

AN ECONOMETRIC PROJECTION OF PENANG'S GROSS REGIONAL PRODUCT, 2001-2005

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Introduction: the state's economy

Many, if not most, people know very little about how estimates of state *gross domestic product* or state GDP figures are produced in Malaysia. A more correct term to use for the total production at the state level is the *gross regional product* or GRP. Statistics on state economies are not widely or often reported. In fact the only official source that they are publicly available are in the five-year plans and their mid-term reviews. Since the *Third Malaysia Plan, 1976-1980* up until the *Sixth Malaysia Plan, 1991-1995*, state GRP figures were reported according to broad production sectors: agriculture, mining, manufacturing, utilities, various services and government. Since then, however, the figures reported have become scantier as only the totals are reported without breakdowns into sectors. Depending only on five-year plan figures creates obvious difficulties given the long time that elapses in between publications. There are also uncertainties over accuracy, because discrepancies could be found in the figures for the same years in two different five-year plans resulting from updates and revisions.

The earliest GRP figures reported by states were for 1963 found in the *Mid-Term Review of the Second Malaysia Plan*. These and subsequent figures published in the *Third Malaysia Plan 1976-1980* were estimated according to procedures developed by Rogalsky (1974). Estimates of state GRPs for the *Fourth Malaysia Plan 1981-1985* were made according to improvements recommended by Turgouse (1980). Both methods do not actually attempt to estimate the GRP for Penang and the other states, but merely established systematic ways to distribute the annual output figures, found in national gdp statistics for the various economic sectors, to the individual states in the country. In other words these were techniques for apportioning GDP across the different states. I have not been able to establish whether the Turgouse method continues to be in use today in the more recent five-year plans or that this method have been abandoned altogether. Considering that less comprehensive figures are currently reported it is unlikely that new developments in the estimation techniques to produce GRP numbers in Malaysia have taken place since.

Econometric forecasting

I have never seen econometric forecasts made for Penang. The reason they cannot be found is because the data needed for estimating the parameters contained in forecasting models are unavailable. Despite such a critical shortcoming, however, an attempt is nevertheless made here to perform an econometric forecast because of much curiosity and concern over the economic recession that is before us today. The economy in Malaysia made a downturn in 1997 for which the government responded by stabilising the ringgit via capital controls so that the export surplus that has been traditionally

enjoyed could be exploited to push the economy back up. The strategy worked because the world's economy, outside of East Asia, was booming and the expected recovery occurred as planned.

Unfortunately through the years of recovery, the mechanics that brought about the current recession was already in motion. As a result, many if not most of the world's economy are experiencing little or no growth in nominal GDP marked by deflationary price trends, excess capacity and inventories, low consumer as well as producer confidence, little investments despite low interest rates and indications of business failures such as falling sales, bankruptcies and the increase of bad cheque offences.

Although Malaysia's government has been proactive via a variety of financial regulatory measures, the recent ones announced in the Finance Minister's budget speech in late October, most people are aware that such measures could only have effects on the domestic economy. Given that the current recession is a worldwide phenomenon that is also being felt in Malaysia by way of falling exports, what connections are there between economic growth at home and the economic performance outside the country are of major concern and interest. In the process of developing an econometric model, therefore, many different factors were examined.¹ Using data between the first quarter of 1994 and the last quarter of 2000, variables in the following table were found to be statistically significant explanatory variables that could account for Penang's GRP growth.²

It could be seen that these few variables could explain as much as 70% of the total variation suggesting that much of Penang's GRP is dependent on Malaysia's trade balance and economic growth in Japan and the U.S.³ Similar attempts to link Penang's grp against other variables such as Malaysia's industrial production index, Malaysia's gdp growth rate, consumer price index, the country's foreign reserves or prevailing interest rates did not turn out to be significant according to standard tests using t-statistics or confidence level (probability value).

¹ Forecasts made with single equations are more easily estimated and hence produce better accuracies but they do not possess the policy simulation capabilities of simultaneous equation models that contain feedback links among the included variables. The concern here is mainly making predictions rather than experimenting with alternative policies and thus single equations were used here.

² Based on the results given on the table, the estimated model used for forecasting is $Pggdp_t = -3.01 Usdp_{t-3} + 1.29 Jpngdp_{t-1} - 1.14 Trade_{t-1} + 1.87 Trade_{t-2} + 0.95 (\rho \epsilon_{t-1} + u_t) - 1.13 (\epsilon_t - \lambda \epsilon_{t-1}) + \epsilon_t$

³ In this list of the explanatory variables, the trade balance numbers are cumulated twelve-month balances in March, June, September and December. U.S. gdp and Japanese gdp figures are growth rate figures. The data used are obtained from *The Economists*. The data source of the dependent variable, Penang grp, will be explained in a separate section below.

