consumption goods: $l_m Q_m + l_c Q_c = L$. It is assumed that all the machines produced in the machine industry are entirely used up in the production of machines and consumption goods, thereby making the surplus of the economy consist entirely of consumption goods, Q_c . Thus the output-employment model of the economy is

$$[q_{mm}/(q_{mm} - 1)][Q_c/q_{cm}] = Q_m \Leftrightarrow aQ_c = Q_m \quad (4.16)$$

$$q_{cm}M_c = Q_c \quad (4.17)$$

$$l_m[q_{mm}/(q_{mm} - 1)][Q_c/q_{cm}] + l_c q_{cm}[Q_c/q_{cm}] = L \quad (4.18)$$

$$\Leftrightarrow l_m[q_{mm}/(q_{mm} - 1)][1/q_{cm}] + l_c = L/Q_c \quad (4.19)$$

$$\Leftrightarrow al_m + l_c = L/Q_c \quad (4.20)$$

where M_c is the number of machines currently used in the consumption goods industry, and a is $[q_{mm}/(q_{mm} - 1)][1/q_{cm}]$ and constant since q_{mm} is constant. Consider the gross national product (Q_c) has dropped by 10% from the trend in a recession. Since the production of Q_m is in fixed proportion to Q_c , the intermediate machine industry also experienced 10% drop in its production. If the total employment (L) in the economy decreases less than 10%, then either or both labor production coefficients (l_m and l_c) have to rise according to Equation (4.20), which means a reduction to labor productivity. In this case, we have the negative relationship between unemployment and labor productivity growth in the aggregate data. If the total employment (L) dwindles more than 10%, then either or both labor productivity coefficients should fall according to Equation (4.20), which indicates an improvement of labor productivity. In this case, we have the positive relationship between unemployment and labor productivity growth in the aggregated numbers.

Conclusion

This chapter contributes to behavioral economics as applied to firms by extending the research area beyond the accounting anomalies such as full-cost pricing to a behavioral analysis of cyclical price movements. It shows that at the center of the mechanism for some U.S. industries' recent transition from counter-cyclical to a-cyclical price movement in the early 1980s are two key factors. First, more firms started to consider pricing as a strategic variable, which changes their pass-through

policy in such a way that more shocks to input prices and productivity are absorbed in markups. The more absorption causes cyclical changes in the cost base to have less impact on price cyclicalities. Second, a structural change in the socially-constructed labor productivity is associated with the cost-base stability during the post-1984 period. A decline in hiring and firing costs and cutbacks in social security benefits have made labor discipline effect dominate labor hoarding effect, which implies that labor productivity increases as unemployment rate increases, with the result that the cyclicalities of the cost base has been weakened and thus prices have become less cyclical. Those two structural changes have led the U.S. industrial prices to move a-cyclically in the post-1984 period.

CHAPTER 5

CONCLUSION

Neoclassical economists continue to explain price movement predicated on changes in profit mark-up or elasticity of demand with the marginal cost constant or increasing. Post Keynesian economists had argued that constant average direct costs and fixed indirect costs cause average costs to fall as the output increases, while the ex ante profit mark-up does not vary significantly within the business cycle. They considered the counter-cyclical cost movement with the quasi-constant mark-up as the implicit reason for counter-cyclical price movement, with the labor hoarding effect lying at the center of their exposition of counter-cyclical productivity and prices.

The objective of the dissertation is to refine a Post Keynesian framework for price stability and cyclicity. The dissertation contributes to heterodox microeconomics by building a comprehensive and coherent theoretical system to provide an analytical framework for price cyclicity and stability since they are under-theorized issues in both neoclassical and heterodox microeconomics. In particular, it develops an empirically grounded theory of price cyclicity and stability from the Post Keynesian perspective by examining the causal mechanisms for price setting which are supported by empirical evidence. By doing so, it sheds light on the mechanisms through which price stability is secured. It also shows that there are two key factors at the center of the mechanism for almost half of U.S. manufacturing industries' transition from counter-cyclical to a-cyclical price movement in the early 1980s. First, more firms started to consider pricing as a strategic variable, which changes their

pass-through policy in such a way that more shocks to input prices and productivity are absorbed in markups. The absorption reduces the effect of cyclical changes in the cost base on price cyclicalities. Second, a structural change in the socially-constructed labor productivity is associated with the cost-base stability during the post-1984 period. A decline in hiring and firing costs and cutbacks in social security benefits have made labor discipline effect dominate labor hoarding effect, which implies that labor productivity increases as unemployment rate increases, with the result that the cyclicalities of the cost base have been weakened and thus prices have become less cyclical.

