

**Government-Business Relationship, Economic
Planning and the Cycle of Domestic Investment in
Two East Asian NICs: A Research Note**

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In recent years, most of the comparative political economy literatures about the Four Little Tigers, Hong Kong, Singapore, South Korea and Taiwan, focused on the generality of the East Asian political economy. Few paid much attention to the diversity among the East Asian newly industrializing countries (NICs). However, as I pointed out elsewhere (Chu, 1987), not only there exists significant differences in terms of their respective state structure and state-society relationship, but these varying arrangements are the key to a full comprehension of their divergent economic adjustment experiences in the 1970s and 1980s. In this brief research note, I will present some solid empirical evidences to demonstrate how a systematic comparison of certain key aspects of the structural arrangements of the state apparatus is both intellectually fruitful as

well as imperative. In this research note, I will focus on the organizational characteristics of the state economic bureaucracy and its institutional links to the private business community and demonstrate how these arrangements can have important implications for the capacity of state economic officials with respect to implementing programmatic plans for the national economy. Also, for the sake of space and comparability, I will concentrate my analysis on the two medium-sized NICs, namely South Korea and Taiwan.

I. The Politics of Economic Policy-Making in Taiwan and South Korea

Owing to the different historical circumstances that gave rise to the current political regime, there emerged two rather different arrangements of state economic bureaucracy and institutional links with the private business community between the Republic of Korea (South Korea) and the Republic of China (Taiwan). In Taiwan, the Kuomintang-controlled state organized the overall economic bureaucracy in a way that reflected both the ruling elite's entrenched political dominance at the national level and its detached and potentially conflicting relation with the native capitalist class. The KMT state maintained a highly insulated economic policy process that

kept most of the native capitalists, large or small, at bay. The state agencies responsible for promoting industrial growth in the private sector was not strategically placed in the overall economic bureaucracy nor was powerful policy instruments provided. The powerful and conservative Central Bank of China (CBOC) and Ministry of Finance (MOF) occupied the commanding height of the economic bureaucracy. The seclusive CBOC is placed directly under the Presidential Office and above the cabinet (the Executive Yuan) and always put into the trusted hand of the president. Originally, this arrangement institutionalized the collective memories among the Mainlander old guards of the politically disastrous hyperinflation on the mainland and the hard-won battle against the triple-digit inflation during the 1949-53 period just as they were consolidating their rule on the island. But more importantly, they have had neither the occasion nor the necessity to change this arrangement. During the 1960s, bolstered by continued success, the pro-development technocrats gradually gained more influence and backing, and institutions such as the planning agencies and the Ministry of Economic Affairs (MEA) upgraded their responsibilities.² But the conservative monetary and financial officials were always in a strategic position to check on the planning technocrats. CBOC or MOF officials got appointed to head the supraministerial planning

agencies or policy-coordinating task forces that have been created and reorganized from time to time since 1962³ and they enjoyed the direct control of monetary and fiscal policy tools (Commonwealth, November 1984).

In Taiwan, economic planners retained an aloof posture toward private sector and allowed it only minimal direct sector policy input. The government explicitly discouraged the planning technocrats from developing close personal ties with the business community. In fact, the prevailing ethos within the economic bureaucracy is that soliciting policy input from private economic actors is an act of impropriety. State's penetration into national business and industrial associations was more for political demobilization and control than policy consultation. There also lack intimate institutional links between responsible state agencies and major industrial sectors, with the exception of a few sector-specific policy networks in which state enterprises or para-statal occupy a strategic node.⁴ The typical mode of interaction between the economic planners and the private sector is mutual adjustment rather than collaboration. They formulate policy behind closed doors, and then "they relay their decisions and attendant mechanisms to implement it to the private sector and see what happened" (Gold, 1986: 126). The government uses its medium- and long-term economic plans primarily to indicate where it thinks the

economy is going, to identify potential economic problems and to project its economic policies. Plans had little binding authority on the CBOC. Plans were often revised, even for the investment plans in the public sector.

In South Korea, the organization of the overall economic bureaucracy reflected the Korean military elite's overriding concern with economic growth and its underlying coalitional relationship with the large industrial capitalists. In direct contrast to Taiwan, in South Korea the machinery of economic planning was more elaborate, highly centralized and pivotally placed in the overall economic bureaucracy. At the apex of the economic bureaucracy is the Secretariat of Economic Affairs to the President within the Presidential Office (the Blue House) and the supraministerial planning agency, the Economic Planning Board (EPB). The locus of real policy-making power shifted between the chief economic advisors at the Blue House and the EPB depending on the degree of personal involvement of the president.⁵ The EPB supervised both the development and the implementation of planning. It acquired a very large think-tank, the Korea Development Institute (KDI), to assist it in formulating Five-Year Plans. The budgeting authority, by design, also rests squarely on the EPB. For all governmental agencies, any diversion from the annual budget requires approval from the

EPB. With its budgetary control over the ministries, EPB enjoyed the institutional power to carry out its function of economic planning and coordination of fiscal, monetary, trade and industrial policy. The EPB also had extensive authority in price control, investment projects appraisal, foreign investment review, and procurement.