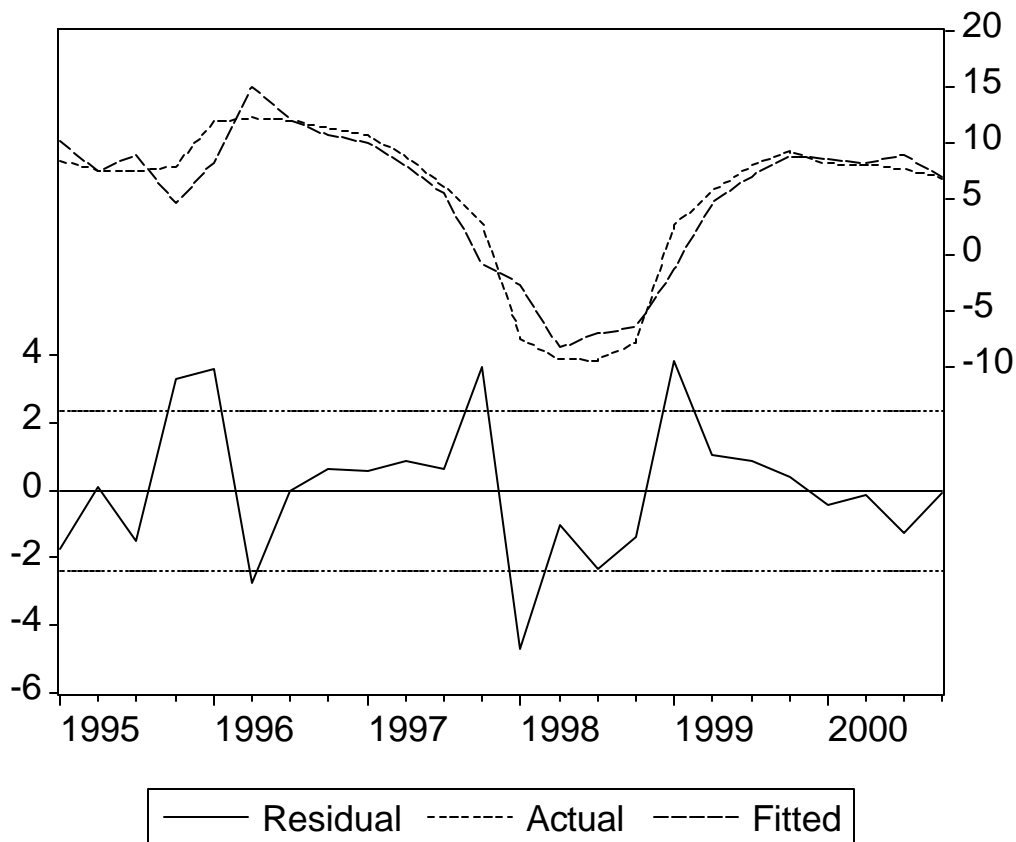
**Results from Econometric Estimation
before and after correcting for positive serial correlation**

Explanatory variable	Estimated coefficient value before correction	t-statistics	Confidence level before correction	Estimated coefficient value after correction	t-statistics	Confidence level after correction
U.S. GDP growth (3 lags)	1.0278	3.51	0.21%	-3.0267	-4.01	0.08%
Japan's GDP growth (1 lag)	2.5713	6.58	0.00%	1.2858	3.74	0.15%
Malaysia's Trade Balance (1 lag)	-0.7710	-1.61	12.25%	-1.1418	-2.38	2.87%
Malaysia's Trade Balance (2 lags)	0.9000	1.83	8.11%	1.8697	3.61	0.20%
Autoregressive term AR(1)	----	----	----	0.9491	49.20	0.00%
Moving avg. term MA(1)	----	----	----	-1.1336	-3.62	.20%
Durbin Watson statistics			1.184			2.09
R-Square (% explained)			70.00%			90.46%

The confidence level is the probability that we would mistakenly reject the significance of the explanatory variable (known statistically as a type 1 error). Often a confidence level of 5% or 10% are used in which case based on the numbers in the above table, the significance of the trade variables might be doubtful. Nevertheless the Durbin-Watson statistics of 1.184 also shows likely dangers of positive serial correlation.⁴ Fortunately this was easily corrected by introducing autoregressive and moving-average terms both of the first order into the model specification. As a result, the R-square was able to rise to 90% and the Durbin-Watson statistics to 208. What the serial correlation correction does is it accounts for the dynamic structure of the Penang GRP series. Penang's growth rate goes up and down but it appears that there is a characteristic structure or pattern to their movements. The autoregressive term analyses the difference each time the growth rate changes and models it. The moving average term analyses the deviation from the mean growth rate each time the growth rate changes and models it. In other words, our fitted model not only links Penang's GRP growth rate with the various explanatory variables but also with detected patterns in its past movements as well.

⁴ The Durbin-Watson statistics should have a value close to 2 to be absent of serial correlation.

Based on t-statistics, confidence level, R-square, and Durbin-Watson statistics the model may be considered to fit well. The following figure shows the pattern for Penang's GRP growth rate generated by the fitted model compared side by side with the actual GRP growth numbers using past data. As could be observed, somewhat similar cyclical patterns could be replicated showing the downturn from 1996 through the East Asian financial crisis and the recovery following capital controls and then tapering off again during the beginnings of the current recession. This model was then used to forecast quarterly GRP growth rate changes between the first quarter of 2001 and the last quarter of 2005.



Penang's GRP growth rate, actual and fitted

The economic outlook with which to frame a forecast

Making economic forecasts based on explanatory variables requires the input of the data values for these variables. Since all the explanatory variables used in our fitted model have at least one lag we would be able to forecast one period ahead, i.e. the next quarter using actual data values. Beyond that, however, actual data for the various explanatory variables, namely U.S and Japanese gdp rates and Malaysia's trade balance, would not yet be available making it necessary for us to depend on predictions of their outcomes. Forecasting over the next five years would thus require some guesswork about what will

happen to the U.S. and Japanese economy and Malaysia's trade position during this time frame. Some people might thus have the criticism that the forecasts made are actually only as good as forecasts made from yet another set of forecasts and are therefore not very reliable.

It is useful to develop scenarios describing different possible outcomes so that an "if-then" sort of forecasts could be produced. Some knowledge of what other people are saying about economic circumstances during the forthcoming years would thus be necessary to create scenarios for our forecast.

The first thing to consider is whether the world is indeed in recession. The forecast published in the *World Economic Outlook* was prepared prior to September 11. They showed a 2.6% GDP growth for the world for this year and 3.5% for 2002. Generally, a rate lower than 2% to 2.5% worldwide would coincide with periods of recessions. The world has experienced positive growth rates every year since the 1930s. Forecasts made by Morgan Stanley released after September 11 for the world is 1.8% for 2001 and 2.1% for 2002. Such rates would count as a world recession by IMF definitions.

For a world recession to occur, the business cycles of many countries must have matched one another unlike, for instance, the East Asian financial crisis in 1997, which occurred when most of the rest of the world was relatively buoyant. Similarly, the American recession following the Gulf war during the early nineties coincided with economic upswings in Japan and in Europe. However, this time as the economic analysis made in the *Outlook* showed, the current business cycle of the US economy is more synchronized with the rest of the world than past cycles. This is because trade links, the globalisation of investments and real-time transactions in the financial markets worldwide bring different economies closely in tandem with one another. Another explanation for the simultaneous recession is the link between the economy and the equities markets, which have fallen, across the board, in the U.S., Europe, Japan as well as among the East Asian markets that have not recovered since the 1997 crisis. Thankfully, the falls have since eased out and stabilised.