The dissertation has four major implications for heterodox microeconomics. First, it demonstrates that there is no such thing as a deterministic relationship between sales and prices predicated on the neoclassical supply and demand framework (Chapters 2 and 3). The relationship can appear to be positive, negative, or nil at all depending on how the cost base responds to the output change. Second, it demonstrates that it is not the profit mark-up but the cost base that works as the driver of price cyclicalities, which means that all neoclassical explanations for industry price cyclicalities have no foundations (Chapters 3 and 4). Third, it refines the heterodox theory of intrinsic price stability by updating Lee's (1998) grounded price theory (Chapter 3). Last but not least, it extends the heterodox price stability theory by differentiating between intrinsic and extrinsic price stability, identifying their roles and implications and incorporating labor hoarding and discipline effects to the theorization of the extrinsic price stability (Chapter 4). All these contributions will be of crucial importance for the refinement and development of heterodox microeconomics.

APPENDIX A

RESEARCH METHOD

Main sources for the journal articles surveyed and investigated in Chapter 2 are Google Scholar citation and JSTOR citation information. JSTOR provides citation information for each journal article only within JSTOR coverage. The advantage of Google citation search is that it allows us to look for journal articles outside of JSTOR literature, which cite a specific document of any kind including paper, book, and Senate Document. Hence I utilized both JSTOR and Google Scholar citation information for Means's major works published in 1935, 1939, and 1972, respectively.

Table 14. Number of Search Results for Articles Citing Means's Works since 1970, as of October 10, 2010

	JSTOR	Google Scholar
Means (1935)	—	109
Means (1939)	—	21
Means (1972)	12	89

I reviewed almost all the articles and excluded some of them because they do not have any serious comments on Means's works. As reading selected ones, I kept including some relevant papers which are cited by the articles having Means's works in their reference in order to trace their theoretical developments as long as they are concerned with the relevant topics to the chapter.

The followings are 61 journal articles reviewed in Chapter 2, which have theoretically and/or empirically meaningful comments on the administered price thesis: Stigler (1962, 1992), Stigler and Kindahl (1970, 1973), Scherer (1970), Barro (1972), Weston et al. (1974), Bohi and Scully (1975), Weiss (1977, 1993), Wu (1979), Domberger (1979, 1981), McRae and Tapon (1979), Dalton and Qualls (1979), Carlton (1979, 1986, 1989), Cukierman (1979, 1982), Philips (1980), Gordon (1981), Fischer (1981), Okun (1981), Aaronovitch and Sawyer (1981), Boschen and Grossman (1982), Blinder (1982), Amihud and Mendelson (1983), Chappel and Addison (1983), Kawasaki et al. (1983), Stiglitz (1984), Farber (1984), Conlisk et al. (1984), Ross and Krausz (1986), Encaoua and Geroski (1986), Garber and Klepper (1986), Blanchard (1987), Strand (1987), Rotemberg and Saloner (1987), Allen (1988), Bedrossian and Moschos (1988), Garber (1989), Worthington (1989), Lichtenberg and Griliches (1989), Jones and Laudadio (1990), Lai and Pauly (1992), Siegel (1994), Goode (1994), Caucutt et al. (1994, 1999), Basu (1995), Shaanan and Feinberg (1995), Clark (1995, 1999), Nordhaus (1996), Jackson (1997), Hanes (1999), Wolman (2000), Georganta (2003), Athey et al. (2004), and Connor (2005)

APPENDIX B
DEVELOPMENT OF NEW COSTING TECHNIQUE SINCE 1980

- B1 Clarke, P. (1992) Management accounting practices in large Irish Manufacturing firms, a pilot study, Proceedings of the Annual Conference 1992, *The Irish Accounting and Finance Association*, 17-34
- B2 Clarke, P., Hill, H. and Stevens, K. (1999) Activity-based costing in Ireland: barriers to, and opportunities for change, *Critical Perspectives on Accounting*, 10(4): 443-468
- B3 Foster, G. and Swenson, D (1997) Measuring the success of activity based cost management and its determinants, *Journal of Management Accounting Research*, 9: 109-42
- B4 Groot, T. (1999) Activity-based costing in U.S. and Dutch food companies, *Advances in Management Accounting*, 7: 47-63
- B5 Innes, J. and Mevellec, P. (1994) ABC: a Franco-British intra-group comparison, *Journal of Management Accounting*, 3: 21-34
- B6 Innes, J. and Mitchell, F. (1995) A Survey of Activity Based Costing in the UKs Largest Companies, *Management Accounting Research*, 6: 137-153
- B7 Innes, J., Mitchell, F. and Sinclair, D. (2000) Activity-based costing in the UKs largest companies: a comparison of 1994 and 1999 survey results, *Management Accounting Research*, 11: 349-362
- B8 Malmi, T. (1996) Activity-based costing in Finnish metal and engineering indus-

