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Was Singapore Extraordinary?

A Comparative View of Singapore's Saving Performance 1965-99

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WORKING PAPER SERIES

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Gregor Hopf[1]

Abstract

Although the mere observation of saving aggregates might have us believe differently, this article argues that Singapore's sustained high saving performance was far from extraordinary once the country's particular circumstances are econometrically controlled for. Singapore's saving performance should therefore not be regarded as a mere blip in economic history. As a matter of fact, not the high saving rates in the late 1980s and 1990s, which usually attract the most attention, but rather the speed of transformation of the country's saving behaviour in the first years of independence is shown to be indeed extraordinary. Singapore was able to overcome its low initial saving performance much faster and much more strongly than could have been expected given its circumstances.

Keywords: Asia, Singapore, saving rate, economic growth

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1. Introduction[2]

Singapore's real per capita GNP measured in 1990 constant Singapore dollars stood at S$4,224 in 1965, the year of the country's separation from the Federation of Malaysia, which marked its final step towards independence. By 1999 this figure had increased more than eight-fold to S$34,965. Converted at purchasing-power-parities, this ranked Singapore seventh in the world - one rank behind Switzerland.[3] The country's economy managed an average compound growth rate of aggregate real GNP of 8.5 per cent annually for the first 35 years since its independence.

While there still is controversy over exactly how much of this spectacular growth performance can be attributed to productivity improvements and how much to capital accumulation, the discussion by now seems to be about which shade of grey is the most appropriate one. Both sides agree that the majority of Singapore's growth was due to capital accumulation.[4] This brings Singapore's saving behaviour to the forefront of the discussion. In 1965 Singapore saved 11.2% of its GNP, which was already a big improvement from negative savings in the early 1960s. In 1961 and 1962 the Gross National Saving (GNS) Ratio stood at -2.4% and -2.3% respectively. By 1984 Singapore had further raised its GNS-ratio to 45.6%, among the highest in the world. After a short-lived decline of the ratio in the second half of the 1980s, national saving increased again to a peerless 54% of GNP in 1999.[5]

The nation's savings has always been considered central to the country's economic development. Dr. Goh Keng-Swee, the nation's first finance minister and a permanent member of the government cabinet until 1984, summarised the government's understanding of the importance of savings in a 1979 speech:

> How was it possible for a small island state with no natural resources to achieve such an economic performance? A detailed answer would have to describe many complicated economic as well as political and social issues. Here I want to briefly discuss one crucial element in our recent economic progress to which inadequate attention was paid in the past. This is the role of domestic savings. There is no real secret about the way in which nations and individuals grow rich. They must save a good part of their incomes and invest their savings profitably. The more you save and the more wisely you invest, the faster you get rich.[6]

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2 This article forms part of a larger research project (Hopf, 2004), which has benefited from many helpful comments by various people, access to research facilities and financial support from various sources, particularly: Professor Mukul Asher, Dudley Baines, Prof. Nick Crafts, Philip Epstein, Prof. Gregg Huff, Associate Professor Gavin Peebles, Catherine Schenk, Professor Amina Tyabji and Associate Professor Peter Wilson; the Institute of South East Asia Studies, the Monetary Authority of Singapore and the National University of Singapore; the Economic History Society, the ESRC, the LSE Conference Fund, The Royal Historical Society and the University of London's Central Research Fund.

3 World Bank (2001), p. 275

4 For summaries of the TFP literature on Singapore see for example Owyong and Thangavelu (2002), Peebles and Wilson (2002, pp. 58-65), Miles and Scott (2002, pp.106-111) and International Monetary Fund (2000, pp. 6-8).

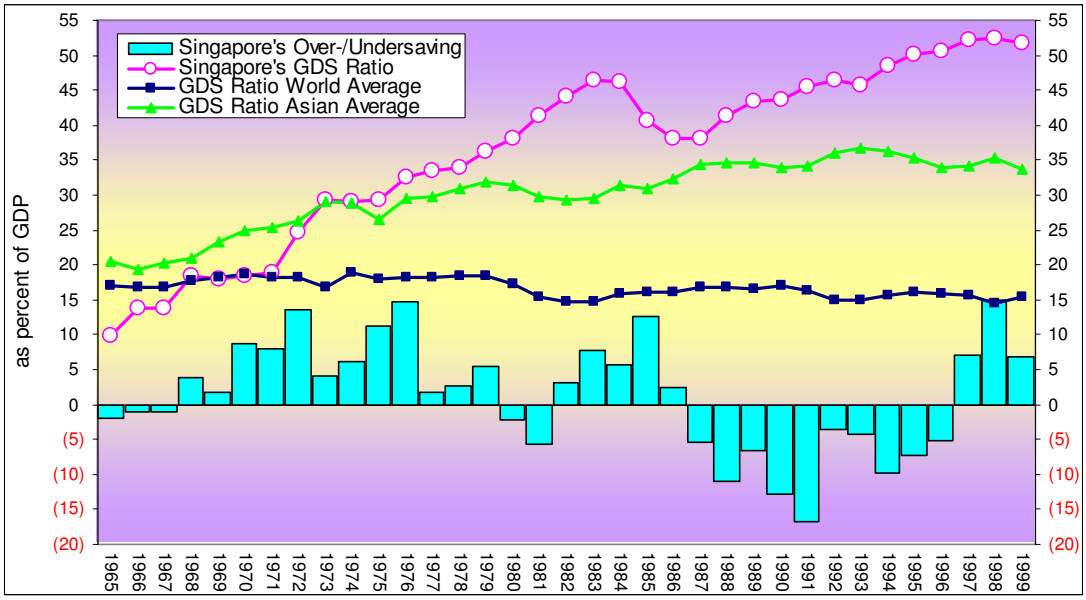
5 Singapore's Gross Domestic Saving in 1999 equalled 52% of its GDP. The average in East Asia stood at 37% and among the world's high-income countries at 22%. The closest to Singapore was Angola with 48% and China with 42%. (World Bank, 2000)

6 Goh (1995, p.78) in a speech given in 1979 to Singapore's National Trade Union Congress. After his retirement from parliament, Dr. Goh also held the post of Deputy Chairman of the Monetary Authority of Singapore from 1985-1992

Singapore's average annual Gross Domestic Saving Ratio for the 35 years from 1965-99 stood at 36.13% of its GDP, which equals about double the world average.[7] The country's saving performance becomes even more dramatic if we look at the latter half of the period only. Annual GDS-ratios for the years 1981-99 average out at 45.6%, while the world's average was 15.8%. From 1995 onwards Singapore's Gross Domestic Saving accounted for more than 50% of her Gross Domestic Product.

Such a sustained high-saving performance is easily seen as a mere outlier in economic history. However, so far no attempt has been made to quantify the degree of extra-ordinarity.[8] This article intends to fill this gap by establishing how much Singapore's saving might have been 'sui generis' indeed and therefore how much we can truly learn from it. Additionally, it tries to quantify how much policy choices in Singapore mattered, by normalising for influences on the country's national saving rates other than (saving) policies so that it can be seen to what degree Singapore's saving performance was due to exogenous factors. In other words, the exercise tries to establish what saving rates could have been expected of Singapore given the country's circumstances.

Figure 1: Singapore's Saving Performance



Singapore's over-/undersaving refers to the country's savings above/below the econometrically established benchmark using model 5 described below.

For data sources and descriptions see notes at the end of the article.

7 The average given is an unweighted average of Singapore's 35 annual GDS-ratios for 1965-99. If the ratios were weighted by the respective GDPs of each year the overall saving ratio would stand at 46.13% since more recent years with higher GDPs and higher saving ratios would attract a higher weight.