This means that the rest of the world will be more sensitive this time to the current American recession. This would be a second consideration for our forecasting scenario. The American economy began slipping towards the end of last year despite efforts to hold it through interest rate cuts by the Federal Reserve nearly every month since. The federal-fund rate after nine revisions is now at 2.5% down from 6.5% as of the end of 2000 this being the lowest since 1962. The University of Michigan's consumer confidence survey showed that its index at 81.8 was at its lowest in eight years down from 91.5 in September but has since eased out in October to 83.4. Industrial production in the U.S. have had 12 continuous months of decline giving a combined effect of -5.8% loss in output over the same period

The current thinking is American GDP rates for the third and fourth quarters this year would be about -1%, this being lower than the hard landing that was feared when 2001 first rolled in. During the first two quarters of 2002, growth rate is expected to be flat but

the economy is expected to climb quickly to 3%-4% in the last two quarters of 2002. The current American recession is thus expected to be V-shaped, i.e., the economy would hit bottom up and recover quickly instead of a prolonged U-shaped slow down.

The third consideration would be the Japanese economy, which has gone into many years of huge budget deficits caused by massive public-works projects. They were implemented to help revive the economy but despite much fiscal inputs, the economy has not picked up. Meanwhile, the Japanese private sector has also raked up huge corporate debts. The *Tankan* survey on business confidence reported its index down from -16 to -33 in September, this being three continuous quarters of decline. The trade surplus shrank by 37.3% year on year as of August.

Stagnation of the Japanese economy has entered its second decade and at near zero or negative GDP rates there is little avenues left to stimulate the economy. The relatively strong yen has caused exports to continue shrinking and further aggravating the already deflationary trend at home. Wholesale prices, excluding imports, fell 1.1% as of September. Because Japanese interest rates cannot be made to fall, the yen becomes even more attractive when other countries trim their rates in response to the recession. The yen surged following the East Asian crisis towards the tail end of 1997. There was a decline since 2000 but the yen spiked again after September 11. The reason for the strong currency amidst a recession is its huge current account surplus, much of it being invested abroad. Japan's foreign investments are worth more than a quarter of its GDP.

The low rate of nominal gdp growth associated with the current recession is a fourth consideration for our forecast. Interest rates are considered to be high or low depending on how they compare against nominal (i.e., non inflation adjusted) growth in GDP, which should coincide with rates of returns from business investments. If interest rates are higher there would be little incentive to borrow and invest as cost of funds would be more than expected returns. In this respect, the lackluster economy, suggest that even lower interest rates will be needed to beckon expansion. But deflation makes it difficult for authorities to trim interest rates further in the hope to boost investments.

Following the same characteristics as the recession faced in much of the rest of the world, nominal gdp growth rates have also plummeted in Malaysia. This means that the economy is not generating the needed cash flows among businesses not only for production but also for servicing debts. Fortunately, with the peg currency Bank Negara can attempt to push interest rates down further without creating exchange rate instabilities and consequently the ability to conduct foreign trade smoothly. Relative to nominal gdp rates, current interest rates may not be low enough although loan growth targets continue to be pursued by the banking industry in Malaysia. However, falling consumer confidence since the last quarter of 2000 and the declining trend in the production index since the second-quarter of 2000 reveal dismal business conditions. MIER's third quarter 2001 update reported that the business conditions index has slipped 1.4 points from the last quarter to 42.6, i.e., well below the 50-point mark that acts as a threshold figure to indicate a recession. The third quarter index in 2000 was 59.3. The current index figure is the lowest third-quarter figure since 1998. The consumer sentiments index for the third

quarter is 98.7, although up from 96.2 during the second quarter it is a substantial fall from 126 points recorded during the third quarter of 2000. The threshold is 100 points below which marks a recession.

In the past, the government tended to, like Japan, only spend on public works projects. In March 2001, an RM3 billion fiscal package was introduced for construction and infrastructure. Many economists do not think much about the efficacy of such fiscal measures. In this connection, it is conceivable that the government is experimenting with a back up strategy when a further RM4.3 billion package was introduced in September that puts money more directly into the pockets of consumers: training, welfare, rural development. The government also decided to give out a bonus and a pay rise to government servants that make up 11% of the country's workforce. These might generate cash flows within the domestic economy given that several festive seasons: Deepavali, Hari Raya Puasa, Christmas and the Chinese New Year are being sequenced in the months to come. If things work according to plan more spending might somewhat offset the deflationary tendencies. The wishful thinking is for private sector investments to spark off so that a new round of economic momentum and nominal growth can begin.

The forecast scenarios

Making econometric forecasts over an extended time period is generally not a very wise thing to do, because as time progresses changes that cannot be caught by the forecasting model will make such forecasts very uncertain. Nevertheless, there are reasons for making this attempt. First, there is concern over how fast will be the recovery from the current recession take place? Second, what will the growth dynamics after that be like? Third, will quarterly growth dynamics over the next five years bring us anywhere near official forecasts made in the Eighth Malaysia Plan and for the Second Penang Strategic Development Plan or PSDP-II.

The forecast made is dynamic meaning that the forecasted Penang's GRP growth rate for each forward period is used to drive the modeled changes for the following period. Thus forecasting over about twenty quarters into 2005 would be considered a relatively bold venture. Nine scenarios were forecasted based on possible outcomes resulting from external forces. They are as follows:

Scenario 1 to 3

Scenarios 1 through 3 consider a favourable trade balance that would stabilise at US\$16.4 billion recorded as a past twelve month cumulated value in March, June, September and December of each year to reflect the performance during the different quarters. The annual year on year balance as of September 2001 was US\$15.4 and this would climb steadily every quarter to US\$16.4 by December 2003 and hold at that level which is the average annual trade balance since the introduction of the RM3.80 to the dollar peg alongside capital control measures in 1998.

