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Egyptian Economy Between Static and Dynamic Choice with Reference to Japanese Experience: Macro Economic Model

By

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Abstract

This paper proved that the concept of competitiveness as a dynamic issue in regard to international trade was a source of increasing the volume of Japanese exports in the international market; growth and development in the domestic economy. This result comes from mainly two factors: the first, rapid change in the structure of Japanese production and the composition of Japanese exports paralleling the rapid structural change in the international market. The second factor is the rapid change in the prices and quality of Japanese exports. Policy implications obtained from this analysis are: In order to improve the economy's long-term competitiveness and economic growth; Egyptian and developing country's policy-makers have to create and adopt dynamic economic policies that can facilitate the structural change in the Egyptian economy toward the sectors, which has a strong demand in the international market. Furthermore, they have to improve the parameter of the non-price competitiveness and the national system of innovation.

Key Words

Static choice, Dynamic choice, International trade, Economic development

1. Introduction (Objectives and Plan):

In view of factors of determination and the process of the creation of the theory of international trade and growth in the economic literature—after Leontief Paradox —has changed dramatically[1]. The competitiveness seemed to be a dynamic issue, in terms of 'combines growth with balanced trade', with aspiration levels changing over time; while the sort of investment in physical & human capital, technology, and information are the means to change the attainable welfare and the level of competition.

This paper attempts to make a comparison investigation for the sources of the relative competitiveness and growth in both economies Japan (as developed economy) and Egypt (as one of the developing economies). It also attempts to identify the sources

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[1]Leamer, Edward E, (1984). Sources of Intemational Comparative Advantage, Cambridge: MIT Press, pp. 3 -11

and process of the Japanese high economic growth and competitiveness at the macro level by contrast to the Egyptian performance. This paper also investigates the role of these internal and external variables (such as the domestic price, the quality of the industrial production, structural change and the relative prices of the national exports, the technical progress, the quality and the price elasticity's of exports) in creating and supporting the high rate of economic growth, while simultaneously sustaining giant share in the international market in the Japanese experience. On the other hand, what is the role of these factors in the Egyptian economy? What are the necessary policies that Egyptian economy needs to create and sustain its competitiveness and growth in the short and long term?

The paper is organized as follows: the next section presents a brief overview of the methodology and theoretical specification of the model. Section 3 describes the data sources and adjustments. Section 4 explains the empirical results (factors behind Japanese competitive ness and growth). Section 5 summarizes the main arguments of the papers.

2. The Methodology:

The paper will use post-Keynesian macroeconomic model[2] for the growth in an open economy, based on the balance-of-payments constraint[3]. In general the model depends on four kinds of equations as are stated below. These equations explain the parameters that determine the competitiveness of the economy and the behavior of economic growth in the short-term and long run as follows:

2-1 Exports Function:

Exports here depend on two kinds of variables, internal and external.

$$X = Y^{*\varepsilon}\left(\frac{P}{P^*}\right)^{\eta} \Omega^{\lambda} \tag{1}$$

With; X being the value of industrial exports, Y^*being the value of GDP of the rest of the world, ε income elasticity of exports (>0), P the value of the level of prices in the country, P^* the value of the prices in the rest of the world, η the value of price elasticity of exports (<0); λ the value of quality elasticity of exports (>0); and Ω being the value of quality of exports.

2-1-1 Quality Function:

Exports quality is assumed to be a function of accumulated (production) experience and supposed to have a constant elasticity represented by aggregate production as the following equation shows:

$$\Omega = K^{\nu} = \left[\int_0^t Q(t)\, d\tau\right]^{\nu} \tag{2}$$

Where Ω is the quality of exports, K the cumulative output, and ν the quality

[2]Amable, Bruno (1993). National effects of learning international specialization and growth paths, in Technology and the Wealth of Nations, Dominique Foray and Christopher Freeman (eds), New York: Martin's Press, pp. 173-186.

[3]Thirlwal, A. P. (1979), "The balance of payments constraint as an explanation of international growth rate differences", Banca Nazionale del lavoro Quarterly Review, 128, pp. 45-53.

elasticity to cumulative production (>0).

2-2 Import Function:

The volume of a country's imports is a function of the GDP of the country, the level of domestic prices compared to international prices and the elasticity of the price and income for imports as is showing in the following equation:

$$M=Q^{\alpha}\left(\frac{p}{p^{*}}\right)^{\beta} \tag{3}$$

M is the value of imports, Q being the value of GNP of the country, α being the value of income elasticity of imports (>0), β being the value of the price elasticity of imports (>0).

2-3 Wages function:

The model supposes wages are indexed on the productivity and allows for the growth rate of the nominal wage as following equation:

$$w=\mu a \tag{4}$$

Whereat w is the growth rate of nominal wages. a is the growth rate of productivity, and μ is a constant term. Domestic prices are supposed to be equal to unit costs plus mark-up, which is supposed to remain constant. Thus the rate of increase in domestic prices is the difference between the rate of increase in wages and the rate of growth of productivity:

$$p=w-a \tag{5}$$

Since real wages take account of changes in the level of domestic prices and are supposed to be increased by the same rate as productivity, growth rate of real wages are deduced in following equation:

$$w-p=a \tag{6}$$

2-4 Productivity Function:

The productivity rate of growth is specified as a positive function of the growth of production (according to a Kaldor-Verdoorn type linear formula) and technical change as follows:

$$a=n+lq \tag{7}$$

Since, a is the growth rate of productivity, n is the autonomous trend of technical progress (>0), l being the Kaldor_Verdoorn coefficient ($0<1>1$), q is the growth rate of the GNP of the country.