The other two powerful arms of the development machinery were the Ministry of Trade and Industry (MTI) and the Ministry of Finance (MOF). The MTI took on many functions of Japan's MITI (Johnson, 1982) and was influential in decisions on tariff and credit policies. It decided which industries and firms to promote, which to phase out. The analytical capacity of MTI was enhanced by the affiliated industrial policy think-tank, the Korean Institute of Economics and Technology (KIET),⁶ which along with an official trade promotion agency, KOTRA, surveyed the world for needed market and technology and assisted in formulating sector-specific promotion plans. The Ministry of Finance supervised the entire financial sector, controlled foreign exchange rationing, and implemented fiscal policy. The MOF in South Korea, much like its Japanese counterpart, has been a stronghold of pro-dirigist officials. On the other hand, the central bank, the Bank of Korea (BOK), enjoys little statutory autonomy. The head of MOF presides over the Monetary Board, the policy-

making organ of the Bank of Korea. The Board also included members representing the EPB, the two other spending ministries, the MTI and the Ministry of Agriculture and Fishery (MAF). This arrangement institutionalized the control of planning technocrats over the monetary instruments.

In South Korea, various state-sponsored industrial associations and trade organizations were essentially an extension of state economic bureaucracy. They were directly involved in economic policy formulation and implementation. These industry associations played an important role in creating a consensus between government and industry on the policy goals and implementation mechanisms.⁷ As one foreign banker put it, "In Korea, the distinction between the public and the private is purely an academic one".⁸ Industrial associations at a level corresponding to 2 or 3 digit standard international trade classification (SITC) were created throughout the industry, and the functioning of these intermediary organizations are facilitated by informal cross-cutting interpersonal connections between business elite and middle and high-ranking state officials (Michell, 1984). Most elite Chaebol enjoyed direct access to the Blue House. Close and regular contact between high-ranking economic officials, economic advisors, top business leaders and representatives of various industrial associations was institutionalized in such well-publicized

arrangements as the Monthly Export Promotion Meeting, which the President himself religiously attended, and many less known industrial policy committees organized along sectorial lines.

II. The Policy Implications

The divergence in the arrangements of state economic bureaucracy and state-business relationship has important implications for the capacity of the two governments in steering the national economy in general and private sector business activities in particular. I argue that the South Korean government's overall organizational capacity in steering the national economy to pursue the planned development targets has been greatly enhanced, first, by a centralized economic bureaucracy in which planning officials coordinate the policy process and avail themselves of a full array of policy instruments, and secondly, by well-established policy networks that provide economic officials with multi-faceted channel of access into the leading firms and major industries. In the specific period that I will examine below, this overall organizational capacity enabled the South Korean government to assert an detailed control over the industrial upgrading process. It enabled the South Korean government to continue the on-going industrial

projects in spite of external economic turbulence in the 1970s and early 1980s, most notably the two oil crises and the 1974-76 and 1980-83 world recessions. In contrast, the ability of the Taiwanese economic officials to direct the industrial adjustment process in the private sector is more limited for short of more direct forms of policy instrument and extensive policy networks.

At the macro level, a direct indication of this capacity lies in the binding authority of the official economic programs over the gross investment activities in the private sector. In both South Korea and Taiwan, the government exercises its economic guidance through a system of multi-year macroeconomic planning and a series of complementary multi-year sectorial plans for the targeted sectors. While in both countries, under the increasing external pressures for industrial upgrading, the official economic plans began in the early 1970s to shift the emphasis from labor-intensive industries to capital-intensive ones, the realized impact of these programs on investment activities would not be the same if their binding authorities differ. If my characterization of their differing organizational capacity is valid, we will expect that there emerged divergent patterns in gross private investment since the early 1970s. In the South Korean data, we should expect to see the level of gross private investment being on a general

rise as the state's push for capital-intensive industries intensified over time. In the Taiwanese data, we should expect to see the level leveling off or even on a general decline as the external pressure for industrial upgrading intensified and new investment opportunities with lower capital requirements and short-term returns gradually dwindled. Furthermore, both government exercise macroeconomic planning with a fixed multi-year cycle. Taiwan began its four-year economic planning as early as 1953 and the Korean government introduced its first five-year plan (1962-1967) only one year after the military installed the Park regime. Thus another possibility to verify the differing binding effect of the official economic programs between the two countries is through examining the short-term fluctuations in the gross domestic investment level in terms of the significance, or absence, of a corresponding planning cycle.

Official economic planning would have rather different bearings on the short-term private investment activities in the two countries for exactly the same reasons that account for the divergence in long-term trends. In South Korea, planning officials avail themselves of policy instruments to control the microscopic environment of private firms and the responsible state agencies maintain multi-facet connections with the business community. Through state-sanctioned indus-

trial associations, elite business clubs, and personal bonds, the economic officials solicit input from major business concerns at early stage of policy formulation. All leading firms and major sectors are required to set and report their own growth targets in production and export volume for all their major lines of business, and the government incorporates the projected capital and foreign exchange requirement into the official plans. Thus the conforming behavior of the large Korean private firms does not grow out of a process of mutual adjustment as in the case of Taiwan, where private sector adapts business strategy to the realized or projected impact of the official economic plan and the economic bureaucracy in turn reacts to the unfolding state of the economy. In South Korea, the conforming behavior is more or less proactive. The existing policy network establishes an effective channel of communication and negotiations and helps nurture consensus between the two parties and cement mutual expectation. In effect, the South Korea state has turned private firms, in particular the leading conglomerates, into its primary instrument for carrying out the planned targets for individual sector and consequently the national economic objectives.