8 For a critical assessment of past investigations into Singapore's saving behaviour see Hopf (2006)

2. Methodology: The Benchmarking Process

In a series of ten articles between 1956-67 Kuznets analysed inter-country variation in principal components of the gross national product and compared these results to historical changes in developed countries.[9] This research gave rise to Chenery and Syrquin's investigation of over 100 countries for the period 1950-75. Twenty-eight independent variables describing accumulation, allocation, demographic and distributional processes were independently regressed on semi-log functions with income, population and net capital inflows as explanatory variables.[10] One of the dependent variables investigated was the countries' GDS-ratios. Chenery and Syrquin were trying to summarise the relationships of these processes along growth paths and thus establish certain 'Patterns of Development', particularly structural changes of the economy as the country increases its level of economic development defined as per capita income. They also realised but did not exploit the possibility to use their work for the derivation of benchmarks, which is the route this article will take rather than investigating development patterns.[11]

By deriving best-fit regressions for the world sample (excluding the country under investigation) and then inserting the respective country's actual data for the explanatory variables, an 'expected value' for the dependent variable is obtained. The relationship of this expected value with the actual value can be investigated over time to highlight significant deviations in certain periods.

Applied to Singapore's saving performance, this exercise aims to obtain benchmark values for Singapore's GDS-ratio controlling for those explanatory variables, which prove to be significant in modelling the variation in GDS-ratios across a world sample. Moreover, the pool of potential explanatory variables is being restricted to those, which are not, or only to a limited degree influenced by the countries' policies. As a result the statistical model determines how much of the variance between individual countries' savings performance can be explained by variables exogenous to the countries' respective policy choices.[12] The modelling process works its way through three levels of control. The initial level controls only for the strictly non-policy environment. The second step adds the country's external situation and finally a peer-group factor is incorporated. Inserting Singapore's actual data into such a model will tell us how much the country should have been expected to save given her particular circumstances. What remain un-modelled are largely country-specific issues, which are open to policy choices.

Linear regression models are estimated both on an annual and on a pooled (fixed-effects) basis. A full panel data analysis is unfortunately prohibited due to the sample properties, particularly the fact that it does not consist of a constant set of countries with observations for all years. Countries, which report data irregularly, would need to be excluded in order to allow for a minimum time-series dimension for each country.[13] Moreover, it is likely that such an exclusion leads to a systematic bias in

9 Journal of Economic Development and Cultural Change, various issues 1956-67.

10 Chenery and Syrquin (1975). In a later study, Syrquin and Chenery (1989), the period was extended to cover 1950 – 1983 and the sample size comprised 108 countries. Crafts (1984) applies their approach to 19th century Europe and Leamer (1987) extends the methodology to a three-factor, n-good General Equilibrium Model.

11 Chenery and Syrquin (1975, p. 4): "By comparing countries that are following similar development patterns, it is possible to derive more valid performance standards and also compare the policies chosen by countries under similar conditions."

12 Generally, policy can impact the regression analysis in two ways. Policy can influence the respective variable's effect on savings, i.e. its coefficient, and also impact the observed level of the variable. The former effect is controlled for by the use of a world sample, i.e. Singapore is given the same impact the variable has in average across the world. The selection of the variables tries to contain the impact of the latter effect by prohibiting policy induced factors from being modelled.

13 Loayza et al. (2000), for example, lose every twentieth observation in their sample by limiting its coverage to those countries with at least five consecutive annual observations.

the sample. Therefore, it was decided to conduct both pooled and annual analyses. Furthermore, both general-to-specific elimination of insignificant variables and specific-to-general addition of potentially significant variables were used in separate model construction approaches.

A pooled sample, in which all observations across the whole time-period are included no matter from which year they stem, assumes that no differences between certain time-periods exist. In other words, whether country A achieved its respective saving ratio in year X does not matter. What matters is that it achieved it with the respective values of its explanatory variables. However, the (true) impact, i.e. the coefficients, of these variables might differ significantly over time and between time periods, particularly with such strong world-wide economic events as, for example, the oil-crisis years as part of the sample period. The use of annual time-dummies helps somewhat in capturing time-specific sub-period influences. However, it will not allow for the development of individual coefficients over time. Therefore, on the one hand, the explanatory quality of fixed-effects models must be considered generally weaker than that of annual models. On the other hand, they are still much preferable over simple averaged models, in which the observations for the individual variables have been averaged over the whole period, since this causes the complete loss of the time dimension in the model. With fixed-effects models at least the respective relationship of the individual variables at a given time is taken into consideration by the regression analysis even though the final coefficient is fixed for the whole period.

The removal criterion for the general-to-specific elimination of variables is a joint-hypothesis F-Test of the variable's coefficient. A maximum probability of the F-statistic of 0.1 was allowed for the variable to remain in the model.[14] Variables were removed from the model in individual steps, i.e. one at a time. The additional use of a specific-to-general method of equation construction was made necessary since the general-to-specific model will require the countries to have observations for all the variables, no matter whether they turn out to be significant or not. The general-to-specific model will, therefore, almost always have a smaller sample size than the specific-to-general model, which only requires observations for all significant variables. Additionally, the specific-to-general method has the advantage of showing the incremental impact of individual variables, which is particularly important in order to separately capture the impact of the three main explanatory dimensions of non-policy, external and peer-group effects.

The possible existence and impact of a number of potential statistical pitfalls, such as multi-collinearity, heteroskedasticity or simultaneity, was investigated in a comprehensive sensitivity analysis in order to highlight their likely effect on Singapore's benchmark savings. The statistical software package employed for all statistical computations was SPSS version 10.07.

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14 A more stringent criterion for the removal of individual explanatory variables has been proposed by Edward Leamer (1985). In his attempt to try to identify robust empirical relations in the economic growth literature he developed the 'extreme-bounds test', which in essence amounts to saying that if one finds a single regression for which the sign of an individual coefficient changes or becomes insignificant, then the variable is not (absolutely) robust and should be dropped. For a critical assessment of Leamer's extreme-bounds test see Xavier X. Sala-i-Martin (1997, p.178-9), who argues that the test is too severe for almost any variable to pass it. The Joint-Hypothesis-Test, on the other hand, determines whether an equation with the variable in question is significantly different from the equation without that variable.

3. Literature Review

The question of high-savings in Singapore has attracted a fair share of interest. This stems from the fact that over the last four decades saving rates have experienced a marked divergence which has been particularly dramatic within the developing world: saving rates have risen steadily in East Asia, stagnated in Latin America, and generally fallen in sub-Saharan Africa.[15] These regional disparities have been closely matched by diverging growth experiences: across world regions, higher saving rates tend to be correlated with higher income growth.[16] A substantial number of studies have therefore used cross-country regression analyses to explain the variance either in international growth experiences or in saving performances. However, almost none of these investigations have tried to derive a benchmark value for any of the countries in their sample. These studies are purely interested in finding the reasons for the countries' respective economic performance, not in establishing what performance could have been expected given the countries' respective circumstances.