2-5 Balance of Payments Constraints:

This model supposes the Economy is working under the dynamic equilibrium of the balance of payments. So the growth rate of total exports is equal to the growth rate of total imports. Therefore;

$$x=m \tag{8}$$

From equation (4), putting the equation (1) and (3) into a log specification; gives us;

$$\varepsilon y^* + \eta\,(p - p^*) + \lambda\omega = \alpha q + (\beta)\,(p - p^*) \tag{9}$$

2-6 Estimating the Economic Growth Under Balance of Payments Constraints:

From equation (9) with substitution the value of $w = \mu a$ and the value of $a = n + lq$ into the equation (6) so, $p = w - a = \mu a - a = a\,(\mu - 1) = (n + lq)\,(\mu - 1)$ and consequently economic growth can be expressed as the following equation:

$$q = \frac{\lambda\nu}{\alpha + (\beta - \eta)\,(\mu - 1)l}k + \frac{\varepsilon y^*\,(\beta - \eta)\,[p^* - n\,(\mu - 1)]}{\alpha + (\beta - \eta)\,(\mu - 1)l} \tag{10}$$

By simplifying equation (10): Since q is the rate of growth of instantaneous production and k is the rate of growth of cumulative out put, therefore equation (10) can be written as follows:

$$q = k + \frac{\dot{k}}{k} \tag{11}$$

2-7 Properties of Economic Growth:

Equation (11) can be expressed as follows:

$$k = Ck^2 + Bk \tag{12}$$

If $k \neq 0$ with:

$$C = \frac{\lambda\nu}{\alpha + (\beta - \mu)\,(\mu - 1)l} - 1 \tag{13}$$

$$B = \frac{(\beta - \eta)\,[p^* - n\,(\mu - 1)] + \varepsilon y^*}{\alpha + (\beta - \mu)\,(\mu - 1)l} \tag{14}$$

C and B are description variables for the growth rate of instantaneous production (q) and since these variables can be positive or negative; there are four possible cases for these variables ranging from absolute negative to absolute positive according to the value of k at the initial position and the conditions of the macro economic variables and the parameters in each economy. These four cases are:

(1) $C < 0$ and $B > 0$:

In this case the stability of equilibrium in the long run is strictly positive because of the positive values of k. From an economic standpoint this case is the most interesting because it is a company with an asymptotically stable balanced growth rate. The necessary conditions for this case are the growth in the rest of the world and the income elasticity of exports of the country considered have to be sufficiently strong. On the other hand, endogenous mechanisms of technical progress (Kaldor-Verdorn law) and accumulation of experience (quality of exports) should also be strong.

(2) $C = 0$ and $B = 0$ as is shown in figure below:

According to equation (11) this case (No. 2) is also an equilibrium case; but it is unstable; because, first, if the original value of k falls short of equilibrium position, production tends to zero. Second, if the original value of k is larger than the value of equilibrium production tends to infinity.

(3) C may > 0 and $B > 0$

(4) C may <0 and also B

Original equilibrium in these two cases is negative and therefore is not significant from an economic standpoint. These two cases also suppose to be non-equilibrium positions and also not stable cases. They correspond to either very powerful or very weak cases of endogenous mechanisms of technical change and accumulation of experience, accompanied by parameters expressing, respectively, very strong or very weak exogenous growth in the rest of the world. For instance, if the origin value of k is positive, the level of production will tend to infinity in case of $C>0$ and $B>0$. On the other hand, it will tend to zero in case of $C<0$ and $B<0$.

Equations (10), (11), (12), (13) and (14), are the general model equation and indicate important economic relationship between economic growth, the factors of competitiveness, and time path. These equations mean the growth rate of instantaneous production depends on two kinds of components; Viz. exogenous factors such as economic boom or recession in the rest of the world and the subsequent increasing or decreasing of GDP and international prices. The second are endogenous factors such as local prices, national income elasticity, and gross domestic income. In brief, the economic growth of the nation is not only affected by the internal but also by external demand. It has an especially deep impact on developing countries due to shortage of foreign currency. The paper will use these equations in empirical testing along with regression equations analysis and a computer simulation.

3. Data Sources and adjustments:

The databases for estimating the above equations—for Japanese and Egyptian economies—are the International Financial Statistics, Years Book, 1997 of the International Monetary Fund, Central Bank of Egypt and the Bank of Japan. Fused into them were data from the country page, World tables, World Bank, different years.

Based on the data of the Economic Bulletin of the National Bank of Japan, 1997, the research estimated the main trading partners with Japanese economy (using the relatively weighted shares of the exports and imports) are USA, Germany, China, United Kingdom, Netherlands, Malaysia, Hong Kong, Republic Korea, Singapore and Thailand.

Regarding to Egyptian economy, Based on the data of the National Bank of Egypt, Economic Bulletin, 1997, the research estimated the main traders group with the Egyptian economy (using the relatively weighted shares of the exports and imports) are USA, Italy, German, Netherlands, France, United Kingdom, Saudi Arabia and Japan.

The research uses the data of GDP of this group of traders with Japan and Egypt to represent the world's GDP. The world's GDP has been estimated based on the relatively weighted shares of Japan's and Egypt's trade volume in regard to each country in the main traders group. Furthermore, the research used the data of the GDP deflators for the same countries to estimate the relative GDP's deflator and then estimate the GDP by constant prices in national currency units using 1990 as a base year. After that the exchange rate for each national currency unit was been used to transfer the domestic GDP to USA dollars. The research depended on the data of the GDP (after using the GDP's deflator to transfer it to constant prices) of the Japan and Egypt economies instead of the GNP data.