Furthermore, in South Korea, both the multi-year plans and sectorial plans are always faithfully enforced by responsible ministries and backed up by a coherent set of fiscal, mone-

tary and industrial policies, including detailed instructions to the state controlled financial institutions for the allocation of policy loans. The central planning authority, Economic Planning Board (EPB) coordinates the implementation of economic plans among economic ministries and resolve the inter-departmental differences, with the Presidential Office, the Blue House, looking over its shoulder and intervening directly on occasional basis. In addition, EPB's supervisory authority over the implementation of multi-year macroeconomic plan is enhanced by a system of annual planning, which ensures annual budgeting and short-term macroeconomic management policy to be consistent with the guidelines provided by the multi-year plan but allows the year by year implementation to be adaptive to changing economic situations.

In Taiwan, the official guidelines regarding sectorial development and the overall economic activities as stipulated in each of the government's multi-year economic plans didn't have the same kind of influence on private business strategy because, first of all, the local business community has little standing in the process of plan formulation. Within the overall economic bureaucracy there is no comparable strong central planning authority to effectively implement the multi-year macroeconomic plans. The two important arms to the power

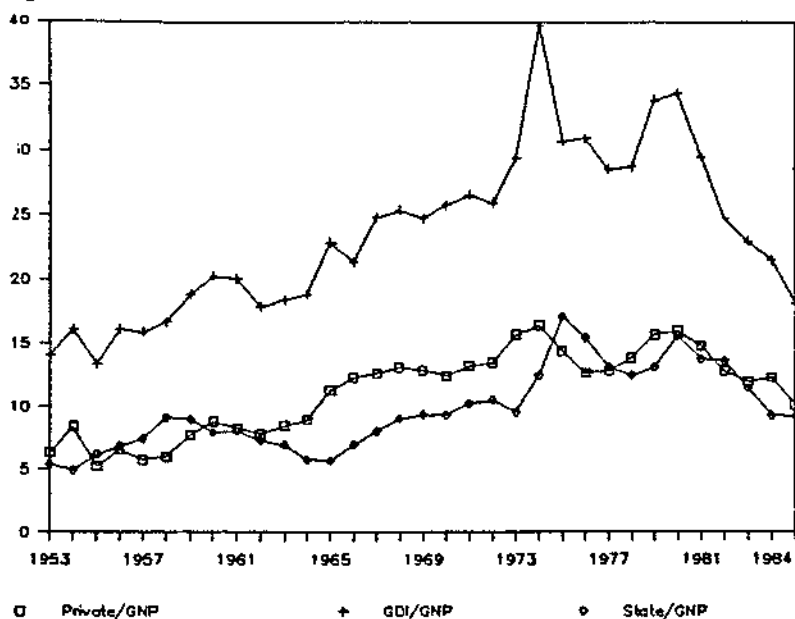
of EPB, the system of detail-oriented annual planning and the assumption of budgeting authority, never have their counterpart in Taiwan's planning process and practice. The powerful fiscal and monetary authority adheres to its own policy agenda and is more readily adaptive to the changing economic state to achieve economic stability than to be bound by the planned macroeconomic performance targets. Thus, there is a widely held belief among business concerns that Taiwan's economic bureaucracy is readily willing to adjust the plan direction and targets to the changing economic condition and with much hesitation to totally revise it if necessary. This macroeconomic management style, in turn, reinforced the private business's expectation that they would have to shoulder much of the risks of business cycle and external shocks themselves and, therefore, to hinge their own investment plans largely to the changing market condition of Taiwan's major trading partners.

III. The First Set of Empirical Evidence: The Contrasting Patterns in Gross Domestic Investment

Figure 1.1.a and 1.1.b present Korean and Taiwan's Gross Domestic Investment (GDI) as a percentage of GNP. Each time series is plotted along with its two major component series⁹ — the level of fixed capital formation (FCF) by the private

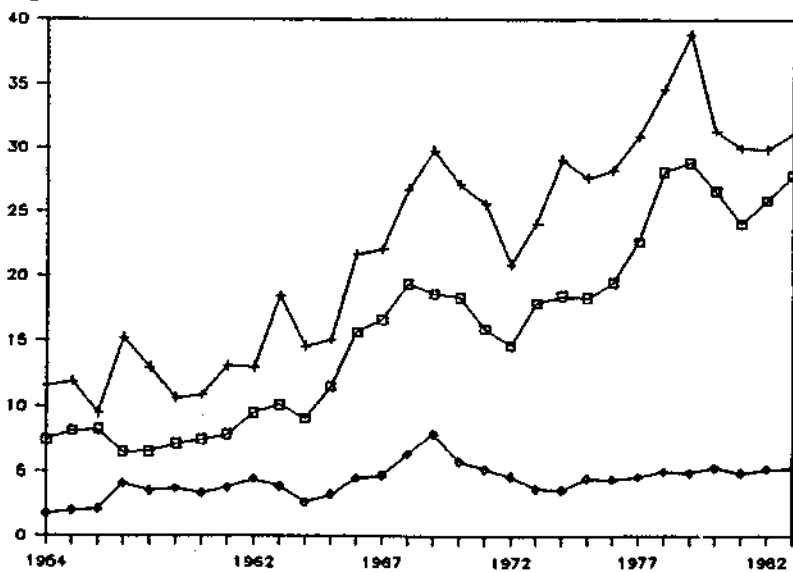
sector, the level of FCF by the government and state enterprises.¹⁰

