

Price Pressure Measurements for Effective Monetary Policy: Methodology and Issues

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**The South East Asian Central Banks (SEACEN)
Research and Training Centre
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PREFACE

Keeping inflation low is an important mandate for all SEACEN central banks. While consumer price index inflation may be low and stable, other price indicators of inflation such as asset inflation may be volatile. Furthermore as the construction of the consumer price index itself may lead to all kind of biases, one has to ask whether central banks should depend solely on the consumer price index as an appropriate measure of inflation if they want to achieve maximum stability of the economy. As such, this paper attempts to provide some insights into the methodologies and issues of price pressure measurement for effective monetary policy.

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However, the views as expressed in this paper are those of the author's and do not necessarily reflect those of the SEACEN Centre nor its constituent member banks and monetary Authorities.

Dr. Subarjo Joyosumarto
Executive Director
The SEACEN Centre
April 2005

Abstract

By examining the construction of the consumer price index itself, clearly there are several reasons why the CPI is not an ideal measure of inflation for monetary policy purposes. The CPI is a noisy signal of the inflationary pressures and it may not necessarily be a good measure of the cost of livings. However, based on a list of criteria needed for a suitable and appropriate index, other measures of price indices such as the producer price index and the GDP deflator do not fare as well. It is also noted that even though the CPI inflation does not fully reflect price level movements, nevertheless it makes a good operational inflation target because it is an index which the monetary authorities can be held accountable. To overcome the limitation of the conventional CPI, superlative indices are highly recommended but as a second best solution, we strongly suggest customizing a family of consumer price indices to ensure different CPIs are aptly used for different purposes.

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Price Pressure Measurements for Effective Monetary Policy: Methodology and Issues

1.0 Significance

Notwithstanding several shortcomings of CPI, central banks around the world continue to use it as an inflation measure on which basis monetary policy is conducted. However, as clearly illustrated by Japan experience, CPI inflation could be low and stable while the economy is moving into a bubble phase through escalation in asset prices and credit growth. While the debate on whether and to what extent central bank should respond to asset price changes have yet to be settled, it is generally agreed that central bank should not just rely on CPI in setting monetary policy. In this regard, a few SEACEN member countries have started monitoring movements of asset prices although they still grapple with the problems of defining asset price bubbles.

Another main determination of inflation is wage inflation. Higher wages contributed directly to increased cost of production and consequently prices as well as inflation expectations, while inflation expectations in turn influence wages. Given the widespread prevalence of wage-price rigidities in the SEACEN countries, there is a concern whether these factors are fully reflected in the CPI. Thus, the formulation of a well-balanced monetary policy not only requires clear understanding and proper measures of economy-wide price pressures, but also the wage and price dynamics particularly in an open economy.

1.1 Objectives

- To evaluate the usefulness of CPI as basis for formulating monetary policy;
- To identify proper measures of economy-wide price pressure that are suitable for monetary policy objectives; and
- To enhance understanding of wage and price dynamics in an open-economy setting.

1.2 Issues to be covered:

- Current measures of price pressure, namely CPI, core CPI, asset price index, etc. and their usefulness for monetary policy objectives;
- Proper measures of price pressure for certain purposes, including role of asset prices and wages;
- Producers' wage-price setting behavior: how sticky are prices and wages and why; and
- In-depth analysis of each measure to gauge appropriateness for use as monetary policy's operational target.

2.0 Introduction

In the SEACEN region, the accurate measurement of inflation has become a major topic of interest of late. Firstly, in recent years, while inflation rate remained low in most SEACEN countries, it has become somewhat more volatile. One such episode was during the phase of rigorous liberalization efforts in opening the capital accounts on the balance of payments in the mid-1990's during which rapid economic growth was accompanied by relatively volatile inflation rates. Another period was during the 1997 Asian financial crisis where immediate post-crisis, inflation peaked in several SEACEN countries, particularly Indonesia and Myanmar but following its aftermath, the rate and its volatility declined sharply. Post-crisis, Brunei, Taiwan and Singapore even experienced unprecedented deflationary pressure. Secondly, four SEACEN countries, namely Indonesia, Korea, Philippines and Thailand have since followed inflation targeting with price stability as the overriding *explicit* objective.¹ Thirdly, in recent years, many SEACEN central banks, non-inflation targeting banks included have been granted greater degree of legal independence with a clear mandate to keep inflation and its expectation low. Fourthly, as debates were centered on whether information on existing price indicators such as asset price could be

1. Sri Lanka is considering pursuing inflation targeting to replace the current framework of targeting monetary aggregates.

useful for monetary policy strategies, SEACEN countries in the 1990's such as Indonesia, Korea, Malaysia, Singapore, Taiwan and Thailand experienced to a certain degree, asset price inflation. Fifthly, in some SEACEN countries, government expenditures such as pension are explicitly linked to the consumer price index (CPI) inflation and therefore any kind bias in the index is viewed with extreme interest.

In the international arena, the 1996 Boskin Report on CPI drew attention to possible bias in the U.S. consumer price index and this led to a widespread deliberation on whether inflation has indeed been mismeasured.² According to the Boskin Report, inflation in the U.S. may have been overstated by a cumulative amount of more than one percent due to various kinds of mismeasurement such as substitution bias, quality bias, new goods bias and retailing outlet substitution bias.³ Substitution bias occurs when relative prices change as consumers, given the same income level are likely to consume more of the goods with falling prices as they substitute the goods with rising price for them. The bias arises because of the conventional practice of constructing price index using a fixed basket of goods and services to construct CPI. Quality bias is a result of price index not fully captured the quality improvement of existing or new goods in the market while new goods bias arises when for some reasons, the index is unable to include them on a current basis. Retailing substitution bias occurs because prices are collected at the same stores throughout the years but consumers are likely to switch stores and shop at places that charges lower prices.⁴

2. Boskin & et. al. (1996).

3. U.S. Bureau of Statistics (1997).

4. Assume that the new lower-priced outlets are able to provide service of the same quality as the higher-priced incumbents. (US Bureau of Labor Statistics, 1997).

2.1 Cost of living index ⁵

The Cost of Living Index (COLI) is a theoretical concept to measure the minimum expenditure needed to achieve the same level of satisfaction (utility) across two different sets of prices.⁶ COLI intends to answer the following question: “What is the cost, at this month’s market prices, of achieving the standard of living actually attained in the base period?”⁷

Assuming the utility function of a society (U) is given by

$$U = f(q_1^1, q_2^1 \dots q_m^1, q_1^2, q_2^2 \dots q_m^2, q_1^3 \dots) \quad (1)$$

Where q_i^t = quantity of i^{th} goods/services consumed at time t .

The cost function that minimizes cost in order to attain a specific level of utility u could be specified as

$$C(p^t, u) = \min \sum_{i=1}^n (p_i^t q_i^t); u \leq U(q^t) \quad (2)$$

where p_i^t is the corresponding measurable price. Since it is impossible to measure prices of all goods and services consumed, $n < m$

5. There are at least two schools of thoughts regarding index number literature (See Hill, 2002). The first method, based on the economic approach assumes quantities are a function of prices. This approach is firmly grounded in the theory of utility maximization behaviour of rational agents. In this approach, households regard the observed price data as given and the quantity data are regarded as solutions to various economic optimization problems (ILO & et.al, 2004). The second method, the axiomatic approach is to subject the choice of formulae to a series of tests to see whether they satisfy a series of specific axioms. This approach pioneer by Fisher (1922) treats prices and quantity as two independent variables. These axioms include homogeneity, invariance, symmetry and monotonicity tests etc. One of the better known axioms is the proportionality axiom which states that $P_2(p_1, p_2, q_1, q_2) = \lambda$ if $p_2 = \lambda p_1$. (See Hill , 2001).
6. It is also possible to construct ‘cost of living’ indices based on other criteria. For example, Indonesia has developed an index called the “minimum living need” based on a basket of foodstuffs needed for a 3,000 calorie per person per day diet to defined poverty lines. Sri Lanka and Nepal have also constructed similar indices.
7. U.S. Bureau of Labor Statistics (1997).

The True Cost of Living Index (TCOLI) is then defined as

$$[c(p^t, u)] / [c(p^b, u)] \quad (3)$$

where p^b refers to prices in some base period b . If $TCOLI > 1$, then it implies that the cost of living has increased. Likewise, if $TCOLI < 1$, then the cost of living has declined.

By definition, COLI takes into account consumers adjusting their pattern of expenditure when relative price changes. However, in practice, to approximate the cost of living, a less broader index is calculated using the consumer price index. The CPI is normally computed via the Lowe index, using fixed basket of goods and services as weights. The Laspeyres and the Paasche are such indices. For example, the CPI-Laspeyres index aims to approximate COLI by measuring the cost of purchasing a *fixed* basket of consumer goods and services of constant quality and similar characteristics across different periods. To ensure that items in the basket being selected are representative of households' expenditure for a specified period, data from household expenditure survey are often used.

The Laspeyres index is defined as

$$P_L = \sum P_t^i q_{t-1}^i / \sum P_{t-1}^i q_{t-1}^i \quad (4)$$

and the Paasche is defined as

$$P_P = \sum P_t^i q_t^i / \sum P_{t-1}^i q_t^i \quad (5)$$

where P_t^i = prices of goods i at time t , q_t^i = quantity at goods i at time t .

As the Laspeyres index uses quantity weights in a base period, its growth is basically the weighted average of the growth in the cost of each item. Since the quantity is unchanged, it will reflect pure price movements. On the other hand, as the Paasche index uses quantity weights in the current period, it takes into account both price and quantity movements.

Table 1
Main Features of Consumer Price Index as at January 2004

Country	Base	Index ^{3/}	No of Items	Coverage	Time lags	Frequency	Source of weights ^{5/}
Brunei	1990	L	640	Urban	1 month	Monthly	HES 89/90
Fiji	1993	L	331	Urban	1- 2 days	Monthly	HIES, 92/93
Indonesia	2002	L	249-353	Urban (45 cities)	1 day	Monthly	FIES, 2002
Korea	2000	L	-	Urban (36 cities)	-	Monthly	FIES, 2000
Malaysia	2000	L	430	Nationwide	15days	Monthly	HES, July 98-June 99
Myanmar	1997	L	79	Urban	1 week	Monthly	HES, 1997
Philippines	2000	L	286-753	Nationwide	5 days	Monthly	FIES, 2000
Singapore ^{1/}	97/98	L	-	-	-	Monthly	HES, Nov 97-Oct 98
Sri Lanka ^{2/}	1952	L	-	-	-	Monthly	FBS, 1952
Thailand	1998	L	326	Urban ^{4/}	< 1 week	Monthly	SES,98,

^{1/} Nov 97-Oct 98.,^{2/}Newly introduced, Sri Lanka also computed the Consumer Price Index (SLCPI, Base year 1995 to 1997 = 100).^{3/} L=Lapseyres.^{4/} with 2-6 persons (6000-43000 Baht per month in 1998. Thailand CPI weights are also based on market share information.^{5/} HES=Household Expenditure Survey, HIES=Household Income Expenditure Survey, FBS=Family Budget Survey, SES=Social-Economic Survey, FIES=Family Income and Expenditures Survey.
Source: Table 3, UNESCAP(2000), with modifications

For the Laspeyres index, if a consumer income's is changing in proportion to the changes in the index, then in the subsequent period, given the increased income, the same consumer can still purchase the same quantity of goods to attain the same utility. But if there is a change in the *relative* prices of goods and services, being a fixed weight basket index, the Laspeyres will be subject to substitution bias if quantity purchased and prices are negatively correlated.⁸ For instance, given the same income, rational consumers can attain higher utility level by substituting existing new goods that are dearer with cheaper ones. Bias of this nature is especially relevant to transition and development countries where there is frequent introduction of new products while others exit from the market.