To avoid data shortage the wholesale price index for this group of main traders with the Japanese and Egyptian economy was used here—instead of the export & import unit values—to estimate the international relative price level[4]. The same index was also used to determine the level of domestic prices in the Japanese and Egyptian economy, in addition the research considered year (1990＝100) as base year to estimate the exchange rate index. Then by dividing the WPI over exchange rate index we obtained WPI after deflation. Data of exports and imports are the values by constant price values in Japanese currency for 36 years since 1960.

For the Egyptian economy, the data of exports and imports are the values by constant prices of the Egyptian currency for 24 years since 1973. The data in table number (8) are the values of the index of real wages per employment. The base year for this data has been changed from the year 1987 to 1990. The data also has been extended to the year of 1996 by using the total average growth rate as a trend to estimate the data for the years after 1992. In table (11) the data of GDP deflator and real wages values have been used to estimate the growth rate of the nominal wages. In table (12) the data of the growth rate of the real wages has been used here as a reference to the data of the growth rate of productivity.

4. The Empirical Results:

The equilibrium model outlined in the previous section was estimated for the Japanese and Egyptian economy during the period 1960 to 1996 for the first and during the period 1973–1996 for the second. It should be pointed out that this model could be highly sensitive to small changes in specification and the data. For both equations, exports and imports in the model has been used the logarithm regression data analysis and for the other function it used the normal data regression analysis.

4–1 Export Function:

Regression equation (1) was estimated for both economies without using the dummy variables. As can be seen in Table 1.

The estimated world income elasticity in the export demand equation has the expected positive sign for both economies, Japanese (＋2.15) and (0.61) in case of Egyptian economy. However the difference between the levels of demand of the exports in the international market for both economies is quite clear. Furthermore the high degree of significance in the Japanese case comparing with the low degree in the Egyptian performance is also clear. This implies a very weak link and response between Egypt's exports and the change in the international demand in the Egyptian economy. The opposite side is also quite correct in the case of Japanese economy. The response of exports to changes in the relative GDP for the main traders group with the Japanese economy is very high. In the other wards, the composition of the Japanese export's goods and services are from such types, which have a strong demand in the international market. The model explains the continual increasing trend in the Japanese exports, thereafter the growth and the sound economic development. In the

[4]Further more the use of import & export unit values, as a measure of prices has been at times controversial. See W. Sawyer & R. Sprinkle, Communication the demand for imports and exports in Japan: a survey. Journal of the Japanese and International Economies 11, 247–259, 1997. p. 248.

Table 1 The result of regression analysis for the export function

$$Log\,(X)=\varepsilon Y^{*}+\eta log\,(P/P^{*})+\lambda\nu logk \quad (1)$$

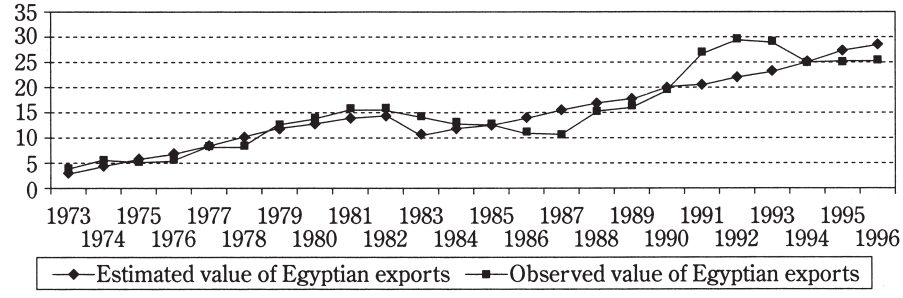
The variables	Constant (C)		Price elasticity (η)		Quality Elasticity of export & quality elasticity of cumulative output ($\lambda\nu$)		Income elasticity of export (ε)	
	Japan	Egypt	Japan	Egypt	Japan	Egypt	Japan	Egypt
Estimated coefficients	−8.02	−4.396	−0.72	−0.547	0.075	+0.387	2.15	+0.619
Standard error	2.250	3.734	0.163	0.630	0.097	0.0813	0.09	0.556
T-Statistic	−3.56	−1.177	−4.41	−0.868	0.77	4.769*	4.73	1.11
Parameters	Japan				Egypt			
R^2 Adjusted R^2	0.97 0.96				0.85 0.87			
F-Statistic, D-W Statistic	322 0.58				45.25 0.66			

**=1% Significant, *=5% Significant

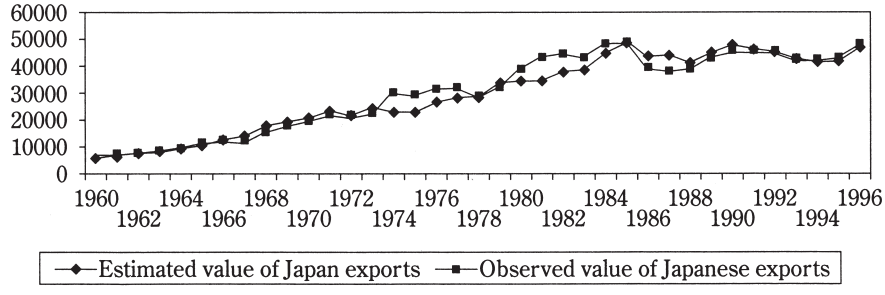
case of Egyptian economy this mechanism is very weak and therefore the performance of economic growth is trended at an insufficient level to lift the economy away from the vacuum and vicious circles.