Figure 1.1 Taiwan Gross Domestic Investment Ratio



□ Private/GNP + GDI/GNP ◇ State/GNP

Figure 1.2 Korea Gross Domestic Investment Ratio



There are several characteristic patterns in the data that are of interest here. First, an important resemblance between the two countries's GDI data is the general trend of increasing proportion of gross national product being spent on investment until the late 1970s. In Taiwan, the trend has been a gradual one. In South Korea the level of GDI gained a phenomenal rise in the 1960s, a rise which coincided with the launch of the First and Second Five-Year plans, and it peaked in the late 1970s, at the height of the push for heavy and chemical industries. Undoubtedly, in both countries this general trend can be attributed in part to the state's overall capacity in mobilizing domestic and foreign resources for investment use, and it is also a telling feature of the East Asian NIC's success story in economic growth.

However, the resemblance stops when we turn to the component parts of GDI, where our theoretical predictions matter. In the South Korean data, the investment by the government and state enterprises has accounted for a very insignificant and almost constant portion of GDI ever since the early 1960s, and all the long-term rise and short-term fluctuations in the GDI originated in the private sector. More importantly, conforming to our expectation, the level of gross private investment has been clearly on a general rise since the early 1970s. In Taiwan, the investment in the private sector

had played second fiddle to the government and state enterprises in the early years of the post-war era. It surpassed the public sector investment beginning in the early 1960s and retained its leading role throughout the first phase of export expansion. But since the early 1970s, conforming to our prediction, it began to level off and then moved into a sliding trend in the late 1970s as the external pressure for industrial upgrading intensified and new investment opportunities for short-term return dwindled. At the same time, the public sector investment reemerged as the dominant factor in GDI and picked up the slack in the private sector since the early 1970s. Entering the 1980s, the Korea's GDI level fell off slightly as many leading sectors suffered from severe over-capacity and the new military government embarked on an IMF-endorsed stabilization program. In Taiwan, the GDI took a nose dive. The private sector became increasingly reluctant to initiate new investment despite the state's intensified effort since the late 1970s while the state was waiting out the world recession before setting its next public sector investment drive – the Fourteen Projects – in full swing.

Aside from these long-term trends, of equal significance is the short-term fluctuations, where the GDI data provides additional direct evidences about the contrasting organizational capacity of the state economic bureaucracy in directing

private investment activities. During most of the period under economic planning, evident in the Korean GDI ratio data is a characteristic oscillation which synchronizes with the last three five-year planning cycles. In each of these cycles, the GDI/GNP ratio rises steadily and peaks in the third year, or the mid-point, of each five-year plan. As pointed out earlier, this cyclical pattern by and large originates from a parallel cycle in the private sector investment. In contrast, there is no readily detectable cyclical patterns in Taiwan's GDI/GNP data or in any of its component series.

Why would the planning cycle take an inverted-U shape? Yusuh and Peters (1985), who first reported this characteristic oscillation in South Korean data, gave the following account: In these first three years, there was an overshooting of plan targets that tended to push the economy into terrain not charted in the Plan, as a result of which the investment spree slowed. The private entrepreneurs who had been operating in the secure environment of explicit government direction became uncertain of their bearing and reluctant about committing capital to new venture. In the public sector, as the growth rate of GDI significantly exceeds the plan targets, promotion for industrial investment also tended to slacken. Also it was difficult for the economic officials to start major new projects towards the close of a plan; important new initia-

tives were held off until the start of the new plan.

The period under the First Five-Year (1962-1966) Plan was the only exception to this characteristic cycle, and it is not too difficult to understand why. First, the formal system of multistaged plan formulation and the system of annual planning to facilitate yearly implementation of the Five-year Plan was introduced in Korea beginning with the Second Plan (Kim, 1983). The hastily prepared First Five-year Plan was actually a revision of the Five-year Economic Plan that had been prepared earlier by the deposed Democratic party government and hastily adopted by the military government (Kim, 1983: 54). Also, during this period, U.S. aid was still the major source of fund for fixed investment. However, the First Plan was an important learning experience for the re-vitalized Korean economic bureaucracy as it became more adept in the use of policy instruments and gradually expanded its reach and scope of regulatory activities with the passing of each economic milestone (Yusuh and Peters, 1985: 21).

VI. The Second Set of Empirical Evidences: A Statistical Test for Planning Cycle

While the divergent patterns in long-term trend clearly conform to our prediction, the comparison of the divergent

patterns in short-term fluctuation may not be as conclusive as it might seem. Although the imprint of the last three five-year plans on the Korean domestic investment is readily visible, a bare-eyed examination of the Taiwanese data is inadequate because it is difficult to detect cyclical components in a time series since they might be contaminated by other noise components. Thus, it is difficult to either reject or accept the hypothesis that the Taiwan's GDI/GNP data also indicates a plan-led multi-year cyclical pattern based on the visual examination. Furthermore, the short realization of the annual data makes either an visual verification or visual rejection even less assuring. A more rigorous verifying scheme and a longer realization of the process are called for. Univariate time series analysis and a data series collected on quarterly basis are clearly in order.