Because of this substitution bias, in general, a price index based on the Laspeyres methodology will be larger than COLI as it assumes

8. Most international studies of free economies note that bias in the CPI is mostly because of the ability of consumer to substitute cheaper goods. See Diewert(1995), Oulton,(1996), Dahlen,(1994), Woolford, (1994) and Cunningham (1996).

no substitution. On the other hand, the Paasche index provides the lower bound for COLI because it assumes full substitution across the various time periods. Under normal economic circumstances where prices and quantity of goods and services are negatively correlated and if there is a change in the relative prices, the following is true:⁹

Laspeyres	<	COLI	<	Paasche
No Substitution		Some Substitution		Full Substitution
Upwards bias		No Bias		Downward Bias

2.2 Superlative index

These superlative class of indices are designed to give good approximate to the underlying COLI as it is intended to overcome the weakness of both the Laspeyres and the Paasche indices. One such index is the Fisher Ideal Index (F).¹⁰ The Fisher Ideal index is basically a geometric mean of the Laspeyres and Paasche indices. From equation (4) and (5),

$$F = \sqrt{(P_L \times P_P)} = \sqrt{\left\{ \sum P_t^i q_{t-1}^i / \sum P_{t-1}^i q_{t-1}^i \times \sum P_t^i q_t^i / \sum P_{t-1}^i q_t^i \right\}} \quad (6)$$

The Fisher Index accommodates substitution effect while holding living standards constant by including data on current period quantity and not on designed based period.¹¹

9. Kohli (2004) has argued that it is generally not true that Laspeyres will be larger than the Paasche index if we evaluate these indices in the supply context.

10. Other superlative indices include the Walsh and the Törnqvist indices. In practice, these three indices tend to approximate each other and the current consensus is that the choice between them is of little consequences (Hill, 2002).

11. This is true when prices are market clearing and the utility function is homothetic. Under more realistic non-homothetic preferences, expenditure shares vary with income and thus, “income bias” is introduced into the superlative indices. Thus substitution bias in superlative indices could be larger than the Laspeyres index.

Several reasons were cited by the U.S. Bureau of Economic Analysis (1998) for the popularity of superlative indices. Firstly, during the 1970's energy crisis, indices using fixed-weight approach were grossly mismeasured. Secondly, in recent years, important theoretical advances were made to the theory of superlative index and thirdly, improvements in information technology make it practical to calculate superlative indices efficiently. For instance, the 1996 Boskin Report recommended that it was timely for the U.S. Bureau of Statistics to compute the CPI index using the superlative methodology. Having said that, superlative indices are highly desirable but there are some practical limitations. For example, the Fisher Ideal Index, which depends partly on Paasche index, is demanding in its data requirements. Hence, superlatives indices can only be published on an estimated basis or computed with some lags as they require contemporaneous data on the pattern of expenditures which are not available on a real time basis. Furthermore, in general, superlative indices are complicated and therefore are not so easily understood by wage and price settlers.

2.3 The consumer price index

As recommended by the Fourteenth International Conference of Labour statisticians (ICLS, Geneva, 1987) on consumer price index, conventional CPI construction is based on the Lapseyres or some form of modification of the Lapseyres methodology (See table 1 for coverage and Methodology in SEACEN Countries). The Resolution adopted by the ICLS concerning consumer price indices states the following:¹²

“The purpose of a consumer price index is to measure changes over time in the general level of prices of goods and services that a reference population acquire, use or pay for consumption. A consumer price index is estimated

12. The 1987 resolution adopted during the 14th International Conference for Labour Statisticians details guidance on the conceptual, theoretical and the operational aspects of CPI compilation. The first ILO resolution on CPI was in 1925 and subsequent revision were in 1947, 1962, 1987 and 2003. In 1994, a major International Working Group on Price Indices, known as the Ottawa Group, established under the auspices of the UN Statistical was established to look into specific issues such as quality changes in the computation of CPI.

as a series of summary measures of the period-to-period proportional change in the prices of a fixed set of consumer goods and services of constant quantity and characteristics, acquired, used or paid for by the reference population. Each summary measure is constructed as a weighted average of a large number of elementary aggregate indices. Each of the elementary aggregate indices is estimated using a sample of prices for a defined set of goods and services obtained in, or by residents of, a specific region from a given set of outlets or other sources of consumption goods and services.”

Consumer goods and services is defined as “one that member of households use, directly or indirectly to satisfy their own personal needs and wants.”¹³ In this respect, a distinction is normally made between acquisition and their subsequent consumption (use) of goods and services. For instance, in theory, the user approach is preferred when calculating COLI. For pragmatic purposes, conventional CPI computation is based on acquisition approach as the weights are based on the value of the goods and services purchased by households during the reference period irrespective of their subsequent usage.

The 1987 resolution that was revised at the 17th Conference of Labour Statisticians (ICLS) of 2003 lists down several important uses of the consumer price index. It notes that the CPI index can provide an average measure of price inflation as being a major macro-economic indicator, it aims to approximately measure the effects of price changes on the cost of achieving a constant standard of living (i.e. level of utility or welfare) or COLI. Being the most recognized index and most widely accepted, it is also used in the adjustment of payments in social security, commercial contracts, government fees and for formulating macroeconomic policies (See Appendix A for the list of main usage of CPI).

13. ILO & et.al, 2004.

3.0 Some Issues in the Current Consumer Price Index Construction

As the CPI construction strives to approximate the cost of living index (COLI), there are several issues regarding its construction relevant to developing countries.

3.1 Weighting Issue¹⁴

In the construction of the CPI-Laspeyres index, to reflect the spending patterns of an average individual household, the underpinning weights based on the share of the expenditures of the item are extracted from household expenditure surveys.¹⁵ As surveys have to be carried out regularly to update these weights, it is a costly exercise and developing countries have limited resources allocated for such purposes. Therefore, over the years, substantial substitution bias can come about due to infrequent weight changes.¹⁶ For instance, in Sri Lanka, the official index used to determine the Cost of Living Allowances is the Colombo's Consumer Price Index (CCPI) but the CCPI is computed with 1952 as a base year. This fact allows the users to question its credibility.¹⁷ Recently, although Sri Lanka has started to publish the Greater Colombo CPI (GCPI) and the Sri Lanka CPI index based on more recent Income and Expenditure surveys and wider geographical coverage, due to familiarity of CCPI over the years, their usages are still limited. The ICLS 2003 resolution recognizes the shortcoming of infrequent changing

14. The CPI classification should be as much as possible conformed to the most recent UN classification of individual Consumption by Purpose (COICOP).

15. As pointed out by Diewert (2003), theoretically, the CPI is not a truly Laspeyres index as the expenditure weights are collected on the annual basis but prices are collected on a monthly basis.

16. Another way to reduce and evaluate substitution bias is through the use of high frequent and timely scanner data as such data may capture "strong substitution effects occurring at the level of individual commodities." (Hill, 2004) On the other hand, the use of scanner data in the computation of consumer price index is "likely to reflect inventory and shopping behavior in response to sales prices more than changes in consumption" (Triplett, 2003). However, the use of scanner data is mostly limited to urban location and in some geographical areas where varieties of similar goods are limited, substitution bias can be relatively insignificant.

17. The Department of Census and Statistics, Sri Lanka (2004).

of weights and strongly recommends that weights used should be updated at least every five years and more frequent in periods of high inflation. For at least one SEACEN country, since 2003, Korea has started to compute the Laspeyres Chained Index which changes the weights of items every year, to reflect the change of the expenditure structures and consumption behaviors as the supplementary index to the CPI.¹⁸

Even if weights could be updated regularly updated, it may not be proper to just use only one set of weights to be representative of the consumer spending behaviour. This is especially true for developing countries where the level of urbanization differs widely across countries or across regions in a country. For instance, income disparities are large between the urban and rural areas and therefore a large degree of bias can be expected across regions and different income groups. Often, for practical reason, certain segments of the population areas are excluded. For instance, in Fiji and Thailand, the geographical coverage is limited to the urban area and in Indonesia, it covers mostly capital and main cities. In Korea only in 2003, the Household Income and Expenditure Survey was expanded to cover rural areas as well as urban areas but the current Korean CPI construction still excludes farmer's and fishermen's households.

3.2 Quality adjustment and new goods

Quality changes of a product are an important consideration to be taken into account in the construction of a CPI. However, it should be noted while improvement in quality may entail upward bias it is not necessarily always the case.¹⁹ For instance, in the case of new cars, it may be more appropriate to treat pollution control and mandatory safety equipment, at least in part, as raising price to a consumer rather than improving quality.²⁰ In the case of deterioration of quality changes, the CPI may experience downward instead of upward bias.

18. Korea National Statistical Office, (2004).

19. Substantial evidence does suggest that the measurement bias for certain items is downward rather than upward (Camba Mendez & et.al, 2002).

20. Greenspan (1997).

While the ICLS 2003 pays great attention to quality changes, it also admits that identifying such changes is an extremely difficult task for statisticians. For example, as clothing is subject to fashion changes, it is tricky to evaluate the quality differences between new and old items.²¹ The measurement of quality changes is further complicated by rapid development in areas such as the telecommunication, financial and the health sectors. This has resulted in not only a proliferation of new services but also a marked improvement in the quality of such services.²² This is particular relevant in developing countries where mismeasurement in quality changes in services is becoming increasingly important as demand shifts from goods to services when economies grow richer (Gordon, 2000). The ICLS resolution recommends that adequate resources should be allocated by the authorities to collect a considerable amount of information on the relevant character of a product and that assessment on quality changes should be based on objective criteria. The ongoing research to correct quality bias is the hedonic approach.²³ As in the SEACEN countries, quality adjustment is not normally taken into account but Korea is underway to introduce hedonic regression techniques into personal computers and other electric goods.

In the case of new goods, as there are significant time lags in revising the specification of items to be included, conventional CPI is unable to incorporate them immediately. Therefore the CPI may overstate inflation as new goods are typically not included in the index until several years after they first appear on the market. By the time they are included in the calculation of the CPI, these items would have already undergo large price reductions not picked up in the index. However, new expensive products normally do not have a large market

21. Goods that are subject to frequent fashion or taste changes (such as clothing) may be subject to significant downward bias (Gordon,2001).

22. Hill, 2004 and ILO & et.al, (2004).

23. In many cases one observes prices only for the overall goods or services instead of a bundled of goods or services. For instance, many goods and services are made up of individual components. Hedonic regression attempts to exploit this fact by statistically regressing the overall price onto these individual component characteristics. For example, using the following function: price (p) =f(X), where X is the set of its characteristics (x_1, x_2, \dots, x_n). However, data limitations make the hedonic approach impractical.

share when they are first introduced and therefore their impact may be limited.²⁴ Furthermore, at the beginning of a product's lifetime any information about sales is almost impossible to find.²⁵ It is also extremely difficult to make a distinction between a new product or an improved version of the existing product. Having said that, it is therefore difficult to decide when new goods should be introduced into the calculation of the existing index. One way is to turn to a uniform threshold value as in the case of the Harmonised Index of Consumer Prices (HICP) of the European Union.²⁶ In the HICP, new goods is included in the index if the share of a new goods exceeds 0.1 percent of total expenditure. The introduction of new goods is especially problematic to the CPI construction as it is difficult to integrate a coherent methodological treatment of new goods into a fixed based Laspeyres index (Diewert, 2003) but some economists such as Hausman (1997) has proposed a simpler solution. He notes that the percentage bias can be approximately by $\text{bias} = -0.5(S_n/d_n)$, where S_n is the percentage of expenditure shares of new goods and d_n is its price elasticity.

3.3 Administrated prices and informal markets

Administrated prices may not necessarily be a problem in the construction of the index per se but it poses challenges to monetary policy if the inclusion of such prices makes the index less responsive to it. For example, Malaysian CPI includes many items that are price-controlled goods. Like many developing countries, public fares are highly subsidized but yet the transport basket forms about 18 percent of the index. In Thailand as high as 24 and 30 percent of the goods and services in the CPI baskets pre-and post 1997 are administrated.²⁷ In most cases,

24. See Baker (1996).

25. Statistics Demark (2004).

26. The HICP is used to formulate monetary policy strategy of European Central Bank (ECB) as the Governing Council of the ECB states: "Price stability shall be defined as a year-on-year increase in the Harmonized Index of Consumer Prices (HICP) for the euro area of below 2%". In United Kingdom, it currently uses the harmonized index of consumer prices HICP (now renamed CPI in UK) as its inflation target when in 2003, the Bank of England switched from targeting from the retail prices index excluding mortgage costs:(RPIX).

27. Chantanahom & et.al. (2004).

being administrated prices, adjustments are infrequent. But if they do adjust, they have a domino effect on other administrated prices. For instance, increase in administrated prices such as energy and fuel are likely to lead to the transportation sector demanding similar increase in fares. This chain-reaction among administrated prices is likely to be beyond the control of a central bank. Nevertheless, it is not feasible to exclude these items as the index would then not be reflective of the cost of living. However, with increased privatization and corporatisation, pricing of these items is becomingly more market determined.