- tries, *Finnish Journal of Business Economics*, 45(3): 243-264
- B9 Shields, M. (1995) An empirical analysis of firms' implementation experiences with activity based costing, *Journal of Management Accounting Research*, 7: 1-28
- B10 Stratton, W., Lawson, R. and Hatch, T. (2009) Activity-Based Costing: Is It Still Relevant?, *Management Accounting Quarterly*, 10(3): 31-40
- B11 Friedman, A. and Lyne, S. (1999) Success and Failure of Activity-Based Technique: A Long Term Perspective, In *Chartered Institute of Management Accountants*, London, England

APPENDIX C

DIVERSIFICATION OF PRICING STRATEGIES SINCE 1980

- C1 Abratt, R and L. Pitt (1985) Pricing Practices in Two Industries, *Industrial Marketing Management*, 14
- C2 Coe, B. (1990) Strategy in Retreat: Pricing Drops Out, *Journal of Business & Industrial Marketing*, 5
- C3 Carson, D. et al. (1998) Price Setting in SMEs: some empirical findings, *Brand Management*, 7
- C4 Noble, P. and T. Gruca (1999) Industrial Pricing: Theory and Managerial Practice, *Marketing Science*, 18
- C5 Chia, J. and P. Noble (1999) Industrial Pricing Strategies in Singapore and the U.S.: Same or Different?, *Asia Pacific Journal of Management*, 16
- C6 Talkinton, A. (2004) 2004 Pricing Survey, *Impressions*, 28
- C7 Piercy, N. (1981) British Export Market Selection and Pricing, *Industrial Marketing Management*, 10
- C8 Mayers, M. (1997b) The Pricing Processes of Exporters: A Comparative Study of the Challenges Facing U.S. and Mexican Firms, *Journal of Global Marketing*, 10
- C9 Tzokas, N. et al. (2000) Industrial Export Pricing Practices in the United Kingdom, *Industrial Marketing Management*, 29
- C10 Zeithaml, V. et al. (1985) Problems and Strategies in Services Marketing, *Jour-*

nal of Marketing, 49

- C11 Morris, M. and D. Fuller (1989) Pricing an Industrial Service, *Industrial Marketing Management*, 18
- C12 Hankinson, A. (1995) The Small Firms Preoccupation with Cost-based Pricing, *Pricing Strategy & Practice*, 3
- C13 Mochtar, K. and D. Arditi (2000) Pricing Strategy in the US Construction Industry, *Construction Management and Economics*, 19
- C14 Avlonitis, G. and K. Indounas (2005) Pricing objectives and pricing methods in the service sector, *Journal of Service Marketing*, 19
- C15 Indounas, K. (2009) Successful industrial service pricing, *Journal of Business & Industrial Marketing*, 24
- C16 Shipley, D. and E. Bourdon (1990) Distributor Pricing in Very Competitive Markets, *Industrial Marketing Management*, 19
- C17 Forman, H. and R. Lancioni (2002) The determinants of Pricing Strategies for Industrial Products in International Markets, *Journal of Business-to-Business Marketing*, 9
- C18 Rao V. and B. Kartono (2009) Pricing objectives and strategies: a cross-country survey, *Handbook of pricing research in marketing*, (ed.) Vithala Rao, Edward Elgar
- C19 Nakagawa, S. et al. (2000) Pricing-Setting Behavior of Japanese Companies, Bank of Japan
- C20 Horngren, C., Foster, G. and Datar, S. (2000) *Cost Accounting*, 9th ed., Prentice Hall

- C21 Mills, R. (1988), Pricing Decisions in UK Manufacturing and Service Companies, *Management Accounting*, 66: 3839
- C22 Shipley, D. (1983) Pricing Flexibility in British Manufacturing, *Managerial and Decision Economics*, 4: 224233
- C23 Govindarajan, V. and Anthony, R. (1983) How Firms Use Cost Data in Price Decisions, *Management Accounting*, 65: 3036
- C24 Shim, E. and Sudit, E. (1995) How Manufacturers Price Products, *Management Accounting*, 76: 3739
- C25 Lukka, K. and Granlund, M. (1996), Cost Accounting in Finland: Current Practice and Trends of Development, *European Accounting Review*, 5: 128