From the time series analysis point of view, we can verify the existence of planning cycle in gross domestic investment in either the time domain (Box-Jenkins) or frequency domain (spectrum analysis). Since most of my colleagues in political science are more familiar with the former technique, only the ARIMA analysis results will be presented here. But the two approaches shall yield comparable results.

In the realm of time domain, a seemingly straightforward way to verify the presence of a multi-year planning cycle in

the investment activity is to test the statistical significance of an order autoregression component, i.e., $ARIMA(1,0,0)_n$, within a fully-identified univariate ARIMA model where n equals the length of the planning cycle.¹¹ In the South Korean case, the expected cyclical impact of the five-year plans can be represented by a $ARIMA(1,0,0)_{20}$ component when quarterly, instead of annual, data is used in the analysis. Similarly, we should expect a $(1,0,0)_{16}$ component of Taiwan's four-year plans.

To test the hypothesized AR component, we apply standard ARIMA model building procedures to the quarterly GDI/GNP ratio series of both countries.¹² The available Korean data covers the period 1963-I to 1984-IV, or from almost the beginning of the First Five-Year Plan to the third year of the Fifth Five-year plan. Comparable Taiwan's data is somewhat difficult to define since in 1975 the government dropped the Sixth Four-Year plan (1973-1976) and replaced it with a new six-year plan (1976-1981), and in 1982 the system was returned to the four-year track. Two series of different lengths are used for completeness. The longer one covers the period 1961-I to 1983-VI. The shorter one covers the period 1961-I to 1976-IV, or from the beginning of the Third Four-Year plan to the end of the Sixth Four-Year plan. Two preliminary procedures were taken before the model fitting process

proceeds: First, logarithm transformation is applied to all three series since each series' variance is proportional to change in the series level. Secondly, each series' autocorrelation function (ACF) and partial autocorrelation function (PACF) are checked to ensure that they all satisfy the stationarity condition.¹³

We take a two-fold strategy to test the presence of an ARIMA (1,0,0)₂₀ or (1,0,0)₁₆ component. First we fit to the data an empirically identified ARIMA model, one identified through the standard iterative diagnosis/identification/estimation model-building strategy (McCleary and Hay, 1980), and see if it contains the hypothesized component. If it does, then we go one step backward: we estimate an alternative model which includes all empirically derived parameters except the hypothesized cyclical component, and we subject the residual series of the alternative model to a diagnosis check to see if the patterns of spiking for its ACF and PACF fit the patterns expected of the hypothesized component. Specifically, for an ARIMA (1,0,0)₂₀ component we expect a spike at precisely the lag of 20 in both ACF and PACF; for an ARIMA (1,0,0)₁₆ component we expect a spike at the lag of 16 in both. To warrant its inclusion in a statistically adequate model, the ACF and PACF spiking patterns must fit the prediction and they should be statistically significant.

On the other hand, if an empirically identified model does not contain the hypothesized component and the ACF and PACF spiking patterns of the model's residual series do not fit the spiking patterns expected of the hypothesized component or they are statistically insignificant, then we can conclude that there is little empirical foundation for its presence. Thus in either case, we present supplementary evidences that warrant the inclusion or exclusion of the hypothesized component. By specifying the above criterion for admissible evidences; we in fact turn ARIMA modeling, which is otherwise an analytical exercise essentially of an inductive nature, into a rigorous hypothesis-testing tool.

Following the model building strategy suggested by McCleary and Hay (1980), we conclude that the quarterly South Korean data is well represented by the ARIMA(0,01)(1,0,0)₄(1,0,0)₂₀ model.¹⁴ It can also be written as

$$(1 - m_4 B^4 - m_{20} B^{20}) \text{Ln}(Y_t) = i_0 + (1 - i_1 B^1) a_t$$

where a_t is a white noise series, and the estimation result is

$$(1 - .59B^4 - .17B^{20}) \text{Ln}(Y_t) = .81 + (1 - .51B^1) a_t$$

(.098) (.061) (.241) (.112)

The above model satisfy all the conventional criterion for a robust model. Parentheses under each parameter estimates indicate its standard error estimates. All parameter estimates in the two models are statistically significant at the .01 level. The

residual series is statistically not different from white noise. The Box-Ljung $Q(21)$ statistic equals 18.36 at 0.63 significance level. In addition to a first-order moving average component, the model contains two seasonal components: First, there is a strong 4th order autoregression component as one would expect of any quarterly macroeconomic data. Secondly, there is a significant $ARIMA(1,0,0)_{20}$ component which can be understood only in terms of a five-year planning cycle. Next, we estimate the alternative model, $ARIMA(0,0,1)(1,0,0)_4$, and present the ACF and PACF of its residual series in Figure 2.1 and 2.2. Parentheses about the ACFs and PACFs indicate confidence interval of plus and minus two units of standard errors. As expected, both functions show a spike at precisely 20th lag, and the value of $ACF(20)$ is statistically significant at .01 level; the value of $PACF(20)$ is significant at .10 level.

