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**THE STABILITY OF MINNESOTA'S  
SALES TAX**  
A Working Paper  
October 1987

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**Research Department**  
Minnesota House of Representatives

**THE STABILITY OF MINNESOTA'S  
SALES TAX**

**A Working Paper**

**October 1987**

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**This paper examines the stability of the state's present sales tax base and major base expansion options. It measures both long term stability and the sensitivity of the sales tax base to changes in the economy.**

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This working paper was prepared by DOUG WILSON,  
JOEL MICHAEL, and LUNG-FAI WONG, Legislative  
Analysts in the House Research Department.

Questions may be addressed to the authors.

DOUG WILSON	(612) 296-9253
JOEL MICHAEL	(612) 296-5057
LUNG FAI WONG	(612) 296-5204

Secretarial support was provided by JUDY HANSEN.

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## PREFACE

This paper examines the stability of the state's present sales tax base and the major base expansion options such as food, clothing, and personal and household services. Two measures of stability are explored. The first is a measure of long term stability or adequacy -- the ability of a revenue to maintain a steady source of funding over a period of time for a given revenue base. The second measure of stability is the cyclical nature of a revenue source or its sensitivity to changes in the economy.

Public attention has recently focused on Minnesota's general sales tax--in particular its narrow tax base and the instability of its revenues. The Minnesota Tax Study Commission recommended that the sales tax be extended to clothing and services.<sup>1</sup> The Commission found that this would make the tax more equitable and a more stable source of revenue.

A previously released working paper, The Burden of the Sales Tax, examines the income distribution (the progressivity or regressivity) of both the existing sales tax base and the major base expansion options.<sup>2</sup> An upcoming information brief summarizes both working papers, and presents estimates, prepared by the Department of Revenue, of the revenue yields for the base expansion options.

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<sup>1</sup>The Final Report of the Minnesota Tax Study Commission, vol. 1, 15-18, 165 (1986).

<sup>2</sup>The major expansion options differ slightly between The Burden of the Sales Tax and this paper because of the necessity of using two different data sources.



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## SUMMARY

The Minnesota sales tax has a relatively high rate of six percent and a narrow base. Recent experience has demonstrated a possible relationship between sales tax revenues and cyclical swings of the economy. For example, sales tax revenues during the recession of the early 1980s fell significantly short of predictions. Most necessities such as food, clothing and many services are not subject to the sales tax. Taxable items tend to be purchases that can be delayed such as cars and household appliances. Therefore revenues from the sales tax may be very sensitive to the business cycle.

This report examines the "stability" of Minnesota's sales tax and tests how dependent the current tax base and various base expansion options are on the economy. Major base expansion options include food, clothing, energy related purchases, personal services presently not taxed and medical services. Two types of stability are examined.

Long term stability - the ability of a revenue source to keep pace with the growth in the economy and expenditures - is measured by an income elasticity measure.

- The results demonstrate that the items currently subject to sales tax (current tax base) and personal services have generally grown at the same rate as the economy.
- Purchases of food and clothing have grown at a slower rate over the study period than the current tax base.
- Energy related purchases and medical services have grown at a much faster rate than the economy due in part to significant price increases over the study period.

Short term stability - the cyclical relationship between the revenue source and the business cycle - is measured by the cyclical index.

- The current tax base was found to be more sensitive to swings in the economy than any of the base expansion options.
- Purchases of food was shown to increase the stability of the sales tax more than any other base expansion option.
- Clothing and shoe purchases appear to be the base expansion option with the least effect on the stability of the sales tax.



## INTRODUCTION

The stability of state revenue sources has become an important issue for state officials given the occurrence of swings between budget surpluses and shortfalls, especially in the last seven years. The downturn in the national economy during the early 1980s was a major cause of the budget shortfalls. The state faced shortfalls of almost \$2 billion during the 1980-81 and 1982-83 biennium. After a period of economic improvement, which included a marked improvement in the state's overall budget picture during the 1984-85 biennium, the state again faced anticipated revenue shortfalls. This seven-year period of instability caused state officials to examine and initiate various means to improve the overall stability of the state's revenue sources and expenditures.

A Minnesota Department of Finance report<sup>3</sup> identifies a number of measures to improve the state's budget stability problem. These include:

- Budget reserves,
- Trigger taxes,
- Change the mix of taxes,
- Expenditures linked to revenues,
- Changes in the budget process (e.g. annual budgeting),
- Changes in the timing of certain expenditures (e.g. payments to local jurisdictions),
- Flat rate income tax, and
- Broadening the sales tax base.

This report examines the last measure -- broadening the sales tax base. It is thought by expanding the base to items less susceptible to economic swings, the base will yield more predictable and less volatile revenue flows.

This report examines the stability of major categories of base expansions options as compared to the present sales tax base. The major sales tax base expansion options examined in this report are food, clothing and shoes, energy products, personal and household services, and medical services. For the purpose of this report, two different definitions of stability will be explored for each of the base expansion options.

1. Long Term Stability measures revenue adequacy -- whether a particular revenue source will provide a stream of revenue sufficient to keep pace with the growth in expenditures. For example, if a revenue source grows at half the rate of the expenditures it funds, over time a shortage will develop. Eliminating the shortage requires cutting expenditures, increasing the tax rate, or a combination of the two.
2. Cyclical Stability addresses a revenue source's short term relationship or sensitivity to changes in the overall economy. This type of stability examines a revenue source's response to fluctuations in economic factors such as income, exports, and employment over a shorter period of time such as a two year biennium. This study examines the revenue source's volatility in response to swings in the business cycle -- expansions or recessions. Unlike long term stability where the interest is to provide an adequate revenue source over time to keep pace with the

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<sup>3</sup>Minnesota Department of Finance, State Budget Stability: The Limits of Forecasting -- Creating a Manageable Budget, November 1986.

economy and expenditure growth, the interest in cyclical stability is to provide a revenue source that does not widely fluctuate with changes in the business cycle.<sup>4</sup>

This report is divided into four major sections:

1. The Minnesota Sales Tax provides a description of the present sales tax system in Minnesota.
2. Description of Data discusses the data source, including its limitations. (A more detailed description of the data is found in Appendix A.)
3. Long Term Stability explores the overall revenue growth of options in comparison with the national economy over a fifteen year period.
4. Cyclical Stability examines the cyclical nature or sensitivity of the various base expansion options to the business cycle.

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<sup>4</sup>The predicted yield of a revenue source is an issue that is closely related to the cyclical stability. Policy makers often seek a predictable revenue source -- one that will yield approximately the same amount of revenue that was predicted two years before. Changes in the level of economic activity are the largest contributing source to the unpredictable nature of a total revenue system, according to the Minnesota Department of Finance report. In the view of the authors of that report, technical forecasting problems accounted for a much smaller proportion of forecasting error.

## 1. The Minnesota Sales Tax

The Minnesota general sales and motor vehicle excise taxes<sup>5</sup> are imposed on final sales of tangible personal property and a few selected services. The general tax rate is 6 percent. An 8.5 percent rate applies to purchases of alcoholic beverages. Lower rates are imposed on some purchases of capital equipment and farm machinery.

Exemptions from taxation are provided for purchases of necessities -- food for consumption at home, clothing and shoes, prescription drugs, and home heating fuels purchased during the winter months. Purchases of motor fuels that are subject to the special sales tax on fuels for use in vehicles used on the public highway are exempt, as well as a variety of other more minor categories of purchases.

The tax base consists of a combination of consumption items and capital goods. The consumption items are primarily consumer durables (e.g. appliances and furniture), supplies, building materials, motor vehicles, alcohol, tobacco, food consumed in restaurants, and recreational expenses (admissions and amusements). The capital goods subject to tax include machinery, equipment, and building materials.<sup>6</sup> Goods purchased for resale or for incorporation in products for resale are not taxable. Many services and the "necessities" listed above are excluded from the tax base. The 1987 Legislature broadened the tax base by adding some personal services to the items subject to the sales tax including many domestic services, long distance telephone calls, and parking and towing fees.