Using regression analysis to obtain benchmark saving values for specific countries has not often been undertaken.[17] Denizer and Wolf (1998) use this method to model savings for twenty-five transition economies in Eastern and Central Europe as an attempt to estimate forced savings before the transition to a free-market economy. Yashiro and Oishi (1997) built a simultaneous equations model for the Japanese economy to forecast savings largely depending on changes in the country's demographic composition. Besanger et al. (2000) apply an economic modelling exercise to five Asian countries, among them Singapore, largely to predict the country's optimal future saving path.[18]

Denizer and Wolf (1998), however, still mix policy-induced and non-policy induced variables, so that the explanatory power of their benchmark is somewhat dubious in nature. Their models with r-squared between 0.55 and 0.63 and 131 observations taken from an unspecified set of market economies of, in their view, comparable development levels show that individual ex-communist countries were far from their predicted equilibrium, free-market saving rates. The models include as explanatory variables, which the authors refer to as fundamentals: the dependency ratio, urbanization-ratio, GDP growth, M2 to GDP ratio, inflation, changes in terms of trade, per capita GDP and a dummy for military conflict. The study, however, is plagued by a number of problems, foremost by the lack of a specification of the 'control group', i.e. the set of countries on which the initial regression is run. Furthermore, the restriction of the control group to 'comparable' countries also limits the power of the analysis. A world sample, in this case excluding all the former planned economies, would have been preferable particularly because the inclusion of a per capita income variable already controls for

15 Particularly comparisons between East Asia and Latin America have been common. See for example: Singh (1997), Birdsall and Jaspersen (1997), Dayal-Gulati and Thimann (1997) to name just a few. Also see Meier (1995, pp.33-61) for a summary of the stylized facts of comparative economic development in the LDCs post WW-II, offering a concise overview of East Asia, Latin America, Sub-Sahara, and Chinese economic development with references to all the main generalizations and many of the remaining questions.

16 Loayza et al. (2000, p. 165)

17 See Haque et al. (1999) and Loayza et al. (2000) for recent reviews of the literature regarding cross-country regression analyses of saving ratios.

18 Two related examples of an attempt at benchmarking using econometric techniques are Ostry (1997) and Kim and Roemer (1981). Ostry (1997) models Current Account Balances for five Asian economies, including Singapore. He finds that expectations of future income growth appear to be a significant determinant, economically and statistically, of current account behaviour in the sample of countries and that the CA deficits in the ASEAN region have primarily reflected high levels of investment rather than excessive private consumption. Kim and Roemer (1981) use the original Chenery and Syrquin (1975) equations, without re-estimating them, to determine expected values for the South Korean economy. Chenery and Syrquin themselves have not really used their analysis to build benchmarks. Their studies remain one step removed. Hopf 2004 offers a replication of their approach with our dataset and explicit benchmarking purpose.

different levels of development. Additionally, it must be noted that the time period for the regression is not specified and many of the variables are not significant.

Yahiro and Oishi's (1997) simultaneous equations model for the Japanese economy also struggles with a number of methodological problems. The equation model still exhibits autocorrelation of its residuals visible through low DW statistics, which can be due to either misspecification of the model or a missing lag structure or both. Moreover, the model uses the OLS technique with most likely non-stationary variables, which creates the problem of spurious regressions results. At the analytical level, the general problem of using past data to forecast future data, i.e. the underlying assumption that elasticities and thus preferences of the population remain unchanged in average, can be viewed critically. Overall, even if one disregards this potential analytical pitfall the methodological problems already render results far from robust.

A related literature, of which Besanger et al. (2000) is the example which specifically refers to Singapore, tries to construct a macro-economic model of the respective economies based on utility theory and resulting production functions in order to predict future, socially optimal levels of savings allowing for a variety of factors such as changing demographic structures, labor productivity and consumption demands.[19] Besanger et al. (2000) have applied this technique to five Asian countries, among them Singapore, largely to forecast the country's future saving path. The years of their resulting predictions of optimal savings, for which we now have actual data, 1996-99, would argue that Singapore saved in excess of the country's optimal level of just above 30% of GDP. Our study does not follow this literature, because of the inherent conceptual differences between socially optimal savings and to-be-expected savings. It is far from reasonable to equate optimal achievements with those, which are actually to be expected.[20] Furthermore, the necessary assumptions on the rate of time preferences, rate of technological progress, wealth to consumption ratios, planning horizons, interest rates, depreciation rates, elasticity of output to capital, elasticity of substitution between capital and labour etc. and, even more, the development of these factors over time make the results very sensitive. Moreover, such an analysis will not allow for a separation of policy and non-policy induced circumstances. Therefore, this technique cannot be used to determine what could have been expected of Singapore given its circumstances.[21]

19 For a description of the exact economic modelling exercise see Guest and McDonald (1998 as well as 1999).

20 In a theoretically related exercise Masson and Tyron (1990) estimate a consumption function using regression analysis in order to derive a set of elasticities, which are in turn inserted into a macro-economic model developed by the IMF (MultiMode) to forecast the different effects of aging on the economic situation of seven industrialised countries, including their saving behaviour.

21 The by far largest part of the cross-country saving literature is content with finding the significant explanatory variables without an attempt to derive benchmark saving values. For a summary of this literature with special reference to Singapore see Hopf (2006).

4. Findings

4.1 Non-Policy Models

What kind of saving performance could have been expected of post-independence Singapore given the country's situation at time of independence, geographic location and its population's demographic development over time, i.e. the country's exogenous circumstances?

In order to maximise the sample size the initial fixed-effects model has been built in a specific-to-general approach starting with the description of the initial situation in 1965, which also includes the most likely strongest explanatory variable: the average GDS-ratio for 1962-64. Demographic and geographic variables were included in consecutive steps. Finally, regional dummies and then the demographic-geographic variable capturing the exposure to malaria in a given country were added. Table One offers the results.

Table 1: Initial Situation, Demographics and Geographics

	1965-99					
	1	**2**	**3**	**4**	**5**	**6**
Const	5.579	5.404	-4.849	-8.188	6.627	5.439
IniGds	0.68	0.708	0.648	0.667	0.621	0.641
IniGDP		-7.99E-04	-2.69E-03	-2.60E-03	-1.21E-03	-9.25E-04
Urb			0.106	0.067	0.069	0.077
ToTPop			1.00E-08	6.68E-09	not sig.	not sig.
EcoAcRat			0.126	0.227	not sig.	not sig.
Airdist				-2.44E-04	not sig.	not sig.
Tropicar				2.25	2.96	not sig.
Landlock				-4.00	-5.83	-4.85
Pop100km				not sig.	-4.59	-4.62
Asia					10.1	10.8
Sahara					-4.03	-5.56
LA					-1.98	not sig.
MalFal66						5.38
N	2,820	2,716	2,716	2,424	2,424	2,322
adj. R-sqr.	0.332	0.340	0.375	0.410	0.445	0.456
Predicted Avr. Saving Rate for Singapore	8.96%	8.57%	16.14%	16.69%	24.48%	22.11%

[not-sig = removed based on joint-hypothesis testing and equation re-estimated without this variable]

The immediate result from this exercise is that Singapore's saving performance remains extraordinary given the country's initial situation, demographic and geographic profile. Unless we allow for peer-group effects via regional dummies the saving rate, which could have been expected of Singapore, would have been below the actual world average. What is of further interest, however, is that given the country's demographics, particularly its high urbanization-ratio, the country must have had a strong potential to increase its saving performance beyond the initial, 'inherited' saving rate. Furthermore, if we accept peer-group effects which might have driven Singapore's savings it could have been expected of Singapore to achieve above average saving rates similar to its successful regional neighbours.