The spike patterns in the two figures also suggest an alternative specification of an $ARIMA(0,0,1)(1,0,0)_4(1,0,0)_{10}$ model or an $ARIMA(0,0,1)(1,0,0)_4(1,0,0)_{10}(1,0,0)_{20}$ model with the presence of an $ARIMA(1,0,0)_{10}$ component, i.e., a two and a half year cycle, independent of the $ARIMA(1,0,0)_{20}$ component. However, the statistical evidences for either possibility are not strong. The $ARIMA(0,0,1)(1,0,0)_4(1,0,0)_{10}$ model simply does not provide a good fit to the data, and the

Figure 2.1 AUTOCORRELATIONS OF THE RESIDUALS FROM THE ARIMA MODEL FOR KOREA'S QUARTERLY GROSS DOMESTIC INVESTMENT 1963.1-1983.1V

1- 12	.09	.13	.19	.10	.02	-.01	-.06	-.02	.13	-.23	-.15	-.01
ST.E.	.11	.11	.11	.11	.11	.11	.11	.11	.11	.12	.12	.12
13- 24	-.06	-.11	.15	.07	.09	.13	.02	.26	.06	-.12	.04	-.09
ST.E.	.12	.12	.12	.12	.12	.12	.12	.12	.12	.13	.13	.13

PLOT OF AUTOCORRELATIONS

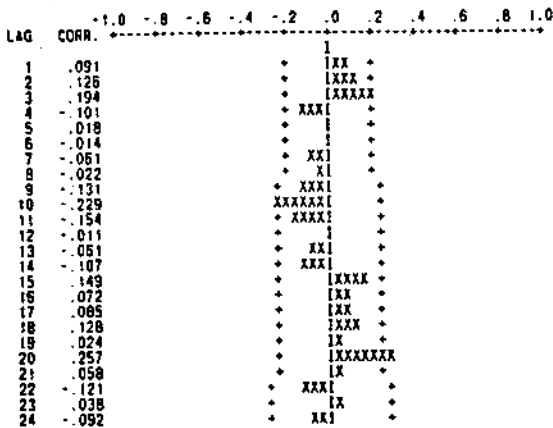
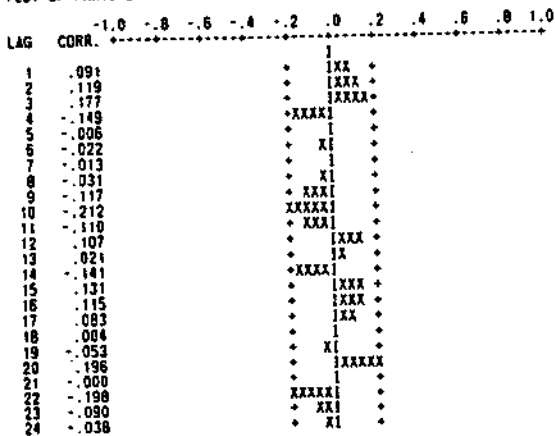


Figure 2.2 PARTIAL AUTOCORRELATIONS OF THE RESIDUALS FROM THE ARIMA MODEL FOR KOREA'S QUARTERLY GROSS DOMESTIC INVESTMENT 1963.1-1983.1V

1- 12	.09	.12	.18	.15	-.01	-.02	-.01	-.03	-.12	-.21	-.11	.11
ST.E.	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11
13- 24	.02	-.14	.13	.12	.08	0.0	-.05	.20	0.0	-.20	-.09	-.04
ST.E.	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11

PLOT OF PARTIAL AUTOCORRELATIONS



$(1,0,0)_{10}$ parameter is statistically insignificant (T-Statistic equals -1.30). The estimation of the $ARIMA(0,0,1)(1,0,0)_4$ $(1,0,0)_{10}(1,0,0)_{20}$ model shows that the $(1,0,0)_{20}$ parameter is still highly significant but the $(1,0,0)_{10}$ parameter is on the border line of being significant.

Applying the same model building procedure to the two time series for Taiwan, we conclude that both series can be well represented by the $ARIMA(0,0,2)(1,0,0)_4$ model, which can be rewritten as

$$(1 - m_4 B^4) \text{Ln}(Y_t) = i_0 + (1 - i_1 B^1 - i_2 B^2) a_t$$

and the estimated model for the first series (1961-I to 1983-IV) is

$$(1 - .84B^4) \text{Ln}(Y_t) = .52 + (1 - .49B^1 - .55B^2) a_t$$

(.050) (.155) (.093) (.092)

and the estimated model for the shorter series (1961-I to 1976-IV) is

$$(1 - .86B^4) \text{Ln}(Y_t) = .47 + (1 - .57B^1 - .59B^2) a_t$$

(.062) (.187) (.111) (.112)

The consistency in model specification and parameter estimation between the two estimation periods give a strong indication for the robustness of our model building process. Both model estimation show a strong 4th order autoregression component but rule out other seasonal components. Figure 3.1 and 3.2 show the ACF and PACF for the residual from the

Figure 3.1 AUTOCORRELATIONS OF THE RESIDUALS FROM THE ARIMA MODEL FOR TAIWAN'S QUARTERLY GROSS DOMESTIC INVESTMENT 1961.I-1983.IV

1- 12	.05	.04	.14	-.03	.01	-.08	-.02	-.06	-.07	.11	.02	0.0
ST.E.	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11
13- 24	-.11	-.06	-.07	.03	-.13	.10	.12	-.02	.04	.07	.11	-.05
ST.E.	.11	.11	.11	.11	.11	.12	.12	.12	.12	.12	.12	.12