The narrowness and the nature of the tax base suggest that the revenues generated will not be stable. For example, it is likely that consumers will delay purchases of refrigerators, washing machines, and new houses and will reduce the number of restaurant meals consumed during recessions. By contrast, purchases of food, clothing, and other currently nontaxable necessities are likely to fluctuate less with changes in the economy.

## 2. Data Description

The source of data for determining the measures of stability used in this report is the Personal Consumption Expenditures (PCE) data series provided by the U.S. Department of Commerce. Personal Consumption Expenditures generally include the purchase of goods and services by consumers and nonprofit organizations, in-kind goods and services and the net value of used goods. PCE do not include purchases of dwellings or the purchases of goods and services by businesses and government.

This data series only provides national estimates. Individual state estimates are not available. Since there is no accurate estimate of spending by the Minnesota population, the national data is used as a proxy. For purposes of this report the assumption is made that the consumption patterns of the U.S. population reflect the consumption patterns of the Minnesota population.

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<sup>5</sup>Minnesota imposes a separate sales tax, the motor vehicle excise tax, on the purchases of automobiles, trucks, and other motor vehicles used on the public highways. Minn. Stat. chapter 297B. This tax is imposed at the same rate as the general sales tax, but is enforced through the motor vehicle registration process. For convenience, throughout the paper the term sales tax includes the motor vehicle excise tax.

<sup>6</sup>This report does not include an analysis of the stability of capital goods nor does it include capital goods in the estimate of the current tax base. The recent Department of Finance report, "State Budget Stability", found the sales tax was less stable when capital equipment was deleted, based on actual collections. When a state estimate of capital equipment sales was used, one of their measures of stability demonstrated greater stability when factoring capital goods out of the base and another measure demonstrated greater instability.

Appendix A provides a description of the Personal Consumption Expenditures. A detailed listing of what type of goods and services are included in the estimate of the current tax base and the major base expansion options discussed in this report are also a part of Appendix A.

### 3. Long Term Stability

The first measure of stability examined in this report focuses on the long term relationship between the revenue source and income. It measures whether a revenue source provides revenue that keeps pace with overall economic growth. The consequence of an inadequate revenue source is that growth in revenues over time does not keep pace with the growth in the government expenditure base.

One of the first major research efforts in sales tax stability that examined this long term relationship was undertaken by Groves and Kahn who viewed a stable tax source as "one which assures the treasury an approximately constant real income over a period of time."<sup>7</sup> Groves and Kahn saw that state and local government required stable and consistent sources of revenue to continue to pay for government services since these units generally do not share the federal government's ability to incur a deficit.

This long term relationship between the revenue source and income is measured by the revenue source's income elasticity. Income elasticity is defined as the ratio of the percentage change in revenues to a specific percentage change in income. This is commonly expressed as the percentage change in the revenue source resulting from a one percent change in income.<sup>8</sup>

A revenue source is sensitive to income or highly income elastic when the change in income has a relatively large effect on the revenue source (income elasticity is greater than 1.0). Changes in income produce large swings in the collection of the revenue source. When revenue increases at roughly the rate that income increases, the elasticity is said to be unitary (income elasticity is approximately equal to 1.0). A revenue source whose growth is not significantly affected by changes in income is inelastic (income elasticity is less than 1.0).

Groves and Kahn generally found that property taxes and excise taxes (e.g. cigarette, gasoline and telephone) were income inelastic (not affected significantly by changes in income) and corporate and individual income taxes were found to be highly elastic or sensitive to changes in income. General sales taxes were found to provide sources of revenue that grew roughly in proportion to income, or whose elasticity was unitary.

To test how the base expansion options generally discussed in this paper respond to long term changes in income, income elasticities were estimated using national level consumption data previously described, and personal income data. Quarterly data over the 15 year period of 1972 to 1986 were used (only the first two quarters of 1986 were included).<sup>9</sup> The use of time series data in estimating income elasticity

<sup>7</sup>Groves and Kahn, "The Stability of State and Local Taxes," American Economic Review, March 1959.

<sup>8</sup>The relationship is expressed as:

$$\text{Elasticity} = \frac{T}{\Delta T} / \frac{Y}{\Delta Y}$$

To estimate the income elasticity of a revenue source a linear regression equation is used:

$$\text{Log } T = \text{log } a + b \text{ log } y + e$$

where T is the revenue source over time, Y is a measure of income over time, b is the estimate of the income elasticity and e is the unexplained variance.

<sup>9</sup>The data used in this analysis are not adjusted for price changes. While price adjusted data could show whether relative consumption is growing or whether the prices of a specific revenue alternative are increasing faster than prices overall, elasticity is used to measure the responsiveness of

estimates often leads to serial correlation problems.<sup>10</sup> Because of this, the Cochrane-Olcutt technique autoregressive model included in the SHAZAM statistical computer package is utilized.<sup>11 12</sup>

Table 1 presents the income elasticities for the base expansion options. The income elasticity for the current base estimate is also included and demonstrates growth at roughly the same rate as the personal income measure. The food and clothing options demonstrate the lowest income elasticity over the period. Only medical services and energy related products show income elasticities significantly greater than unity. The greater elasticity value for medical services can generally be explained by a larger rate of price increases for medical services than prices overall during the study period. The same can be said for energy prices. This means that if medical services and energy related products had been taxed during this period, tax revenues from the sale of these items would have grown at a faster rate than the current tax base. Overall, any of the base expansion options would provide relatively long term stable revenue based on past performance during the 1972 and 1986 period.

Table 1

LONG TERM STABILITY MEASURED BY INCOME ELASTICITIES 1972 to 1986	
<u>Expenditure Category</u>	<u>Income Elasticity</u>
Current Tax Base	.94
Food	.85
Clothing	.83
Energy	1.48
Personal Services	1.02*
Medical Services	1.27

\*The Durban-Watson test, which measures the degree of serial correlation, is inconclusive for the relationship between personal income and the nontaxable personal services. The other categories passed the Durban Watson test at the .05 significance level.

revenues to changes in income, not price level changes.

<sup>10</sup>Serial correlation is generally defined as the existence of a relationship between observations. If serial correlation is found, the adjustments to the estimation equation are necessary to provide unbiased coefficient estimates.

<sup>11</sup>White, Kenneth, SHAZAM: A Econometric Computer Model, Sept. 1981.

<sup>12</sup>Under this technique, the unexplained variance or error term "e" included in the equation  

$$\log T = \log a + b \log Y + e$$
is redefined for first order serial correlation as:

$$e = pe(t-1) + u$$

where p is the autoregressive parameter Rho, t is the current time period and u is a new independent disturbance or unexplained variance.

#### 4. Cyclical Stability

The discussion of the long term stability measure analyzed which base expansion options provide revenues that generally grow at or near the rate of growth in the economy. While this is important, it is not the only measure of stability that merits examination. A revenue source may provide adequate revenues to keep pace with government expenditures over a period of years, but the stream of revenue may prove to be so sensitive to changes in the economy that it can not be a dependable stable source of revenue. Generally, government expenditures do not decrease as the economy slows even though tax collections often decrease. In some cases (e.g. public assistance expenditures), the demand for government services may actually increase as the economy slows. If a revenue source is highly sensitive to the changes in the economy, the short term changes or cyclical swings in the revenue source prove to be a difficult problem in meeting budget needs.