The export quality elasticity and the quality elasticity for cumulative out put also carries the expected positive sign in both economies, (0.075) in the case of the Japanese economy and (+0.387) in the case of the Egyptian economy. The sign is significantly different from zero (at the usual 5% level) in the case of Egypt however it is not strongly different from (0) in the case of the Japanese economy. That means improving the quality of Egypt export will increase the volume of total exports. By contrast to Japan's case had already reached to the nearest point of the quality's ceiling. On the other hand there is still a huge effort to be done regarding the quality of exports in the case of the Egyptian economy to improve the export's achievements in the long run. On the other side of the currency we can say that there is a big chance in the Egyptian case to improve the volume of exports by changing the levels of the production system and the quality control. In contrast to the previous elastic ties, the estimated price elasticity in the same equation carries the expected negative sign for also both economies, (−0.72), (−0.54) for Japan and Egypt respectively. The sign is insignificant different from zero (at the usual 5% level) in the case of Egyptian economy. Furthermore the value of the elasticity is too small therefore changes in the relative prices will not improve the total value of export's flow at the present time. Furthermore the negative value of the intercept does not support the value of export when the value of the price, income and quality elasticity of exports changes. However the value of price elasticity and the level of significance (T-Statistic is −4.41) are too sufficient to change the volume of Japanese export at the international market. The coefficients of determination, R2, are estimated for the both cases, it is near (0.87) and the adjusted R-squared is (0.85) for Egypt and (0.97) for R^2, (0.96) for the adjusted R^2 for the Japanese estimation. The estimation of R^2 is a relatively ambiguous result because the explained variables can be helpful in explaining the variation in the volume of exports. The value

Graph 1 Relation Between Estimated and Observed Values of Egyptian Exports



Graph 2 Estimated & Observed Japanese Exports



of (F) statistic is also high in both estimations (322), (45.2) for the Japan and Egypt respectively. While the estimations value of D-W test are not so high however the estimation of the model is rather accurate as can be seen from table 1, Graph 1 and 2.

4-2 Imports Function:

Regression equation (3) was estimated for both economies with using the dummy variables zero value for this period 1973-1982 and then they took the value one for these years, 1983-1996 in the Egyptian economy case. However for the Japanese economy the dummy variables had the zero value for all the period (1960-1996) except these years (1970, 1971, 1983, 1984, 1989,1980) since the dummy variables took the value one. The table 2 below shows the estimated coefficients and summarizes the results.

As can be seen in Table 2. The relative prices elasticity for Egyptian imported goods and services (+0.33) carries the expected positive sign however the value of the elasticity is too small therefore the efforts to change the relatively prices in order to decrease the total value of imports could be useless at the present time. Furthermore it is not significantly different from zero (T-statistic is 0.613 at the usual 5% level). That means the imported goods and services in the Egyptian economy are not from such imports that have been affected by the change in the price. That means also the composition goods of the imported goods and services are from such necessary goods whatever the level of the production side (intermediate or capital goods) or consumption

Table 2 The Result of Regression Analysis for the Imports Function

$$LogM = \alpha \log Q + \beta \log\left(P \Big/ P^*\right) \quad (3)$$

The variables	Constant (C)		Price elasticity (β)		Income Elasticity of Imports (α)		Coefficient of Dummy Variable	
	Japan	Egypt	Japan	Egypt	Japan	Egypt	Japan	Egypt
Estimated coefficients	−6.70	−2.059	1.00	0.33	1.33	+1.26	.02	−0.34
Standard error	1.45	0.63	0.26	0.53	0.11	0.17	0.08	0.16
T-Statistic	−4.66	−3.24	3.84	0.61	11.9	7.28	0.24	−2.12
	Japan				Egypt			
R^2 Adjusted R^2	0.92 0.91				0.87 0.85			
F-Statistic, D-W Statist.	131.55 0.55				45.6 1.14			

**=1% Significant, *=5% Significant

side (long-term consumer goods).

By contrast the relative prices elasticity for Japanese imported goods and services (+1.00) carries the expected positive sign. Furthermore the value of the elasticity is quite big enough therefore the price mechanism to control the size and structure change of the Japanese imports from goods and service will be working well at the present time. Furthermore it is significantly different from zero (T-statistic is (3.84) at the usual 5% level). That means on the one hand the imported goods and services in the Egyptian economy are from such goods that have been effecting by the change in the price. On the other hand it means the bulk of the composition goods that are imported are not from such necessary goods whatever at the level of the production side (intermediate or capital goods) or consumption side (long-term consumer goods).

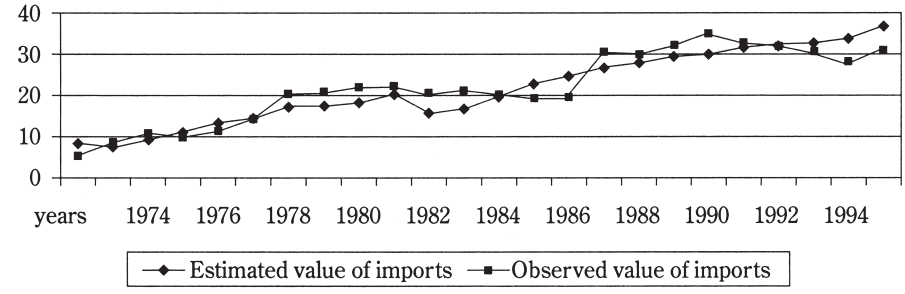
The estimated income elasticity in the import demand equation for both economies has also the expected positive sign (+1.269), (1.33) for the Egyptian and Japanese economies and they are significantly different from zero (T-statistics is 7.288) in case of Egypt and (T-statistics is 11.9 8) for the Japanese estimation. These imply a fairly large response of imports to change in the Egyptian and Japanese GDP. In the other wards, the composition of the Egyptian and Japanese import goods and services are from such types which have a strong demand in the domestic market as a result of necessary goods that are crucial for the development process in the case of the Egyptian economy. On the other hand as a result of these two factors in the case of Japan:

- Necessary goods and services constitute the bulk of total Japanese imports, such as oil and other energy resources. Further more this includes the import of raw materials such as iron, phosphate and other mineral items.
- The highest level of prices for domestic goods and services in Japan.