PLOT OF AUTOCORRELATIONS

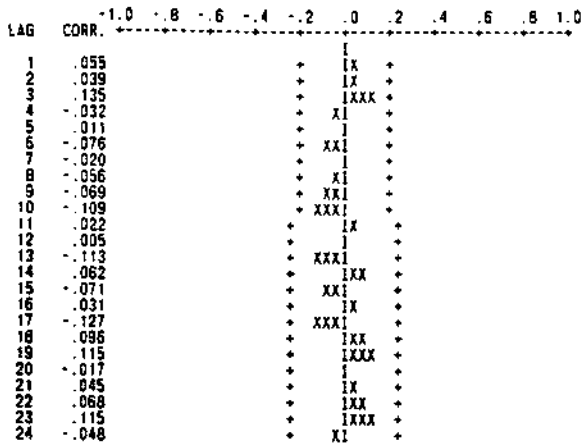
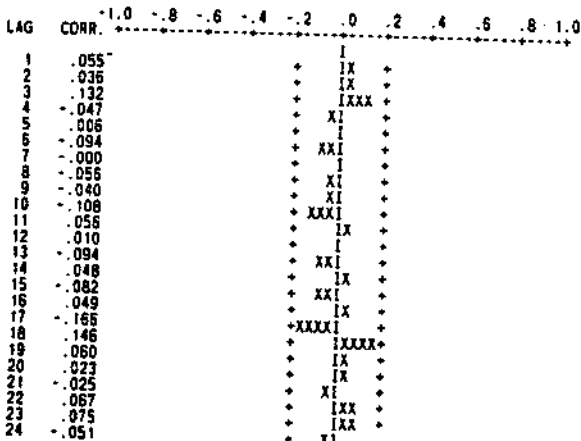


Figure 3.2 PARTIAL AUTOCORRELATIONS OF THE RESIDUALS FROM THE ARIMA MODEL FOR TAIWAN'S QUARTERLY GROSS DOMESTIC INVESTMENT 1961.I-1983.IV

1- 12	.05	.04	.13	-.05	-.01	-.09	0.0	-.06	-.04	-.11	.06	0.0
ST.E.	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11
13- 24	-.09	-.05	-.08	.05	-.17	.15	.06	.02	-.02	.07	.07	-.05
ST.E.	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11

PLOT OF PARTIAL AUTOCORRELATIONS



longer series. As it can be seen, neither the ACF nor the PACF spiking patterns provide any evidence to suggest the presence of an $ARIMA(1,0,0)_{16}$ component or any other seasonal components.

The statistical test for planning cycle has several important implications. First, it confirms our visual examination of the relation between multi-year planning and domestic investment. Second, it provides support to our argument about the state's differing organizational capacity in directing the investment activities in the economy between the two countries. Lastly, and perhaps more significantly, the planning cycle in the Korean GDI persisted throughout the 1970s despite the turbulent international economic environment. This persistence reveals a characteristic macroeconomic adjustment pattern that clearly differentiate South Korea from Taiwan.

V. By Way of Conclusion

In the beginning of this research note, I set out to demonstrate how differences in organizational characteristics of state economic bureaucracy and its institutional links to the private business community can have important implication for the capacity of economic officials in implementing

programmatic plans for the national economy. The difference in the guiding effect of the multi-year macroeconomic plans on domestic investment turned out to be consistent with my argument. The above analysis also demonstrate that a systematic comparison of the varying institutional arrangements in the area of economic policy-making among the East Asian NICs is both intellectually fruitful as well as imperative. Without duly attention to the important diversity among them, the experiences of the East Asian growth can only be partially understood.

Bibliography

- Chu, Yun-han, 1987. State and Economic Adjustment in the East Asian Newly Industrializing Countries. Paper presented at the Program on Interdependent Political Economy workshop, Department of Political Science, University of Chicago, April 1, 1987.
- Evans, David, and Parvin Alizadeh. 1984. Trade, Industrialization, and the Visible Hand. *Journal of Developmental Studies*, 20 (December): 22-46.
- Gold, Thomas B. 1986. *State and Society in the Taiwan Miracle*. New York: M. E. Sharpe.
- Haggard, Stephan and Tun-jen Cheng. 1987. State and Foreign Capital in the East Asian NICs. In Frederic C. Deyo, ed., *The Political Economy of East Asian Industrialism*. Cornell University Press.
- Johnson, Chalmers. 1982. *MITI and the Japanese Miracle*. Stanford: Stanford University Press.
- Kim, Kwang Suk. 1983. The Korean Experience in Development Planning, Policy Making and Budgeting. World Bank Staff Working Paper, No. 574.
- Kim, Kwang Suk. 1985. Industrial Policy and Industrialization in South Korea: 1961-1982. The Hellen Kellogg Institute for International Studies, University of Notre Dame,

Working Paper No. 39.

Little, Ian. 1981. The Experience and Causes of Rapid Labour-Intensive Development in Korea, Taiwan Province, Hong Kong and Singapore and the Possibilities of Emulation. In E. Lee, ed., *Export-led Industrialisation and Development*. Geneva: Asian Employment Programme, International Labour Office.