The cyclical swing index is one measure that determines how sensitive Minnesota's sales tax base is to changes. This index was originally used by Friedman and Bretzbelder<sup>13</sup> in their study of the sensitivity of wage and salaries to the business cycle. This index measures the difference between changes in a variable during economic expansions and during recessions, thus measuring the performance of the variable in relation to the business cycle. Friedman and Bretzbelder defined the index as the difference between:

1. the percentage point difference between the mean quarterly percent change in the expansion(s) and the mean quarterly percent change in the whole cycle(s) and
2. the percentage point difference between the mean quarterly percent change in the recession(s) and the mean quarterly percent change in the whole cycles.<sup>14</sup>

A resulting positive index with a relatively large value demonstrates greater growth during periods of expansions. A negative index with a relatively large absolute value demonstrates that the variable actually grows faster during periods of recession than during economic expansion. A positive or negative value close to zero means that the variable shows little difference in growth between periods of economic expansion or recession.

While the index does not provide an absolute measure of stability, it provides a relative measure to compare alternatives. For example, if one compares the cyclical behavior of various categories of employment, those categories with greater absolute index values have a higher variation of growth rates between periods of economic expansion and recessions and therefore have a lesser degree of stability. Those employment categories with index values closer to zero would show a smaller difference in growth rates and therefore demonstrate a greater degree of stability.

Periods of economic expansion and recessions are determined, for the purpose of this report by the National Bureau of Economic Research. The Bureau determines turning points in the national economy and reports them in the monthly publication Business Conditions Digest.

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<sup>13</sup>Friedberg, Howard and Robert Bretzbelder, "Sensitivity of Regional and State Nonform Wages and Salaries to National Business Cycles 1948-79", Survey of Current Business, 60 May 1980, p. 27.

<sup>14</sup>The algebraic equation for the cyclical swing index is:  

$$CSI = [MQE - MQC] - [MQR - MQC]$$
 where MQE is the mean quarterly percentage change during periods of expansion, MQR is the mean quarterly change during periods of recession, and MQC is the mean quarterly percentage change for the entire cycle or study period.

Table 2 lists the turning point for the period covered by this study, 1959-1986.

**Table 2**

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**TURNING POINTS IN THE NATIONAL ECONOMY**

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<u>Beginning of Expansion</u>	<u>Beginning of Recession</u>
1958 - 2nd quarter	1960 - 2nd quarter
1961 - 1st quarter	1969 - 4th quarter
1970 - 4th quarter	1973 - 4th quarter
1975 - 1st quarter	1980 - 1st quarter
1980 - 3rd quarter	1981 - 1st quarter
1982 - 4th quarter	

---

John Mikesell extended the use of the cyclical swing index to compare the stability of revenues systems and the responses of those systems to national business cycles. In his 1984 article<sup>15</sup> Mikesell compared the cyclical nature of different sources of state and local revenue. Table 3 details the results of this study. The corporate income tax proves to be the least stable of the major revenue sources followed by the individual income tax. Property taxes are very stable in comparison -- in fact the negative value for the cyclical swing index indicates that revenues from this tax actually grew slightly faster during recessions than in economic expansions. Sales and excise taxes prove to be relatively stable compared to the other major state revenue sources. When excise taxes such as taxes on motor fuels, alcohol and tobacco are factored out, the index increases significantly as indicated by the values for retail sales tax. One may conclude from these results that the excise taxes tend to be stable sources of revenue. After factoring out statutory rate changes resulting in the implicit taxable retail sales category, the index increases significantly. Mikesell found that the stability of the retail sales tax since 1970 was not due so much to the stability of the tax base but to increases in the tax rate. With this, he found that the actual total retail sales tax base was less stable than the individual income tax.

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<sup>15</sup>Mikesell, John, "The Cyclical Sensitivity of State and Local Taxes" (Public Budgeting and Finance, Spring 1984, p. 32.)

Table 3

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**MAJOR STATE AND LOCAL TAXES  
CYCLICAL SWING INDEX  
1958 to 1982**

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Cyclical Swing Indices

Revenue Source	1958-2nd quarter to 1983-4th quarter	1970-1st quarter to 1982-4th quarter
Individual Income Tax	2.37	2.03
Corporate Income Tax	5.84	5.51
Sales and Excise Tax	.93	.93
Retail Sales Tax	NA	1.49
Implicit Taxable Retail Sales*	NA	2.21
Property Tax	- .49	- .49

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Source: Mikesell, John L., "The Cyclical Sensitivity of State and Local Taxes," Public Budgeting and Finance, Spring 1984, p.36.

\* The implicit taxable retail sales variable measures the total tax base for retail sales, statutory changes in rates have been accounted for.



In his research efforts for the Minnesota Tax Study Commission published in 1985, Mikesell used the cyclical swing index in specifically examining Minnesota's sales and use tax. He generally found that the overall sales and use tax base was not sensitive to the business cycle while collections from various industry components (e.g. communication/utilities, finance) were relatively sensitive to the business cycle. Actual collections, after adjustments for rate changes and accelerated collections, also proved to be stable using the cyclical swing index measure for the period 1970 to 1982.

This paper goes one step further as to the sensitivity of the sales tax to the business cycle by examining the cyclical nature of several potential base expansions for the Minnesota sales tax. It is important to look at indices for each base expansion option and the current tax base since the index for the option alone only indicates the cyclical sensitivity of the option when it is examined alone. The base expansion option alone does not provide information on the extent to which the option would improve overall stability when added to the current tax base. For example, clothing may have a relatively high degree of stability as measured by the cyclical swing index, but because of the relatively small amount of revenue it would generate, it doesn't add a great deal of cyclical stability to the overall revenue system.

Table 4 details the cyclical swing indices for the major base expansion options where the base expansion option has been added to the current base estimate. Indices for two time periods -- 1959 to 1986 and 1970 and 1986 -- are displayed to determine if there has been a difference in the sensitivity of the consumption of these goods and services between these two periods. Table 5 provides the cyclical swing indices for a more detailed list of expenditure categories. The tables in Appendix B detail the overall, expansion period and recession means used in calculating the indices found in Tables 4 and 5.

**Table 4**

<b>CYCLICAL SWING INDICES FOR MAJOR EXPENDITURE CATEGORIES 1959 to 1986</b>		
	1959 to 1986	1970 to 1986
Current Tax Base Estimate	1.38	1.49
Tax Base & Food	.89	1.03
Tax Base & Clothing	1.32	1.43
Tax Base & Energy	1.07	1.14
Tax Base & Nontaxable Services	1.17	1.28
Tax Base & Medical Services	1.07	1.13
Tax Base & All Expansion Options	.60	.69

The following major findings can be concluded from Tables 4 and 5:

- The current tax base estimate is generally more sensitive to change in the economy than any of the potential base expansions that are presented in this report. Major components of the current tax base such as motor vehicles, furniture and household equipment (e.g.

appliances) and other durable goods cause the current base to be a relatively unstable source of revenue.

- Food as a potential base expansion option offers a relatively stable effect on countering the relatively unstable nature of the current tax base. When food is added to the current tax base the cyclical tax index is reduced from 1.38 to .89 for the period 1959 to 1986.
- Clothing and shoes offer the smallest improvement in stability. While the clothing and shoes option is relatively more stable than the current base, adding this option to the current base provides only marginal improvement in stability. The index decreases from 1.38 to 1.32 during the 1959 to 1986 period.
- An expansion of the sales tax base to personal and household service would also improve the stability of the sales tax but not to the extent that food would. When added to the current tax base, the personal services option reduces the cyclical swing index from 1.38 to 1.17 for the 1959 to 1986 period, a reduction of approximately 20 percent.
- Generally the cyclical swing indices for the 1970 to 1986 period demonstrate only slightly greater instability or little change from the indices for the 1959 to 1986 period. Home heating fuels are an exception. The indices for both fuel oil and natural gas demonstrate significant increases between the two data sets. Much of the increase in instability can be traced to large price increases. When the data were adjusted for price increases, there is a smaller difference than between the two period's indices. (Adjusted data are not presented in this paper.)
- The major base expansion options counteract the cyclical nature of each other. Table 4 shows that the cyclical swing index (1959 - 1986) for the existing base and all major expansion options is .60, considerably less than any of the indices for the current base and only one of the options.
- The products and services that were added to the list of taxable items by the 1987 Legislature appears to be more stable than the taxable items prior to the 1987 Legislation. The index for the current estimated tax base without the new taxable products and services was 1.52 (1959-1986) while the index decreases to 1.38 when the new items are included in the estimate of the current tax base.

