

Where Do We Invest? A Cross-Country Comparison

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This paper suggests that an over-investment on real estate may be one major source of the fundamental weakness of some financially troubled Asian economies. An over-development of the real estate sector could dissipate the crucial process of building a strong productive capacity of the economy. We analyze investments and savings in Korea and compare with those of Japan, Taiwan, and Thailand. A few noticeable facts stand out between Korea and Taiwan. Korean growth performance was very close to Taiwan who was saving and investing 50% less in terms of the percentage shares of GDP. One possible explanation can be obtained in the decomposition of the total investment. Korea invested 36% of her total investment into the machinery and equipments category and Taiwan spent 48.8% of her total investment. We also attempted to show the measurement error as a possible source of grossly overvalued total saving rate in Korea. Once the measurement error is properly corrected, then households' consumption occupies 68.9% of GDP and the total saving and investment ratio become 24% of GDP, which is very close to that of Taiwan. If the true saving rate of Korea is around the mid-20%, not the mid-30%, and if the past investment have heavily concentrated on housing and its related activities, then the Krugman-Lau debate tells us how we might prolong the past growth performance. Korea could improve the saving rate, say to the level of Japan. This input-driven growth can also be made more effective by improving the efficiency of investment.

I. Introduction

One would naturally expect that the issue of "over-consumption" given such a prominent role in the debate of economic restructuring following the Asian crisis must bear a certain amount of explanatory power for the current state of the economy.¹ We also hear about the factual evidence of excessive (?) amount of saving in Asian economies, which seem to be at odds with the phenomenon of over-consumption. This paper attempts to suggest that the form of wealth accumulation that puts an unusually heavy emphasis on real

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1. Certainly this has been the case in Korea. The policy authority and the press tend to point fingers at the over-consumption of a group of well-to-do consumers and the conspicuous consumption pattern of the general public for the current malaise of the economy.

estate may explain the evident contradiction. We show that this might also be one major source of the fundamental weakness of some Asian economies that have succumbed to the pressure from the recent financial crisis.

From consumers' point of view, the investment in residential construction is an important form of saving, which in turn is captured as investment in national income statistics. This saving-investment connection is clear and self-explanatory. Residential construction is a major part of national wealth accumulation and the service derived from the stock is an ultimate measure of economic welfare. An over-development of the sector, however, could dissipate the crucial process of building a strong productive capacity of the economy's external sector, which often has been the source of foreign exchange earnings for newly industrializing countries. The bubbly real-estate investment boom, regardless of its sources, may engender a few unusual resource allocation problems for the economy and its consumers.

First, a heavier than normal proportion of national saving that is devoted to housing and its associated investment simply implies that industrial capacity building and other productivity-enhancing resources receive a smaller share. For an economy relying on steadily improving foreign exchange earnings and on strengthening domestic capital formation, this could be a potential bottleneck in the process of sustained growth process. Second, the asset-accumulation in the form of houses and apartments during the real-estate boom is indeed very attractive. In particular, when the future economy is pictured bright and promising, this is regarded as an almost risk-free option in the spectrum of portfolio choices. Concerted efforts to save more are made and even a heavy borrowing is encouraged to expedite the asset acquisition. Holding appreciating assets may result in excessive transitory consumption over a period of time. For this reason, one may feel justified for calling "over-consumption" as a possible culprit for the current economic troubles. A more interesting aspect is that the asset-holding individuals are experiencing an abnormally heavy expenditure on housing. Coupled with the idiosyncratic measurement problems, we have the inconsistency of high saving rate and over-consumption.

Finally, the penchant for the peculiar form of asset accumulation could induce the financial sector to misalign the portfolio balance over a significant period of time. When the tide changes, of course, this would create havoc for the whole economy as we have been witnessing recently. The field of finance and development seems to have paid little attention to the composition of wealth accumulation and its consequences on the growth path of a developing economy.

The paper is organized as follows. The next section looks at a simple asset-market equilibrium model with real estate as one of the key sectors. The standard comparative-static exercises will be performed in order to derive a few implications of asset market bubbles. One of the results is that the real interest rate could remain high, which in turn could depress the investment activities of the real sector while encouraging the investment in the housing sector. Section III considers the housing investment and imputed rent in Korea and compares with those of Japan, Taiwan, and Thailand. Section IV discusses the implications of the finding for the debate on the nature of East-Asian development patterns (a-la Kim-Lau controversy, Kim and Lau (1994)) and for the efficiency of capital stock. The paper ends with some concluding remarks.