Scenario 4 to 6

Scenarios 4 through 6 consider a less favourable but positive annual trade balance of US\$6.5 billion. This means that the balance would deteriorate further from the US\$15.4 in September 2001 down to US\$6.5 billion by the last quarter of 2003 and then hold that level through to 2005. US\$6.5 billion was the average annual trade balance since the first quarter of 1994 through to September 2001. Thus unlike scenarios 1 to 3, these scenarios incorporate both pre and post 1998 capital control circumstances.

Scenario 7 to 9

Scenarios 7 through 9 consider a zero trade balance situation. The average annual trade balance between 1994 and 1998 was negative US\$0.2 billion. Thus these scenarios reflect trade circumstances prior to capital controls.

Scenarios 1, 4 and 7

These three scenarios consider a recovering and strengthening Japanese economy beyond 2002. The Japanese economy went into negative rates beginning with the first quarter of 2001, down from 2.8% year on year during the last quarter of 2000. As of the second quarter it had fallen to -0.7% from -0.1% during the first quarter. It is widely believed that economic growth would ease down to -0.8% through the last two quarters of 2001 and continue to slide at that rate through 2002. Scenarios 1, 4 and 7 consider a recovery involving a 1% growth in 2003, 2% growth in 2004 and 3% in 2005 which would be at the level just before the beginnings of the current recession before the end of 2000.

Scenarios 2, 5 and 8

These scenarios consider the Japanese economy not to do better than 1% growth beginning with the first quarter of 2003 after sliding at the rate of -0.8% through to the last quarter of 2002.

Scenarios 3, 6 and 9

These scenarios consider the Japanese economy not to do better than 0% growth beginning with the first quarter of 2003 after sliding at the rate of -0.8% through to the last quarter of 2002.

The nine scenarios thus combined the effects of Malaysia's trade balance and the performance of the Japanese economy over the next five years. In all nine scenarios, the American economy began its slide from 6% year on year growth during the second quarter of 2000 down to only 1.2% by the second quarter of 2001. A rate close to 1% would amount to the hard landing that was feared around the end of 2000. However, it turned out that the situation would be much worse especially with the September 11 event. The current thinking is that growth in the U.S. economy would be about -1% for the last two quarters and stay flat for the first two quarters of 2002 and then surge forward to 3% and then 4% in the last two quarters of 2002. In all nine scenarios, we consider an average of 3% to 4% growth from 2003 through 2005 in the U.S. economy. In other words, the Americans are expecting a very short recession that is although deep but quickly recovering. V-shaped that is.

The forecasts have a Theil's inequality coefficient of 69.48%.⁵ This means that although they are far from perfect, in which case the coefficient value would have been zero, they are still better than a naïve forecast of no change, i.e., had the coefficient value been equal to one. Detailed numbers for the nine scenarios are given as appendices alongside charts showing cyclical movements between 2001 and 2005.

It appears that the model showed that the current recession is milder than that which is perceived, although the year on year growth has slumped from over 8% in the first two quarters of 2000 down to about 2% in the second quarter of 2001. What is more astonishing is that the model also shows that recovery has already taken place and strong growth would be expected right through to the end of 2002. There are two possible explanations. First, the current year on year trade-balance during each quarter, although it has been systematically falling, remains very high at US\$15.4 billion as of September 2001. Second, the dynamics of the business cycle effects on Penang's GRP growth involved an up-trend into 1995 followed by a downturn into 1998 and then another upswing into 2000 followed by the current recession. Our forecasting model captures such history and statistically these dynamics are driving part of the forecasts, which expects the upturn to occur according to the same cyclical amplitudes that was observed in the past. The same dynamics is also predicting the next downturn as we approach the end of 2003 that showed very dismal growth numbers but because the previous upturn was very strong they do not necessarily mean very poor GRP figures in money terms. However, another upswing would begin again in 2004.

To gauge how concern should we be about this numbers we might compare these forecasts with official announcements by both the Eighth Malaysia Plan that was announced during the end of the first quarter of 2001 and the PSDP-II that have only recently appeared. As shown in the following table, forecasts under the first two scenarios surpassed the Eight Malaysia Plan targets and forecasts for the first three scenarios surpassed the PSDP-II forecast. These three scenarios involved Malaysia's annual trade balance to be stable at the post 1998 average. The following three scenarios involved a trade balance based on the average between 1994 and 2000, while the last three scenarios were based on zero trade balance.

2005 Penang GRP Forecasts (RM billion) and Average Annual Growth Rate

Scen1	Scen2	8thPlan	Scen3	PSDP2	Scen4	Scen5	Scen6	Scen7	Scen8	Scen9
26.19	25.38	24.90	24.50	24.30	21.92	21.23	20.49	20.17	19.97	19.52
8.63	7.94	7.50	7.19	7.01	4.83	4.16	3.42	3.10	2.90	2.43

Shortcomings in the Forecast

Although, based on various test statistics, the estimated model was well fitted and the forecasts performing reasonably according to Theil's inequality coefficient, there is a

⁵ Theil's inequality coefficient is given by $U = \left(\frac{\sum (FRC_i - ARC_i)^2}{\sum ARC_i^2} \right)^{1/2}$ where FRC is the forecasted relative change and ARC the actual relative change. A perfect forecast will give a value of U=0. If U=1, the forecast is no better than if we were to predict that there is no change, i.e. a naïve forecast. If U > 1, the forecast would be considered to be worse than the naïve forecast of no change.

major shortcoming that remains to be explained. Making statistical estimations require comparisons between predicted numbers from the fitted model and their actual numbers from historical records. In the case of this exercise, however, historical records for Penang's quarterly GRP growth rates do not at all exist. Nobody collects the data. The only published official GRP numbers for Penang and their growth rates that could be found are in the five-year plans that were only produced once every few years. The time interval of the reported GRP numbers is usually five years. This large space of time lag between adjacent observations will not allow business cycles to be picked up. Furthermore at five year intervals there will be too few observations to facilitate estimation.