A graphic display of the trend over a period of years is another means of examining the sensitivity of the sales tax to the economy. Figure 1 shows for each quarter from 1970 to 1986 the percent change from the previous quarter in the consumption of the items included in the current sales tax base and when all the options discussed in this paper are added to the current base. The graph in the upper portion of the Figure includes the changes in the current tax base and the changes of all options when combined. The graph in the lower portion of the Figure demonstrates the changes when all options are added to the current tax base. The current base estimate appears very sensitive to changes in the economy. Between 1975 and 1983, the swings between positive and negative real growth in the current tax base have become more pronounced, possibly indicating greater instability. The addition of all of the base expansion options to the current tax base estimate (lower graph) does provide a noticeable improvement in the cyclical nature of the revenue stream. While the swings between positive and negative real growth still exist, the extent of the "peaks and valleys" are decreased.

Appendix C provides similar graphical representations of the sensitivity or cyclical stability of each of the base expansion options.

Table 5

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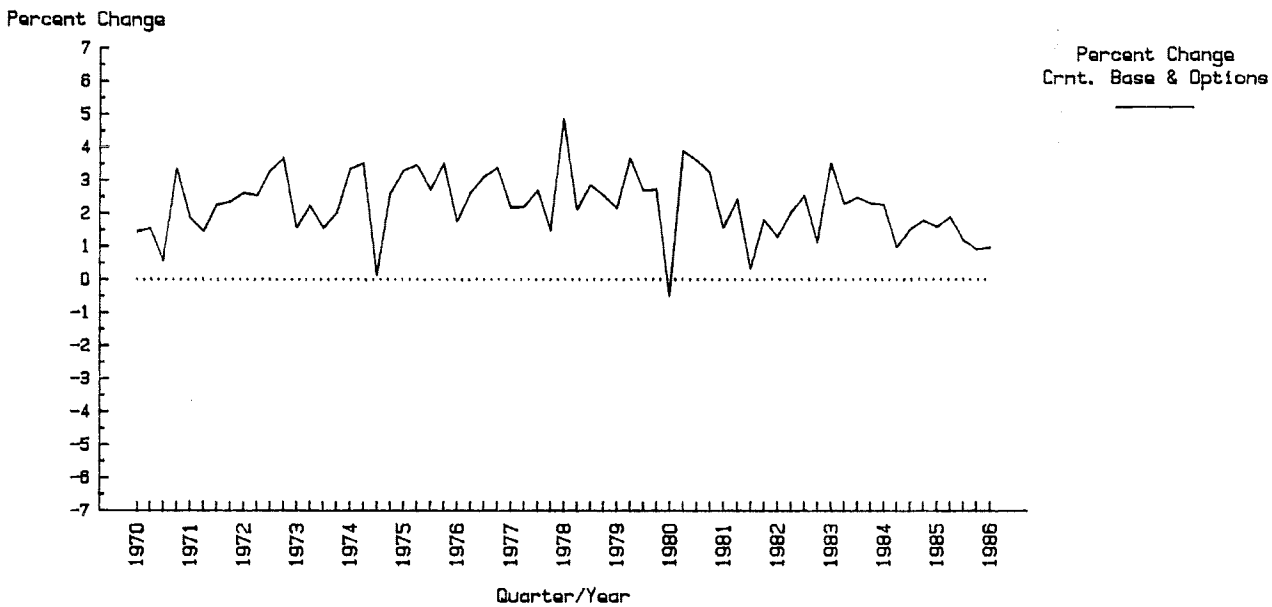
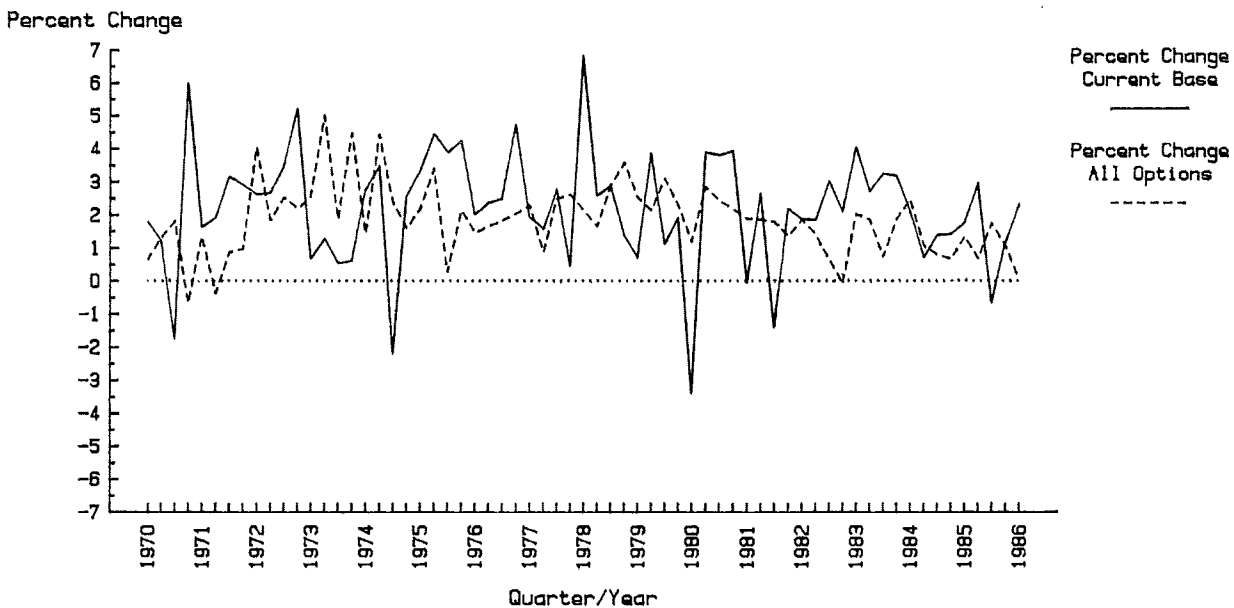
 CYCLICAL SWING INDICES FOR  
 EXPENDITURE CATEGORIES
 

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	<u>1959-1986</u>	<u>1970-1986</u>
1. Motor Vehicles	5.52	5.34
2. Auto parts & tires	.73	.49
3. Household durables	.82	1.88
4. Watches, jewelry, & other non-household durables	2.01	2.14
5. Purchased meals & employer furnished meals	.21	.61
6. Off-sale alcohol	- .19	- .19
7. Luggage	.31	.07
8. Tobacco & related products	- .53	- .67
9. Nondurable household products	.31	.41
10. Recreation expenditures	- .61	- .41
11. Telephone	- .11	- .13
12. Taxable house services	.83	1.57
13. Clothing related services	.28	.53
14. Total taxable items (total 1 to 13)	1.38	1.49
15. Food	- .24	- .09
16. Clothing & shoes	1.07	1.13
17. Gasoline & oil	- .26	- .38
18. Fuel oil & coal	1.61	2.13
19. Electricity	- .73	- .86
20. Natural gas	-1.60	2.06
21. Total energy related (total of 17 to 20)	- .33	- .43
22. Magazines, books, & newspapers	- .08	.04
23. Water & sanitary services	- .49	- .75
24. Household repair (e.g. electrical and t.v.)	.89	1.08
25. Auto repair	.52	.73
26. Barber shops and beauty shops	.98	1.16
27. Personal business services	- .41	- .09
28. Funeral and burial expenses	.22	- .12
29. Veterinarians	1.32	.47
30. Photo development & studios	.43	- .29
31. Total nontaxable services total of 23 to 30)	.13	.27
32. Medical services	- .21	- .36
33. Ophthalmic products & orthopedic appliances	.40	- .30
34. Drug preparation & sundries	- .27	- .02
35. New items taxable in 1987	.24	1.06

**Figure 1**  
**CHANGE FROM PREVIOUS QUARTER**  
**ALL OPTIONS COMBINED**

1970 to 1986



## Appendix A: DETAILED DATA DESCRIPTION

The source of data for determining measures of stability used in this report is the Personal Consumption Expenditures (PCE) provided by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). The PCE data set is seasonally adjusted and available monthly, quarterly or annually. Over 200 data series or categories are estimated by the BEA and a number of these categories are published monthly in the BEA publication Survey of Current Business. A more detailed data set which is used in this analysis is available directly from the National Income and Wealth Division of the BEA.