References

- Aaronovitch, S., & Sawyer, M. (1981). Price change and oligopoly. *Journal of Industrial Economics*, 30(2), 137-147.
- Agresti, A., & Mojon, B. (2001). Some stylized facts on the Euro area business cycle. *ECB working Paper*, 95, 1-44.
- Allen, F. (1988). A theory of price rigidities when quality is unobservable. *Review of Economic Studies*, 55(1), 139-151.
- Al-Najjar, N., Baliga, S., & Besanko, D. (2008). Market forces meet behavioral biases: cost misallocation and irrational pricing. *RAND Journal of Economics*, 39(1), 214-237.
- Alchian, A. (1950). Uncertainty, evolution, and economic theory. *Journal of Political Economy*, 58(3), 211-221.
- Amihud, Y., & Mendelson, H. (1983). Price smoothing and inventory. *Review of Economic Studies*, 50(1), 87-98.
- Atesoglu, H. (1997). A Post Keynesian explanation of U.S. inflation. *Journal of Post Keynesian Economics*, 19(4), 639-649.
- Athey, S., Bagwell, K., & Sanchirico, C. (2004). Collusion and price rigidity. *Review of Economic Studies*, 71(2), 317-349.
- Backus, D., & Kehoe, P. (1992). International evidence on the historical properties of business cycles. *American Economic Review*, 81, 864-888.
- Barattieri, A., Basu, S., & Gottschalk, P. (2010). Some evidence on the importance of sticky wages. *NBER working paper*, 16130.

- Barnichon, R. (2010). Productivity and unemployment over the business cycle. *Journal of Monetary Economics*, 57(8), 1013-1025.
- Barro, R. (1972). A theory of monopolistic price adjustment. *Review of Economics Studies*, 39(1), 17-26.
- Barro, R., & Tenreyro, S. (2006). Closed and open economy models of business cycles with marked up and sticky prices. *Economic Journal*, 116, 434-456.
- Basu, S. (1995). Intermediate goods and business cycles: implications for productivity and welfare. *The American Economic Review*, 85(3), 512-531.
- Bedrossian, A., & Moschos, D. (1988). Industrial structure, concentration and the speed of price adjustment. *Journal of Industrial Economics*, 36(4), 459-475.
- Bergin, P., & Corsetti, G. (2005). Towards a theory of firm entry and stabilization policy. *NBER Working Paper Series*, 11821.
- Bhaskar, R. (1989). *Reclaiming reality*, London.
- Bilbiie, F., Ghironi, F., & Melitz, M. (2007). Endogenous entry, product variety, and business cycles. *NBER Working Paper Series*, 13646.
- Blair, J. M. (1974). Market power and inflation: a short-run target return model. *Journal of Economic Issues*, 13(2), 453-478.
- Blanchard, O. (1987). Aggregate and individual price adjustment. *Brookings Papers on Economic Activity*, 18(1), 57-122.
- Blinder, A. (1982). Inventories and sticky prices: more on the microfoundations of macroeconomics. *American Economic Review*, 72(3), 334-348.
- Blinder, A., Canetti, E., Lebow, D., & Rudd, J. (1998). *Asking about prices*, Russell Sage Foundation.

- Bohi, D., & Scully, G. (1975). Buyers prices, sellers prices, and price flexibility: comment. *American Economic Review*, 65(3), 517-525.
- Boschen, J., & Grossman, H. (1982). Tests of equilibrium macroeconomics using contemporaneous monetary data. *Journal of Monetary Economics*, 10(3), 309-333.
- Bowles, S. (1985). The production process in a competitive economy: Walrasian, Marxian, and Neo-Hobbesian models. *American Economic Review*, 75(1), 16-36.
- Bowles, S. (1991). The reserve army effect on the wage in a labor discipline model. In T. Mizoguchi (Ed.), *Making economies more efficient and more equitable: factors determining income distribution*, Oxford University Press.
- Bresnahan, T. F. (1987). Competition and collusion in the American automobile industry: the 1955 price war. *Journal of Industrial Economics*, 35(4), 457-482.
- Buchheit, S. (2004). Fixed cost magnitude, fixed cost reporting format, and competitive pricing decisions: some experimental evidence. *Contemporary Accounting Research*, 21(1), 1-24.
- Buchheit, S., & Feltovich, N. (2011). Experimental evidence of a sunk-cost paradox: a study of pricing behavior in Bertrand-Edgeworth duopoly. *International Economic Review*, 52(2), 317-347.
- Carlton, D. (1979). Contracts, price rigidity, and market equilibrium. *Journal of Political Economy*, 87(5), 1034-1062.
- Carlton, D. (1986). The rigidity of prices. *American Economic Review*, 76(4), 637-658.