The existing theory of CPI construction assumes each household in the reference population faces the same prices for each goods and services. In practice, it is normal practice for pricing to be collected only in urban areas where the markets are relatively large and with a wide variety of commodities. However, price levels of many commodities in developing countries vary significantly across regions due to lack of communication and inadequate distribution networks. Furthermore, in many rural areas, a large number of transactions is done through the informal channel but the pricing in such informal markets is difficult to collect. Thus, in developing countries purchases from roadside vendors and local transient markets that are normally held two or three times are not covered.²⁸

3.4 Cross-border shopping

Another issue that raises concerns regarding the construction of the CPI is cross-border shopping among different countries. With increased development and globalization, the cost of cross-border information flows across developing countries have been lowered resulting in increased cross-border shopping such as purchases through the Internet. However, it is noted that if the CPI is to measure the changes in domestic price level, then, then cross border shopping is not relevant.²⁹ But if the CPI inflation is taken as changes in the cost of living, then this issue becomes of paramount importance.

28. Sultan (2002).

29. Statistics Singapore (2001).

3.5 Unanticipated random shock

In developing countries, CPI is a noisy signal of the inflationary pressures as unanticipated shocks and seasonal changes can affect the overall statistical behaviour of the CPI.³⁰ For example, in developing countries, food is an important component of the consumer price index and thus the CPI inflation rate is heavily influenced by agricultural shocks caused by adverse weather conditions that affect food supply (table 2).³¹ Having said that, the range of weights of the food component is fairly dispersed in the SEACEN countries and for obvious reason, the weight is higher in lower income economies. For instance, weight of food component is around 27 percent in Korea in contrast with over 71 percent in Sri Lanka.

Another important unforeseen shocks is due to energy prices. For example, the energy crisis of 1973 and 1979 launched bouts of inflationary pressures in oil importing SEACEN countries such as like Korea, Nepal, Singapore Thailand and the Philippines. However, since such shocks are normally short-lived, the long-run statistical behaviour of the CPI can be very different from the short-run. While it is now a common practice to use core inflation to deal with excessive volatility, its uses are still subject to much debate.

3.6 Consumer price index and house prices

Housing is one of the most important assets as normally it is the single largest purchase by household.³² Houses and owner-occupied dwellings serve two main purposes. They provide shelter services and

30. The Consumer Price Index Manual (ILO & et.al, 2004) suggests that both seasonal adjusted and unadjusted series should to be computed but it makes no comments on the preference on which is to be the main CPI index. But international experts agree that as unadjusted index reflects the price consumers actually paid, seasonal adjusted index may not be transparent as the seasonal effects can mask underlying trends. (Mai, 2004 & Department of Statistics, Singapore, May 2004)

31. In some countries such as Korea, price collected excluded discount prices due to volume purchase, temporary disturbance due to natural disasters etc.

32. House purchases are normally funded by mortgage loans and such mortgages payments can change in the case of variable interest rates as the interest rate changes.

Table 2 Weights of the Consumer Price Index						
Base Year	Korea 2000	Malaysia 2000	Singapore 97/98	Nepal 95/96	Sri Lanka 95-97	Thailand 98
Food	27.1 ^{8/}	33.8	27.5	53.2 ^{8/}	71.2 ^{2/}	38.5
Housing	15.6	22.4 ^{1/}	22.9	14.9	13.1 ^{7/}	25.9
Fuel and Lights	5.8	-	-	5.9	-	-
Clothing	5.7 ^{4/}	3.4 ^{4/}	22.9	8.9	4.4	3.7 ^{4/}
Transport & Comm	15.9	18.8	18.0	4.0	2.9 ^{5/}	16.2 ^{5/}
Medical care	4.4	1.8	3.1	8.0	2.4	5.6
Education	11.5	5.9 ^{3/}	7.3	7.1 ^{9/}	1.3	6.7 ^{6/}
Beverages & Tobacco	-	3.1	-	1.7	-	3.5

^{1/} include gross rent, fuel and power, ^{2/} includes tobacco, ^{3/} includes recreational, cultural services, ^{4/} includes footwear, ^{5/} transport only, ^{6/} includes recreation, publication, ^{7/} water, electricity, gas and other fuels, ^{8/} Includes beverages: ^{9/} reading and recreation.

as a form of investment. As owner-occupied housing can be a capital goods, a consumer goods or both, the question is whether to incorporate housing as a flow of housing services or to include the price of dwellings directly into the index.³³ Currently the treatment of housing in an inflation price index is done through three approaches, namely: the Acquisition Basis, the Consumption Approach and the Payment Approach. All three methods have their own advantages and disadvantages (see Table 3 and Appendix B). Although all the three methods are universally acceptable, they are likely to give different numerical results. Diewert (2002) has suggested that statistical agency should choose one “*approach for their flagship index*” but also compute other indices based on the other methods for interested users.³⁴

In some SEACEN countries because of problem of computation, all three methods are being used in various instances. For example, in Brunei, Fiji, Indonesia, Brunei Philippines and Thailand, actual rental is used while in Malaysia and Singapore use the rental equivalent approach. These are either collected through rent survey or through third party sources. For example, Singapore also uses the Annual Accessed Value (AAV), defined as the annual equivalent of the gross rent at which the house is let to the occupier and the data is obtained from the valuation division of the Inland Revenue Authority of Singapore (IRAS).³⁵

33. Other durable goods such as cars, freezers etc in principle could be treated as dwellings. However, as stated by the Consumer Price Index Manual (ILO & et.al, 2004), traditionally, these items have been “regarded as too difficult and artificial” to evaluate. As such these items are treated as durables and are classified as consumption expenditures.

34. The US Department of Labor reported that prior to 1983, housing prices was included in the CPI based on a procedure to include the changes in the asset value of owned houses and it caused the inflation rate to become excessively overestimated when the asset value of houses grew more than the consumption value. The rental equivalence approach to measure the value of housing was then used beginning 1983. On the other hand, when the Bank of England dropped the RPIX (Retail Prices Index (RPI) excluding Mortgage Interest Payments) as its operational target in favour of the HICP, it is noted that it may be harder for the Bank to “correctly gauge what effect the notoriously volatile UK housing market is having on the economy” as housing costs such as building insurance and council tax have much bigger weights in RPIX (Coulter,2003).

35. Statistics Singapore (2001).

Table 3
Treatment of Housing in CPI Calculation

Method	General Ideas	Comments
Net Acquisition Approach (NA)	<p>Value of Owner Occupied Dwelling is estimated on the basis of observed prices of (new) houses. Weights are derived from construction statistics.</p> <p>Purchases and sales of existing housing which occur within the household sector is considered as having no effect on the net expenditure component in the CPI.</p>	<p>Reflect full price paid for housing and not affected by method of financing.</p> <p>Current costs (e.g. for repairs), inheritance in addition to purchase of housing, quality changes and holding gains should also be taken into account.</p> <p>Does not make distinction between investment and consumption goods.</p>
User Costs Approach (UC)	<p>Net operating and opportunity costs caused by owner occupation plus net holding gains (imputed rather than actually observed costs)</p>	<p>UC comprises in addition to actually observed costs (e.g. mortgage costs, MC) "costs" which need a more or less complicated estimation or imputation. These "costs" may not reflect actual prices paid.</p> <p>But index can become negative if net gains become relatively large.</p>
Rental Equivalence Approach (RE)	<p>Observed rents spent by tenants are used to impute what owner-occupiers would pay if they were tenants rather than homeowners.</p>	<p>The existence of well established and intact rental housing markets facilitates estimation of imputed prices. RE is also in line with the practice of National Accounts.</p> <p>May not be able to estimate reliably in typical household expenditure surveys.</p>
Payment Approach (PA)	<p>Actual payments made by owners due to having incurred liabilities (eg., mortgage payments)</p>	<p>Makes the price of a service flow dependant on factors which are more or less unrelated to this service.</p>

Sources: Von Der Lippe (2002) with modifications and ILO & et.al (2004)

4.0 Comparison among various price indices

Most central banks and monetary authorities seek to promote sustained non-inflationary economic environment using the CPI as main indicator of inflation. Two other readily available indices are the producer price index (PPI)³⁶ and the GDP deflator.³⁷ In this section, a comparison is made among CPI, PPI and the GDP deflator based on a list several choices of a suitable price index for central bank to employ.³⁸ Although many of the criteria are either overlapping or conflicting, consumer price index seems a better choice.

4.1 The price index should be credible

For it to be credible, the price index must to a large degree be reflective of the cost of living but yet it should be up-to-date and never revised. In this respect, the selected indicator must not only reflect price movements but also one in which the monetary authority can be held accountable. For example, in the U.S., when comparing the conventional CPI with the Personal Consumption Expenditures Price

36. The Producer Price Index (PPI) measures prices relating to the production sector. It normally measures the average changes in the selling prices received by domestic markets. While the CPI is based on consumption, PPI is based on economic theory of production, and they differ sharply in definition and composition. According to the IMF manual on Producer Prices, its main uses include

1. Short-term indicator of inflationary trends;
2. National accounts deflators;
3. Indexation in legal contracts in both the public and private sectors, particularly for more detailed PPI components;
4. Required by international organizations such as Eurostat, the OECD, IMF, and European Central Bank (ECB) for economic monitoring and comparison;
5. Current cost accounting;
6. Compilation of other inflation measure such as the final expenditure price index (FEPI); and,
7. Analytical tool for businesses/researchers.

37. The GDP Deflator measures the entire changes in prices of all new, domestically produced, final goods and services in an economy. Thus with some limitations, the GDP deflator is a measure of general inflation in the domestic economy.

38. Some of the criteria are based on Webb (2004) and Diewert(2002).

Index (PCEPI) and the chained-consumer price index for all urban consumers (C-CPI-U), the PCEPI is a better approximation to the true cost of living than the conventional CPI as it tracks more items.³⁹ The chained-CPI (C-CPI), on the other hand, uses exactly the same price information as the conventional CPI. Both the PCEPI and the indices are superlative indices aiming to reflect the effect of substitution.⁴⁰ The PCEPI is calculated using the Fisher Ideal methodology while the C-CPI is a chaining Törnquist index utilizes expenditure data from adjacent time periods. As both the PCEPI and C-CPI are continuously revised and are not current while the conventional CPI is never revised after it is published, conventional CPI is probably more credible. This is especially convincing if such revisions are large and frequent. Hence, the certainty conventional CPI generated enables it to be used for indexation purposes in business or legal contracts.⁴¹

4.2 The coverage of a price index should be broad enough

Compared to CPI, both the producer price index (PPI) and the GDP deflator have a much wider coverage. From the PPI, two indices can be extracted from the production chain. The input prices (P_{in}) are the prices of input goods used to produce the final goods while the output (P_{out}) prices are the basic prices received by the producers. However, input prices may not necessary lead to a corresponding increase in output prices. Firms may scale down their markup price for a variety of reasons such as to gain increased market share (Clark, 1995). On the other hand, output prices measure the price change that actually takes place and are therefore a more direct measure of inflation. A better measure of overall inflation would be the difference between

39. Both indices are computed by the US Department of Commerce's Bureau of Economic Analysis.

40. Webb (2004).

41. However, credibility issues of conventional CPI may arise when policymakers try to make use of different versions of the CPI such as core inflation or when the index is used in circumstance where it is deemed inappropriate conceptually (ILO & et.al, 2004).

the input prices (P_{int}) and the output prices (P_{out}).⁴² Conceptually the CPI is an input index and the PPI is an output index. Therefore the substitution bias of CPI and PPI is likely to behave in the opposite direction as price and quantity consumed is likely to be negatively correlated for CPI and positive for PPI as firms would want to produce more given an increase in prices.⁴³

Even though the CPI has less coverage in terms of goods and services, the more comprehensive nature of both the PPI and the GDP deflator is likely to be a disadvantage when compared to the CPI as they include items that are not reflective of the cost of living. For example, compare to CPI, the GDP deflator is a much broader index as it includes most goods, though not necessarily consumed. However as it is also designed to exclude import prices, it is possible that because of rising imported prices, overall inflation rises but yet the GDP deflator remains unchanged or even move in the opposite direction.⁴⁴ It is also worthwhile to note that PPI excludes services and imported goods.⁴⁵ The PPI or the GDP deflator would make a better indicator to target if the concern is about misallocation of investment funds and distorting saving decision as CPI exclude investment in its construction.⁴⁶ But the CPI is a better choice to measure overall inflation.

4.3 The selected price index must be theoretically consistent

An index must be familiar to the public so as to enable them to relate to their everyday life but yet it must be theoretically consistent. When compared to PPI and the GDP deflator, the CPI approximates more closely the cost of living. Therefore it is likely to be the indicator

42. Input prices may include import prices, wage rates, user costs of reproducible capital and land and resource user costs. The ratio between the indices is one measure of productivity (Diwert 2002b).