Personal Consumption Expenditures include the following:

- goods and services purchased by individuals
- operating expenses of non-profit institutions
- value of food, fuel, clothing, rent and services received in-kind by individuals
- net value of purchases of used goods

Those items or purchases not included in the PCE estimates include:

- purchases of dwellings (except that an estimate of the imputed rent of the dwelling is determined)
- expenditures for goods and services by businesses
- expenditures for goods and services by governmental jurisdictions

To calculate the PCE estimates, the BEA determines a category's value for a benchmark year as a final demand component of an input-output table. The sources of "basic data" for the input-output table includes both government sources (e.g. censuses of agriculture, business and manufacturers, Interstate Commerce Committee, Internal Revenue Service) and private sources. The data for the benchmark year is then updated and adjusted until the next benchmark year. Each series is available in constant dollar estimates (adjusted for inflation) and in current dollar estimates (not adjusted for inflation).

This data set only provides national estimates. Individual state estimates are not available. For purposes of this report the assumption is made that the consumption patterns of the U.S. population reflect the consumption patterns of the Minnesota population. Since estimates of spending by the Minnesota population are not available, the national data must be used.

Tables A-1 and A-2 detail the expenditures included in each category used in this report. Table A-1 provides the content of this report's estimate of Minnesota's current sales tax base. This estimate is generally made up of the expenditures made by individuals and not businesses. Therefore this current base estimate does not include expenditures for capital equipment, building materials and other purchases made by businesses so the estimate underestimates the actual base. The capital equipment (officially referred to as "accessory tools") component accounts for between only one and two percent of the actual tax base. Table A-2 provides the expenditures that are the components of the five base expansion options -- food, clothing and shoes, energy related, personal and household services, and medical services.

Table A-1

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**CURRENT TAX BASE  
CONSUMER EXPENDITURES**

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1. Motor Vehicles
2. Motor Vehicle Parts, Tires and Accessories
3. Furniture and Household Equipment
  - Furniture
  - Appliances
  - Household electronics (e.g. televisions, radios, records, musical equipment)
  - China and glassware
  - Carpets and other floor coverings
  - Tools
4. Non-Household Related Durable Goods
  - Jewelry and watches
  - Toys and sports equipment
  - Boats and aircraft
5. Taxable Food
  - Purchased meals
  - Employer supplied meals
  - Beverages
6. Alcohol Purchased for Off Premises Consumption
7. Luggage
8. Tobacco and Related Products
9. Non-Durable Goods
  - Semi-durable household goods
  - Toilet articles
  - Stationary and writing supplies
  - Non-durable toys and sports equipment
  - Cleaning supplies, paper products and lighting
10. Recreational Expenses
  - Movie theaters and other theater admissions
  - Spectator sports admissions
  - Commercial participant sports (e.g. bowling)
11. Telephone Services
12. Household Services
  - Rug and furniture cleaning
  - Domestic services
  - Pet services
13. Clothing Related Services

Table A-2

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TAX BASE EXPANSION OPTIONS  
CONSUMER EXPENDITURES

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1. Food Purchased for Off-premise Consumption
2. Clothing, Shoes and Accessories
3. Exempt Fuels
  - a. Gasoline and oil
  - b. Fuel oil and coal
  - c. Electricity for household use
  - d. Natural gas for household use
4. Personal and Household Services
  - a. Water and sanitary services
    - Water
    - Sewer
    - Garbage collection
  - b. Household and personal repair service
    - Electrical repair
    - Watch repair
    - Radio and T.V. repair
    - Upholstery and furniture repair
  - c. Auto repair
  - d. Barbershop and beauty parlor
  - e. Personal business services
  - f. Funeral and burial expenses
  - g. Veterinarians
  - h. Film developing and photography studios
5. Magazines, Books and Newspapers
6. Medical Services, Physicians, Dentists, Hospitals and Medical and Hospital Insurance
7. Ophthalmic Products and Orthopedic Appliances
8. Drug Preparations and Sundries

Table B-1

Cyclical Swing Indices and Means  
1959 to 1986

<u>Expenditure Category</u>	<u>Overall Index</u>	<u>Expansion Mean</u>	<u>Recession Mean</u>	<u>Cyclical Swing Index</u>
1. Motor vehicles	2.42	3.49	-2.03	5.52
2. Auto parts and tires	2.18	2.32	1.59	.73
3. Household durables	1.87	2.22	.40	1.82
4. Watches, jewelry, and other non-household durables	2.40	2.79	.77	2.01
5. Purchased meals and employer furnished meals	2.05	2.09	1.89	.21
6. Off-sale alcohol	1.57	1.54	1.73	-.19
7. Luggage	2.14	2.20	1.89	.31
8. Tobacco and related products	1.54	1.44	1.98	-.53
9. Nondurable household products	1.93	1.99	1.68	.31
10. Recreation expenditures	2.30	2.18	2.79	-.61
11. Telephone	2.18	2.16	2.27	-.11
12. Taxable household services	1.26	1.42	.59	.83
13. Clothing related services	1.45	1.51	1.22	.28
14. Taxable items	1.95	2.22	.84	1.38
15. Food	1.57	1.53	1.76	-.24
16. Clothing and shoes	1.72	1.92	.85	1.07
17. Gasoline and oil	1.85	1.80	2.06	-.26
18. Fuel oil and coal	1.25	1.56	-.05	1.61
19. Electricity	2.42	2.28	3.01	-.73
20. Natural gas	2.21	1.90	3.50	-1.60
21. Total energy related	1.94	1.87	2.20	-.33
22. Magazines, books, and newspapers	1.83	1.82	1.89	-.08
23. Water and sanitary services	2.52	2.43	2.91	-.49
24. Household repair (e.g. electrical and t.v.)	1.50	1.68	.79	.89
25. Auto repair	2.17	2.27	1.75	.52
26. Barber shops and beauty shops	1.81	2.00	1.01	.98
27. Personal business services	2.53	2.45	2.86	-.41
28. Funeral and burial expenses	1.57	1.62	1.40	.22
29. Veterinarians	2.91	3.16	1.85	1.32
30. Photo development and studios	2.56	2.64	2.21	.43
31. Total nontaxable service	2.23	2.25	2.13	.13
32. Medical services	2.90	2.85	3.07	-.21
33. Ophthalmic products and orthopedic applications	2.31	2.39	1.98	.40
34. Drug preparations and sundries	2.03	1.98	2.24	-.27
35. Taxable and food	1.83	2.01	1.11	.89
36. Taxable and clothing	1.91	2.16	.84	1.32
37. Taxable and energy	1.94	2.15	1.08	1.07
38. Taxable and nontaxable services	2.00	2.22	1.06	1.17
39. Taxable and medical services	2.12	2.33	1.26	1.07
40. Taxable and all nontaxable	1.97	2.09	1.48	.60
41. 1987 Taxable	1.47	1.52	1.28	.24