- Carlton, D. (1989). The theory and the facts of how markets clear: is industrial organization valuable for understanding macroeconomics?. In R. Schmalensee & R. D. Willig (Eds.), *Handbook of industrial organization*, 1(10), 909-946.
- Caucutt, E., Ghosh, M., & Kelton, C. (1994). Pricing behavior in United States manufacturing industries: a statistical study using disaggregated data. *Review of Industrial Organization*, 9(6), 745-771.
- Caucutt, E., Ghosh, M., & Kelton, C. (1999). Durability versus concentration as an explanation for price inflexibility. *Review of Industrial Organization*, 14(1), 27-50.
- Chadha, B., & Prasad, E. (1994). Are prices countercyclical? evidence from the G7. *Journal of Monetary Economics*, 34, 239-257.
- Chappel, H., & Addison, J. (1983). Relative prices, concentration, and money growth. *The American Economic Review*, 73(5), 1122-1126.
- Chatterjee, S., Cooper, R., & Ravikumar, B. (1993). Strategic complementarity in business formation: aggregate fluctuations and sunspot equilibria. *Review of Economic Studies*, 60(4), 795-811.
- Chevalier, J. A., Kashyap, A. K., & Rossi, P. E. (2003). Why don't prices rise during periods of peak demand? evidence from scanner data. *American Economic Review*, 93(1), 15-37.
- Clark, T. (1995). Do produce prices lead consumer prices?. *Federal Reserve Bank of Kansas City Economic Review*, 3, 25-39.
- Clark, T. (1999). The responses of prices at different stages of production to monetary policy shocks. *The Review of Economics and Statistics*, 81(3), 420-433.

- Conlisk, J., Gerstner, E., & Sobel, J. (1984). Cyclic pricing by a durable goods monopolist. *Quarterly Journal of Economics*, 99(3), 489-505.
- Connor, J. (2005). Collusion and price dispersion. *Applied Economics Letters*, 12(6), 335-338.
- Cooley, T. F., & Ohanian, L. H. (1991). The cyclical behavior of prices. *Journal of Monetary Economics*, 28(1), 25-60.
- Coutts, K., & Norman, N. (2011). Post Keynesian approaches to industrial pricing: a survey and critique. In G. Harcourt & P. Kriesler (Eds.), *Handbook of Post Keynesian economics*. Oxford, United Kingdom.
- Cukierman, A. (1979). Rational expectations and the role of monetary policy. *Journal of Monetary Economics*, 5(2), 213-229.
- Cukierman, A. (1982). Relative price variability, inflation, and the allocative efficiency of the price system. *Journal of Monetary Economics*, 9(2), 131-162.
- Dalton, J., & Qualls, P. (1979). Market structure and inflation. *Antitrust Bulletin*, 14(1), 17-42.
- Den Haan, W. J., & Sumner, S. (2004). The comovements between real activity and prices in the G7. *European Economic Review*, 48(6), 1333-1347.
- Devereux, M., Head, A., & Laphamb, B. (1996). Aggregate fluctuations with increasing returns to specialization and scale. *Journal of Economic Dynamics and Control*, 20(4), 627-656.
- Dhyne, E., Fuss, C., Pesaran, H., & Sevestre, P. (2009). Lumpy price adjustments: a microeconomic analysis. *Journal of Business & Economic Statistics*, 29(4), 529-540.

- Dickens, W., Goette, L., Groshen, E., Holden, S., Messina, J., Schweitzer, M., Turunen, J., & Ward, M. (2007). How wages change: micro evidence from the international wage flexibility project. *Journal of Economic Perspectives*, 21(2), 195-214.
- Domberger, S. (1979). Price adjustment and market structure. *The Economic Journal*, 89(353), 96-108.
- Domberger, S. (1981). Price adjustment and market structure: a reply. *The Economic Journal*, 91(364), 1031-1035.
- Downward, P. (1999). *Pricing theory in Post Keynesian economics*, Cheltenham: Edward Elgar.
- Downward, P. (2000). A realist appraisal of Post-Keynesian pricing theory. *Cambridge Journal of Economics*, 24(2), 211-224.
- Downward, P. (2002). Realism, econometrics and Post Keynesian economics, In S. C. Dow & J. Hillard (Eds.), *Post Keynesian Econometrics, Microeconomics and the Theory of the Firm* (pp. 144-161). Edward Elgar.
- Downward, P., & Mearman, A. (2002). Critical realism and econometrics: constructive dialogue with Post Keynesian economics. *Metroeconomica*, 53(4), 391-415.
- Downward, P., & Mearman, A. (2003). Presenting demi-regularities: the case of Post Keynesian pricing. In P. Downward (Ed.), *Applied economics and the critical realist critique*. London: Routledge.
- Downward, P., & Mearman, A. (2007). Retrodution as mixed-methods triangulation in economic research: reorienting economics into social science. *Cambridge Journal of Economics*, 31(1), 77-99.

