

THE EFFECT OF TRADE LIBERALIZATION ON THE CONSUMPTION FUNCTION IN MOROCCO

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Abstract: This paper investigates the impact of the 1983 trade liberalization and inflation on the consumption function of Morocco. Findings indicate that trade liberalization and moderate inflation had little impact on consumption. The results do, however, show strong support for the permanent income hypothesis because lagged consumption was found to be significant in predicting current consumption.

Keywords: Morocco, trade liberalization, inflation, consumption.

INTRODUCTION

The rapid movement towards free world trade necessitates an understanding of the impact of such liberalization on less-developed economies. This study focuses on Morocco and provides researchers with the ability to examine the impact of trade liberalization on a consumption function specified by previous research.

The purpose of this analysis is to reexamine the consumption function of Morocco subsequent to the enactment of trade liberalization laws. Two previous papers by Darrat (1985) and (1987) derive consumption functions for Morocco while specifically addressing the impact of inflation and its variability on developing economies. This paper attempts to accomplish three goals:

- Extend the earlier analysis by the addition of data from the years 1983-1989;
- Broaden the earlier analysis by eventually including a variable to proxy liquid assets; and
- Investigate the impact of trade liberalization.

In 1983 Moroccan authorities adopted a trade liberalization program which reduced import duties, phased out import licensing and enacted

several other measures to encourage free trade. Bertola and Faini (1991) examined the liberalization of trade laws in Morocco and the impact of this change on import demand. Their findings indicate a change in income elasticities of demand for imported goods when quantitative restrictions on trade were lifted. Specifically, the income elasticity with respect to import demand increased.

It seems reasonable to suggest that consumption was affected in some way by this trade liberalization. This policy change is equivalent to a change in taxation and Summers (1981) found that changes in tax policies can affect saving and consumption. Reducing quotas and tariffs will result in imports being more readily available to the population of Morocco at lower prices.

The basic premise of this paper is that the consumption function of Morocco has changed or shifted due to this change in trade policy. Since Darrat's two studies (1985, 1987) use data from 1957-1982, his analysis is unable to capture the effects of trade liberalization.

The remainder of the paper is organized in the following manner. Section two presents the estimated consumption function as well as the functions used to estimate expected inflation and the variability of expected inflation. Some background and justification material is also presented. Section three provides empirical results for the model. The final section provides

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the overall conclusions of the paper and some suggestions for future research.

BACKGROUND AND JUSTIFICATION

The concepts of consumption as well as its counterpart, saving, have been widely accepted as subjects worthy of research attention. Bowles (1985) attests to this fact in his survey of the consumption literature of the 1970s and 1980s. According to Bowles, private consumption is important because it comprises about two-thirds of our gross national product (GNP). It is also important to understand the basic relationship between savings and consumption. The relationship between consumption and savings can be stated as disposable income minus consumption equals savings. Cullison (1990), in a study of the U.S. savings rate, reminds us that savings equals investment. Investment, in turn, is a major source of economic growth and development, leading to a higher standard of living.

In examining Morocco, we find that private consumption comprised 67.3% of the gross national expenditure of Morocco in 1989. This fact, coupled with the connection between consumption and economic growth via the rate of saving, validates the decision to investigate further the consumption function of Morocco. The results could be potentially useful in policy making.

Maintaining consistency with Darrat (1985), the consumption model is specified in the following manner:

$$\log C_t = a_0 + a_1 \log X_t + a_2 \pi_t + a_3 \pi_{t-1} + a_4 \log C_{t-1} + \mu_{1,t}$$

Where:

- C_t = real private consumption for Morocco
- X_t = real income (real GDP used)
- π_t = expected inflation
- π_{t-1} = variability in expected inflation
- C_{t-1} = real private consumption lagged one period
- $\mu_{1,t}$ = whitenoise error term

According to Hall (1978), rational expectations theory suggests including the variable of lagged consumption. His empirical work provides the justification for the one period lag. Using real income as an independent variable in a consumption function is also widely accepted in economic theory. Including the variables of expected inflation and the variability of expected inflation is based on research by Burehe and Werneke (1975), Springer (1977) and numerous others.

The current analysis also includes the additional variable W_t , which serves as proxy for liquidity. This variable is represented by money combined with quasi-money. Mishkin (1977) concluded that consumers' liquidity has a significant effect on consumption. Illiquid consumers are less likely to purchase consumer durables.