McCleary, Richard and Richard A. Hay, Jr. 1980. *Applied Time Series Analysis*. Beverly Hills: Sage Publications.

Wade, Robert and Gordon White, eds. 1984. Special Issue on Developmental States in East Asia: Capitalist and Socialist. *Institute of Development Studies Bulletin*, 15 (April): 1-70.

Yusuf, Shahid and R. Kyle Peters. 1985. Capital Accumulation and Economic Growth: the Korean Paradigm World Bank Staff Working Paper, No. 712.

Note:

1 For examples, Wade and White (1984), Evans and Alizadeh (1984) and Haggard and Cheng (1987).

2 The point agency for the private industry, the Bureau of Industrial Development under the MEA, was upgraded to its current form as late as 1970.

3 During most of the 1960s and early 1970s, the planning agency, Council for International Economic Cooperation and Development (CIECD), was headed by C.K. Yen (1964-69), a former finance minister, and later by Chiang Ching-Kuo (1969-1973), the Generalissimo's oldest son. After Chiang Ching-Kuo (CCK) became the Premier, CIECD was reorganized and downgraded into a advisory agency known as Economic Planning Council (EPC) in 1973, and the real economic policy-making power was taken over by a new five-man Finance and Economic Small Group of Executive Yuan, headed by Central Bank governor, Yu Kuo-hwa. In 1977 as CCK was elected president, EPC was revitalized to become a supraministerial agency known as Council for Economic Planning and Development (CEPD) and again was headed by Yu Kuo-hwa. But as Yu was promoted to the Premier in 1983, the influence of the CEPD was once again downgraded. In recent years, the CEPD performs primarily an advisory role in the policy-making process.

4 One such example is the petro-chemical policy network centering around the state-owned China Petroleum.

5 The best analogy for the subtle relationship between Secretary of Economic Affairs to the President and EPB is that of the National Security Advisor to the President and State Department in the U.S. government.

6 Formerly, the Korean Institute of International Economics.

7 Starting with the Second Five-Year Plan, representative of appropriate industrial associations were included in various working groups organized to help prepare sectorial plans (Kim, 1983: 46-47). Industrial associations frequently submitted their proposals for industrial policies for their respective industry either on demand or on their own initiatives and they also helped responsible state agencies in conducting industrial survey, devising Korean Standards, and enforcing governmental regulations (Kim, 1985).

8 Interview in Seoul, December 1986.

9 The residual component is increase in stock.

10 Because of differences in accounting practices and statutory stipulation, the first two component time series are not strictly equivalent between the two countries. In the South Korea, the investment activity of the twenty-six "public corporations" (parastatal), some of which are fully owned by the state, is reported in the private sector fixed capital formation data, while in Taiwan there is no such distinction. All fully-owned state enterprise are collapsed into one category. On the other hand, in Taiwan the private sector data includes private firms with minority state equity participation and a handful of semi-parastatal enterprises, e.g., the party-run

business, which do not have their counterpart in South Korea.

11 The ARIMA (p,d,q) notation denotes an ARIMA model which contains an autoregressive process of order p, an moving average process of order q, and an integrated process of order d, i.e., the number of differencing required to achieve stationarity. The ARIMA (P,D,Q)_s notation represents a seasonal ARIMA model in which P, D, and Q are analogous to p, d, q. The parameter s indicates the length of cycle. Finally, a general ARIMA seasonal model is denoted by ARIMA (p,d,q)(P,D,Q)_s. Please see McCleary and Hay (1980) for details.

12 It would be nice to also model the private sector investment ratio and public sector ratio separately. The Korean governmental publications, however, do not report the two component series on quarterly basis, and the data for Taiwan were available only since 1980.

13 The natural logs of all three series within the period of observation are in fact stationary. While a (1,0,0)₄ seasonal component is readily detectable in all three, all series are seasonally stationary as they are uniformly characterized by decaying seasonal lags of spiking ACF and PACF at lag 4, 8, 12 and 16.

14 The RATS 1.20 econometrics program and BMDP-T2 statistical packages were used in this and other statistical analyses reported in this report.

從中韓兩國經濟計劃與國內投資變動的關係看兩國政經結構之差異

朱 雲 漢

晚近研究東亞新興工業化國家的政治經濟結構的著作，往往偏重「四小龍」國內結構的共通性的分析，而忽視了各國之間顯著的差異。四國政府在七十年代面臨工業升段及經濟調整的挑戰後，所採行的對應政策各異其趣，因此必須同時掌握四小龍政府所面對的國內外結構限制上的共通性及差異性，才能進一步掌握這四國晚近的工業化過程及未來的發展課題。本文目的在證實由於四小龍的國家經濟官僚體系的組織特性不同，政府與民間企業的關係親疏有別，因此國家對工業升段過程的主導能力在四國間存在明顯差異。限於篇幅，本文集中於比較中韓兩國在上述兩項結構性因素上的差異，並進一步檢視上述差異如何表現在政府經建計畫與國內投資毛額的關係上。利用晚近時間序列分析的技術，作者證實韓國的五年經建計畫對國內投資有明顯的引導作用，但我國的四年經建計畫對國內投資卻無類似作用。這是由於(1)韓國的財經官僚體系以重發展的計畫官僚為核心，我國則以重安定的財金官僚為核心；(2)韓國政府與企業界形同一體而在我國兩者保持一定距離。