43. In general, we can conclude that indices calculated using the Laspeyres method provides a lower bound for PPI but an upper bound for the CPI (Waehrer,2000).

44. Diwert (2002b) & Hill (1996).

45. Some countries like Indonesia and Thailand compute regional PPIs to reflect regional price dispersion and regional markets for produced goods.

46. Hill (2004).

which gains public acceptance since the public is more concerned with the impact of the changes in the prices of consumer goods and services as they affect the standard of living. Furthermore it is noted that any changes in the CPI tend to receive a lot of publicity, as the CPI is already a high profile statistic.⁴⁷

Many argue that as the price of owner-occupied housing is one of the largest single components of consumer spendings, its proper inclusion from the point of view of it being theoretical consistent and yet reflective of the cost of living index is rather important. As noted above, the various approaches recommended by the ICLS may result in a very different impact to the CPI. For example, if one uses the imputed rent approach, house price may rise but with no parallel increase rent. However, if asset prices are fully included in the calculation of CPI, the inflation rate could be overestimated during rapid asset price inflation. But it should be noted that under the current methodology of CPI construction, there is no apparent contradiction when movement in CPI inflation does not move in line with asset price inflation.

4.4 The index should be reliable and timely

A suitable index should not only be theoretical consistent but it should also be objective and reliable.⁴⁸ For example, given the specifications for the index and the same basic data, different statisticians should be able to produce the same index number value. An index is timely if it can be announced without any delay based on a predetermined schedule. Timeliness will not only reinforce public acceptance but also aids the operational aspects of the central bank.⁴⁹ Compared with the GDP deflator, the CPI is published frequently, usually each month and without much delay while the GDP deflator is often untimely and only available the very least, on a quarterly basis. The timely nature makes CPI inflation an appropriate index to be monitored

47. The CPI Manual, International Labour Organisation & et.al, 2004.

48. see Diewert (2002).

49. Kent (2004).

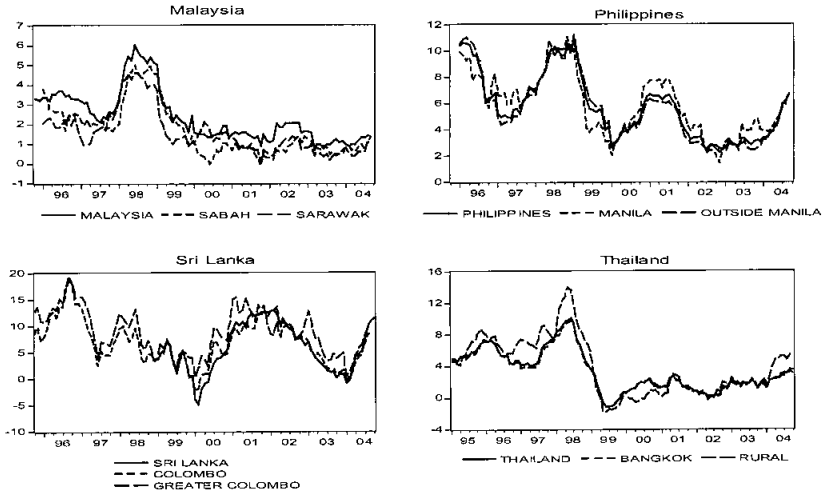
Price Pressure Measurements for Effective Monetary Policy: Methodology and Issues closely. However, in some countries, to avoid delays, only the national CPI is computed and released on a timely basis.

4.5 The index should be comparable

For an index to be useful for policy purposes, it must be comparable across regions. However, all domestically produced indices such as the CPI, PPI and GDP deflator do not have comparative advantages for regional comparison and cross-country comparison. But compared to PPI, regional computed CPIs are more easily understood as their economic interpretation is easier to comprehend. In fact many SEACEN countries have published regional inflation rates based on the CPI for different geographical areas in the countries (see chart 1). As for cross-country comparison, incompatibility is often due to different goods baskets and dissimilar treatment in the certain areas. For example, in areas related to methodology for quality adjustments and sampling methods. However, there have been successfully attempts to harmonize CPI for cross-country comparison. For example, within the European Union, a Harmonized Index of Consumer Prices (HICP) published by Eurostat has been developed.⁵⁰ It is been used to obtain comparable measures of price development in the European Union (EU) and as an inflation indicator in evaluating European Monetary Union's (EMU) monetary policy goals.

50. COICOP (Classification of Individual Consumption by Purpose) is used for product harmonized classification of the HICP. Other harmonization criteria include similar procedure for consideration of new products, quality adjustment and index formulas. Compare to the standard CPI, in some areas, when the methodology used is not consistent across countries in the standard CPI, these items are excluded. For example, in the HICP, in areas particularly related to housing, interest cost for owner-occupied homes are not included and certain costs of owner occupied homes such as repairs and real estate taxes are excluded. However, in some cases, the HICP has a wider coverage than a standard CPI. For example, entries such as childcare, elder care, hospital care and certain financial services are in the HICP but not in the CPI (Statistics Sweden, 2003).

Chart 1
Regional Inflation of Selected SEACEN Countries (M-o-M)



4.6 The index should be empirically stable

For an index to be useful for monitoring and monetary policy purposes, it must be empirically stable, at least in the long run. Compared to conventional CPI, superlatives indices are likely to be much more volatile in the short run. This is likely to pose problems for policymakers even if the volatility truly reflects movements in short-term prices as monetary policy can only exert limited influence in the short run.⁵¹ In this respect, the statistical properties of the various price indicators are investigated. Both the augmented Dickey-Fuller and the Philips-Peron tests suggest that the selected indicators of price inflation are stationary indicating that the impact of any shocks would be minimal in the long run. (Table 4). However, the standard deviations of CPI inflation were significantly much smaller than the other measures (Table 5). In some cases, the standard deviations of the other measures of inflation were as much as four times larger than CPI inflation.

51. Kent (2004).

Table 4:
Unit Root Tests for various Inflation Indicators

	ADF Prob	ADF Lag	PP Prob	Observations
CPI Inflation				
Fiji	-8.11 ***	0	-8.06 ***	80.Q2-04.Q2
Indonesia	-4.85 ***	0	-4.79 ***	80.Q2-04.Q3
Korea	-5.73 ***	0	-6.51 ***	80.Q2-04.Q4
Malaysia	-3.60 ***	0	-6.91 ***	80.Q2-04.Q4
Mongolia	-11.9 ***	0	-14.6 ***	91.Q4-02.Q3
Myanmar	-5.66 ***	0	-5.71 ***	80.Q2-03.Q4
Nepal	-3.43 **	8	-8.71 ***	80.Q2-04.Q1
Philippines	-4.17 ***	2	-5.13 ***	80.Q2-04.Q2
Singapore	-3.35 **	1	-5.61 ***	80.Q2-04.Q3
Sri Lanka	-7.71 ***	0	-7.58 ***	80.Q2-04.Q4
Taiwan	-6.57 ***	4	-10.55 ***	80.Q2-04.Q4
Thailand	-7.91 ***	0	-7.91 ***	80.Q2-04.Q2
GDP Deflator				
Korea	-5.13 ***	0	-11.05 ***	80.Q2-04.Q2
Malaysia	-6.41 ***	0	-6.86 ***	91.Q3-04.Q2
Philippines	-3.87 ***	7	-8.40 ***	81.Q3-04.Q2
Thailand	-5.96 ***	0	-5.94 ***	93.Q3-04.Q2
Wholesale Price				
Indonesia	-6.90 ***	0	-6.87 ***	80.Q2-04.Q2
Korea	-7.78 ***	0	-7.81 ***	80.Q2-04.Q2
Malaysia ^{1/}	-6.75 ***	1	-6.29 ***	84.Q2-04.Q1
Philippines	-5.24 ***	0	-5.17 ***	80.Q2-04.Q1
Singapore	-8.36 ***	0	-8.24 ***	80.Q2-04.Q2
Sri Lanka	-6.83 ***	0	-6.83 ***	80.Q2-04.Q1
Taiwan	-6.18 ***	3	-10.47 ***	80.Q2-04.Q4
Thailand ^{1/}	-6.47 ***	0	-6.45 ***	80.Q2-04.Q2

^{1/} Producer Price Index

ADF=Augmented Dickey Fuller Test (lag length chosen by Schwarz Criteria with maximum equals to four lags, with the test regressions include a constant term), Prob=Significant level, PP=Philips-Peron Tests, ***, ** : 1 % and 5 % significance levels respectively. Inflation (ΔP) is measured by $\ln(P_t) - \ln(P_{t-1})$.

Sources: IMF CD-Rom and CEIC.

Table 5
Standard Deviation Ratio to CPI Inflation

	GDP Deflator	Wholesale Price	Producer Price
Indonesia (80Q1-04Q2)	-	1.80 ^{1/}	-
Korea (80Q2-04Q2)	1.83	1.32	-
Malaysia (91Q1-2004Q1)	3.20	-	4.04
Philippines (81Q1-04Q1)	1.23	1.37	-
Singapore (80Q2-04Q2)	-	4.03	-
Sri Lanka (80Q2-2004Q1)	-	1.84	-
Taiwan (80Q2-2004Q4)	-	-	1.05
Thailand (93Q2-04Q2)	1.66	-	2.36

^{1/} Ratio is 1.4 for wholesale price excludes petroleum.

5.0 The choice of domain of CPI

5.1 Core inflation and CPI inflation

In maintaining price stability, monetary authorities cannot be expected to be concerned with every transitory price movement nor should they react to every price fluctuation. Therefore, in setting monetary policy objectives, central banks are expected to focus only on the underlying inflation trend which is defined by Blinder (1982) as the rate in which actual inflation tend to fluctuate. But as the underlying trend is not directly observable, the argument call for a narrower measurement of inflation; the 'core' inflation.

Core inflation is defined by Eckstein (1981) as *"the rate which would occur on the economy's long-term growth path provided the path were free from shocks and the state of demand were neutral."* In this respect, core inflation can be defined as the persistent or permanent component of inflation. This generally involves inflation (π), being divided in a statistical sense among its trend (core inflation, π_p), transitory components(π_t) and a cyclical component (π_c) whereby:

$$\pi = \pi_p + \pi_t + \pi_c \quad (7)$$

The trend component is usually and can be influenced by the stance of monetary policy while the transitory component is random and may include fluctuations due to supply shocks to inflation. Therefore core inflation should measure the long-term trend movements in prices that reflect the state of demand in the economy rather than one-off shock coming from the supply side. Basically the idea behind core inflation is that “*monetary policy works primarily through its influence over demand pressures in the economy*” (Roger 1995).

Ideally, core inflation would be:

- *a good indicator of current and future trends in inflation;*
- *a good measure of inflation for empirical work; or*
- *a viable target for monetary policy.*⁵²

The easiest and most common method of computing core inflation is to simply exclude items that are deemed seasonal or volatile. For instance, Blinder (1997) notes that food and energy component should be removed as a basis for calculating core inflation not because “*these component are extremely volatile [but] because the real reason was that the price of food and energy are beyond the control of the central bank.*” The other preferred methods are the trimmed mean method and the weighted median method. These two methods measure the volatilities for a set of prices and if they are significantly larger than the average, the “outliers” are either assigned less weight or totally excluded. Another weighting scheme suggested by Wynne (1999) is the simple variance-weighted approach in which the weights of the various individual prices are inversely related to the volatility of prices. Blinder (1997) has also suggested that core inflation should focus on durable or persistent component of underlying price changes as such persistence changes capture the ongoing element of price movements. By durable, he also suggests that the weighing scheme should depend on components that have “*value for near-and medium term forecasting.*” Calculating core inflation by exclusion is by far the easiest to compute and most easily understood by the public although a prior decision has to be made as to which items to exclude.

52. Johnson (1999).

Recently there has been much development to put core inflation on a more solid theoretical footing. These newer methods adopt an econometric rather than behavioural approach to the problem of price measurement. These include the Dynamic factor index (DFI), proposed by Stock and Watson (1989) and Bryan and Cecchetti (1993) and the SVAR technique pioneered by Quah and Vahey (1995). The DFI method attempts to treat the weighting-bias as a statistical problem by deriving the weights in a time varying manner based on the statistical behaviour of the sub-series of the CPI. The common inflation component (core inflation) is extracted using a Kalman filter approach involving a Markovian process. On the other hand, the Quah and Vahey (1995) method imposes a long-run restriction on a bivariate VAR system for output and inflation as they define core inflation as “*the component of measured inflation that has no medium and long term effect on output.*”

A major setback of using econometric approach is when new data is obtained and the model reestimated. The newly derived core inflation series could be very different from the series generated earlier. Hence, the continuous changing estimation of the core inflation series is likely to create some degree of uncertainty. Credibility issues may arise if the derived core inflation series is used as part of central bank communication strategies with the public.⁵³ But so far, none of the central banks have use econometrically generated core inflation as their official targets. However, there is no general consensus on the best method to extract a solid measure of long-term price movements from headline inflation.⁵⁴ The criteria for selecting a measure of core inflation can be seen from table 6.