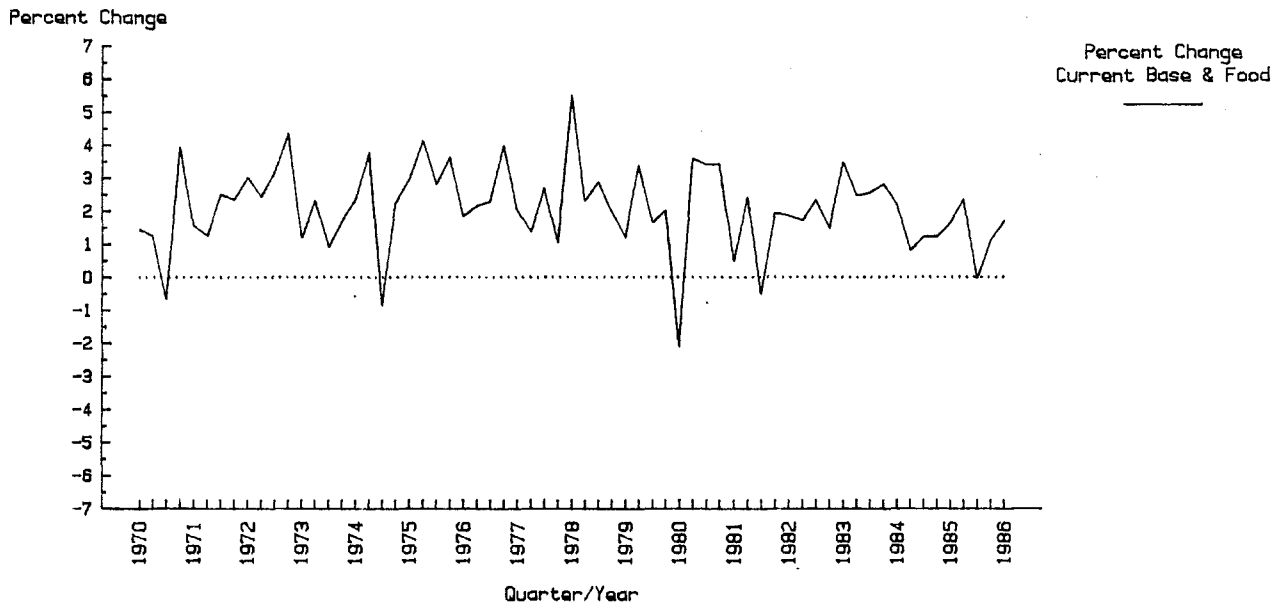
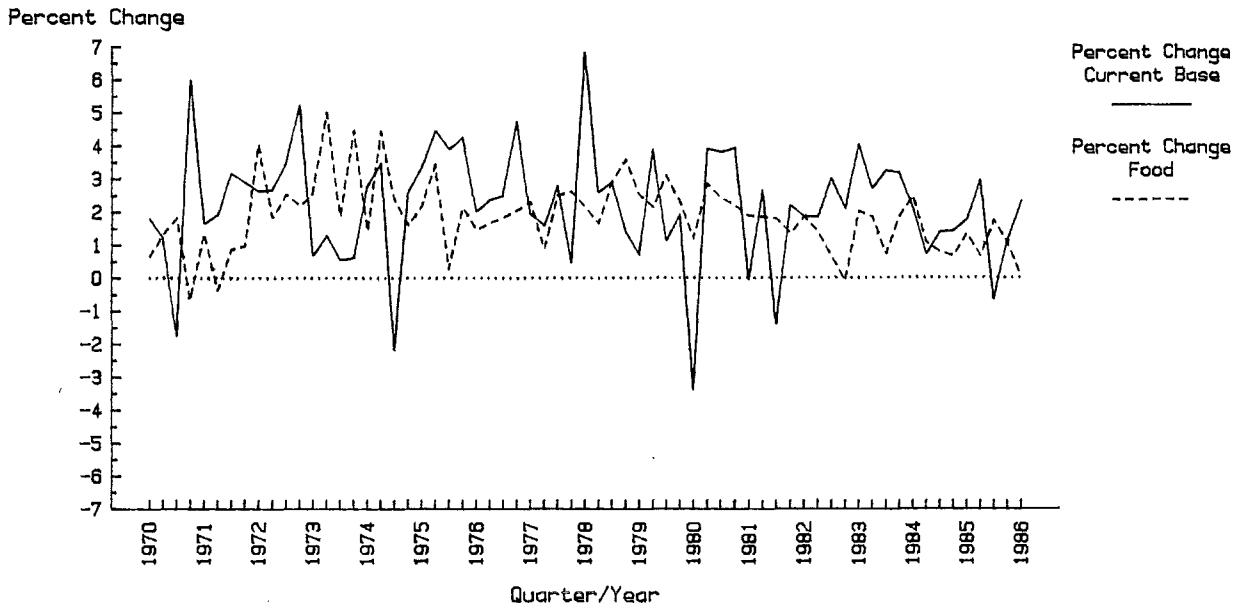


Table B-2

Cyclical Swing Indices and Means  
1970 to 1986

<u>Expenditure Category</u>	<u>Overall Mean</u>	<u>Expansion Mean</u>	<u>Recession Mean</u>	<u>Cyclical Swing Index</u>
1. Motor vehicles	2.88	4.20	-1.14	5.34
2. Auto parts and tires	2.22	2.34	1.85	.49
3. Household durables	2.08	2.55	.67	1.88
4. Watches, jewelry, and other non-household durables	2.69	3.21	1.07	2.14
5. Purchased meals and employer furnished meals	2.37	2.52	1.91	.61
6. Off-sale alcohol	1.65	1.61	1.80	-.19
7. Luggage	2.05	2.07	1.99	.07
8. Tobacco and related products	1.83	1.66	2.34	-.67
9. Nondurable household products	1.93	2.03	1.62	.41
10. Recreation expenditures	2.61	2.50	2.92	-.41
11. Telephone	2.29	2.26	2.39	-.13
12. Taxable household services	1.51	1.89	.32	1.57
13. Clothing related services	1.70	1.83	1.30	.53
14. Taxable items	2.19	2.56	1.07	1.49
15. Food	1.83	1.81	1.90	-.09
16. Clothing and shoes	1.95	2.23	1.09	1.13
17. Gasoline and oil	2.06	1.97	2.35	-.38
18. Fuel oil and coal	1.91	2.44	.31	2.13
19. Electricity	2.97	2.76	3.62	-.86
20. Natural gas	2.66	2.15	4.21	-2.06
21. Total energy related	2.33	2.22	2.65	-.43
22. Magazines, books, and newspapers	1.88	1.89	1.84	.04
23. Water and sanitary services	2.73	2.54	3.29	-.75
24. Household repair (e.g. electrical and t.v.)	1.61	1.87	.79	1.08
25. Auto repair	2.30	2.48	1.74	.73
26. Barber shops and beauty shops	1.78	2.07	.91	1.16
27. Personal business services	2.96	2.94	3.03	-.09
28. Funeral and burial expenses	1.76	1.73	1.84	-.12
29. Veterinarians	2.45	2.57	2.09	.47
30. Photo development and studios	2.31	2.24	2.52	-.29
31. Total nontaxable service	2.48	2.54	2.28	.27
32. Medical services	3.14	3.05	3.41	-.36
33. Ophthalmic products and orthopedic applications	2.46	2.39	2.69	-.30
34. Drug preparations and sundries	2.12	2.12	2.14	-.02
35. Taxable and food	2.09	2.34	1.31	1.03
36. Taxable and clothing	2.15	2.50	1.08	1.43
37. Taxable and energy	2.21	2.49	1.35	1.14
38. Taxable and nontaxable services	2.25	2.56	1.28	1.28
39. Taxable and medical services	2.39	2.67	1.54	1.13
40. Taxable and all nontaxable	2.25	2.42	1.73	.69
41. 1987 Taxable	1.77	1.92	1.32	.61