It became a necessity therefore in this exercise to produce a quarterly GRP growth series for Penang to represent the historical record from which to estimate the forecasting model. Basically what had to be done was to break down official five year interval data for Penang's GRP into annual data and then further break down the annual data into a quarterly series. The annual GRP series for Penang, which were broken down from five-year plan official figures, was made available by SERI. Although the numbers from these series are not truly actual data, they are nevertheless officially announced and used by the state government and the state economic planning unit. This annual series was then transformed using a set of distributional weights imposed on the following, the current and the preceding annual GRP numbers to produce the quarterly series for each current year.⁶ As we begin our estimation from the first quarter of 1994 through to the last quarter of 2000, there were only 28 observations upon which the model is based, this being marginally short of the minimum number of 30 observations required to produce a reasonable normal distribution.

Conclusions

Economists have had a poor record regardless of where they come from or when they did their forecasts. Many people do not think much of the forecasts made because they realise that the world continues to evolve and change. There is thus no reason to have high expectations about the accuracy of economic forecasts. One begins to wonder why forecasts continue to be made. The reason is economic forecasts are in high demand despite their low expectations. Phone calls come in from many sources asking what the crystal ball says not only from those making investment decisions but also government officials. It is not very different from people going to fortune-tellers asking about their future even though most of us do not take their predictions seriously.

However, in this exercise I have attempted to make the above forecasts more transparent than those we are likely to find in economic reports that do not say much, if anything,

⁶ The distributional weights used to produce the numbers for each quarter are $Qtr_1 = 0.548 Y_{t-1} + 0.2343 Y_t - 0.0390 Y_{t+1}$, $Qtr_2 = 0.0079 Y_{t-1} + 0.2655 Y_t - 0.0240 Y_{t+1}$, $Qtr_3 = -0.0233 Y_{t-1} + 0.2652 Y_t + 0.0080 Y_{t+1}$, $Qtr_4 = -0.0392 Y_{t-1} + 0.2347 Y_t + 0.0545 Y_{t+1}$, where Qtr are the number for each of the four quarters and Yr are the numbers for each of the three adjacent years. I have not been able to trace the origins of this technique so that I can give a proper acknowledgement. We were using this technique to produce data by quarters for our work at the MIER during the early parts of the 1990s.

about how their forecasts were made. This also means that I have to be objective about how the forecast will turn out since there will be no opportunities to fiddle with the numbers just because they do not look right.

No different from what fortune tellers might have told us these forecasts act merely as guides that make us aware of possible outcomes. Hopefully they will help us be more prepared even though they are not likely to occur exactly as predicted. The cyclical patterns that the model has generated between now and 2005 will undoubtedly come to past eventually, because similar cycles have previously occurred at various intervals. The forecasting model has scheduled their timings in the future according to statistical calculations based on past patterns. Future patterns, of course, would not necessarily emulate those of the past and therefore although we know there will definitely be future cycles, our predictions of their timings may be off by months. In other words, the cycles between now and 2005 may make either wider arcs or instead they might be much narrower but sharper.

Bottom line, out of nine scenarios, only the first two which forecast the 2005 grp for Penang at RM26.2 billion and RM25.4 billion respectively surpassed the Eighth Malaysia Plan forecasts of RM24.9 billion. The third at RM24.5 billion is only marginally short of it. The first three scenarios also surpassed the PSDP-II forecast of RM24.3 billion by 2005. These are scenarios involving Malaysia's trade balance to achieve the post-1998 capital control annual average. The forecasts therefore point to the criticalness of the performance of the exports sector during the forthcoming years. Business efforts and policy targets should thus pay close attention to it.