53. Wayne (1999).

54. Bank for International Settlements (1999).

Table 6
Criteria for Selecting a Measure of Core Inflation

	Exclude Food & Energy	Moving Averages	Trimmed Mean	Variance Weighted	Dynamic Factor Index	SVAR Measures
Computable in Real Time	Yes	Maybe	Yes	Yes	Yes	Yes
Forward Looking	No	No(?)	No	No	No	Yes
Track Record	Yes	Yes(?)	Yes	Yes(?)	Yes	Yes
Understandable By Public	Yes	Yes(?)	Maybe	No	No	No
History Does Not Change	^{1/} Yes	Maybe	Yes	No	No	No
Theoretical Basis	No	No	No	No	No	Yes

^{1/} The estimation changes each time a new observation is observed.

Source: Table 2, Wayne (1999), with some modifications.

Many central banks started off an inflation-targeting regime using core inflation as operational target but eventually some has switched to conventional consumer price index, albeit with some modification to it. For instance, the Reserve Bank of Australia and the Reserve Bank of New Zealand stopped using core inflation as monetary target in 1998 and 1999 respectively. In New Zealand, a new way of calculating CPI was introduced in 1999 to exclude the interest rate and house prices from the CPI and this new index has since now become the Reserve bank inflation target as defined in the Policy Target Agreement (The Treasury, New, Zealand, 2004). Australia has also recomputed its CPI to exclude interest rates from the CPI, thus removing the main obstacle to its use as the focus of the inflation target (Cockerel, 1999). Among other changes to the Australian CPI, mortgage and consumer interest charges were replaced by house purchasing costs (RBA 1998).

As in the SEACEN countries, Bank Indonesia switched from net inflation (consumer price inflation excluding the effect of government price and incomes policy) to headline inflation in January 2002 as the central bank firmly believes that headline inflation is a better measurement of the consumer living cost index.⁵⁵ In the Philippines,

⁵⁵. Bank Indonesia website (2004).

the official core inflation measure is computed using the exclusion method. Bangko ng Pilipinas notes that this approach was chosen for the following reasons: 1) ease of construction; 2) understandability by the general public; 3) easy replication and verification by others; 4) increased accountability and transparency of measurement; and, 5) timeliness.⁵⁶ However, headline inflation is the official inflation target. On the other hand, The Bank of Korea first adopted consumer price inflation targeting in 1998 as the CPI then was considered the most recognizable indicator.⁵⁷ But then it shifted to core inflation in 2000. The Bank of Thailand (BOT) chose to target core inflation (exclude raw food and energy) at the onset. (Table 7). According to the BOT,⁵⁸ core and headline inflation are statistically correlated, implying that *“the maintenance of price stability in terms of core inflation will therefore lead to overall price stability.”*⁵⁹ However, it should be noted that only about 19 percent of the basket is excluded in Thailand’s core inflation.⁶⁰

56. Bangko Sentral Bank, Website (2004).

57. There is a need for central bank to decide whether targeting inflation is better than targeting price level. Mishkin (2001)) argues in favour of inflation targets over price-level targets as inflation target misses are not revised by central banks while price level targets require that missed targets be revised resulting in more volatility to monetary policy in the short-run.

58. Bank of Thailand website (2004)

59. Allen (1999) notes that once a price index is chosen it may be desirable to target it as a band instead of a single point target. A band can function as: 1) a mean to maintain credibility as it is obvious that a single point target is difficult to achieve; 2) a device to monitor whether the bank is achieving its desired target; and, 3) as a mean to introduce flexibility in the monetary policy to allow some cyclical fluctuation in the rate of inflation. For example, The Bank of Korea has set a target range of 2.5 ~ 3.5 percent for the average rate of increase in core inflation for the three year period 2004 ~ 2006.

60. It is noted by Kent (2004) that it is not necessarily optimal for central banks in an inflation-targeting regime to switching to an even less biased measure of inflation as other characteristics of the targeted measure matter such as credibility of the index are also equally if not more important.

Table 7
Inflation Targeting and Core Inflation
Measurement in SEACEN Countries

Concept Target	When	Mid-Term Targets	Central Banking Reforms
Indonesia			
Net Inflation (Consumer price inflation excluding the effect of government price and incomes policy)	January 2000- December 2001	4-6%	Enactment of new Central Bank Law in May 1999
Headline CPI inflation	January 2002 present	6-7%	
Korea			
Headline CPI inflation in 1998-99; since then core inflation (excluding petroleum and agricultural products other than cereals)	September 1998	2.5% Since 2004, 2.5-3.5%	1997
Philippines			
Two-year policy horizon	2002-2003	4.5-5.5%	1993
CPI headline inflation but take into account 'core' inflation (excluding food- and energy-related components of the CPI).	2004-2005	4.0-5.0%	
Thailand			
Consumer price inflation (core) excluding raw food and energy prices	May 2000	0-3%	On-going

Other countries such as Singapore a non-inflation targeting also monitor underlying inflation closely. Singapore's underlying excludes only private road transport, transportation costs and accommodation and therefore any change in the supply side would be reflected in this index. This includes for example adjustment in GST and excise duties on alcoholic drinks and tobacco as well as the price increases in commodity-related and related services items.⁶¹

⁶¹. Monetary Authority of Singapore (2004).

5.2 Food inflation and CPI inflation

As mentioned above, food is a relatively big component in the CPI construction in developing countries (Table 1). In this section, the interaction of between headline CPI inflation and food inflation is investigated using a simple bivariate vector-auto regression (VAR) model of headline inflation and food, food and non-food inflation for the post crisis period.⁶² As food is a large component of the CPI, from the generalized impulse functions, it is obvious that a shock to food prices translates into a relatively large shock on impact to headline inflation in contrast to a much smaller and insignificant shock to non-food inflation (Chart 2).⁶³ However, most of the shocks associated with food do appear to dissipate rather quickly as they become insignificant after a period of around 2-3 months. After the initial food price shocks, there is no long run effect except for Indonesia. This may indicate although food price shocks increase short-term volatility of headline inflation, in the longer run, it may not matter much as to which indicator is targeted.⁶⁴ In another words, it implies that either targeting core inflation or headline inflation could lead to overall price stability in the long run. However, a caveat is that for country like Sri Lanka which may move to inflation targeting in the near future, core inflation excluding food may not be a good indicator as food accounts for over 70 percent of the total weight of CPI calculation.

62. Official published data is used. For Indonesia, Malaysia, Singapore and Sri Lanka, there is no official release data for non-food inflation. For the Philippines, Taiwan and Thailand, since headline inflation is a direct function of food inflation and non-food inflation, two bivariate models which consist of 1) headline inflation and food inflation; 2) food inflation and non-food are estimated to overcome any problems generated by the collinear nature of the regressors. For Korea, as core inflation is used, the VAR consists of headline inflation, non-food and core inflation. Philippines, Sri Lanka and Thailand, food includes beverages. Data is monthly with sample range as follows: Indonesia (1998.1-2004.11), Korea (1998.1-2004.7) Malaysia (1998.1-2004.11), Philippines (1998.1-2004.11), Singapore (1998.1 2004.6), Sri Lanka (1998.1-2004.7) Taiwan (1889.1-2004.11) and Thailand (1998.1-2004.7). Lag lengths are decided by either Schwartz criteria or a minimum of one lag. Inflation (ΔP) is measured by $\ln(P_t) - \ln(P_{t-1})$. All data are from IMF, IFS CD-Rom.

63. Generalised impulse responses are independent to the ordering of the VAR variables.

64. Core inflation in some countries is defined as food inflation.

5.3 Asset price inflation and CPI inflation

Asset Price inflation can be defined as “*a sharp and prolonged increase in the price of assets or a composite group of assets such as real estate and shares of relevance to monetary policy decision via aggregate demand and the household stocks.*”⁶⁵ Asset price inflation gains increased attention in recent years because of the creation of the wealth effect that could eventually feed into inflation. For example, Japan’s experience of asset and real estate price bubble in the late 1980’s and early 1990’s and in some SEACEN countries in the mid-1990’s.

In a seminal paper, Alchian and Klein (1973) argue that a correct measure of inflation should include asset prices because they reflect the current money prices of claims on future as well as current consumption. Inflation measure (π_{ak}) can be summarized as a weighted sum of conventionally measured inflation (π) and asset price inflation (π_{ap}):

$$\pi_{ak} = \alpha\pi + (1-\alpha)\pi_{ap} \quad (8)$$

where α is the weight on conventionally measured inflation and $1-\alpha$ is the weight on asset price inflation.⁶⁶

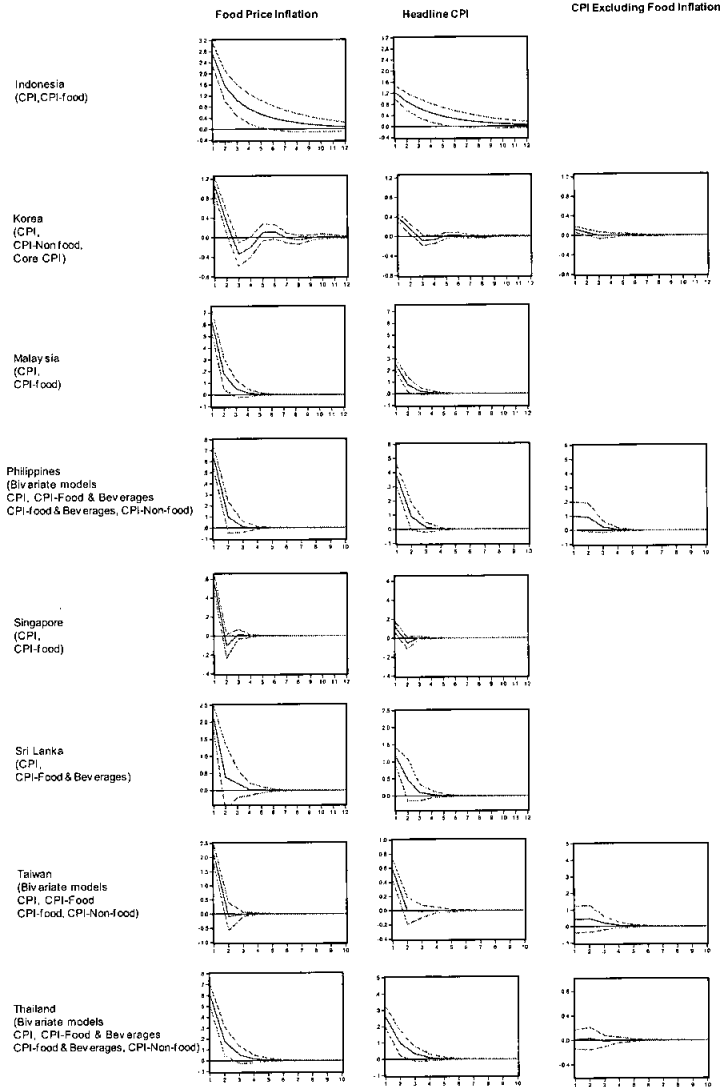
As monetary policy is all about managing the future rate of inflation, central banks should be concerned with a wide range of economic variables that are useful for its forecasting processes. Hence Alchian and Klein’s broader measure of inflation has the potential to improve macroeconomic performance if forward-looking signs of inflation are captured in asset prices.⁶⁷ Others such as Goodhart (1995) have also recommended that central banks replace conventional inflation measures – such as the CPI or PCEPI – with a much broader measure that

65. The SEACEN Centre (2001).

66. The debate therefore boils down to what is the appropriate value for α .

67. If consumers anticipate higher inflation in the future, economic theory suggests that, all else being equal, stock markets and housing prices would rise immediately.

Chart 2
 Response to Generalized One S.D. Innovations ± 2 S.E. to Food Price Inflation Shock



includes stock market and housing prices, weighted appropriately. According to Hill (2004), as the central banks priority is to stabilize the prices of goods and services, one should also be concerned about asset prices when its rate of increase is faster than the conventional CPI as asset prices may eventually lead to general price inflation.