From a statistical point-of-view, it is striking how strong the explanatory power of the initial GDS-ratio is. This inertia effect is the by-far strongest variable in any of the above equations, with consistently high beta-coefficients never below 0.5 and always the highest of all beta-coefficients. The somewhat surprising negative sign for the initial level of per capita GDP appears to support the view that this variable is rather an indicator for a country's stage of development than its saving potential. It seems to measure whether the country is a mature economy with high income but low savings or a developing economy with high investments/savings but comparatively low income. It is also of interest to note how the ratio of the economically active population, the total size of the population as well as the distance from the nearest commercial centre all lose their significance once regional dummies are included. This seems to suggest that these regional dummies capture the demographic and distance effects. Similarly, the inclusion of the country's exposure to malaria makes the regional dummy for Latin-American countries and the degree of exposure of the country to tropical climates lose their significance. This seems to suggest that the effect of both these variables on a country's saving performance might be driven by the economic impact of malaria. However, the positive sign of the malaria variable, while the Latin American dummy had a negative sign and the tropics variable a positive sign, makes this conclusion rather precipitate. In general, these results concerning the loss of significance upon inclusion of other variables should not be over-interpreted due to the good but not excellent r-squareds, which hint at the likelihood that still missing variables might yet again change the significance of the variables included so far. It must also be noted that some equations suffer from a mild degree of multi-collinearity with the tolerance indicator for some variables only slightly above 0.3.[22]

In order to investigate the behaviour of both the statistical qualities of the models as well as the resulting benchmark saving rate over time, annual models were estimated. In order to keep the ratio of sample size and number of variables tested at a level which still allows for a qualified benchmark, a two step procedure was used in which first a set of variables describing the initial situation as well as the demographic and geographic profile is reduced in a general-to-specific procedure to include only those variables still significant and then in a second step regional dummies are added, which are subsequently reduced to only those which add significantly to the model. The initial situation was described by the countries' average saving ratio for the years 1962-64 and their respective average per capita income for the same years (measured in current US dollars). The demographic development is captured by the proportion of the population aged between 15 and 64 and the urbanization rate. Describing the geographic profile of a country, the Gallup-Sachs-Mellinger variables were used again: the countries' distance from the nearest international economic centre, the proportion of the population living within 100 kilometres from the coast, the proportion of the country with tropical climates as well as a dummy, describing whether the country is landlocked. Regional dummies for Latin American and Sub-Saharan countries were employed together with the Asian dummy.

Table 2 shows the results from this investigation. If the individual variable does not have a coefficient associated with it in the table, the variable was not able to remain in the model. Some years can have two models if one or more of the regional dummies significantly improved the first-step equation. The last two columns offer the predicted benchmark saving rate for Singapore next to the country's actual saving rate.

22 In a detailed sensitivity analysis (see Hopf 2004) a number of institutional variables as well as alternative measures of income and demography were tested. While the significance of some variables changed due to these alterations, the overall finding of substantially higher actual than expected savings for Singapore given the country's strictly non-policy circumstances was not contradicted.

Table 2: Annual Non-Policy Models

	Cst	Initial GDS	Initial GDP	Urb	Eco Ac Rat	Tropic	Pop 100 Km	Land lock	Airdist	Asia	Sa-hara	N	Adj. R-Sqrd	Pre-dicted GDS	Actual GDS Rate
1965	1.02	0.98										72	0.87	5.92	9.86
1966	0.22	1.03										72	0.85	5.36	13.71
1967	0.74	1.05	-1.95E-03									72	0.83	5.07	13.75
1968	1.02	1.05	-1.91E-03									72	0.80	5.38	18.35
1969	2.05	1.04	-2.17E-03									72	0.77	6.23	18.03
1969	1.82	1.02	-1.93E-03							4.76		72	0.77	10.79	18.03
1970	3.33	0.99	-2.15E-03									72	0.71	7.26	18.35
1970	3.08	0.97	-2.19E-03							5.04		72	0.72	11.94	18.35
1971	2.49	0.95										71	0.71	7.23	18.92
1971	2.19	0.94								5.49		71	0.72	12.37	18.92
1972	3.54	0.94										71	0.65	8.20	24.58
1973	5.06	0.95										71	0.55	9.77	29.29
1974	3.84	1.09										71	0.53	9.25	29.07
1975	2.22	0.99										71	0.54	7.13	29.41
1976	3.58	0.97										71	0.48	8.40	32.64
1977	4.22	0.89										71	0.45	8.67	33.51
1977	8.54	0.78									-7.12	71	0.48	12.42	33.51
1978	4.56	0.68					5.97					71	0.45	13.90	33.99
1978	9.93	0.62					0.04			8.29	-6.47	71	0.50	21.36	33.99
1979	3.36	0.95										69	0.48	8.10	36.32
1979	7.77	0.84									-7.28	69	0.51	11.93	36.32
1980	2.19	0.97										69	0.48	7.02	38.08
1980	6.45	0.86									-7.06	69	0.50	10.73	38.08
1981	-2.68	0.75		0.14								69	0.49	15.35	41.29
1981	3.48	0.73		0.07							-6.92	69	0.51	13.82	41.29
1982	-2.83	0.57	-4.31E-03	0.23								70	0.36	21.06	44.04
1983	2.57	0.75										70	0.31	6.32	46.55
1983	6.62	0.61								10.27	-7.47	70	0.35	19.94	46.55
1984	-0.73	0.56		0.15								69	0.32	17.16	46.29
1984	-0.21	0.59		0.11						13.00		69	0.35	26.23	46.29
1985	8.95	0.51						-8.27				69	0.29	11.49	40.62
1985	7.72	0.50						-6.98		13.22		69	0.34	23.43	40.62
1986	-42.84	0.56	-5.28E-03		0.92							69	0.31	22.61	38.19
1986	-24.01	0.54	-3.62E-03		0.55					11.27		69	0.34	27.61	38.19
1987	-58.68	0.40			1.12	7.51						68	0.29	30.78	38.12
1987	-34.53	0.43			0.69	5.30				13.04		68	0.33	35.04	38.12
1988	-54.04	0.49	-5.43E-03		1.15							68	0.31	28.47	41.29
1989	-55.38	0.49	-4.46E-03		1.16							68	0.36	28.87	43.36
1990	-54.27	0.54	-6.94E-03		1.14							68	0.41	28.37	43.59
1991	-66.00	0.34	-1.61E-02		1.71		-14.1	-9.59	-1.42E-03			67	0.50	31.12	45.54
1992	-67.28	0.35	-5.80E-03		1.38							67	0.44	31.77	46.39
1992	-50.90	0.34	-4.57E-03		1.07					10.22		67	0.46	36.32	46.39
1993	-61.29	0.41	-4.35E-03		1.24							67	0.41	38.22	45.77
1993	-41.12	0.40	-2.90E-03		0.86					12.83		67	0.45	34.29	45.77
1994	-47.85	0.27			0.99	6.87		-11.86				67	0.42	31.03	48.50
1994	-22.20	0.31			0.54	4.68		-12.84		12.82		67	0.45	35.50	48.50
1995	-27.32	0.26			0.72			-7.87				67	0.34	25.00	50.03
1995	-6.89	0.29			0.33			-8.82		13.54		67	0.39	31.85	50.03
1996	9.82			0.19				-11.00				67	0.23	28.42	50.67
1996	10.29			0.16				-10.59		11.97		67	0.27	37.76	50.67
1997	-35.63	0.33			0.80							67	0.34	23.09	52.23
1997	-19.72	0.37			0.50					11.40		67	0.37	29.12	52.23
1998	-30.26				0.80			-8.51				66	0.34	26.58	52.43
1998	-8.69				0.42			10.04		14.01		66	0.41	34.91	52.43
1999	-41.09				0.99			-5.78				63	0.47	28.78	51.73
1999	-26.60				0.73			-6.92		9.54		63	0.51	34.60	51.73

Light grey background describes the fact that the variable was not significant anymore once regional dummies were added

Analytically, two immediate findings result from the investigation: Firstly, it should not be surprising to see Singapore achieve at least world average saving rates by the mid-1980s given her exogenous circumstances, particularly her favourable demographic development. Allowing for peer-group effects captured by the Asian dummy variable raises the expected savings even above world average levels. Secondly, Singapore was able to consistently go beyond this benchmark.

While a substantial improvement in Singapore's saving behaviour beyond her initial situation and eventually beyond world averages should not be surprising, the actually achieved saving ratios remain beyond expectable levels given the country's strictly non-policy environment as is the speed and degree of the transformation before 1980.