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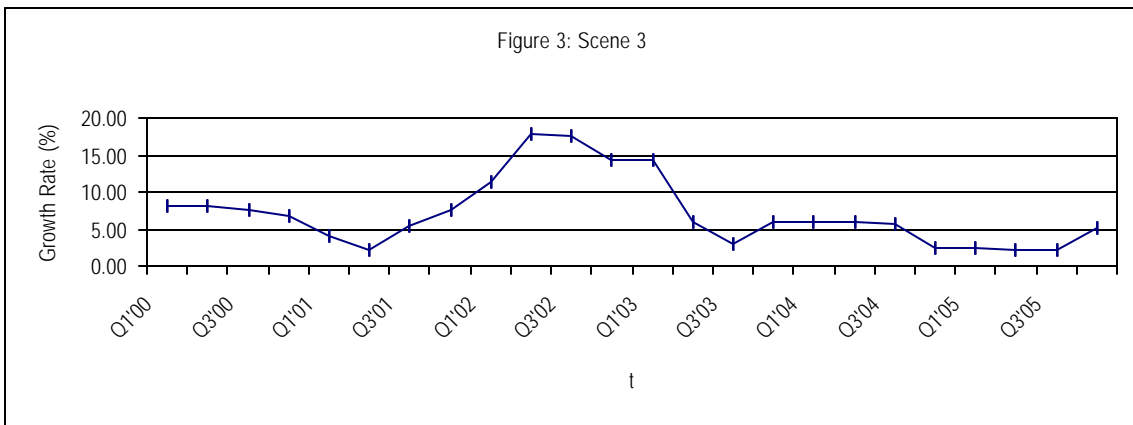
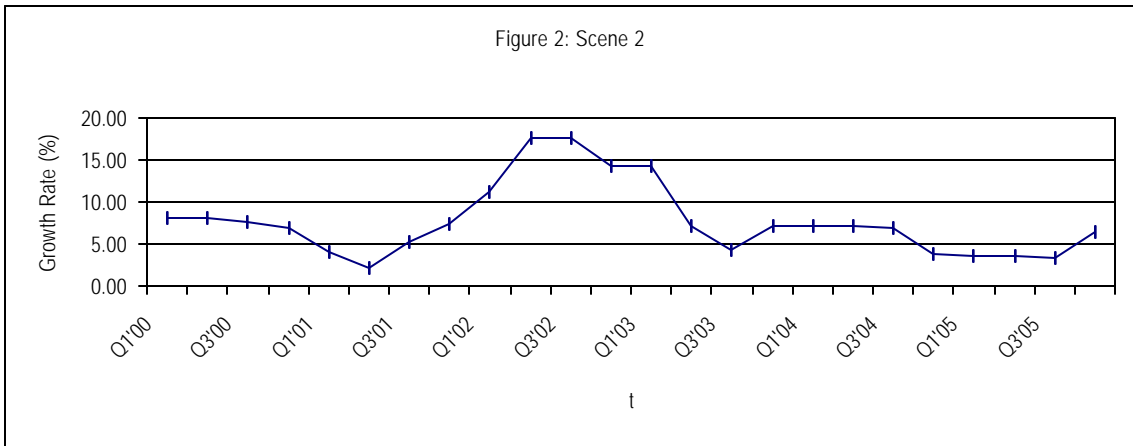
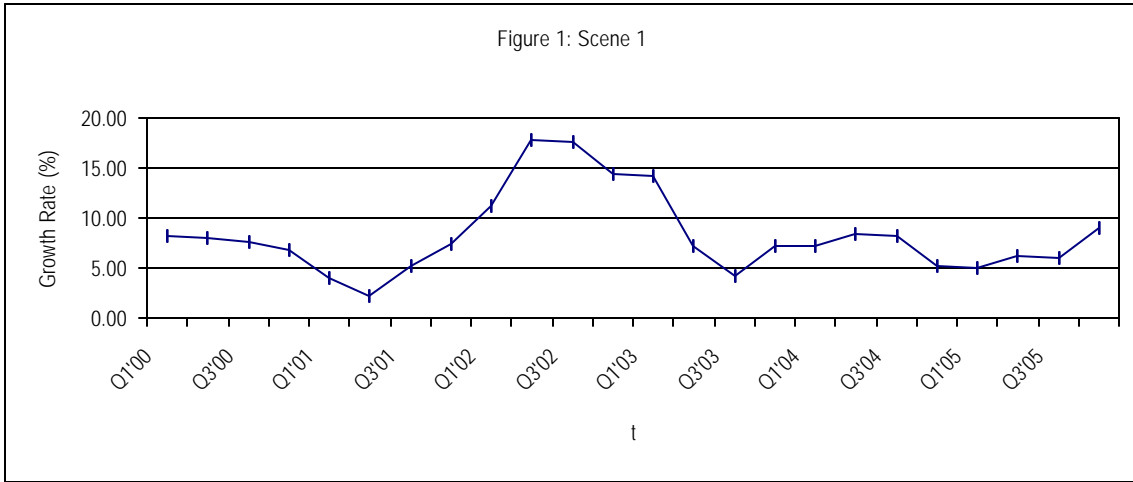
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Appendices



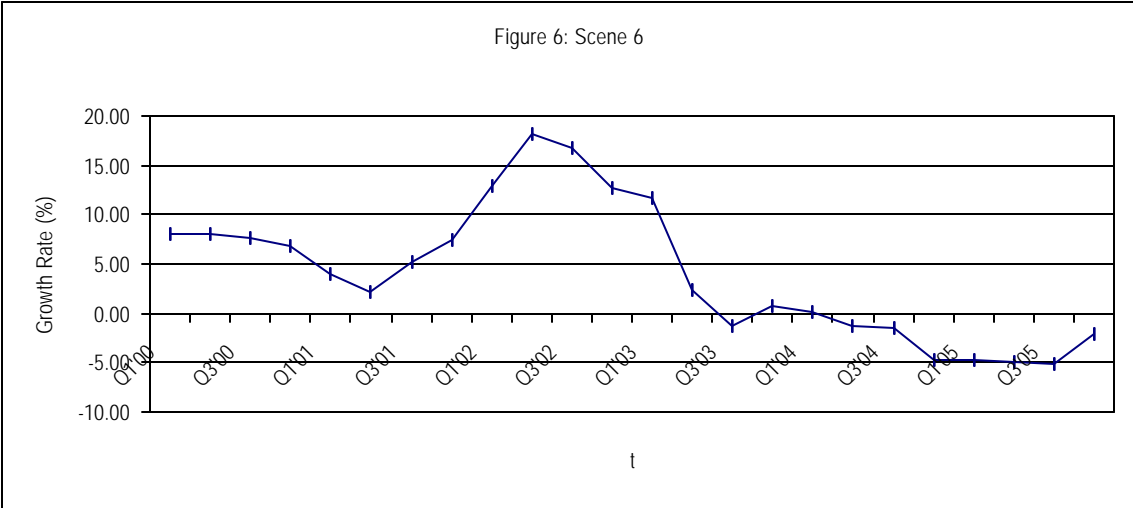
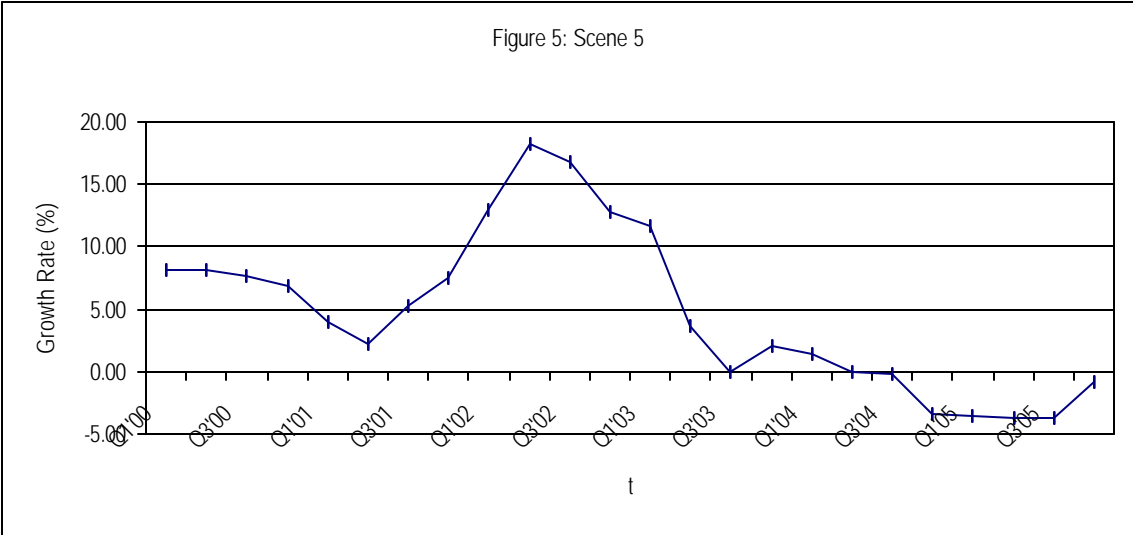
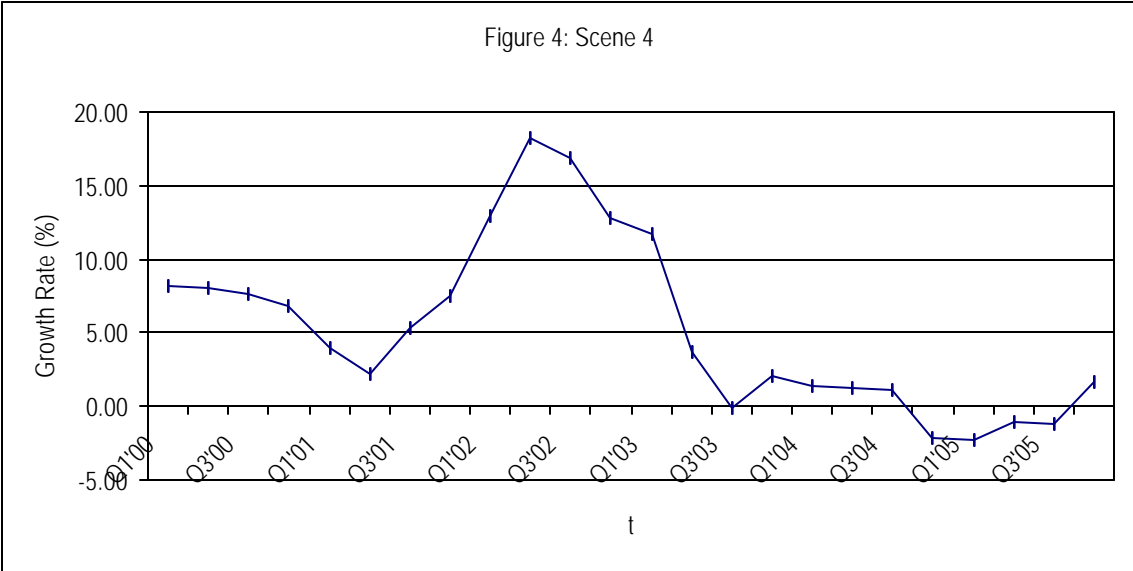