It is also argued that monetary policy should actively seek to encourage asset price stability because if asset prices form bubbles, the aftermath of bursting of such bubbles could lead to potentially high macro-economic volatility. But it is difficult to determine whether increase in asset prices actually reflects forward-looking signals or speculative activities as asset-price bubble need not be associated with a rise and fall in the general prices. There is also the problem of an asymmetric perception of asset price movements. Increase of stock prices is fine, while declines are considered as destroying wealth; therefore any action by the central banks to mitigate stock price increase is seen as having destroyed private wealth.⁶⁸ Therefore, when central banks are irresolute to prevent asset price bubbles under the bull market but react immediately when the financial market becomes unstable, this gives rise to moral hazards as it induces investors to believe that monetary policy would support stock prices and therefore tempting them to seek higher risks.^{69,70} In this respect, gearing monetary policy to asset price movements might jeopardize a central bank's credibility.

The arguments for monetary response to asset prices are as follows:

1. Alchain and Klein (1973) note that *“since assets are sources of future services, asset prices provide clues to prices of present*

68. See Ham and Hong (2000).

69. Jung and Lim (2002).

70. The central bank and the private sector are permanently engaged in a complex game where each tries to extract information and anticipate the moves of the other. Since the acquisition and processing of information is an extremely costly and time consuming activity, both the private agents and the authorities try to 'free ride' each other. The central bank would like to have direct and updated information on the state of the economy through the financial institutions that are in direct contact with the economic agents, while the market participants would like to guess the reaction of the central bank to current and expected developments.

claims on future consumption.” Therefore asset prices may contain expectation and useful information on future economic conditions. It can be considered a leading indicator which is useful for important forward looking monetary policy decision. As conventional consumer price index has some limitations for gauging the inflation pressure on overall economies, an intimate knowledge of asset prices is required for central banks to be able to forecast effectively the inflation pressure upon the overall economies;

2. In the short run, asset prices can affect demand directly through household wealth and consumption. Asset prices, in particular equity have gained greater importance in recent times as stock market ownership is now more widespread. Therefore any sharp movement in equity prices may have larger macroeconomic impacts (Saxton, 2003);
3. Large fluctuation of asset prices can cause instability if banks engaged in asset based lending, with assets pledge as collateral. On borrower’s part, declining asset prices can lead to unplanned leverage on part of borrower access to credit. Declining asset prices may also led to the negative financial accelerator effect (Bernanke & et.al, 1996)⁷¹; and,
4. Central banks can rein in expectation before it is translated into inflation.⁷² For example, if one follows Goodhart’s (1995) recommendation on the use of a broader measure of inflation that includes asset prices, an increase in asset price inflation could prompt tighter monetary policy even if conventionally measured inflation were low and stable.

71. A fall in a borrower’s net worth or cash flow raises the demand for external finance and subsequently reduces investment for firms that do not have access to the bond market. Given that negative shocks to asset price affect cash flows, the effect of an initial shock to the economy may be amplified and thus small shocks might therefore create large cycles.

72. It is also noted that asset price inflation could occur in a period of relative price stability (Mccaluley, 2001).

While the arguments against monetary response are as follows:

1. It is very difficult to detect accurately whether increase in asset prices reflects improvement in economic fundamentals or the formation of speculative bubbles. Central banks should not intervene if movement of asset prices merely reflects changing underlying economic fundamentals as central banks must not be seen as wanting to control asset price inflation⁷³;
2. King (2002) notes that the response of asset prices to changes in monetary policy can be unpredictable. Therefore a central bank's reaction to volatile asset prices might not necessarily improve macroeconomic performance. By responding to asset prices, the central bank may end up worsening economic conditions, if these asset prices respond to factors other than expected inflation. In this case, a systematic approach would therefore be inappropriate. Furthermore endogeneity problem may arise when asset prices depend on monetary policy and monetary policy itself relies on them; and,
3. Asset prices probably contain little marginal information that is useful for forecasting (Gertler, & et al. 1998) and empirical evidences are at best mixed. Even if asset prices help predict inflation, it is still not clear how central bank should react to asset prices.

5.4 Inflation and stock prices

As noted above, systematic and rule based response to asset prices such as stock prices may be unwarranted if the central bank's reaction leads to excessive volatile of other macroeconomic variables.⁷⁴ This is illustrated by a simple three equations error-correction simulated model

73. However others such as Cecchetti & et al (2003) argue that while it may be difficult to estimate and measure asset-price misalignments, asset prices are obviously misaligned in many cases.

74. Lack of sufficient data prevents similar study to be conducted for the housing sector.

in the case of Taiwan (see Chart 3).⁷⁵ In this model, interest rate is modelled to response to both inflation rates and stock prices. A mild response to stock returns is defined as: interest rate equals 1.0*inflation rates plus 0.05*stock returns while a more aggressive response is defined as interest rate equals 1.0*inflation rates plus 0.1*stock returns. While this is an arguably naive and very simple model, it does illustrate the fact that a more aggressive response monetary policy to stock prices would only lead to increased variability of other economic variables.⁷⁶ Similar models of other SEACEN countries would have elicited the same responses given the statistical behaviour of the stock markets.

We also used the Dynamic Factor index methodology to integrating stock prices into the CPI for the case of Malaysia. The maximum likelihood estimates of the common trend response are obtained by using the Kalman filter.⁷⁷ From the chart 4, the common trend is not only more volatile but it also shows a much higher inflation rate. The only period when the generated trend is close to the actual inflation is during the 1997 Asian financial crisis period. This was the period where, stock returns were on a downward trend but inflation rates were exceptionally high. From the two cases above, it seems that it would be problematic for the authorities

- 1) to target directly volatile asset prices such as stock prices as indicators; and,
- 2) to incorporate volatile asset prices, in particular stock prices into the CPI.

75. Similar results are reported for the case of Korea (see Park, 2001).

76. This is confirmed by the Equality of Variance Tests.

77. $\Delta y_{it} = \lambda \Delta C_t + \varepsilon_{it}$, $\Delta C_t = \beta \Delta C_{t-1} + \mu_t$ and $\varepsilon_{it} = \delta_{it-1} + \pi_{it}$, Y = inflation rates, stock returns and C is the common unobserved component. We assume the process is AR(1). See (Stock & Watson, 1989).

Chart 3
Simulate Response to Monetary Policy Option: Taiwan

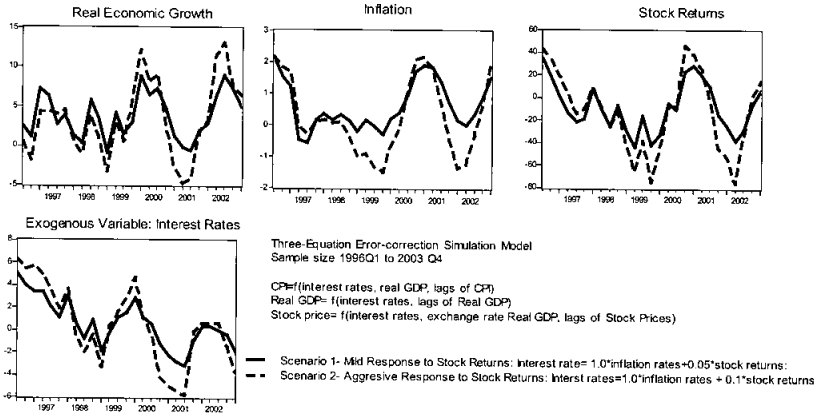
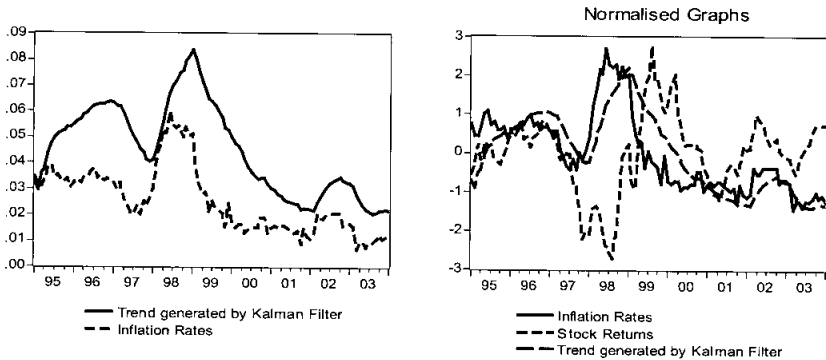


Chart 4
Stock Prices and Inflation Rates:
Kalman Filter Combination
The Case of Malaysia



5.5 Wages and CPI inflation

Standard economic theory states that any increase in wages paid by employers without a corresponding increase in productivity is deemed as a cost-push factor because wages are a component of production cost. Faced with a higher production cost, producers, as profit-maximizing agents would mark-up the prices of goods and services. In other words, producers raise their prices in order to maintain the real value of their profits. The vicious cycle would continue, as workers would demand higher money wages to maintain their real income. As first noted by Keynes (1936), workers are also said to suffer from money illusion and resist nominal wages cut, or in Keynes's own words, "*movement by employers to revise money-wage bargains downward will be much more strongly resisted than a gradual and automatic lowering of real wages as a result of rising prices.*"⁷⁸ This resistance to lower real wages translates into downward *nominal* wage rigidity. Nominal rigid wages can lead to consequent increase in real labour cost leading to a large variation of unemployment in a low economic growth environment or inflation during economic boom.

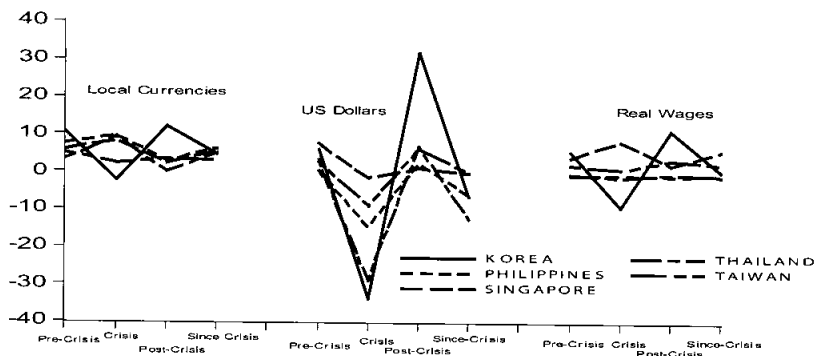
In mid-1990's just prior to the 1997 financial crisis, most SEACEN countries were experiencing overheating economic growth, shortage of both skilled and unskilled labour. This led to higher labour costs and excess demand for domestic goods and services. Pre-crisis, average nominal wages grew on average around 6.6 percent in local currencies and 2 percent in real term (Chart 5).⁷⁹ During the crisis, wages growth in local currencies decelerated to 4.7 percent while real wages declined to -0.5 percent.⁸⁰ However, since the crisis, the percentage increase has more or less return to its pre-crisis level. In US dollar term, wages declined during the crisis period was in line with the depreciation currencies but it has not picked up to the pre-crisis level. However while wages flexibility did help to check the aggravation in

78. Keynes (1936).

79. Data based on Table 3, (HKMA, 2001) for Korea, Philippines, Singapore, Taiwan and Thailand. Please see chart 5 for definition of pre-crisis and crisis period.

80. While nominal wages continue to rise, real wages fell by as much as 30 percent between 1997 and 1998 in Indonesia (UNESCAP, 2002/03).

Chart 5
Wage Trends in Selected SEACEN Countries



1. With the exception of Thailand, the crisis period is defined as from 1997Q4 to 1998Q4, while the pre-crisis period is defined to be from 1993Q1 to 1997Q3, and the post-crisis period from 1999Q1 to 2000Q3. The crisis period for Thailand is defined as from 1997Q3 to 1998Q4. The period “since the crisis” refers to both the crisis and the post-crisis periods.
2. Because of the absence of more recent data, for the Philippines the post-crisis period is to 2000Q1.
3. Only annual data to 1999 are available for Korea, Singapore, and Thailand.
4. Payroll data are used as proxies for the Philippines, Singapore and Taiwan.
5. Data for Singapore are obtained from the CPF Board. It includes bonuses, if any, but excludes employer’s CPF contributions.
6. Real wage data are estimated by deflating the nominal data with the corresponding CPIs.