II. Asset Market Equilibrium

In the standard macroeconomic literature, wealth is defined as:

$$W = M + B + K, \quad (1)$$

where W , M , B , and K are wealth, liquid (monetary) asset, (government-issued) bond, and capital, respectively. Capital is held in the form of equity ownership. Most studies leave land L out of this for it plays a minor role in the short-run theoretical discussion in the standard macroeconomics dealing with developed economies. For example, the analysis of an open-market operation looks into the effects on the economy of simultaneous changes in money and bond. Even for the long-run analysis, it receives only a tangential treatment in the mainstream literature. Although it is an important factor of (agricultural) production, land is not considered as a form of national wealth accumulation. This does not imply, however, all lands are the same. Real estate with better infrastructure (irrigation, transportation facilities, and so on) is definitely more productive and valuable. Note that this sort of real estate development expenditure is a part of K or captured by government expenditure (the investment part of the expenditure).

Suppose private savers consider real estate investment as an attractive form of saving. It is easy to see how this might develop. Given the record of steady economic growth and the promising future prospect, rational agents wanting to maximize the return of their saving might consider ever-scarce real estate as a safest form of personal investment. Given a fragile capital market and the lack of transparency in financial transactions of corporate sector, real estate becomes the choicest mode of asset holding. People in countries like Japan, Hong Kong, and Korea with limited land tend to believe in the special value of land and have had a long history supporting their belief that land investment is always prudent. When a group of agents, albeit small, initiates competitive bidding for the given stock of land, the price starts creeping up and the pattern of speculative real estate boom develops if there exists a sufficient momentum in the rush.

The sellers of real estate during the boom period collect capital gain which of course is financed by buyers' saving. The portion of this gain geared for consumption leaks out of the saving-investment nexus. Thus this may be legitimately called over-consumption associated with the bubble phenomenon. Even if the gain is reinvested into real estate development, the residential construction that has become a major part of the investment activity imparts the significant consequences to the national capital stock and the economy's capital output ratio. Moreover, the growth process might be significantly affected by the continual progress of real estate over-investment zeal.

It is moot whether over-consumption is indeed responsible for the current economic problem. However, if the above calculation is upheld in the more systematic statistical investigation, it is true that consumption including true housing services was indeed extraordinarily high. At the same time, it means saving was not transformed into

production-related investment expenditures.² The high saving - high investment nexus is clearly broken and the mystery that why such a high saving rate did not turn the economy into a powerhouse of production and technology development is a simple statistical oversight.

This section attempts to explore these possibilities by putting real estate into the wealth definition instead of bond. Consider the following asset market composition:

$$W = M + L + eF, \quad (2)$$

where L , F , and e are real estate, foreign asset, and exchange rate (price of foreign money in terms of domestic currency units) respectively. We omitted capital stock in order to emphasize real estate and also for the sake of short-run analysis. The following describes the behavior of each market:³

$$M = m(i, W), \quad (3)$$

$$L = l(i, W, \mathbf{p}), \quad (4)$$

$$eF = f(i, W), \quad (5)$$

where \mathbf{p} is the expected inflation as a proxy for capital gain. The left-hand side of the equation is the supply and the right-hand side denotes the demand behavior. The four equations above describe the three asset markets and when any two markets are in equilibrium the third market can be residually determined.

The theory of liquidity preference implies $m_i < 0$ and $m_w > 0$, where the subscripted behavioral equation denotes the partial derivative of the function with respect to its argument. The equilibrium in the real estate market depends on the rate of interest, wealth, and expected inflation. When the interest rate increases, the price of real estate decreases and its demand increases.⁴ The higher the expected capital gain, the more attractive the holding of real estate. Thus, we have $l_i > 0$, $l_p > 0$ and $l_w > 0$. Foreign assets become increasingly important for newly industrializing economies and capital movements have played a critical role during the asset-bubble period in recent years. The behavioral relation of its demand with the rate of domestic interest and the wealth is as expected: $f_i < 0$ and $f_w > 0$.

2. Arguably, housing is, up to a point, a very important productivity-inducing input. The trend in Seoul seems to suggest that an average size and value of apartment and single family house are beyond the comparable norm. For example, the size is getting larger while the average family size shrinks and the construction becomes more upgraded.

3. The model is standard as in Dernburg (1989), McCafferty (1990), and van Wijnbergen (1983) among many others. We adopt Dernburg's description which seems expositionally simpler.

4. Just consider real estate as a close substitute for bond whose price has an inverse relation with the rate of interest.