- Eichner, A. S. (1976). *The megacorp and oligopoly*. Cambridge: Cambridge University Press.
- Encaoua, D., & Geroski, P. (1986). Price dynamics and competition in five OECD countries. *OECD Economic Studies*, 6.
- Fabiani, S., Loupias, C., Martins, F., & Sabbatini, R. (2007). *Pricing decisions in the Euro area: how firms set prices and why*. Oxford University Press.
- Farber, S. (1984). Cyclical price flexibility: a test of administered pricing. *The Journal of Industrial Economics*, 32(4), 465-476.
- Finch, J. H. (2002). The role of grounded theory in developing economic theory. *Journal of Economic Methodology*, 9(2), 213-234.
- Fiorito, R., & Kollintzas, T. (1994). Stylized facts of business cycles in the G7 from a real business cycle perspective. *European Economic Review*, 38(2), 235-269.
- Fischer, S. (1981). Relative shocks, relative price variability, and inflation. *Brookings Papers on Economic Activity*, 1981(2), 381-431.
- Friedman, D., Pommerenke, K., Lukose, R., Milam, G., & Huberman, B. (2007). Searching for the sunk cost fallacy. *Experimental Economics*, 10(1), 79-104.
- Friedman, M., & Schwartz, A. J. (1982). *Monetary trends in the United States and the United Kingdom: their relation to income, prices, and interest rates, 1867-1975*. University of Chicago Press.
- Gali, J., & Rens, T. (2010). The vanishing procyclicality of labor productivity, *Kiel Working Paper*, No.1641.
- Garber, S. (1989). The reserve-labor hypothesis, short-run pricing theories, and the employment-output relationship. *Journal of Econometrics*, 42(2), 219-245.

- Garber, S., & Klepper, S. (1986). Relative price changes in recession: a microeconomic analysis of US manufacturing. *International Economic Review*, 27(1), 187-208.
- Georganta, Z. (2003). Latent variable modelling of price-change in 295 manufacturing industries. *Applied Stochastic Models in Business and Industry*, 19(1), 67-88.
- Goldberg, P. (1995). Product differentiation and oligopoly in international markets: the case of the US automobile industry. *Econometrica*, 63(4), 891-951.
- Goode, R. (1994). Gardiner Means on administered prices and administrative inflation. *Journal of Economic Issues*, 28(1), 173-186.
- Gordon, R. (1981). Output fluctuations and gradual price adjustment. *Journal of Economic Literature*, 19(2), 493-530.
- Goulding, C. (2002). *Grounded theory: a practical guide for management, business and market researchers*. London: Routledge.
- Griliches, Z. (1971). *Price indices and quality change: studies in new methods of measurement*. Cambridge, MA: Harvard University Press.
- Hall, R., & Hitch, C. (1939). Price theory and business behavior. *Oxford Economic Papers*, 2(1) 12-45.
- Hanes, C. (1999). Degrees of processing and changes in the cyclical behavior of prices in the United States, 1869-1990. *Journal of Money, Credit, & Banking*, 31(1), 35-53.
- Heil, O., & Helsen, K. (2001). Toward an understanding of price wars: their nature and how they erupt. *International Journal of Research in Marketing*, 18(1-2), 83-98.

- Hellerstein, R. (2004). Who bears the cost of a change in the exchange rate? the case of imported beer. /emphFederal Reserve Bank New York Staff Report, 179.
- Holden, S., & Wulfsberg, F. (2008). Downward nominal wage rigidity in the OECD. *The B.E. Journal of Macroeconomics*, 8(1), 15.
- Hubbard, R., & Weiner, R. (1992). Long-term contracting and multiple-price systems. *The Journal of Business*, 65(2), 177-198.
- Jackson, W. (1997). Market structure and the speed of price adjustments: evidence Of non-monotonicity. *Review of Industrial Organization*, 12(1), 37-57.
- Jones, J., & Laudadio, L. (1990). Price rigidity, inflation and market concentration: some canadian evidence from the 1970s. *Applied Economics*, 22(12), 1625-1634.
- Kadiyali, V. (1997). Exchange rate pass-through for strategic pricing and advertising: an empirical analysis of the US photographic film industry. *Journal of International Economics*, 43(3-4), 437-461.
- Kahn, S. (1997). Evidence of nominal wage stickiness from microdata. *American Economic Review*, 87(5), 993-1008.
- Kawasaki, S., McMillan, J., & Zimmermann, K. (1983). Inventories and price inflexibility. *Econometrica*, 51(3), 599-610.
- Keynes, J. (1939). Relative movements of real wages and output. *Economic Journal*, 49, 34-51.
- Klepper, S. (1996). Entry, exit, growth, and innovation over the product life cycle. *American Economic Review*, 86(3), 562-583.
- Konstantakopoulou, I., Tsionas, E., & Kollintzas, T. (2010). Stylized facts of prices and interest rates over the business cycle. *Economics Bulletin*, 29(4), 2613-2627.