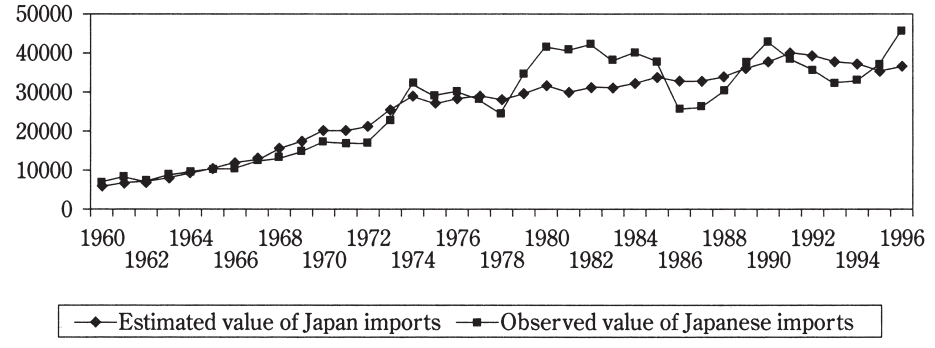
The coefficient of the dummy variables is significantly different from zero (T-statistics is −2.12) in the case of the Egyptian economy and it carries negative sign (−0.34). The external shocks here also have negative impacts on the imports but they are still not as strong as the case of the export by contrast to Japanese case. The values of dummy variables are too small. Further more, they are not significant.

The coefficient of determination, R^2, is estimated for both economies, it is near (0. 87) and the adjusted R-squared is (0.85) in the Egyptian economy. However it still larger in case of Japan (0.92) for R^2 and (0.91) for Adjusted R^2 .It seems to be a relatively ambiguous result because the explained variables can be helpful in explaining the variation in the volume of imports. The value of (F) statistic is also high (45) in the case of Egypt and (131) in the case of Japan while the value of D-W test is not so high. However the estimation of the model is rather fine as can be seen here from Table 1 and the graph below. These good results pay our attention to the important role of the independent variables in explaining the changes in the Egypt and Japan's imported goods and services. The value of D-W test is rather high and the estimation of the model is also better as can be seen here from previous Table 2, Graph 3 and 4 below.

Graph 3 Relation Between Estimated and Observed Values of Egyption Imports



Graph 4 Observed and Estimated Japanese Imported values



4-3 Wages Function:

Regression equation (4) was estimated for both economies with using the dummy variable by the value zero for the period since 1973 up to 1982 and then it took the value one for the rest of the period, 1983 up 1996 in the Egyptian economy and they took the same values that had been used in the previous equations in the Japanese case. The Table 3 summarizes the results.

As can be seen in Table 3 below the coefficient μ (growth of the nominal wage) on

Table 3 The result of regression analysis for the wages function

The Variables	Coefficient (μ)		Coefficient of Dummy Variables	
	Japan	Egypt	Japan	Egypt
Estimated Coefficients	1.43	+1.55	0.035	−0.058
Standard Error	0.047	0.24	0.011	0.92
T-Statistic	30	6.3	3.1	6.3
	Japan		Egypt	
R^2 Adjusted R^2	0.93 0.92		0.47 0.45	
F-Statistic, D-W Statistc	472 2		4.3 1.09	

the equation (4) carries the expected positive sign (+1.55) and it is significantly different from zero (T-statistics is 6.32) for the Egyptian economy. For the Japanese estimation the result is not so much different from the result of the Egyptian estimation. The coefficient μ also carries the expected positive sign and it is significantly different from zero (T-statistic is 30). The only difference between the two cases is that the value of dummy variables in the case of Egyptian economy carries the negative sign. They indicate the negative impact of the external shock on the domestic wages and salaries. By contrast to the Japanese case the value of dummy variables took the positive sign. Further more the value of the μ coefficient in the Egyptian case is rather larger than the value of the same coefficient in the case of Japan. Even after considering the values and the sign of the dummy variables in both equations the value of μ coefficient in the Egyptian case is still larger than the value of the Japanese case. Although this results are indicating to a positive and right relation between the productivity and the nominal wages in the Egyptian and Japanese economy, even that, it still includes something misunderstood. How did the real earning in the case of Egyptian economy become larger than the case of Japanese estimation? The possible reason for this contradiction is that Japanese's economy allocates higher percentage from the national income to reinvestments.

4-4 Productivity Function:

Regression equation (7) was estimated by using the dummy variables of zero value for the period 1973-1982, and then it took the value one for the rest period, 1983-1996. However for the Japanese economy the dummy variables had the zero value for all the period (1960-1996) except these years (1970, 1971, 1983, 1984, 1989,1980) since the dummy variables took the value one. The table 4 below shows the estimated coefficients for Japan and Egypt's economies and summarizes the results.

As can be seen in Table 4. The intercept of the equation (autonomous trend of the technical progress "n") carries the expected positive sign (0.034) and it is strong significantly different from zero (T-statistics is 2.76) in the case of Egypt. In the case of Japan it is (0.042) and also is significantly different from zero (T-statistics is 2.23). However the value of the intercept in the case of Egypt is too small especially when we added the negative value of the dummy variables (−0.039) therefore the effect of the technologi-

Table 4 The Result of Regression Analysis for the Productivity Function

The Variables	Constant (n)		Kaldor-Verdoorn Coefficient (l)		Coefficient of Dummy Variable	
	Japan	Egypt	Japan	Egypt	Japan	Egypt
Estimated Coefficients	0.042	0.034	0.54	−0.33	0.041	−0.039
Standard error	0.018	0.012	0.23	0.26	0.024	0.01
T-Statistic	2.23	2.76	2.73	−1.3	1.78	−3.6
	Japan		Egypt			
R^2 Adjusted R^2	0.15 0.10		0.39 0.33			
F-Statistic, D-W Statist.	3 1.09		6.5 2.1			

cal change on the productivity is not fairly large. On the other hand it implies that the trend of the technological progress is fairly slow. The estimated dummy variable for productivity equation is negative as we said before and it is strong significantly different from zero (T-statistics is −3.61). This means also that the external shocks have negative impacts on the productivity achievements and the trend of technological change since 1983 is declining comparing with the level before.