Combining the four equations into one, we have

$$W = m(i, W) + l(i, W, \mathbf{p}) + f(i, W),$$

which, upon being differentiated with respect to W and i , yields

$$1 = m_w + l_w + f_w, \quad (6)$$

$$0 = m_i + l_i + f_i. \quad (7)$$

Equation (6) is the usual adding-up constraint; that is, an increase in wealth will end up in some combinations of increases in its components. The substitution among the three assets implies that $l_i = -(m_i + f_i) > 0$. An increase in the rate of domestic interest causes substitution toward real estate away from domestic liquid asset and foreign asset.

Equations (2) through (5) describe three asset markets and the Walras law allows us to omit any one market in the equilibrium analysis. Given our focus, the preferred choice is the money market. Thus, the model consists of Equations (4), (5) and

$$M = W - l(i, W, \mathbf{p}) - f(i, W) \quad (8)$$

in three endogenous variables, *i.e.*, and W . The model above does not include the exchange rate as an explicit argument in the demand equations, meaning the absence of currency substitution and the under-developed capital market. However, the exchange rate enters into each asset market indirectly by the relation

$$dW = Fde \quad (9)$$

that is obtained by differentiating Equation (2). To see this, totally differentiate Equation (4) and use Equation (9) to obtain

$$0 = l_i di + l_w dW = l_i di + l_w Fde, \quad (10)$$

that yields $\left. \frac{de}{di} \right|_L = -\frac{l_i}{Fl_w} < 0$. The equilibrium in the real estate market slopes negatively

when pictured in the plane of the exchange rate and the rate of interest. A drop in the exchange rate (an appreciation of domestic currency) induces a decrease in the stock of wealth, which in turn implies a decrease in demand for all assets including real estate. Given the fixed amount of real-estate supply, this decrease has to be met by an increase in demand caused by an increase in the rate of domestic interest.

Totally differentiating Equations (3) and (5) and using (9), we obtain $\left. \frac{de}{di} \right|_M = -\frac{m_i}{Fm_w} > 0$

and $\left. \frac{de}{di} \right|_F = \frac{f_i}{F - Ff_w} < 0$, which determine the slopes of money and foreign asset market in

the plane of prices. An increase in the stock total wealth caused by an increase in the exchange rate brings about a higher demand for money, which has to be absorbed by an equal decrease in demand induced by an increase in the rate of interest. Thus, the money market equilibrium slopes upward. A similar argument de

monstrates the slope of an equilibrium relation in the market for foreign assets is negative. The stability is guaranteed if the slope of the real-estate market equilibrium is steeper than that of the foreign asset market (see McCafferty (1990) for such an analysis). A simple algebraic manipulation shows that indeed this is the case given the assumption of the signs associated with partial derivatives.⁵

5. $\left. \frac{de}{di} \right|_L < \left. \frac{de}{di} \right|_F \Leftrightarrow f_i m_w + m_i (l_w + m_w) < 0$.

Figure 1 below shows that the market is in equilibrium at point a. Now, consider a capital inflow associated with trade deficit. Without an intervention, this will only create a depreciation of domestic currency without affecting the rate of interest. However, if the policy authority worries about the depreciation and/or inflation, a tight monetary policy might be used to dampen the currency movement. Also suppose the capital inflow is funneled into residential construction fueled by an expectation of higher capital gain (ρ). The situation is depicted by a new equilibrium at point b. Exchange rate is stabilized but with a much higher domestic interest rate. The higher interest rate curbs the non-housing investment activities such as plant and equipment. The scenario might fit what happened in Korea and Thailand. Arguably, the exchange rates have been kept unreasonably low in Korea, perhaps aided by political factors.⁶ The inflation-phobia combined with a temporarily sustained economic boom could also have helped the high-interest-rate policy. At least in Korea, the bulk of available fund has been siphoned into the hands of major business groups and the high rate of interest must have discouraged other potentially productive investment projects by small and medium enterprises.

On the other hand, a trade surplus creates an opposite result. In the absence of policy intervention, the surplus generates an increase in F which will put an upward pressure in the exchange rate market, with a net result of a constant value of eF . Worrying about the international competitiveness, the likely policy response might be an easy money. The interest rate will stay low and make non-housing investments more attractive. The situations of Japan and ROC may be the case in point. Although Japanese yen has been strengthened in the 90s, the N.T. dollar paralleled the movement of Korean won.⁷ The interest rates in Japan and ROC were relatively much lower than those of Thailand and Korea (see Table 1). The next section will investigate the consequences of these contrasting policy reactions.