- Kydland, F. E., & Prescott, E. C. (1990). Business cycles: real facts and a monetary myth. *Federal Reserve Bank of Minneapolis Quarterly Review*, 14, 3-18.
- Lai, K., & Pauly, P. (1992). Production lags and price behaviour. *Economica*, 59(233), 53-62.
- Lavoie, M. (1992). *Foundations of Post-Keynesian economic analysis*. Aldershot: Edward Elgar.
- Lavoie, M. (2001). Pricing. In R. Holt & S. Pressman (Eds.), *A new guide to Post Keynesian economics*(pp.21-31). Routledge.
- Lee, F. (1994). From Post-Keynesian to historical price theory Part I: facts, theory and empirically grounded pricing model. *The Review of Political Economy*, 6(3), 303-336.
- Lee, F. (1996). Pricing, the pricing model and Post-Keynesian price theory. *The Review of Political Economy*, 8(January), 87-99.
- Lee, F. (1998). *Post Keynesian price theory*. Cambridge.
- Lee, F. (1999). Administered price hypothesis and the dominance of neoclassical price theory. *Research in the History of Economic Thought and Methodology*, 17(1), 23-42.
- Lee, F. (2002). Theory creation and the methodological foundation of Post Keynesian economics. *Cambridge Journal of Economics*, 26(6), 789-804.
- Lee, F. (2005). Grounded theory and heterodox economics. *The grounded theory review*, 4(2), 95-116.
- Lee, F., & Downward, P. (1999). Retesting Gardiner Meanss evidence on administered prices. *Journal of Economic Issues*, 33(4), 861-886.

- Lewis, V. (2006). Macroeconomic fluctuations and firm entry: theory and evidence. *National Bank of Belgium Working Paper*, 103.
- Lichtenberg, F., & Griliches, Z. (1989). Errors of measurement in output deflators. *Journal of Business and Economic Statistics*, 7(1), 1-9.
- Lucas, R. E. (1977). Understanding business cycles. In K. Brunner & A. Meltzer (Eds.), *Stabilization of the Domestic and International Economy* (pp.7-29). North Holland.
- MacDonald, J. M. (2000). Demand, information, and competition: why do food prices fall at seasonal demand peaks?. *Journal of Industrial Economics*, 48(1), 27-45.
- McConnell, M., & Perez-Quiros, G. (2000). Output fluctuations in the United States: what has changed since the early 1980s?. *American Economic Review*, 90(5), 1464-1476.
- McRae, J., & Tapon, F. (1979). A new test of the administered pricing hypothesis with canadian data. *The Journal of Business*, 52(3), 409-427.
- Means, G. (1933). Chapter VI. the modern corporation and basic economic thought. In F. Lee & W. Samuels (Eds.), *The Heterodox Economics of Gardiner C. Means*. Sharpe, 1992.
- Means, G. (1935). Industrial prices and their relative inflexibility. *U.S. Senate Document 13*, 74th Congress, 1st Session, Washington.
- Means, G. (1939). *The structure of the American economy*. Washington, D.C.: Government Printing Office.
- Means, G. (1972). The administered-price thesis reconfirmed. *American Economic Review*, 62(3), 292-306.

- Monroe, K. (2003). *Making profitable decisions*. New York: McGraw-Hill/Irwin.
- Mumtaz, H., Simonelli, S., & Surico, P. (2011). International comovements, business cycle and inflation: a historical perspective. *Review of Economic Dynamics*, 14(1), 176-198.
- Nakamura, E., & Zerom, D. (2009). Accounting for incomplete pass-through. *NBER Working Paper*, 15255.
- Nordhaus, W. (1996). Do real output and real-wage measures capture reality? the history of lighting suggest not. In T. Bresnahan & R. Gordon (Eds.), *The economics of new goods*(pp.27-70). NBER Studies in Income and Wealth, 58.
- Offerman, T., & Potters, J. (2006). Does auctioning of entry licences induce collusion? an experimental study. *Review of Economic Studies*, 73(3), 769-791.
- Okun, A. (1981). *Prices and quantities*. Washington, DC: Brookings.
- Philips, L. (1980). Inter-temporal price discrimination and sticky prices. *Quarterly Journal of Economics*, 94(3), 525-542.
- Plehn-Dujowich, J. M. (2008). On the counter-cyclical of prices and markups in a cournot model of entry. *Economics Letters*, 99(2), 310-313.
- Porter, R. H. (1983). Optimal cartel trigger-price strategies. *Journal of Economic Theory*, 29(2), 313-338.
- Ross, H., & J. Krausz (1986). Buyers' and sellers' prices and administered behavior. *Review of Economics and Statistics*, 68(3), 369-378.
- Rotemberg, J., & Saloner, G. (1987). The relative rigidity of monopoly pricing. *American Economic Review*, 77(5), 917-926.
- Rotemberg, J., & Woodford, M. (1999). The cyclical behavior of prices and costs. In J.