Source: Table 3, HKMA, 2001.

unemployment, lower real wages also mean higher incidence of poverty in some of the crisis-affected countries.⁸¹ In real term, falling wages, particularly in the urban formal sector affected mostly high-income group during the crisis although in some countries such as Thailand, the impact was felt mostly in rural areas because of the small increases in agricultural prices.⁸²

81. ESCAP 2002/03.

82. World Bank (2000).

The relationship between inflation and wages is explored by conducting a simple unbalanced panel analysis using for both unit cost labour and wages (see table 8a & 8b).⁸³ From the results above (table 8a), it appears that changes in nominal wages and unit labour cost are determinants of CPI price pressure. This relationship is best described by Pétursson (2004) as “*a conflicting claims channel, where firms and workers attempt to maximize their share in total profits[by] wage bargaining process with firms raising their prices and workers claiming higher nominal wages until a steady state is reached.*” However, it is noted that their impact on inflation though significant are not large. For example a 10 percent increase in changes in wages and unit labour cost results in 1.4 percent and 1.0 increase in inflation respectively.⁸⁴ From table 8b, it appears that the wage and inflation setting behaviour hinges heavily on past inflation rates and not so much on current or future inflation (expectations). This may be because many wage contracts are backward looking, implying that any adjustment to wages is likely to occur rather slowly.⁸⁵

It is noted that while nominal wages grew relatively fast during the periods of relatively high nominal GDP growth, in period of recession, the labour market did exhibit some degree of downward *flexibility* as nominal wage cut and other measures (include cuts in bonuses, no

83. Equation 1 uses annual data from Indonesia (1996-1997, 1999-2001, wages in Manufacturing), Korea (1998-2001, nominal wages), Malaysia (1989-1997, 2000-2002, wages in Manufacturing), Philippines (1989-1995, wages in Manufacturing), Singapore (1990-1997 wages in Manufacturing), Sri Lanka (1989-1992, 1997-2001), Taiwan (1988-2001, wages in Manufacturing) and Thailand (1989-2001, monthly wages). Equation 2 uses data for Korea (1993-2001), Malaysia (1993-2001), Philippines (1993-1998) Singapore (1993-2001) and Thailand (1993-1997). Unit labour cost is defined by ILO as remuneration for hours worked and additional labour costs, including extra payments, payment for days not worked, employers' compulsory contributions to social security funds, expenditure for employee pension schemes and other non-wage labour costs. Sources are from ILO statistics and CEIC.

84. This result has to be interpreted with some caution because of the endogeneity of the variables. While it is preferred that the panel regressions should be able to analyze cross-section specific coefficients, insufficient data make it statistically impractical to do so.

85. See (Roubini, 1998).

Table 8a
Panel Linear Estimation after One-step Weighting Matrix
(Cross Section) Seemingly Unrelated Regression (SUR)

Dependent Variable: Inflation Rates (INF)		
	Equation 1 (wages)	Equation 2 (ULC)
Constant	1.22 (0.1)	-0.21(0.60)
INF(-1)	0.51(0.00)***	0.82(0.00)***
Cwages(-1)	0.14(0.01)***	-
CULC(-1)	-	0.11(0.00)***
Total Pooled Sample	71	35
Adjusted R-Squared	0.45	0.88

CULC=changes in Unit Labour Cost, Cwages=changes in wages ***, ** : 1 % and 5 % significance levels respectively. Figures in parenthesis are p-value.

Table 8b
Panel Linear Estimation after One-step Weighting Matrix
(Cross Section) Seemingly Unrelated Regression (SUR)

Dependent Variable: Cwages	
Constant	1.58 (0.17)
INF(+1)	0.36 (0.14)
INF	-0.21 (0.36)
INF(-1)	0.49 (0.02)**
Cwages(-1)	0.52(0.00)***
Total Pooled Sample	61
Adjusted R-Squared	0.68

Cwages=Changes wages, ***, ** : 1 % and 5 % significance levels respectively

Figures in parenthesis are p-value.

Price Pressure Measurements for Effective Monetary Policy: Methodology and Issues adjustment in minimum wages as in Thailand in 1998) were implemented (table 9).⁸⁶ As noted by the International Labour Organisation (2002), “[l]abour markets displayed a great deal of flexibility in the sense that even nominal wages in manufacturing in the Republic of Korea and Thailand fell in the wake of crisis, which helped to limit the incidence of unemployment.”⁸⁷

5.6 Demand and supply shocks and CPI inflation

In this section, we examine in a general context to see whether demand or supply shocks are more important. Using CPI to measure inflation, the structural VAR of Quah and Vahey (1995) is adopted. The methodology, based on long run restriction examines whether the source of price pressure comes from demand or supply shocks. In this

Table 9
Wage Bargaining in Malaysia and Korea during
the 1997 Financial Crisis

	Malaysia % of Companies (Sample of 425)	Korea % of Establishment (Sample of 1610)
Salary Freeze	43.4 (for Management)	69.7
Salary Cut	10.0 3.0 (Non Executive)	(for Management) 17.4
Wage Increase	-	12.9

Sources: Malaysian Institute of Economic Research, 1998 (surveyed in 1998) & Korea Labour Institute 1998.

86. In contrast, Indonesia’s average minimum wage increased by 15 percent in 1997-98. However, some studies indicate that minimum wage adjustment did not contribute to inflation as in most cases, the increase was way below the inflation rate (Reyes, 1996).

87. This is in contrast with studies in developed countries as the “rigidity of nominal wages is a robust phenomenon that does not vanish in a low growth environment” (Ernst, 2003).

respect, output growth is defined to be not affected by demand shock in the long run, implying that the cumulative effective of such shock must be zero. This is an equivalent to the vertical long run-Philips curve.⁸⁸ In the VAR system, the first difference of the log of output and the price index is used.⁸⁹

By examining the inverse roots of the AR characteristics, the models appear to be stable (see Appendix C). By investigating the impulse response function, in the short-run, a positive supply shock can reduce inflationary pressure in Fiji, Indonesia, Korea, Philippines and Thailand while in Malaysia, Singapore and Taiwan, it does appear that a positive supply shock increase inflationary pressure on the domestic economies (Chart 6). This anomaly in the latter case could be due to two reasons. Firstly, there may be some kinds of rigidities of elasticity in the economies, i.e., labour constraints. Secondly, supply shocks appear to lead to the expectation of a more accommodative policy. Having said that, supply shocks have relatively small long-term effect. For all countries under review, as far as demand shock is concerned, it appears to contribute to inflation. The results seems to suggest that while demand factor is the main driven force behind CPI inflation, supply shocks can be equally important.

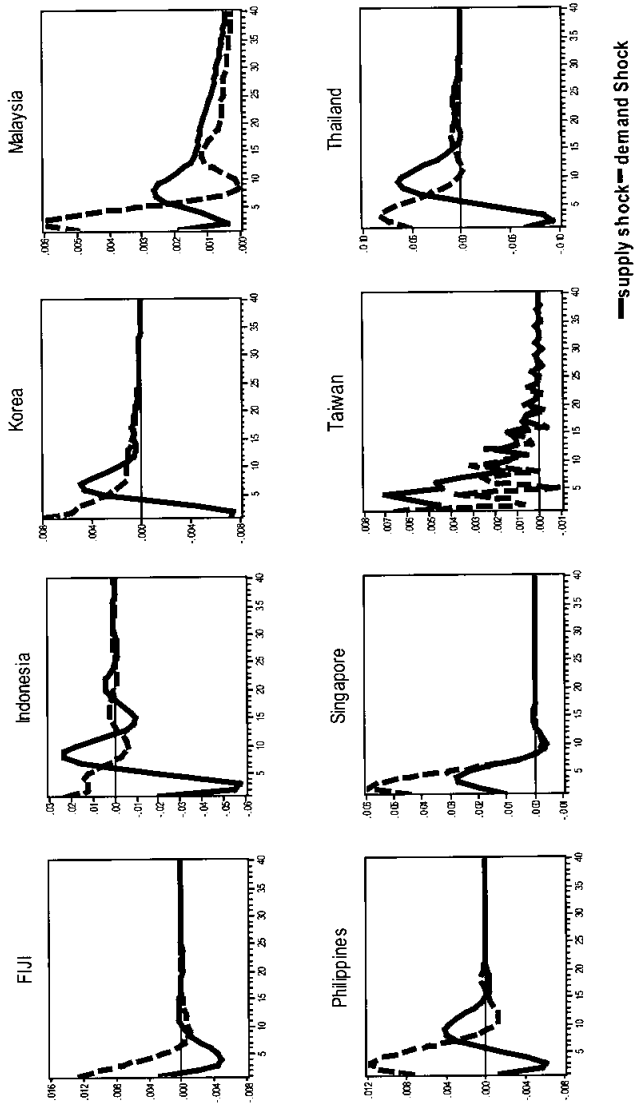
6.0 Some Implications of using CPI as the Inflation Indicator

In the SEACEN region as in elsewhere, for pragmatic purpose, the CPI despite its many flaws is universally accepted as a policy target for monetary policy. While it is argued that an optimal price index should be based on a superlative formula, this is rather impractical as it can

88. See Hahn, 2002.

89. All variables are found to be stationary using the ADF unit root tests. The sample size is as follows: Fiji, 1994Q1-2002Q2, Indonesia 1993Q1-2004Q2, Korea 1994Q1-2004Q4, Malaysia 1994Q1-2004Q1, Philippines 1994Q1-2004Q1, Singapore 1994Q1-2004Q2, Taiwan 1994Q1-2004Q2 and Thailand 1994Q3-2004Q1. Optimal lag length is determined by the Schwartz criteria. All data from IFS, IMF CD-Rom and CEIC. CPI= consumer price index and output=real Gross Domestic Output except Fiji=Industrial Production and Singapore=Manufacturing production.

Chart 6
Response of Inflation to Structural One S.D Innovations



only be computed on a retrospective basis. The second best solution is to change the weights frequently. Changing weights frequently is a compelling argument for developing countries that undergoing rapid economic liberalization and where consumption patterns and taste of consumer can change very rapidly (Roger, 1998). However the decision on how often one should update the weights must be made on a cost-benefit basis. It is also equally important to note that the introduction of new weights every year may pose problems if there are large fluctuations in consumption caused by abnormal shocks, such as weather conditions.⁹⁰

For effective monetary policy, the question that comes in mind is whether to use core or headline inflation as the operational target. In some cases, headline inflation may be more appropriate as it is more reflective of the general price movements. For instance, Hoffmaister (2001) argues that it is advantages to use headline inflation because it is the most recognizable and explicitly used in wage contract negotiations. Furthermore economy-wide inflationary expectations are formed based on headline inflation. But since credibility is crucial to central bank performance, the indicator must also be one in the central bank is able to influence best through its monetary policy. For example the Bank of Thailand is of the opinion that by targeting core inflation it “*can effectively steer monetary policy toward long-term projections because the policy will not have to accommodate short-run supply shocks.*”⁹¹ While the debate on whether to use headline or core inflation has yet to be settled, nevertheless core inflation is not only a vital mean to be used as an input to policy decisions but it also serves as an important tool for communication strategies with the general public.

The next question regarding the construction of CPI is to ask whether asset price should form an integral part of price pressure measurement. Bear in mind monetary policy action involves long lags, it needs a forward-looking and pre-emptive dimension. Therefore central

90. ILO & et.al.(2004).

91. Bank of Thailand website (2004).

banks need to put in considerable effort in forecasting future economic developments that may include movement of asset prices. However, not all asset prices contain useful information for forecasting purposes. For instance, Goodhart (2001a) has argued that there may be a role for housing prices, as the linkage between goods and services inflation and housing prices is much stronger than exchange rate or equity prices.⁹² While the general opinion is that favourable evidence to implicitly include asset prices in monetary rules is certainly not robust (Cecchetti 2003), monetary authorities “*should not ignore them*” (Richards, 2003) as it is worthwhile to note that goods and services price stability is not a sufficient condition for financial stability.

The movements of wages and consumer price inflation in selected SEACEN countries show some correlated relationships and this may suggest that policy authorities may want to utilize wage and labor cost variables in forecasting CPI inflation. While wage determination particularly in the private sector is the outcome of market forces, in the SEACEN region, collective wage bargaining is common and is normally done through the tripartite structure involving workers, employers and the government.⁹³ The concern is that too rapid a rise in wages may jeopardize the economy as the wage-price spiral effects may lead to the escalation of inflation during economic boom. However, although significant the impact of wages and labour cost on CPI inflation is rather small and the total adverse effects in the long-run are also somewhat cushioned by the *downward* flexibility in the labour markets during recession. Having said that, Mankiw and Reis (2002) note that central banks should pay more attention to the growth of nominal wages when monitoring inflation if they want to achieve maximum stability of economic stability because wages are cyclically sensitive. Furthermore, wages not subject to large idiosyncratic shocks compared with most

92. Ahuja & et.al (2003) notes that monitoring housing prices may be more practical in bank-based economy as housing prices may have more impact on the financial system than capital-based economies. They also argue that in Thailand, since property prices tend to lead inflation, inflation targeting which is a forward looking regime can moderate asset price cycles to some extent.