The inclusion of anticipated or expected inflation poses a problem. This variable is not readily available so it must be estimated. The following model, consistent with Darrat (1985), calculates the values for expected inflation to be used as input values for the independent variable π_t :

$$\pi_t = b_0 + b_1 T + b_2 \pi_{t-1} + b_3 \pi_{t-2} + b_4 MG_t + b_5 MG_{t-1} + b_6 MG_{t-2} + \mu_{1,t}$$

This model specification is based on the rational expectations hypothesis as it pertains to inflation. Boyes (1992) contends that individuals formulate their expectations based on acquired information that is relevant to the subject. Based on this statement, expectations about inflation will be based on past inflation, accounted for in this study by the lagged inflation variables and other relevant information. Darrat (1985) includes money growth since it is widely believed that money growth is directly related to inflation. The variable MG represents money growth for Morocco. Time trend is also included as a variable (T), as suggested by Howard (1978). Inflation is measured as the percentage change in the GDP deflator.

Results from the above model are used to calculate the π_t^v , or the variability of the expected inflation rate, according to following formula advocated by Blejer (1979), and consistent with Darrat (1985):

$$\pi_t^v = \frac{1}{n} \sum_{i=1}^n |\pi_{t-1} - \pi_{t-1-i}|$$

For this equation n = 3 was used to maintain consistency with prior research. These estimations are used as independent variables in the consumption function.

Data for the study was retrieved from the International Financial Statistics Yearbook for the years 1983, 1987 and 1992. Annual time series data representing the years 1957 through 1990 was used for the analysis.

EMPIRICAL RESULTS

The previous section explained that the values for π_t^v were to be estimated according to the model specified in that section. The following results were obtained using ordinary least squares:

$$\pi_t^v = .0078 + .0034T - .3633 \pi_{t-1} - .4731 \pi_{t-2} + .0250MG_t + .0913MG_{t-1} + .4059MG_{t-2}$$

(.227) (1.381) (1.459) (1.956) (.080) (.298) (1.227)

Where:

- R² = .391
- SER = .0566
- DW = 2.33
- LM X² = 7.793
- BP = 7.807

where, R² is the squared coefficient of multiple correlation adjusted for degrees of freedom, SER is the standard error of the regression, DW is the Durbin-Watson statistic which tests for serial correlation among the residuals, LM X² is the Lagrange Multiplier statistic developed by Godfrey (1979) to test for autocorrelation, and BP is the Breusch-Pagan (1979) test for heteroskedasticity or non-constance of error

terms (also a Lagrange method). Both of the latter statistics are distributed as X², with LM having p-1 degrees of freedom, and BP having p degrees of freedom. In both cases exceptionally large values indicate violations of the null hypotheses. Godfrey's LM formulates the null as no autocorrelation, while Breusch-Pagan formulates the null as no heteroskedasticity. Also, according to Johnson *et. al.* (1987), Durbin-Watson values approaching 2 indicate no first order autocorrelation. The values in parentheses are absolute t-values. These same statistics will be used in the remainder of the paper.

Because no evidence of serial correlation or heteroskedasticity is present, the results from this regression are used as independent variables in the ensuing analysis. A word of caution is necessary regarding the significance of the overall model used to estimate expected inflation. The overall F statistic was 1.7097 with the probability of a greater F or .182. Lack of a better model and the desire to maintain consistency with previous research necessitates using these results in the consumption function. The variability of expected inflation is calculated using the values derived from this model according to the formula presented earlier.

CONSUMPTION MODEL

Table 1 contains the regression results obtained from the estimation of the consumption model. Beach-Mackinnon maximum likelihood results are also calculated to correct for the problem of serial correlation found in the original models. These results are also reported in Table 1 as ML.