Table 1 Nominal (Real) Interest Rates (percentage (%))

Year	Japan	ROC	Thailand	Korea
1991	7.46(4.79)	6.78(2.93)	11.15(5.40)	17.00(6.90)
1992	4.58(2.85)	6.50(2.57)	6.93(2.44)	14.30(8.24)
1993	3.06(2.45)	6.35(2.84)	6.54(3.21)	12.10(7.01)
1994	2.20(2.03)	6.10(4.21)	7.25(2.12)	12.50(7.02)
1995	1.21(1.85)	5.75(3.81)	10.96(4.96)	12.60(7.00)
1996	0.47(0.93)	5.20(2.52)	9.23(5.20)	12.40(8.99)
1997	0.48(-0.10)	5.35(3.50)	15.69(10.26)	13.20(10.81)
Average	2.78(2.11)	6.00(3.20)	9.68(4.80)	13.44(8.00)

Note: All nominal rates are money market rates except for ROC's time deposit rates. Real rate is simply nominal minus inflation and the latter is calculated using GNP deflators.

6. Often, policy makers identify currency depreciation with a symptomatic failure of economic policies and attempt to maintain the value until the last minute.

7. The Japanese capital market is much more open and subject to the international market influences. The current swings in the value of the yen well reflect the underlying volatility of the currency.

III. Investment Activities and the Measurement of Saving

Consider the basic national income identity:

$$I = S + (T - G) + (IM - EX), \quad (11)$$

where the notations are standard. Often we just look at how national saving is divided into private and public and how much foreign saving contributes toward the total investment. A given amount (in terms of shares of GDP) of total investment may consist of many different combinations of investment categories. As shown in Figure 1, a policy response that brings about a higher interest rate will favor residential construction whereas sacrificing investment in plant and equipment. The private saving might be high but a sizable portion of this might be devoted to accumulating wealth in the form of housing rather than non-residential capital stock through financial intermediation. Efficient capital markets separate savers and investors, whereas an underdeveloped financial system tends to limit the diversification of portfolio.

Table 2 and 3 show the above national income identity for ROC and Korea. A few noticeable facts stand out. First, the ROC's economy saves 3.1% in foreign economies on average, whereas the Korean economy accumulates 1.5% per year on average as a sovereign debt. The net difference between the two countries is 4.6%. Second, in terms of the percentages of national income Korea invests 13.8% more per year than ROC. Given that both economies have often been exemplified as cases of successful economic development, this is indeed a remarkable difference. To accomplish such a high investment rate, Koreans had to rely on a high saving both by the private sector and by the government sector. The Korean private sector saves 6.5% more than that of ROC, whereas the Korean government saves 2.8% more than the counterpart in ROC. One would imagine such a high rate of investment in Korea must have produced an equally high growth rate of the economy. The statistical data on growth performance, however, are puzzling. While Korea saves and invests almost 50% more than its neighboring country in terms of the percentage of national income, the difference in growth rates in the 1990s is less than 1%, Korea being slightly higher than ROC. Two possible explanations for the lack of connection between investment and growth are postulated: a measurement of consumption and the nature of investment activities themselves.

Table 2 Investment and Saving: ROC (% of GNP)

Year	<i>I</i>	<i>S</i>	<i>T - G</i>	<i>IM - EX</i>
1990	22.5	20.1	7.2	- 4.8
1991	22.7	22.5	4.6	- 4.4
1992	24.4	19.7	6.8	- 2.1
1993	24.8	19.0	8.6	- 2.8
1994	23.6	17.9	7.6	- 1.9
1995	23.4	19.0	6.4	- 2.0
1996	21.1	19.7	5.3	- 3.9
1997	22.1	19.1	5.6	- 2.6
Average	23.1	19.6	6.5	- 3.1

Data: Taiwan Statistical Data Book, Council of Economic Planning and Development, 1998.

Table 3 Investment and Saving: Korea (% of GNDI)

Year	<i>I</i>	<i>S</i>	<i>T - G</i>	<i>IM - EX</i>
1990	36.8	27.2	8.7	.9
1991	39.1	28.3	7.8	3.0
1992	36.4	27.1	7.8	1.5
1993	35.2	26.7	8.6	- .1
1994	36.5	26.0	9.3	1.2
1995	37.3	25.7	10.6	1.0
1996	38.9	23.6	11.3	4.0
1997	35.3	24.3	10.3	0.7
Average	36.9	26.1	9.3	1.5