By contrast the intercept of the same equation (autonomous trend of the technical progress "n") carries the expected positive sign (0.042) and it is significantly different from zero (T-statistics is 2.23) in the case of Japan and also is significantly different from zero (T-statistics is 2.23). Further more the value of the intercept in the case of Japan is quite big enough especially when we take into account for the positive value of the dummy variables (+0.041) therefore the effect of the technological change on the productivity in case of Japan is fairly large. On the other hand it implies that the trend of the technological progress is fairly high. Addition to that the estimated dummy variable for productivity equation is positive as we said before and it is strong significantly different from zero (T-statistics is −3.61). This means also that the external shocks have no negative impacts on the productivity achievements and the trend of technological change since 1960 is rather improving or at least stable in the trend comparing with the Egyptian case.

The estimator also shows K-V "l" coefficient carries the expected positive value (0.54) in the case of the Japanese economy. Furthermore it is significantly different from zero (T-statistic is −2.73) by contrast to the Egyptian estimation, since the k-v (l) carried unexpected negative sign (-0.34)[5]. Furthermore it is not significantly different from zero (T-statistic is −1.3). There are many factors behind these poor results for the estimation of the Egyptian economy:

1-The data here is related to the macro economy however the K-V relation is supposed to be more fitted in the case of industrial production[6].

2-The Egyptian economy is not specializing in the sectors that appear to satisfy

[5]Sometimes unexpected sign does not consider as a credible result. See, M. Goldstein & M. Khan. The supply and demand for exports a simultaneous approach, The Review of Economics and Statistics. February 1978. p. 280.

[6]a. Vaglio, Static and dynamic economies of scale in export-led growth. Economic notes, 2, 1988.p. 62.

the dynamic specialization criteria (high-income elasticity and considerable scope for technical progress).

3-The learning effects (special learning by doing) related to the production process do not play an important role in improving the level of productivity.

4-The Egyptian production system is not at the level of the scale that can maximize the returns of production. In the other wards, dynamic economics of scale are not at the level that can strengthen the level of productivity.

4-5 The properties of the growth:

The previous parameters that have been estimated in the previous sections used here also to identify the properties of the economic growth for the Egyptian and Japanese economies. In the other words, those parameters will be used to determine the characters that Egyptian and Japanese economies had in the last twenty-four and thirty-six years in thecase of Egyptian and Japanese economies respectively. The estimator used the equation (13) and (14) to calculate the value of the parameters C and B and the result summarized at the table below.

4-5-1 The properties of the growth in the Japanese economy:

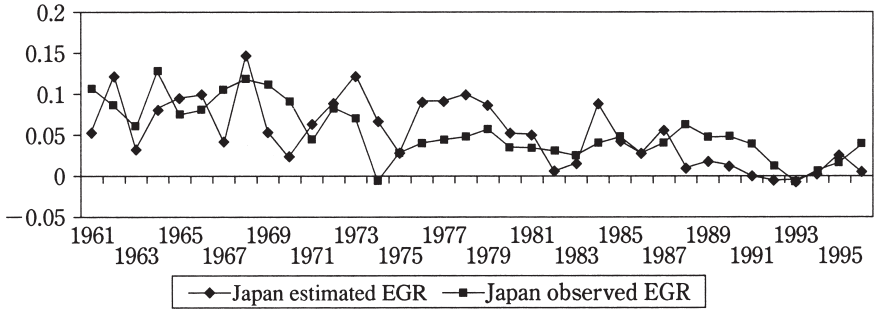
As we can see from Table 5 and Graph 5, the value of C during the period 1960 to 1996 was negative, however, the value of B was positive except for the years (1991-1993). That means Japanese economic growth during that period of time was stable, since C & B met specification of Case 1 ($C<0$ & $B>0$).

- Japanese economic growth during the estimation period satisfied the necessary conditions of the case 1, as follow: First; growth in the rest of the world and income elasticity of Japanese exports (income elasticity of export estimated as 2.15) was sufficiently high. Second, the endogenous mechanisms of technical progress (Kaldor-Verdorn Law) and accumulation of experience (quality of exports) was also positive (0.075). From an economic standpoint this result is very interesting because it shows the economic growth of the Japanese economy was accompanied by an asymptotically stable balance growth rate. That means the stability of the economy during the research period was the result of steady positive structure change that induced the economic process to create, sustain and improve parameters of the economy.
- In the other hand, it was unstable during the period of time from 1991 up 1993 as it was evidenced by the values of C & B that toke the characteristics of Case 4 ($C<0$ & $B<0$). The origin equilibrium in these three years is negative and therefore is not significant from the economic standpoint. It corresponded to very weak endogenous mechanisms of technical change and accumulation of experience, accompanied by parameters expressing very weak exogenous growth in the rest of the world.
- In those cases, the combination of endogenous and exogenous mechanisms for stability and growth is open and unlimited. The above conditions and characteristics seem to more realistically represent the situation for most economies in developing countries. In the case of Japan, we should consider a few points. The case was not over an extended period but just period of three years out of thirty-six years. The relatively international economic growth (GDP for the main trader group with Japan) had lower economic growth during this period of time.