Figure 7: Scene 7

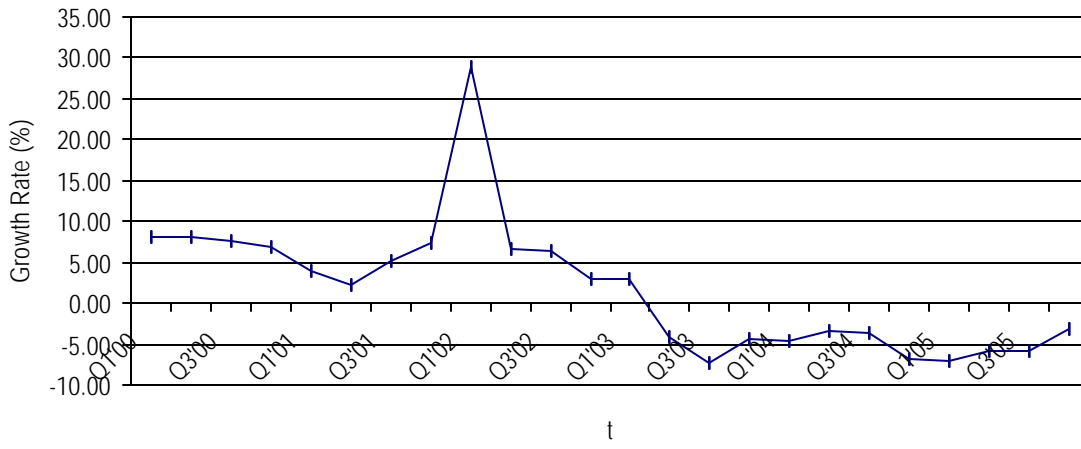


Figure 8: Scene 8

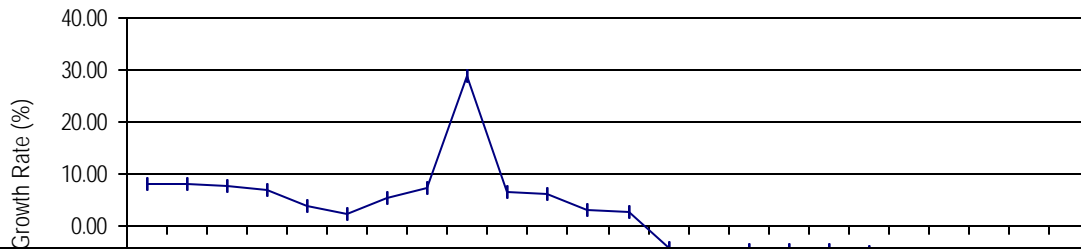
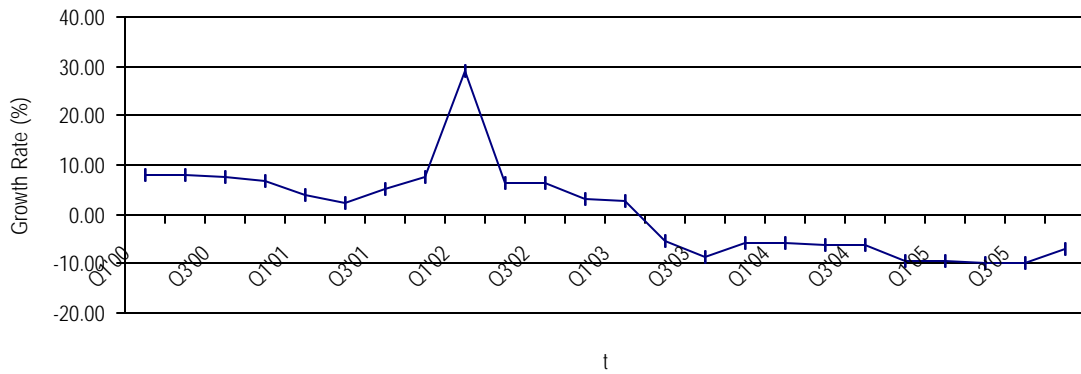