Statistically, three findings stand out. Firstly, it must be noted how long the period of significance of the saving inertia actually lasts. Not until after a period of over 30 years is the effect of the initial saving rate overcome in the world sample. Secondly, some variables, which were still significant within the fixed-effects models, lose their statistical powers, particularly the geographic variables become very erratic. Only the landlocked dummy was strong enough to appear consistently at least in the later half of the period. Chenery-Syrquin's measure for the size of the economy, i.e. its total population, was never able to survive the general-to-specific removal process. Thirdly, the fact that the adjusted r-squared falls in line with the loss of explanatory power of the inertia variable points to the fact that a number of important influences do not seem to be captured yet in the model. The behaviour of individual variables also suggests that the model is not yet fully robust.

4.2 Extending the model

International cross-sectional analyses, which try to explain savings, often include such purely policy induced variables as the government's budget balance or the countries respective pension systems and such strongly policy induced variables as inflation or interest rates. This study avoids these explanatory factors because it does not attempt to explain cross-country saving behaviour. Instead it tries to determine exactly how much can be attributed to policy by controlling only for non-policy induced variables. However, there are a number of factors which are often targeted by government policy but can not be brought about by their own doing, i.e. they depend to a substantial degree on exogenous forces. For Singapore, two of the main ingredients to the country's economic development plan are such factors: her export performance and net-foreign-direct-investments. Both of these were clearly targeted by Singapore's economic policies, but by their nature depend largely on the actions of third parties outside of government control. Even if such actions could be induced by such means as tax regimes, these facilitating policies are certainly not created to improve saving ratios.

This section will try to control for the country's net-export and FDI performance together with the already introduced strictly non-policy factors. Additionally, per capita income will be tested as a potential explanatory factor, because it is such a fundamental variable and is not fully within the government's realm of influence. As with the non-policy models above initially fixed-effects models were estimated followed by annual regression analyses.

In order to maximise the sample size and to make the respective effects of the individual variables stand out more, the battery of independent variables was added in a specific-to-general fashion starting with the variable with the largest sample size. Using the joint-hypothesis F-test, the resulting regression equation was then reduced to include only those variables, which add to the model in a statistically significant way. The Net-FDI ratio was added last, because the variable offers observations only from the 1970s onwards. Table 3 presents the results.

Table 3: Fixed-Effects Models

	1965-99							
Cst	21.471	3.124	0.720	2.102	9.566	5.115	17.356	13.829
NetExRat	0.796	0.775	0.788	0.851	0.83	0.769	0.751	0.758
Urb		5.39E-02	5.21E-02	4.35E-02	7.39E-02	3.03E-02	5.44E-02	6.01E-02
EcoAcRat		0.271	0.324	0.315	0.159	0.233	not sig.	0.109
GDPpcAt			-1.05E-04	-1.45E-04	-1.13E-04	Not sig.	not sig.	not sig.
Pop100Km				1.797	not sig.	2.486	not sig.	not sig.
Landlock				not sig.	not sig.	Not sig.	-0.932	not sig.
Airdist				-2.23E-04	not sig.	-1.46E-04	1.86E-04	1.50E-04
Tropicar				-0.658	not sig.	-2.384	-1.639	-1.114
IniGDS						0.185	0.161	0.156
IniGDP						-2.40E-03	-1.62E-03	-1.86E-03
NetFDI								
Asia					7.315		6.988	6.136
LA					-2.291		-2.270	-2.470
Sahara					-2.532		-3.201	-3.211
Time-Dum.								Yes
N	4,587	4,386	4,021	3,513	3,513	2,314	2,314	2,314
Adj. R-sqr.	0.686	0.705	0.714	0.766	0.784	0.778	0.793	0.803
Predicted Avr. Sav.	20.56	25.61	25.65	25.12	32.92	21.88	28.33	29.13

	1972-99		
Cst	10.824	19.498	16.427
NetExRat	0.809	0.782	0.791
Urb	not sig.	2.74E-02	7.51E-02
EcoAcRat	0.165	Not sig.	not sig.
GDPpcAt	not sig.	Not sig.	not sig.
Pop100Km	3.284	Not sig.	not sig.
Landlock	not sig.	-1.370	not sig.
Airdist	not sig.	2.51E-04	2.19E-04
Tropicar	-4.308	-2.749	-1.961
IniGDS	0.126	9.77E-02	7.44E-02
IniGDP	-2.16E-03	-1.27E-03	-1.74E-03
NetFDI	0.690	0.636	0.700
Asia		8.520	8.270
LA		-1.970	-3.060
Sahara		-3.370	-3.660
Time-Dum.			Yes
N	1,754	1,754	1,754
Adj. R-sqr.	0.767	0.787	0.801
Predicted Avr. Sav.	28.11	36.04	39.56

Among the annual time-dummies only those for 1973 to 1982 and 1999 remained significant. All others were removed

Given the country's resource balance, demographics and geographics, as well as its initial situation, above world average savings should have been expected based on the fixed-effects models. Once all explanatory dimensions are included Singapore's expected average savings is very close to the country's actual saving rates.

In order to further probe this finding, annual models were estimated following the same combined specific-to-general and general-to-specific approach. Annual models with the resource balance, the urbanization-ratio and the economically active proportion of the population predict saving ratios for Singapore above world average, but below actual. The transition to saving rates beyond the initial levels was also to be expected. Statistically, it is striking that the urbanization-ratio loses its significance in the late 1970s, while the economically active proportion of the population does not become significant until the 1980s. Adding geography and per capita income variables does not alter these findings. Moreover, income is rarely significant and the several geographic variables exhibit a very erratic significance with no clear pattern. Adding the inertia variable and the initial income levels alters the results somewhat.[23] The early years until the first half of the 1970s have much lower predicted saving rates than without modelling the initial situation. Particularly, the inertia variable lowers the expected saving rates, which is also at least partly due to the fact that the urbanization-ratio loses its significance in those years and is thus removed from the equation. However, from the mid-1980s onwards, particularly once the economically active proportion of the population becomes statistically significant, benchmark savings rise to levels substantially above world average. In other words, the model would still predict a strong transition from Singapore's early saving rates to levels above world average. Consequently, for the whole period, this yields an average benchmark saving rate of slightly above world levels. Adding regional dummies does not materially alter this finding, although the Asian dummy proves significant in all but six years. The average saving rate is increased somewhat but still remains substantially below the actual level. The transition to higher savings is predicted to be somewhat faster than without the regional dummies but still not as fast as if the initial situation remained outside of the model. Adding Net-FDI, however, does increase the expected saving rate substantially, even if the inertia variable is included in the equation.[24] The model even predicts savings above the actual levels for individual years. Overall the average benchmark savings for 1972-99 is 34.5 percent of GDP compared to an actual of 41.2 percent. If regional dummies are included, this average predicted saving level rises further to 37.5 percent.[25]

Overall, the findings from the extended models support the earlier results, namely that Singapore saved more than could have been expected of the country given its strictly non-policy circumstances. However, once all three explanatory dimensions (non-policy, external and peer-group) are jointly controlled for, Singapore's actual savings turn out to be very close to expected levels. It should not be surprising that Singapore was able to raise her saving rate substantially beyond her saving performance at time of independence and by the mid-1980s to above world average levels. Furthermore, rather than the world-record saving rates of the 1990s, which usually attract the most

23 GDP per capita had to be removed from the model once the initial GDP level was included due to a strong correlation between the two variables.

24 It is noteworthy, that this positive and significant impact of FDI on savings is in contrast with parts of the FDI-literature. For a summary see for example Kentor (1998) who argues that FDI dependence can have a long-run negative impact. Similarly to dependency theory he argues that an economy controlled by foreign interests would not develop organically (p. 1025): "It would grow in a disarticulated manner. The natural linkages that would evolve from locally controlled capital would not occur. Profits would be exported. The interests of the ruling elite would be allied with those of owners of the foreign capital. Income inequality would grow. The economy would stagnate."