**Figure C1**  
**CHANGE FROM PREVIOUS QUARTER**  
**FOOD OPTION**  
**1970 TO 1986**



**Figure C2**  
**CHANGE FROM PREVIOUS QUARTER**  
**CLOTHING AND SHOES OPTION**  
**1970 to 1986**

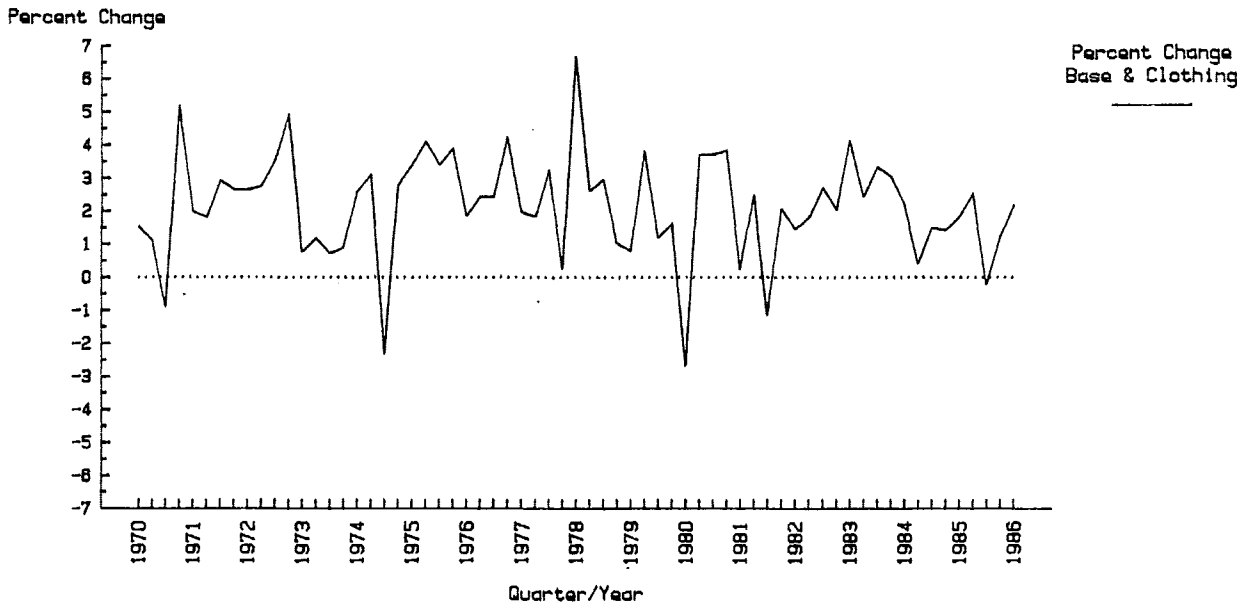
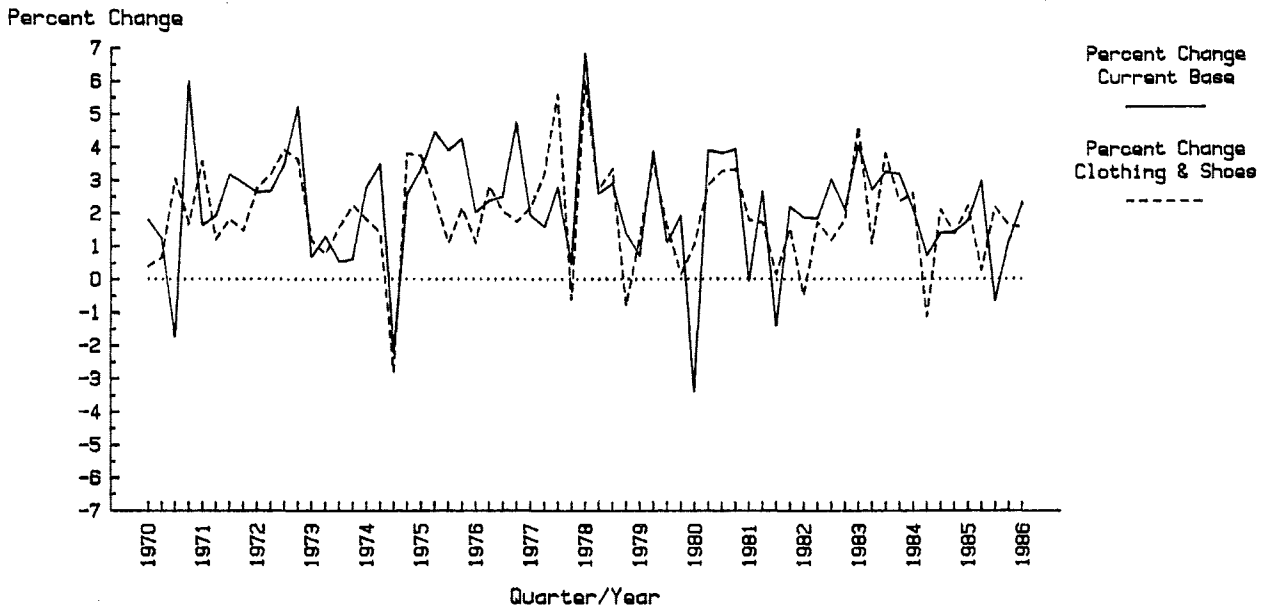
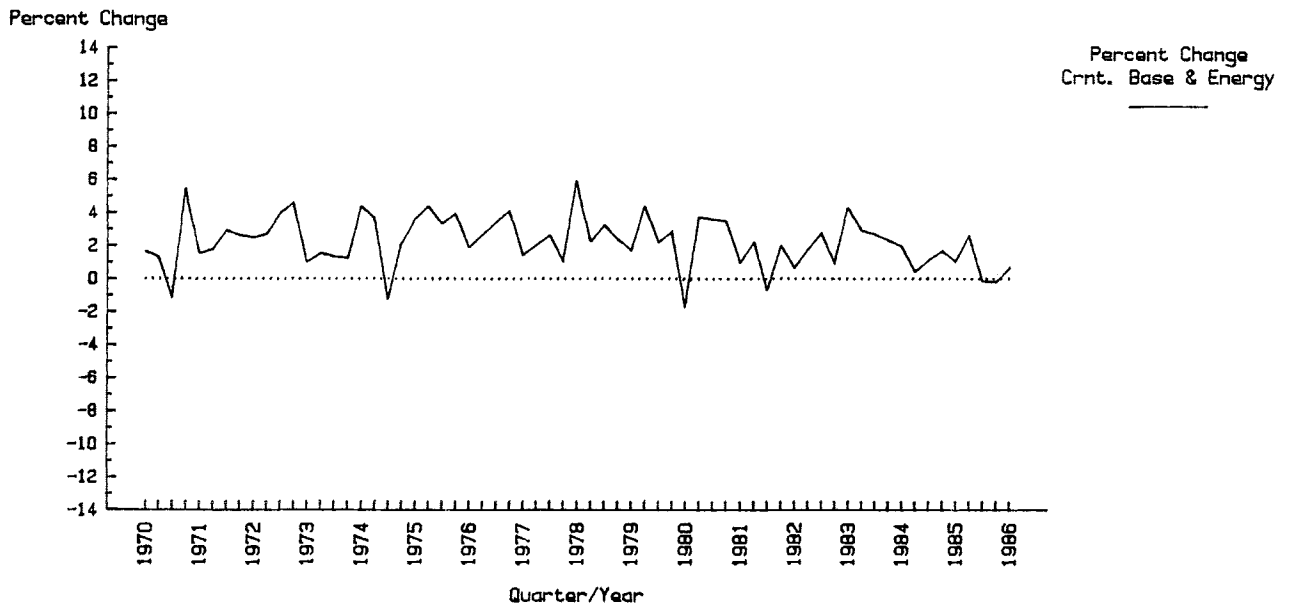
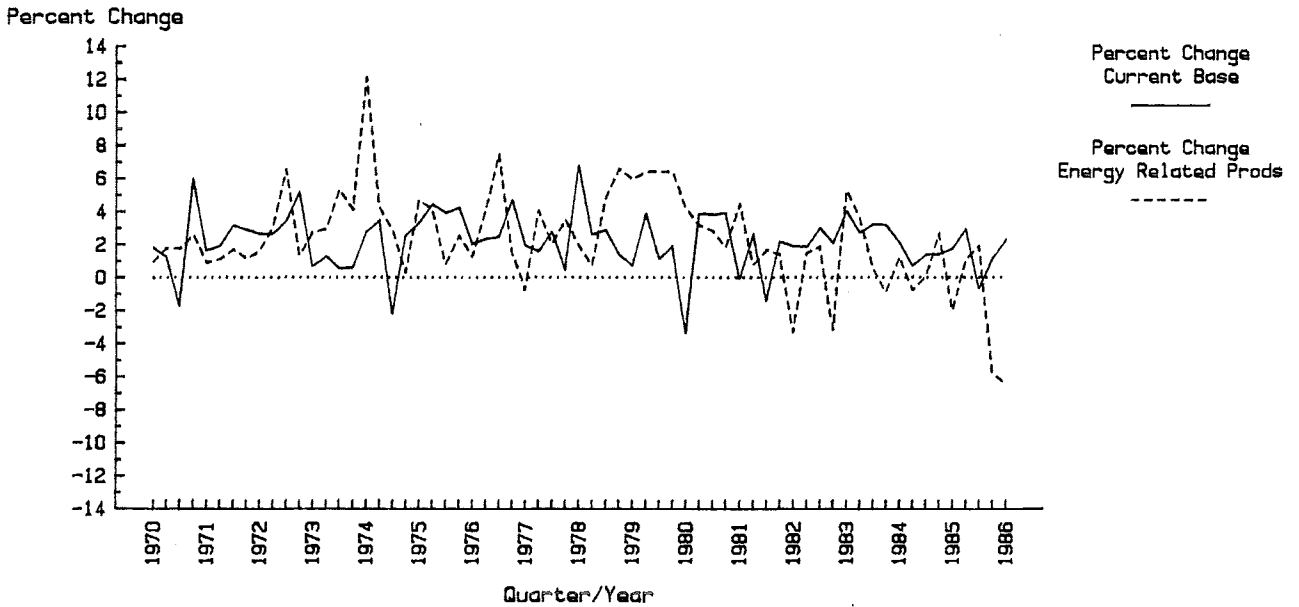