Table 1: Moroccan Consumption Function Regression Results

Equation	Constant	$\log X_t$	π	π'	$\log C_{t-1}$	W	R ²
1.1 OLS	* 2.677 (46.90)	* .017 (18.70)					.93
1.1 ML	* 2.926 (13.70)	* .007 (4.50)					
1.2 OLS	.354 (1.21)	.001 (1.01)			* .883 (8.04)		.98
1.2 ML	.446 (1.42)	.002 (1.24)			* .847 (7.15)		
1.3 OLS	* 2.588 (35.69)	* .011 (18.50)	.955 (1.80)				.94
1.3 ML	* 2.930 (12.78)	* .007 (4.20)	.159 (.49)				
1.4 OLS	* 2.560 (32.90)	* .011 (18.50)	.990 (1.90)	.440 (1.00)			.94
1.4 ML	* 2.940 (12.50)	* .007 (4.20)	.157 (.49)	-.181 (.93)			
1.5 OLS	.351 (1.06)	.001 (.78)	-.025 (.07)	.032 (.12)	* .884 (6.75)		.98
1.5 ML	.450 (1.29)	.002 (1.05)	.016 (.05)	-.002 (.01)	* .845 (6.21)		
1.6 OLS	.413 (1.22)	.003 (1.23)	-.155 (.43)	.039 (.15)	* .840 (6.03)	-.001 (.95)	.98
1.6 ML	.546 (1.53)	.004 (1.56)	-.104 (.29)	-.017 (.07)	* .783 (5.42)	-.002 (1.00)	

Note: * indicates the t-value is significant at the .05 level. Values in parentheses are the absolute value of the t statistic.

Table 2 contains other summary statistics related to the regression including SER, Durbin-Watson, LM X2 statistic for autocorrelation and BP statistic for heteroskedasticity. All equations were significant overall at the .01 level or higher and exhibited relatively low SERs.

To test for the hypothesized structural shift in the consumption function of Morocco, the Chow test is employed. Since the shift is

hypothesized to have occurred in 1983, the data is separated based on this date. A Chow test was conducted in accordance with the methodology outlined in Johnston (1972). The computed F statistic for the Chow test was approximately 1.00. This indicates that no structural shift in the consumption function occurred in 1983.

Table 2: *Regression Diagnostics*

Equation	SER	DW	LM N ²	BP
1.1 OLS	.9300	.4625	13.220	6.914
1.1 ML	.0799	1.9856		
1.2 OLS	.0487	.8402	.885	18.758
1.2 ML	.0541	2.1659		
1.3 OLS	.0877	.6636	11.528	6.248
1.3 ML	.0786	2.0045		
1.4 OLS	.0886	.9142	9.455	5.932
1.4 ML	.0754	1.9054		
1.5 OLS	.0509	.8519	.772	19.337
1.5 ML	.0540	2.1701		
1.6 OLS	.0511	.9456	1.185	17.773
1.6 ML	.0513	2.1405		

Note: In the regression containing a lagged dependent variable, Durbin's 'h' is reported instead of the Durbin-Watson statistic. This alternative statistic takes care of possible bias due to the presence of a lagged dependent variable (Green, 1992).

CONCLUSIONS

Several conclusions can be drawn from the results included in Table 1. The most striking observation from Table 1 is the significance of lagged consumption as a predictor of consumption at time t . The coefficient on lagged consumption is statistically significant in every model that includes this variable. Other results are that, when lagged consumption is omitted from the model, real income becomes significant in every case. Conversely, when lagged consumption is included, income appears irrelevant. Even when real income is significant the coefficients are extremely small, indicating little impact on overall consumption. This finding lends strong support to the permanent income

hypothesis (PIH). According to Hall (1978), the pure PIH¹ states that no variable other than lagged consumption will be significant in predicting current consumption. Contrary to Hall's findings, this study lends credibility to the pure theory. Darrat's (1985) findings support the modified PIH since real income is significant in the presence of lagged consumption.

In addition, expected inflation and the variability of expected inflation do not appear to affect consumption in Morocco. In the full equations the sign is negative as expected, but the variables are not statistically significant. Relatively low levels of inflation that have been the norm in Morocco appear modest enough to have had no impact on consumption.

This study produced no evidence to indicate that trade liberalization affected consumption in Morocco. In addition, the Chow test indicates that the Moroccan consumption function remained stable. The additional years of available data appear to provide more information and slight differences in the findings of Darrat (1985). The differences in the findings are attributed to the additional information. A suggestion for further research would be to obtain quarterly data for the years 1978 to the present and estimate this same consumption function. In addition, information on interest rates should be included in the model. Interest rate data is available beginning in 1978. Boyes (1992) stated that accepted theory proposes that the interest rate should also have a significant impact on consumption via the savings channel. The higher the interest rate, the higher the savings rate, and therefore the lower the level of consumption.

Another suggestion for further research would be to examine the effects of trade liberalization on the consumption functions of other African countries. It would be interesting

¹ The permanent income hypothesis states that consumers form estimates of their expected income and determine their consumption patterns based on that information instead of current income.

to compare the effect of trade liberalization on consumption functions of African countries that have enacted trade liberalization laws since the time Morocco's were ratified.

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