25 It must be noted, however, that once Net-FDI and regional dummies are included the restricting influence of the inertia variable only rarely proves to be significant and is thus removed from many annual models.

attention, the annual analysis points to the first half of the 1970s and if we allow for saving inertia also the late 1960s as Singapore's most sustained period of extraordinary savings.[26]

4.3 Models without removal of variables

So far, only the results from models, from which any insignificant variables have been removed, were discussed. However, one can argue that in order to calculate a benchmark for Singapore, all potentially important variables should be included in the models even though they might not be statistically significant for the world sample in a certain given year. This would allow the benchmark process to continuously control for all factors and thus result in a more consistent benchmark over time instead of being forced to use different models for different years. Moreover, since the equations will not change from year to year, the stepwise revision of Singapore's deceptive extra-ordinarity will become more visible. Statistically, the difference to the regression models with only significant variables should not be too substantial since the removal of the variables was based on a joint-hypothesis F-test, which determines whether the full equation is significantly different with or without the variable. The benchmark results, however, are likely to differ somewhat more. Therefore, the following section functions largely as a narrative device, which nicely brings the findings so far obtained to a concluding point.

Based on the experience from the earlier models, the following five equations were adopted in annual models:

Model 1: Net-export-ratio, urbanization rate and economically active population

Model 2: same as Model 1 plus Net-FDI

Model 3: same as Model 2 plus Asian regional-dummy

Model 4: same as Model 2 plus Initial-GDS-ratio and initial per capita GDP

Model 5: same as Model 4 plus Asian regional-dummy

Table 4 summarises the outcome from these models. The last column gives the average over- or under-saving by Singapore. A positive (negative) number indicates that in average, Singapore saved more (less) than what the model would predict, controlling for the country's circumstances. Figure 2 shows the respective over-/(under-) saving for each year for models 1, 2, 4 and 5, contrasting the results with a comparison based merely on averages.[27]

26 The extended models were also tested for the sensitivity to the inclusion of institutional variables as well as alternatives for the used income and demography variables (see Hopf 2004). These variables, however, were not able to significantly alter the derived benchmark values.

27 For the exact coefficients and their t-ratios for each year see Hopf (2004). Geographic variables were not tested due to their erratic and largely insignificant performance in the earlier annual models. Institutional proxy variables were also not used since they will cause a substantial reduction of the sample size to a level which will make the findings extremely sensitive to the variations within the sample instead of the variance of the explanatory variables. Both of these types of variables as well as others which have not been employed so far will be tested via an extensive sensitivity analysis in the following section, which will also include a Two-Stage-Least-Square procedure in order to control for the potentially endogenous nature of the Net-Export variable.

Table 4: Annual Models without removal of insignificant variables
Summary Statistics

	Sample Size		Adj. R. Sqrd.		Average Benchmark	
	min-max	avr.	min-max	Avr.	Saving	Over/Under
NetExRat + Urb + EcoAcRat	90 - 160	125.31	0.55-0.82	0.73	26.16	9.97
+ Net-FDI	84 - 150	114.89	0.61-0.81	0.73	31.14	4.99
+ Asia	84 - 150	114.89	0.61-0.82	0.74	37.93	-1.81
+ Net-FDI + IniGDS + IniGDP	65 - 80	72.77	0.62-0.90	0.78	29.75	6.38
+ Asia	65 - 80	72.77	0.64-0.90	0.79	34.76	1.37

Net-FDI was only included from 1972 onwards due to limited data availability.

Very similar to the earlier findings, these models confirm that Singapore saved in average between 5 and 10 percent of GDP more than would be expected of a country with similar circumstances given a world sample. If one controls, however, for Singapore being part of a very successful peer-group of neighbouring countries, this 'over-saving' is almost completely neutralised. Therefore, the transition from the country's low saving performance at time of independence should not be surprising, even if we allow for the country's initial situation in the early 1960s affecting the subsequent years. Particularly, the country's favourable demographic development, export and FDI success makes savings far above world average levels by the late 1970s the norm for Singapore. The transition to these above average saving rates, however, took place much faster and more strongly than could have been expected of the country, particularly if its weak starting position is taken into account. On the other hand, the world record saving rates in the 1990s – at least until the Asian crisis – become much less extraordinary.

In terms of policy impact, it can be concluded that Singapore's savings must have been positively affected by the country's policies resulting in higher savings beyond what could have been expected of the country given its circumstances. This policy effect, however, is comparatively small in relation to strictly non-policy and external factors. Furthermore, the policy impact can be econometrically explained by Singapore's place within a particular peer-group of neighbouring countries. In other words Singapore exceeded its saving benchmark in average by between 5 and 10 percent of GDP, which, however, is in line with the saving behaviour of her regional 'control group'. Singapore's saving performance within an Asian perspective, therefore, is far from extraordinary. Even outside of this Asian perspective, the country's saving is far less spectacular than a pure comparison of GDS-ratios would indicate once a number of important non-policy and external circumstances are controlled for. Nevertheless, policies must have certainly increased the speed and strength of the transition in the late 1960s and early 1970s away from the country's initial saving behaviour.