Table 5 The Value of Parameters C &B in Japanese Economy

Years	C	B
1961	−0.95911	0.020541
1962	−0.95911	0.10207
1963	−0.95911	0.023915
1964	−0.95911	0.071315
1965	−0.95911	0.087673
1966	−0.95911	0.089566
1967	−0.95911	0.036051
1968	−0.95911	0.14009
1969	−0.95911	0.048636
1970	−0.95911	0.018502
1971	−0.95911	0.05507
1972	−0.95911	0.082664
1973	−0.95911	0.11615
1974	−0.95911	0.065308
1975	−0.95911	0.023037
1976	−0.95911	0.089209
1977	−0.95911	0.088345
1978	−0.95911	0.096143
1979	−0.95911	0.085695
1980	−0.95911	0.050781
1981	−0.95911	0.04893
1982	−0.95911	0.0094655
1983	−0.95911	0.013341
1984	−0.95911	0.086245
1985	−0.95911	0.037016
1986	−0.95911	0.029561
1987	−0.95911	0.054071
1988	−0.95911	0.0097737
1989	−0.95911	0.015997
1990	−0.95911	0.012454
1991	−0.95911	−0.006643
1992	−0.95911	−0.0059467
1993	−0.95911	−0.0059929
1994	−0.95911	0.0023523
1995	−0.95911	0.025584
1996	−0.95911	0.0085944

Graph 5 Observed and Estimated Japan Economic Growth Rate



4-5-2 Properties of the growth in Egyptian economy:

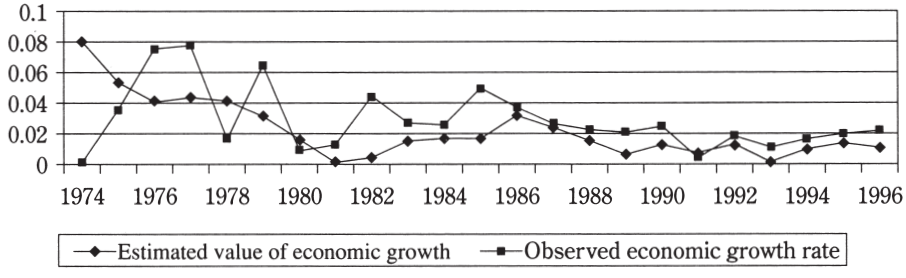
As we can see from the Table 6 and Graph 6 below, the value of C during the period from 1973 up to 1996 was negative however the value of B was in some year' s positive and on the other negative. That means Egypt's economic growth during that period of time was in some years (from year 1977 up 1979, 1984 up 1988, 1990, 1992 and 1994 until 1996) stable since C & B had qualified the specification of case 1 ($C<0$ & $B>0$). In the other hand it was unstable at these periods of time (from year 1974 up 1976, 1980 up 1983, 1989,1991, 1993) since the value of C & B took the characteristics of the case 4 ($C<0$ & $B<0$). The quick comparison between the instability cases in the Table 5 with the graph that representative the estimated economic growth, below; we may classify the instability in the Egyptian economy to two kinds:

- The first we may call it "a boom of instability". This case took the period from year 1974 up to 1976 as a result of a sudden raised in the oil prices and also as a result of high level of other resources inflow to the economy at that time. As it clear from the Graph 6.
- The second is "a recession of instability". These types of instability took place during the period (from 1980 throgh1983 then for years 1989, 1991,1993) and are accompanied with several reasons; declining in the biggest resources for the foreign currency, the Oil, Suez Canal, tourism sector and the worker's remittance. The change in the political system from the president Saddat to president Mubarak accompanied with some kind of social tension. Finally the decline on the other foreign resources such as foreign direct investments.
- Egyptian economy had faced a very weak endogenous mechanism of technical change "n" and also the same thing for accumulation of experience (l). See Table 3. Furthermore it faced a very weak exogenous growth in the rest of the world "ε". See Table 5.
- That means the stability of the economy during the research period had depended on the high level of the resources inflow and not as a result of the steady positive structural change that induce to improve the economic parameters of the economy. This result explains the fluctuation on the growth for the Egyptian economy since 1974 up 1996.

Table 6 The Value of Parameters C & B in Egyptian Economy

Year	C	B
1974	−0.69993	−0.0098659
1975	−0.69993	−0.0022151
1976	−0.69993	−0.0023868
1977	−0.69993	0.0048887
1978	−0.69993	0.012546
1979	−0.69993	0.0053924
1980	−0.69993	−0.0054933
1981	−0.69993	−0.015927
1982	−0.69993	−0.013271
1983	−0.69993	−0.00056081
1984	−0.69993	0.0021417
1985	−0.69993	0.0016058
1986	−0.69993	0.017168
1987	−0.69993	0.01109
1988	−0.69993	0.0035222
1989	−0.69993	−0.0047886
1990	−0.69993	0.0017025
1991	−0.69993	−0.0033357
1992	−0.69993	0.0033816
1993	−0.69993	−0.0074868
1994	−0.69993	0.0020354
1995	−0.69993	0.0067976
1996	−0.69993	0.0033571

Graph 6 Relation Between Estimated and Observed Values of Egyption Economic Growth



5. Conclusion:

In This paper we have examined the properties of a dynamic equilibrium model focused on sectoral specialization and dynamic competitiveness on the international trade. The factors of competitiveness and growth broken-down, which included three parameters on the export side, two parameters on the import side and two parameters

on the productivity side. Furthermore the relation between growth rate of the productivity and the wages index was examined.