- Taylor & M. Woodford (Eds.), *Handbook of macroeconomics*. Elsevier Science.
- Scherer, F. (1970). *Industrial market structure and economic performance*.
- Sen, K., & Vaidya, R. (1995). The determination of industrial prices in India: a Post Keynesian approach. *Journal of Post Keynesian Economics*, 18(1), 29-52.
- Shaanan, J., & Feinberg, R. (1995). Dynamic competition and price adjustments. *Southern Economic Journal*, 62(2), 460-466.
- Shapiro, C., & Stiglitz, J. (1984). Equilibrium unemployment as a worker discipline device. *American Economic Review*, 74(3), 433-444.
- Siegel, D. (1994). Errors in output deflators revisited: unit values and the producer price index. *Economic Inquiry*, 32(1), 11-32.
- Stigler, G. (1947). The kinky oligopoly demand curve and rigid prices. *Journal of Political Economy*, 55, 432-449.
- Stigler, G. (1962). Administered prices and oligopolistic inflation. *The Journal of Business*, 35, 1-13.
- Stigler, G. (1992). Law or economics?. *Journal of Law and Economics*, 35(2), 455-468.
- Stigler, G., & Kindahl, J. (1970). The behavior of industrial prices. *National Bureau of Economic Research Paper*.
- Stigler, G., & Kindahl, J. (1973). Industrial prices, as administered by Dr. Means. *The American Economic Review*, 63(4), 717-721.
- Stiglitz, J. (1984). Price rigidities and market structure. *American Economic Review*, 74(2), 350-355.
- Stock, J. H., & Watson, M. W. (1999). Business cycle fluctuations in U.S. macroeconomic time series. In J. B. Taylor & M. Woodford (Eds.), *Handbook of macroe-*

- economics* (pp.3-64).
- Strand, J. (1987). Oligopolistic fixed-price equilibria and the number of firms. *Scandinavian Journal of Economics*, 89(4), 497-503.
- Sweezy, P. (1939). Demand under conditions of oligopoly. *Journal of Political Economy*, 47, 568-73.
- Tellis, G. (1986). Beyond the many faces of price: an integration of pricing strategies. *Journal of Marketing*, 50(4), 146-160.
- Tirole, J. (1988). *The theory of industrial organization*. Cambridge.
- Waller, W., Shapiro, B., & Sevcik, G. (1999). Do cost-based pricing biases persist in laboratory markets?. *Accounting, Organizations and Society*, 24, 717-739.
- Ware, C. (1992). Academic resistance to administered prices. In F. Lee & Samuels(Eds.), *The heterodox economics of Gardiner C. Means: a collection* (pp.337-348).
- Warner, E., & Barsky, R. (1995). The timing and magnitude of retail store markdowns: evidence from weekends and holidays. *The Quarterly Journal of Economics*, 110, 322-352.
- Webb, R. (2003). The cyclical behavior of prices and employee compensation. *Economic Quarterly - Federal Reserve Bank of Richmond*, 89(1), 69-83.
- Weiss, C. (1993). Price inertia and market structure: empirical evidence from Austrian manufacturing. *Applied Economics*, 25, 1175-1186.
- Weiss, L. (1977). Stigler, Kindahl and Means on administered prices. *American Economic Review*, 67(4), 610-619.
- Weston, F., Lustgarten, S., & Grottke, N. (1974). The administered-price thesis de-

- nied: note. *American Economic Review*, 64(1), 232-234.
- Wolman, A. (2000). The frequency and costs of individual price adjustment. *Federal Reserve Bank of Richmond Economic Quarterly*, 86(4), 1-22.
- Worthington, P. (1989). On the distinction between structure and conduct: adjustment costs, concentration, and price behavior. *Journal of Industrial Economics*, 37, 235-238.
- Wu, S. (1979). An essay on monopoly power and stable price policy. *American Economic Review*, 69(1), 60-82.
- Zandweghe, W. (2010). Why have the dynamics of labor productivity changed?. *Federal Reserve Bank of Kansas City Economic Review*, 3, 5-30.
- Zeithaml, V., Bitner, M., & Gremler, D. (2006). *Services marketing: integrating customer focus across the firm*. New York: McGraw-Hill.

VITA

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