Figure 2: Annual Models without removal of insignificant variables

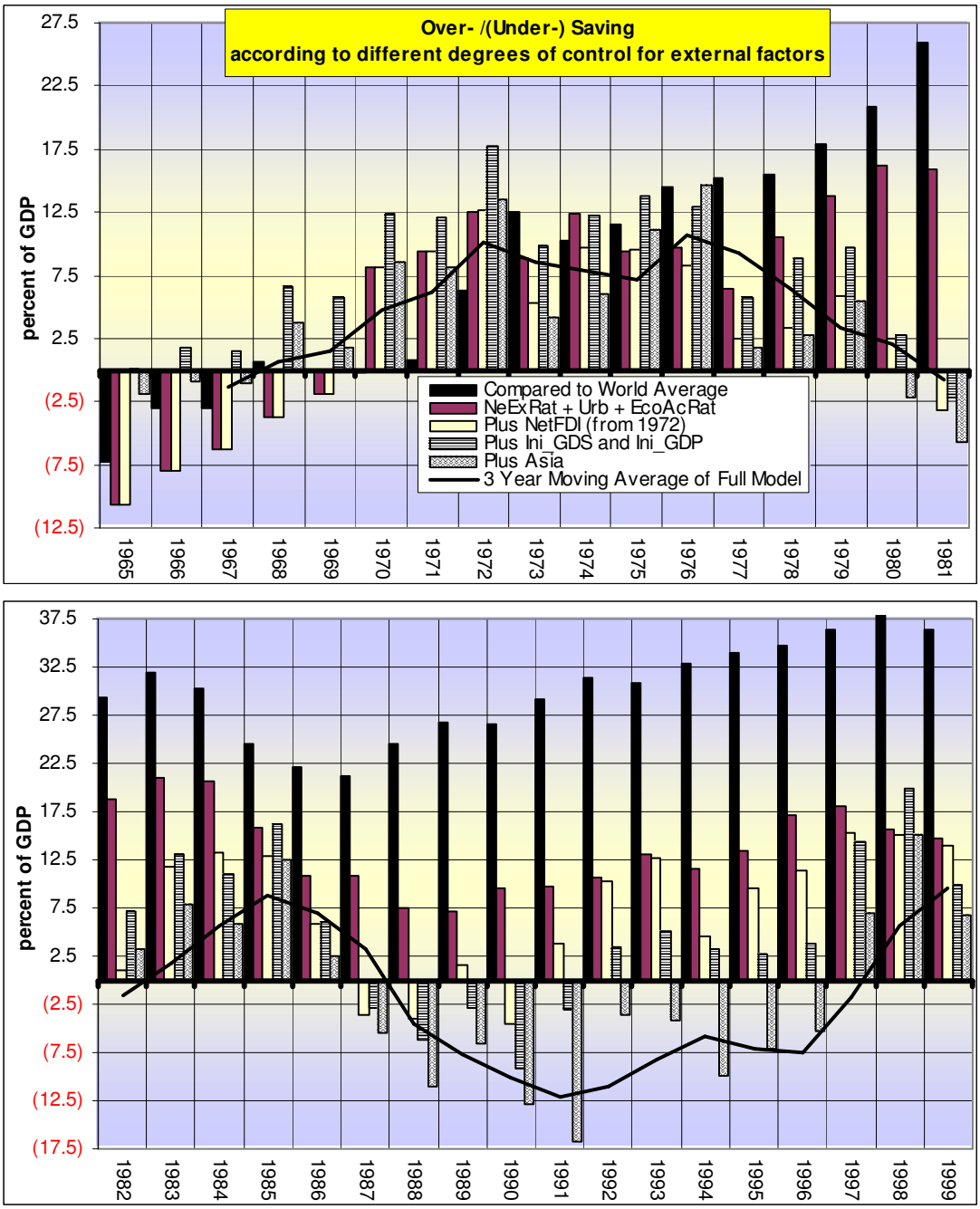
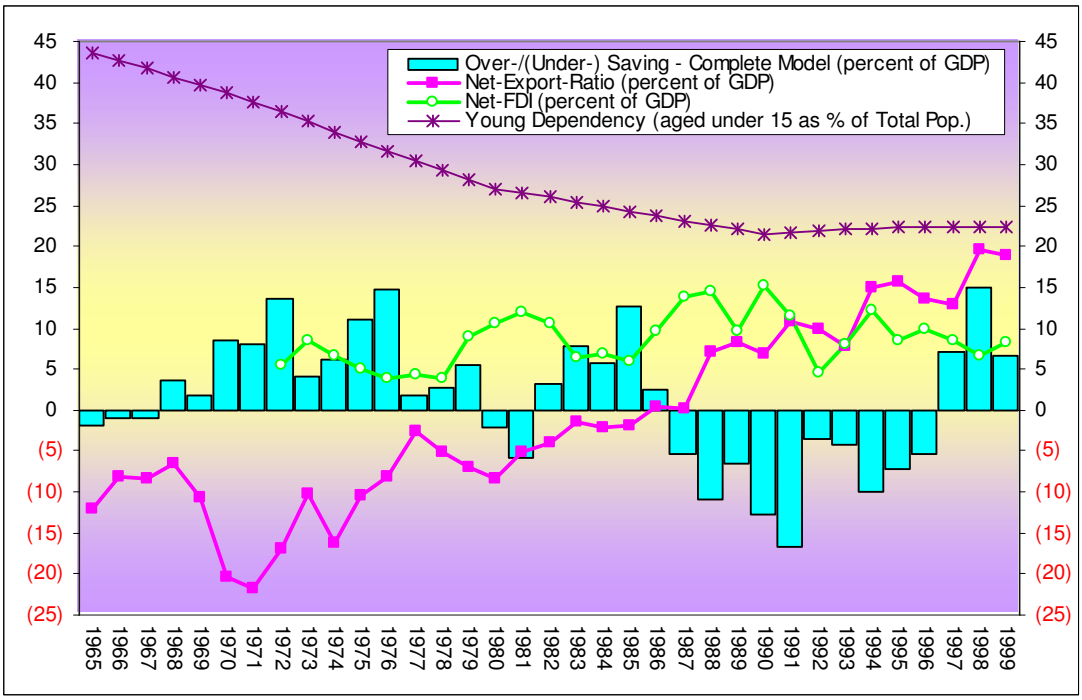


Figure 3 visually shows the development over time of the main influential variables of the regression models – except for those variables with fixed values such as those describing the initial situation. It becomes clear how extraordinary Singapore's early saving performance was given the country's highly negative resource balance and the still high yet falling dependency ratio. On the other hand, the ten years after Singapore's recession in 1985/6 are far from extraordinary given her very successful external position by that time both in respect to the country's net-exports as well as Net-FDI and the by then very low dependency rate.

Figure 3: Main Influential Variables



Complete Model refers to Model 5 described above.

5. Conclusion

Controlling for those explanatory variables exogenous to a country's saving policies, which prove to be significant in modelling variation in GDS-ratios across a world sample, renders Singapore's gross domestic saving performance significantly less spectacular. The article suggests that the key to understanding Singapore's saving behaviour must lie in the turnaround achieved during the first decade of the country's independence. Looking merely at the country's more recent saving performance will not be able to answer how Singapore was able to achieve its world-record saving ratios.

This study removes Singapore's saving performance from its pedestal with the reputation of being hardly transferable and possibly not even desirable. Instead, the results of the benchmarking exercise clearly show the transferability of at least the saving aspects of Singapore's economic history. Moreover, this approach also highlights those circumstances, which are not directly related to saving policies but must be taken into consideration if transferability is assessed, particularly the demographic structure and external position. The cross-country saving analysis furthermore gives an indication to what degree these pre-requisites are likely to affect a country's saving.

In terms of policy impact, the study shows that Singapore's savings must have been positively affected by the country's policies resulting in higher savings beyond what could have been expected of the country given its circumstances. This policy effect, however, is comparatively small in relation to strictly non-policy and external factors, which are the strongest factors in the country's transition from low to high savings. Not more than one third can be attributed to policy even in conservative estimates. Furthermore, the policy impact can be econometrically explained by Singapore's place within a particular peer-group of neighbouring countries. In other words, Singapore exceeded its saving benchmark in average by between five and ten percent of GDP per year, which, however, is in line with the saving behaviour of her regional 'control group'. Singapore's saving performance within an Asian perspective, therefore, is far from extraordinary and even within a world sample, the country's saving is far less spectacular than a pure comparison of GDS-ratios would indicate.

As a by-product of the exercise, it is also shown that export-promotion does not only allow a country to better exploit its comparative advantage but also allows the country to raise its saving levels and thus finance the further improvement and exploitation of this comparative advantage and possibly even to finance the creation of new comparative advantages. In turn, this can potentially open up a virtuous circle of development. Additionally, the cross-country regression analyses demonstrate that it is generally a lengthy process to alter a country's saving performance. Saving inertia in the world sample takes over twenty years to lose its significance.

The exercise lends further support to the view of a favourable starting position as proposed by Huff (1994) and Peebles and Wilson (2002) and thus goes against Singapore's – or rather the PAP's - own folklore, which describes Singapore in the 1960s as a backward fishing village.[28] This finding, however, does not lessen the achievement of the Singapore government and its people. Simply having the chance does not mean that one is able to realise the given opportunity. They did.

28 Huff (1994, p.1) summarises: "Post independence economic development in Singapore began from a strong foundation and with very substantial advantages." See also: Huff (1995, 422-23), Rodrick (1996), Peebles and Wilson (2002, pp. 24-26)

Data description and sources:

If not stated otherwise the data was taken from the World Bank's World Development Indicators extended by data for Taiwan, which is not recognised by the World Bank, taken from Taiwan's Statistical Databook published by the country's council for Economic Planning and Development.

IniGds: Initial average gross-domestic saving ratios 1962-64

IniGDP: Initial average per-capita income 1962-64, measured in current US dollars

Urb: the share of the total population living in areas defined as urban in each country

ToTPoP: Total population

EcoAcRat: Rate of the economically active population defined as those aged between 15 and 64 as a share of total population.