5-1 Regarding to Japanese Economy:

Parameters estimated have been obtained for exports function, imports function, productivity function and Wages function and the following points may be singled out: Results appear to be consistent with theoretical expectations about the importance of 'price' and 'non-price' determinants of trade performance (national competitiveness) and long run economic growth. Export quality elasticity and quality elasticity for cumulative output carry the expected positive sign and are significantly different from zero. The elasticity of the autonomous trend of technical progress carries the expected positive sign and it is significantly different from zero. The clear interpretation of these results is that export quality elasticity and quality elasticity for cumulative output and the autonomous trend of technical progress are crucial parameters for both national competitiveness and long run economic growth. In order to improve the economy's long-term competitiveness; Japan's policymakers created an environment which could improve the national system of innovation functions accompanying an increase in the value of the learning parameters.

The source of the increasing volume of Japanese exports and growth in the international market came from the rapid change in the structure of Japanese production and the composition of Japanese exports paralleling the rapid structural change in the international market. The second assisting factor was the rapid change in the prices of Japanese exports. The improving quality and the quality elasticity of cumulative output did not play the expected role in stimulating the size and the value of Japan' s exports during the first period. On the other hand the role of these factors changed in the second period. While price elasticity also took the expected negative sign it seemed to have a smaller role than that it had during the previous period. Secondly, compared to the previous period, the relation of the signs and the values of both the quality of export and the quality elasticity of commutative output to the increase in the volume of exports changed dramatically. Finally, in contrast, the income elasticity of export had a weak response in this period in respect to the volume of exports. Our point here is, while, the rapid change in the structure of Japanese production and the composition of the Japanese exports paralleled the rapid structural change in the international market, the rapid change in the prices of the Japanese exports, stimulated the size and the value of Japan's exports to the international market in the first period. However, factors such as improving the quality of production, cumulative experience through learning by doing and the flexibility of price elasticity were the crucial factors in increasing the amount and the value of Japanese exports in the second period.

5-2 Regarding to Egyptian Economy:

The Analysis indicates to important result, the instability of the economic growth in the Egyptian economy on the long run is partialy due to unchanged in the specialization structural of the economy since near of 30 years ago. Estimated world's income elasticity for the Egyptian exports demand had the expected positive sign (+0.619) but it was not significantly different from zero. This implies a very weak response of exports to changes in the relatively GDP for the main trader group with the Egypt's

economy. This means also the composition of the Egyptian exports; goods and service are not from such types, which have a strong demand in the international market.

The export quality elasticity and the quality elasticity for cumulative output carries the expected positive sign and it is significantly different from zero. The elasticity of autonomous trend of the technical progress carried the expected positive sign and it is strong significantly different from zero. The clear interpretation of these results is that export quality elasticity and the quality elasticity for cumulative output and autonomous trend of the technical progress are crucial parameters for both the national competitiveness and long run economic growth.

In order to improve the economy's long-term competitiveness, policymakers have to create the environment, which can improve the national system of innovation functions. This has to be accompanied with an increase in the value of the learning parameters when building such types of the large-scale industries.

5-3 Some Considerations:

Although the model had good results in regard to Japanese and Egyptian economies at the macro levels, still there are some considerations regarding its assumptions. The model supposed that an economy is completely open and the competition is completely perfect, however that is not always true, since tariffs are still valid to some degree in the global economies. In addition the model supposed the economy is working under the dynamic equilibrium of the balance of payments. Accordingly it suggested that the growth rate of exports would be equal to the growth rate of imports and that may be valid in the long run however, in the short-term some considerations are still needed.

References:

Amable, Bruno (1993). National effects of learning international specialization and growth paths, in Technology and the Wealth of Nations, Dominique Foray and Christopher Freeman (eds.), New York: Martin's Press, pp. 173-186.

Andrea Boltho. Japan An Economic Survey 1953-1973, Oxford university press, 1975.

Armstrong P., Harrison A. Glyn, J.. Capitalism since 1945, Cambridge, Basil Blackwell, 1991.

Denison F. Edward & William Chung. How Japan's Economy Grew So Fast. The Brookings Institution, Washington, D.C., 1976.

dixon R. and Thirlwall A.. A model of regional growth-rate differences on Kaldorian lines. Oxford Economic papers, Volume 27 July 1975.

Gainer Kevin. The Japanese challenge: Japanese technology and industrial strategy. Business Communications Co.,Inc. U.S.A.

Grossman G. M.. Explaining Japan's Innovation and Trade: Amodel of quality Competition and Dynamic Comparative advantage, monetary and economic Studies, Vol. 8, No. 2, bank of Japan, September 1990.

Gustafson P., Hansson P. and Lundberg L.. Technology, Resource Endowments and International Competitiveness. Trade Union Institute for Economic Research (FIEF) and Stockholm School of Economics. 1996.

Komiya Ryutaro. The Japanese Economy: Trade, Industry, and Government. University of Tokyo Press.

MITI. White Paper 1998. Ministry of International Trade and Industry, Tokyo Japan. 1999.

Perroux Francois, A New Concept of Development. Paris, UNESCO, 1983

Stone P. B.. Japan Surges Ahead; the story of an Economic Miracle. Frederick A. Praeger,

Publishers. New York and Washington. 1969.
————Praeger, Publishers. New York and Washington. 1969.
Thirlwall A. P, The balance of payments constraint as an explanation of international growth rate differences. Banca nazionale del lavoro, Quarterly review, volume XXX11, 1979
Tyson D'Andrea Laura. Who's Bashing Whom: Trade Conflict in high-Technology Industries, Washington: Institute for International Economies, 1992.
U.S. Dep. Of Labor, Japan Statistics Bureau, Japan Productivity Center, from, Gainer, The Japanese challenge.
Vaglio A., Static and dynamic economies of scale in export-led growth. Economic Notes, 2, 1988.
Vogel F. Ezra. Japan As Number One Revisited. Institute of Southeast Asian Studies, Singapore, 1986.