Figure 9: Scene 9



Appendix 2: Projected Growth Rates															
scene1	Q1	Q2	Q3	Q4	Scene2	Q1	Q2	Q3	Q4	Scene3	Q1	Q2	Q3	Q4	
2000	8.13	8.08	7.63	6.86		8.13	8.08	7.63	6.86		8.13	8.08	7.63	6.86	
2001	4.01	2.19	5.27	7.48		4.01	2.19	5.27	7.48		4.01	2.19	5.27	7.48	
2002	11.23	17.72	17.56	14.39		11.23	17.72	17.56	14.39		11.23	17.72	17.56	14.39	
2003	14.25	7.25	4.29	7.21		14.25	7.25	4.29	7.21		14.25	5.96	3.00	5.93	
2004	7.11	8.43	8.27	5.10		7.11	7.14	6.99	3.82		5.83	5.85	5.70	2.53	
2005	4.96	6.12	6.00	8.90		3.68	3.55	3.42	6.33		2.39	2.26	2.14	5.05	
scene4	Q1	Q2	Q3	Q4	Scene5	Q1	Q2	Q3	Q4	Scene6	Q1	Q2	Q3	Q4	
2000	8.13	8.08	7.63	6.86		8.13	8.08	7.63	6.86		8.13	8.08	7.63	6.86	
2001	4.01	2.19	5.27	7.48		4.01	2.19	5.27	7.48		4.01	2.19	5.27	7.48	
2002	12.95	18.23	16.82	12.77		12.95	18.23	16.82	12.77		12.95	18.23	16.82	12.77	
2003	11.65	3.73	-0.07	2.08		11.65	3.73	-0.07	2.08		11.65	2.44	-1.35	0.80	
2004	1.40	1.22	1.07	-2.10		1.40	-0.07	-0.22	-3.39		0.12	-1.35	-1.50	-4.68	
2005	-2.24	-1.09	-1.21	1.70		-3.53	-3.66	-3.78	-0.87		-4.81	-4.94	-5.07	-2.16	
scene7	Q1	Q2	Q3	Q4	Scene8	Q1	Q2	Q3	Q4	Scene9	Q1	Q2	Q3	Q4	
2000	8.13	8.08	7.63	6.86		8.13	8.08	7.63	6.86		8.13	8.08	7.63	6.86	
2001	4.01	2.19	5.27	7.48		4.01	2.19	5.27	7.48		4.01	2.19	5.27	7.48	
2002	28.93	6.55	6.32	3.07		28.93	6.55	6.32	3.07		28.93	6.55	6.32	3.07	
2003	2.86	-4.10	-7.31	-4.47		2.86	-4.10	-7.31	-4.47		2.86	-5.39	-8.60	-5.75	
2004	-4.64	-3.51	-3.66	-6.84		-4.64	-4.80	-4.95	-8.12		-5.92	-6.08	-6.23	-9.41	
2005	-6.97	-5.82	-5.94	-3.03		-8.26	-8.39	-8.51	-5.60		-9.54	-9.67	-9.80	-6.89	

Appendix 3 Penang GRP (RM Million in 1987 prices)															
Scene1	Q1	Q2	Q3	Q4	Scene2	Q1	Q2	Q3	Q4	Scene3	Q1	Q2	Q3	Q4	
	2000			17208					17208					17208	
	2001	17380	17475	17706	18037		17380	17475	17706	18037		17380	17475	17706	18037
	2002	18543	19365	20215	20942		18543	19365	20215	20942		18543	19365	20215	20942
	2003	21688	22081	22318	22720		21688	22081	22318	22720		21688	22011	22177	22505
	2004	23124	23612	24100	24407		23124	23537	23948	24177		22833	23167	23498	23646
	2005	24710	25088	25464	26031		24399	24616	24826	25219		23788	23922	24050	24354
scene4	Q1	Q2	Q3	Q4	Scene5	Q1	Q2	Q3	Q4	Scene6	Q1	Q2	Q3	Q4	
	2000			17208					17208					17208	
	2001	17380	17475	17706	18037		17380	17475	17706	18037		17380	17475	17706	18037
	2002	18621	19469	20288	20936		18621	19469	20288	20936		18621	19469	20288	20936
	2003	21545	21746	21743	21856		21545	21746	21743	21856		21545	21677	21604	21647
	2004	21933	21999	22058	21942		21933	21929	21917	21731		21653	21580	21499	21248
	2005	21819	21760	21694	21786		21540	21343	21141	21095		20992	20732	20470	20359
scene7	Q1	Q2	Q3	Q4	Scene8	Q1	Q2	Q3	Q4	Scene9	Q1	Q2	Q3	Q4	
	2000			17208					17208					17208	
	2001	17558	17912	18254	18566		17558	17912	18254	18566		17558	17912	18254	18566
	2002	18752	18855	19104	19461		18752	18855	19104	19461		18752	18855	19104	19461
	2003	20869	21211	21546	21711		20869	21211	21546	21711		20869	21211	21546	21711
	2004	21867	21643	21247	21010		21867	21643	21247	21010		21867	21572	21109	20805
	2005	20766	20584	20395	20047		20766	20517	20263	19852		20497	20185	19871	19403