Airdist: minimum distance to the closest of any three main economic centres of the world: New York, Rotterdam or Tokyo (Gallup et al., 1999)

Tropicar: percentage of land which lies in the geographical tropics (Gallup et al., 1999)

Landlock: dummy variable, which takes the value of one if nobody in the respective country lives within 100km of a coastline. (Gallup et al., 1999)

Pop100km: the proportion of the population living within 100km of the coastline (Gallup et al., 1999)

Asia: dummy variable consisting of Japan, Singapore, Hong Kong, South Korea, Taiwan, Indonesia, Malaysia, Thailand and China

Sahara: dummy variable consisting of 46 sub-saharan African countries: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Dem. Rep.), Congo (Rep.), Cote d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mayotte, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Zambia and Zimbabwe.

LA: dummy variable comprising 20 Latin American countries: Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela.

MalFal66: the product of the faction of land subject to malaria times the fraction of Falciparum cases, i.e. the malignant from of malaria (Gallup et al., 1999)

NetExRat: Net-Export ratio or Resource Balance

GDPpcAt: GDP per capita adjusted for purchasing power parities using the World Bank's Atlas method

NetFDI: Net-Foreign Direct Investment (only available from 1972 onwards), current US dollars

Bibliography:

Besanger, Serge and Guest, Ross and McDonald, Ian (2000): 'Demographic Change in Asia: The Impact on Optimal National Saving, Investment and the Current Account'; *IMF Working Paper (2000/115)*; Washington D.C., 2000

Birdsall and Jaspersen (Eds.) (1997): *Pathways to Growth - comparing East Asia and Latin America*; Inter-American Development Bank, Washington D.C.; 1997

Chenery, Hollis and Syrquin, Moshe (1975): *Patterns of Development 1950-1970*; Oxford University Press for the World Bank, 1975

Chenery, Hollis and Robinson, Sherman and Syrquin, Moshe (1986): *Industrialization and Growth*; Oxford University Press, 1986

Crafts, N.F.R. (1984): 'Patterns of Development in Nineteenth Century Europe'; *Oxford Economic Papers*, Vol. 36, No.3, 1984; pp. 438-458

Dayal-Gulati, Anuradha and Thimann, Christian (1997): 'Saving in Southeast Asia and Latin America Compared: Searching for Policy Lessons'; in Hicklin, John and Robinson, David and Singh, Anoop (eds.): *Macroeconomic Issues Facing Asean Countries*; IMF, 1997; pp. 130-152;

Denizer, Cevdet and Wolf, Holger C. (1998): 'Aggregate Savings in the Transition'; paper given at World Bank Conference on Savings, Dec. 10. 1998; downloadable from: www.worldbank.org/research/projects/savings/policies.htm

Goh, Keng Swee (1995): *Wealth of East Asian Nations*; Federal Publications, Singapore, 1995

Guest, R.S. and McDonald, I.M. (1998): 'The Socially Optimal Level of Saving in Australia, 1960-61 to 1994-95'; *Australian Economic Papers*, Vol. 37, No. 3; pp. 213-35

Guest, R.S. and McDonald, I.M. (1999): *Ageing, Immigration and Optimal Saving in Australia*; Department of Economics, University of Melbourne

Haque, Nadeem Ul and Pesaran, M. Hashem and Sharma, Sunil (1999): 'Neglected Heterogeneity and Dynamics in Cross-Country Savings Regressions'; *IMF Working Paper* (WP/99/129); Washington D.C., September 1999

Hopf, Gregor (2004): *Saving and Investment: The Economic Development of Singapore 1965-1999*; London School of Economics, London

Hopf, Gregor (2006): 'A Critical Assessment of Past Investigations into Singapore's Saving Behavior'; *The Singapore Economic Review*, Vol. 51, No. 1, 2006; pp.67-90

Huff, W.G. (1994):: *The economic growth of Singapore - trade and development in the twentieth century*; Cambridge Univserity Press, 1994

Huff, W.G. (1995a): 'The developmental state, government, and Singapore's economic development since 1960'; *World Development*; 23(8); pp. 1421-1438

Huff, W. G. (1995b): 'What is the Singapore model of economic development?'; *Cambridge Journal of Economics,* No.19, pp. 735-759

Huff, W. G. (1995c): 'Growth and Planning in an Asian NIC: Singapore Considered'; *Centre for Development Studies Occasional Paper*, No. 13, Feb. 1995; University of Glasgow

Huff, W. G. (1995d): 'Government Interventionism in Singapore's Economic Development since 1960'; *Centre for Development Studies Occasional Paper*, No. 14, Feb. 1995; University of Glasgow

Huff, W. G. (2001):'Entitlements, destitution, and emigration in the 1930s Singapore great depression'; *Economic History Review*, Vol. 54 (2), May 2001, pp.290-323

International Monetary Fund (2001): Singapore Selected Issues; *IMF Staff Country Report No. 01/177*; October 2001

Kentor, Jeffrey (1998): 'The Long-term effects of Foreign Investment Dependence on Economic Growth'; *American Journal of Sociology*, Vol. 103, No. 4, January 1998, pp. 1024-1046

Kim, Kwang Suk and Roemer, Michael (1981): *Studies in the Modernization of the Republic of Korea (1945-1975): Growth and Structural Transformation*; Harvard University Press, Cambridge, Mass, 1981

Leamer, Edward E (1985): 'Sensitivity Analyses Would Help'; *American Economic Review*, June 1985, Vol. 57 (3); pp. 308-313

Leamer, Edward E. (1987): 'Paths of Development in the Three-Factor, n-Good General Equilibrium Model'; *Journal of Political Economy*, Vol. 95 No. 5 Oct 1987; pp.961-999

Loayza, Norman and Schmidt-Hebbel, Klaus and Serven, Luis (2000): 'What drives private saving around the world?'; *World Bank Policy Research Working Papers* (No. 2309); March 2000

Masson, Paul R. and Tyron, Ralph W. (1990): 'Macroeconomic Effects of Population Ageing in Industrial Countries'; *IMF Staff Papers*, 37, pp. 453-85

Meier, Gerald (1986): *Financing Asian Development: Performance and Prospects*; University Press of America; 1986

Miles, David and Scott, Andrew (2002) : *Macroeconomics –Uunderstanding the Wealth of Nations*; John Wiley and Sons, New York, 2002

Ostry, Jonathan (1997): 'Are Current Account Imbalances in ASEAN Countries a problem?'; in Hicklin, John and Robinson, David and Singh, Anoop (eds.): *Macroeconomic Issues Facing Asean Countries*; IMF, 1997; pp. 29-57

Owyong, David T and Thangavelu, Shandre M. (2002): 'The Productivity Challenge'; in Koh et al. (eds.): *Singapore Economy in the 21st Century*; McGraw Hill, Singapore, 2002; pp. 259-271

Peebles, Gavin and Wilson, Peter (2002): *Economic Growth and Development in Singapore – Past and Future*; Edward Elgar, Cheltenham, UK; 2002

Rodrik, Dani (1996): 'Understanding Economic Policy Reform'; *Journal of Economic Literature*; Vol. 34, No. 1, March 1996; pp. 9-41

Sala-i-Martin, Xavier X. (1997): 'I just ran two million regressions'; *American Economic Review*, May 1997, Vol. 87, No. 2; pp. 178-183

Singh, Ajit (1997): 'Catching up with the West: a perspective on Asian economic development and lessons for Latin America'; in Emmerij, Louis (ed): *Economic and Social Development into the 21st century*; Washington DC, John Hopkins Press for the Inter-American Development Bank, 1997; pp. 222-265

Yashiro, Naohiro and Oishi, Akiko Sato (1997): 'Population Ageing and the Savings-Investment Balance in Japan'; in Hurd, M.D. and Yashiro, N. (eds.): *The Economic Effects of Aging in the United States and Japan*'; University of Chicago Press for NBER, Chicago, 1997; pp. 59-88

World Bank (2001): *World Development Report 2000/01*; World Bank