93. Often this involves the highest level of government. For instance, the Prime Minister of Malaysia himself headed the tripartite mechanism during the economic crisis. (Campbell, 2001).

other cyclically sensitive prices in the economy. Thus, they note that “when wages are rising faster than other prices, targeting the stability price index requires tighter monetary policy than does conventional inflation targeting”. But a caveat is that as wage movements can affect both demand and supply shocks, its precise impact is difficult to ascertained.⁹⁴

In conclusion, the choice of which index to use depends on what is the current rate of inflation. If inflation rate is already relatively high, it probably does not matter much which index is used to calculate inflation as this is of a secondary concern (Webb, 2004). However, in a low inflationary environment, as different choice of price measurement can yield difference results, it becomes important to choose the right index to target. CPI may systematically overestimate or underestimate the true rate of inflation but from the point of view of measuring the cost of living, some moderate mismeasurement of prices is expected. But many have also argued that CPI should only reflect pure price change therefore any mismeasurement such as failure to take into account substitution effect should not be treated as a source of bias. Having said that, mismeasurement should not be a problem *per se*. But as it is increasingly common to observe conventional CPI been used in circumstances for which it is deemed inappropriate, what cannot be emphasized enough is that it is imperative to customize a family of consumer price indices (with different weights for different regions, income groups, etc.) to ensure that different CPIs are aptly *used* for different purposes.

94. Pierre-Richard and Hoffmaister (1997).

The uses of a consumer price index ⁹⁵

1. The CPI is used for a wide variety of purposes. It serves as a key indicator of an economy's performance and for evaluating the results of a country's monetary and fiscal policy. The CPI is often used to adjust wages and social security benefits (including pensions) to compensate for changes in the cost of living. CPI sub-indices are used for deflating sub-components in the national accounts' estimates of total household consumption at current prices.
2. The main uses of the CPI have been changing over time, and their importance may differ between countries. In most countries, CPIs were originally compiled to enable adjustment of wages to compensate wage earners for changes in the prices of goods and services purchased and, as such, they have played an important role in the income adjustment process. Recently, the principal use of the CPI in many countries has shifted to providing a general measure of price inflation for the household sector as a whole. An example of an index developed for this purpose is the European HICP.
3. There is a debate about which of the two types of index (i.e. a fixed-basket index and COLI) should be given preference as a means of measuring inflation. There are two diametrically opposed views. One view is that a clear distinction needs to be made between a fixed-basket index and COLI and that a fixed basket is preferred as a means for measuring inflation. A second view is that a COLI does provide precisely that information which is required of an inflation measure.
4. The arguments for the first view are as follows: the fixed basket approach adheres to the principle of a straightforward comparison of prices, therefore only indicating a change in prices, whereas a

95. Report of the Conference, 17th International Conference of Labour Statisticians, Geneva, 24 November to 3 December 2003.

COLI provides information about how, given price changes and the substitution processes, expenditure would have to change to maintain the original standard of living or level of utility. A fixed basket is therefore a pure price index, while a COLI is an index which may show change even when all prices stay at the same level. As such, the latter cannot be considered as an appropriate measure of inflation.

5. The argument for the second view is as follows: the COLI is a price index whose weights change to reflect changes in consumer preferences. It is intended to measure the change in the cost of maintaining a given standard of living and takes into account substitutions in response to changes in relative prices. However, it can “also be interpreted as measuring the change in the value of a fixed basket of goods and services where the fixed basket is a particular blend of the baskets in the two periods compared” A COLI is preferred because in practice fixed-basket indices may be biased estimates of inflation (especially in the indices with weights that are updated infrequently) and therefore are measuring changes in the value of a basket of goods and services that is no longer representative.
6. It is unlikely that a single CPI can perform equally satisfactorily for all of its many applications. Different users have different needs. For example, some users may require monthly timely information on the price movements. This requirement leads to a standard Laspeyres-type index calculated with the weights from the earlier of the two periods compared. However, other users may be more interested in the price changes of a more representative set of items and may prefer increased accuracy to timeliness. Another example where multiple indices would be useful arises in the context of the treatment of owner-occupied housing. Different approaches usually give quite different numerical results. It might be reasonable for a statistical agency to choose one approach for their “headline” index but make available to the interested users the alternative indices. A third example where multiple indices would be useful concerns seasonal commodities. It may therefore be appropriate

to construct a number of price indices that can serve specific purposes, if there is sufficient demand and funding and appropriate indices can be efficiently calculated.

7. It should be recognized, however, that the publication of more than one CPI can be confusing, and for many users the coexistence of different measures may undermine the credibility of them all. Therefore the recommendation in the draft resolution is that each index should be properly named and only one should be referred to as the “headline” CPI. The labelling and providing documentation on the differences between different CPIs should make clear the appropriate use of each of them.
8. In practice, however, most CPIs are used for a variety of purposes, which can create conflicts of interest. This means that compromises have to be made in the construction of the CPI. One such area, for example, is the coverage of the index: when using the CPI as an indicator of general inflation its coverage should be extended to include elements that are not goods and services consumed by households, but this would undermine its role as an index for consumer prices. With such conflicts, it is the main use, as well as considerations of costs and practicalities, that should determine whether the type of index produced should be a fixed-basket index or COLI, the range of goods and services covered, its geographic coverage, the type of households it relates to. The users should be informed of the compromises made and of the consequent limitations of the resulting index for different applications.
9. The CPI is often used as a general indicator of inflation (or deflation). However, it is only a partial indicator, in the sense that it relates to a particular segment of the economy i.e. goods and services purchased by households. It does not include, for example, goods and services consumed by private enterprises or governments nor capital purchases.
10. An inflation index that covers all (market) transactions in the economy would be expensive to produce, could not be as timely as the CPI, and may be more difficult to interpret. Only a few

countries compute a broader price index that provides a measure of inflation for the whole economy (and even then with a delay of several months after the reference period). For the analysis of inflation in the economy and for its full understanding, it may be more meaningful to produce a set of price indices that provide complementary views of the price developments for different types of markets and expenditures (consumer and capital).

11. In most countries the CPI is regarded as the best available measure of inflation, often since there are currently no other measures that would be acceptable to users.

Treatment of housing dwellings in the CPI construction ⁹⁶

1) Consumption approach.

In this approach, household is provided by a flow of shelter services over time and households are deemed to consume such services. Two methods are used to reflect this in the consumer price index.

a) The imputed rent method

In this approach, the consumption of shelter services is taken to be equivalent to the monthly cost for owner occupied housing by the change in the monthly rental for similar type dwellings. In other words, were the owner occupied home available for rent what would the rent likely be. This is also known as the rental equivalent approach.

b) Opportunity cost approach

This approach involves determines the opportunity cost of house ownership as income foregone in using capital for house ownership. This may include recurrent actual cost such as repairs and maintenance.

2) Acquisition basis

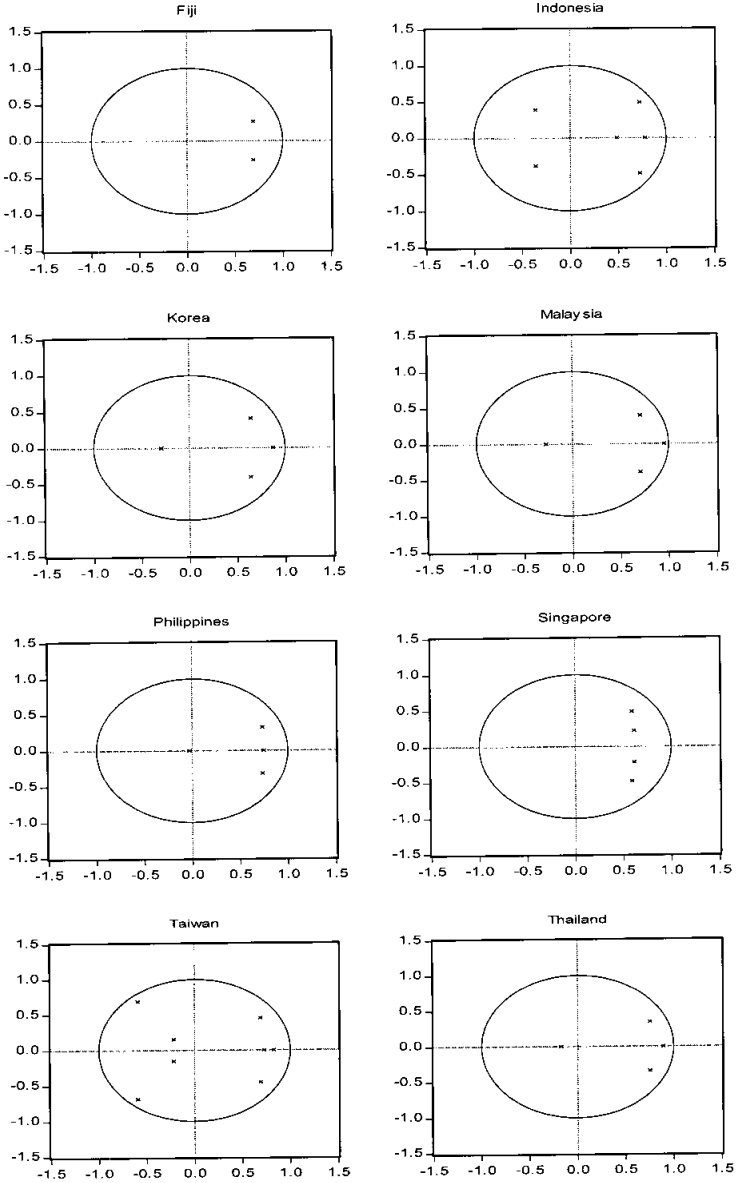
This measures the actual prices that is paid in the market acquisition of dwellings. For example, when the contract becomes binding, regardless of whether payment is made of the goods consumed. The main problem is that in this case, house purchase is often regards as investment.

3) Payment approach

This approach measures changes in payment due to mortgages interest repayments. In practice, it could include repairs and maintenance, insurance etc. According to CSO, this seems to be the most favoured as it reflect the actual expenditure on housing.

96. Based on Central Statistical Office, Ireland and Woodhouse (1997).

Inverse Roots of AR Characteristic Polynomial



Information criteria for the VAR model

Lag	Fiji			Indonesia		
	AIC	SC	HQ	AIC	SC	HQ
0	-5.50	-5.42	-5.47	-5.50	-5.41	-5.47
1	-6.81	-6.55*	-6.72*	-7.42	-7.61	-7.33
2	-6.82	-6.38	-6.67	-8.38	-7.95	-8.23
3	-6.83*	-6.22	-6.62	-8.72*	-8.12*	-8.51*
4	-6.71	-5.92	-6.43	-8.55	-7.78	-8.27*

Lag	Korea			Malaysia		
	AIC	SC	HQ	AIC	SC	HQ
0	-8.71	-8.63	-8.68	-8.89	-8.81	-8.86
1	-10.97	-10.72	-10.88	-11.64	-11.39	-11.54
2	-11.24	-10.82*	-11.08*	-12.06*	-11.64*	-11.90
3	-11.24*	-10.65	-11.02	-11.91	-11.33	-11.70
4	-11.09	-10.33	-10.81	-11.75	-10.99	-11.47

lag	Philippines			Singapore		
	AIC	SC	HQ	AIC	SC	HQ
0	-9.81	-9.73	-9.78	-8.02	-7.94	-7.99
1	-11.95	-11.70	-11.86	-10.49	-10.24	-10.40
2	-12.52*	-12.11*	-12.37	-10.94*	-10.52*	-10.79*
3	-12.40	-11.81	-12.19	-10.81	-10.23	-10.60
4	-12.47	-11.71	-12.19	-10.79	-10.04	-10.51

lag	Taiwan			Thailand		
	AIC	SC	HQ	AIC	SC	HQ
0	-9.85	-9.77	-9.82	-7.43	-7.34	-7.40
1	-11.12	-10.88	-11.03	-11.07	-10.81	-10.98
2	-11.22	-10.81	-11.07	-11.51*	-11.07*	-11.35*
3	-11.61	-11.03	-11.39	-11.34	-10.74	-11.13
4	-11.77*	-11.03*	-11.50*	-11.21	-10.43	-10.93

* indicates lag order selected by the criterion

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

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