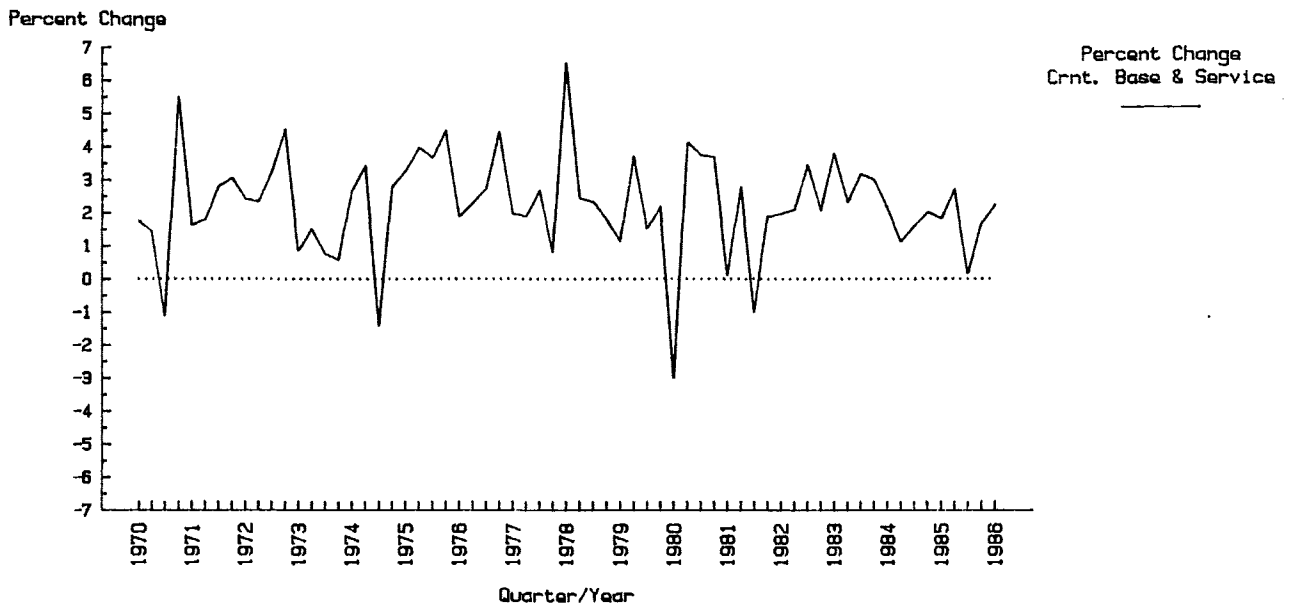
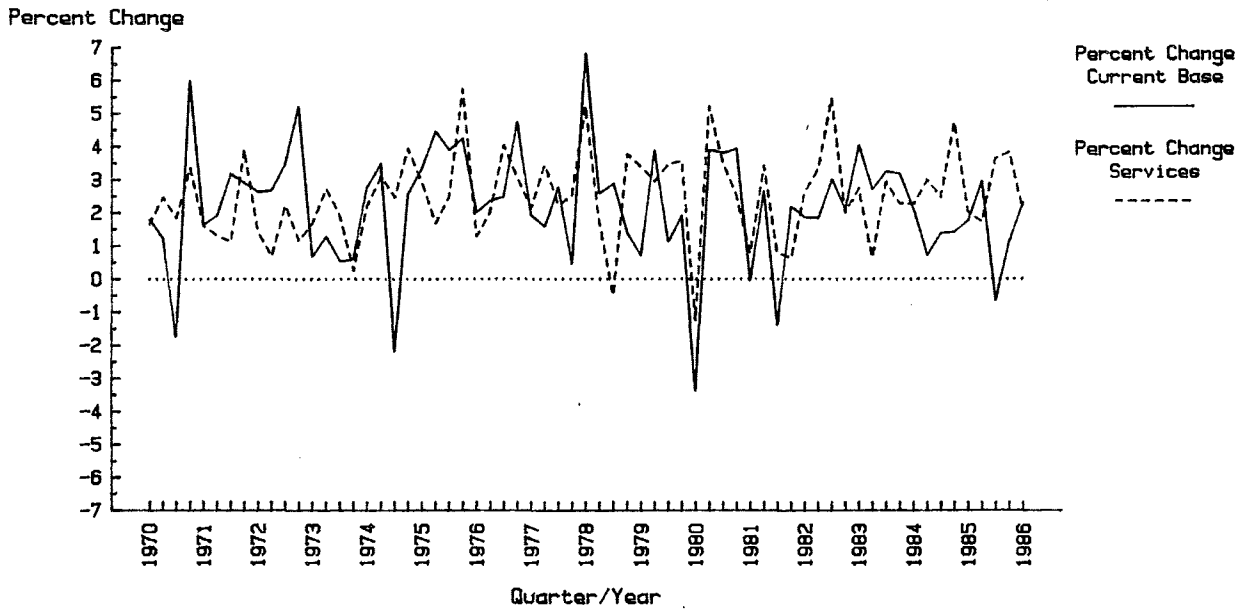
Figure C3

# CHANGE FROM PREVIOUS QUARTER ENERGY RELATED PRODUCTS OPTION

1970 to 1986



**Figure C4**  
**CHANGE FROM PREVIOUS QUARTER**  
**PERSONAL & HOUSEHOLD SERVICES OPTION**  
**1970 to 1986**



**Figure C5**  
**CHANGE FROM PREVIOUS QUARTER**  
**MEDICAL SERVICES OPTION**  
**1970 to 1986**