Table 4 Composition of Gross Capital Formation (%): ROC

Year	Residential Building	Non-residential Building	Other Construction	Machinery and Equipment
1990	11.8	16.1	20.0	51.3
1991	10.8	16.8	22.2	49.2
1992	12.1	16.0	22.5	48.6
1993	13.8	13.7	25.0	46.1
1994	12.1	13.8	26.6	46.7
1995	10.1	14.2	25.8	49.3
1996	8.4	14.6	25.9	50.2
Average	11.3	15.0	24.0	48.8

Table 5 Composition of Gross Capital Formation (%): Japan

Year	Residential Building	Non-residential Building	Other Construction	Machinery and Equipment
1989	19.4	17.8	19.8	39.2
1990	19.0	18.3	19.9	39.1
1991	17.1	20.5	20.3	38.4
1992	16.5	21.9	20.9	36.9
1993	17.7	22.2	21.6	34.6
1994	19.6	21.4	21.9	33.0
Average	18.2	20.4	20.7	36.9

Table 6 Composition of Gross Capital Formation (%): Thailand

Year	Residential Building	Non-residential Building	Other Construction	Machinery and Equipment
1990	22.8	13.1	12.1	49.9
1991	23.7	13.3	13.0	48.5
1992	19.7	14.9	15.8	48.4
1993	18.8	15.7	15.0	49.2
1994	18.7	13.7	17.4	48.9
1995	17.5	13.0	16.4	52.0
1996	16.3	12.2	18.8	51.7
Average	19.6	13.7	15.5	49.8

Table 7 Composition of Gross Capital Formation (%): Korea

Year	Residential Building	Non-residential Building	Other Construction	Machinery and Equipment
1990	22.0	18.5	15.6	40.5
1991	21.6	16.2	17.5	36.8
1992	20.6	15.1	20.5	35.8
1993	24.2	18.2	22.1	34.2
1994	21.2	16.9	21.0	35.9
1995	21.2	17.5	20.1	35.3
1996	19.6	16.0	21.8	33.7
Average	21.5	16.9	19.8	36.0

First, consider how the total investment is disaggregated into sub-categories. Table 4 shows the composition of ROC's gross capital formation. Machinery and equipment includes transportation equipment. Comparing with Table 7 for Korea, we notice that Korea has spent 21.5% of her total investment in residential construction during the period of 1990-1996.⁸ During the same period, ROC spent 11.3% of her total investment on housing sector. In terms of percentage shares of GNP (or GDP), Korea invested 6.7% of her GNP into housing sector, whereas ROC did only 2.6%. The difference is astounding.⁹ One might tempt to say the difference is simply equivalent to that of percentage difference of foreign savings of the two economies. They also differ in investment in machinery and equipment. Korea invested 36% of her total investment (13.3% of GDP) into this category and ROC spent 48.8% of her total investment (11.3% of GDP).

Table 5 and 6 show the composition of total fixed capital formation of Japan and Thailand, respectively. Japan is seen to have invested in machinery and equipment in terms of percentage of output as much as Korea, whereas Thailand's emphasis on this category is as strong as ROC's. Thailand's investment in residential construction has been vigorous up to the recent crisis, but the non-residential and other construction, on the other hand, took the smallest share of the total investment among the four economies. The much talked-about real estate construction boom in Thailand seemed to be a phenomenon that only recently developed.

Both Thailand and Korea have relied on foreign capital inflow in order to maintain their high investment activities. At the same time these economies also attempted to stabilize foreign exchange rates. The analysis in the previous section indicates what would be expected of portfolio adjustment in this situation. A strong development in the residential

8. Construction value is imputed rather than collected. The process starts from the permits (housing and construction starts) and the actual buildings are deemed to be constructed one month after the official permit. The average square footage is assessed and the average cost of construction is applied. After the basic job is done at a base year, updates are made using an appropriate deflator. Given the importance of the sector, the simplistic imputation process seems clearly inadequate and there appear more appropriate methods of calculating the value of investment and hence an improved measure of imputed rent (see below for the problem of the rent imputation).

9. One also observes that a significant portion of non-residential construction in Korea is geared toward semi-residential activities and other entertainment service activities.

construction would prevail with a high rate of interest. In Thailand, the investment in machinery and equipment still remained high perhaps due to a smaller role of public works.

Next, consider the possibility that saving might have been measured with a systematic bias. Alternative measures of national income statistics must eventually be aligned with each other for their consistency. For example, rewards to factors of production add up to national income. One of the items is rent that is normally imputed for services derived from the stock of housing and other real estate items such as office buildings. When consumers own their houses based on long-term mortgage contracts or rent from the commercial firms as in US, the market assessment of the housing services is straightforward. In Korea, people use the mortgage financing less often and, when they do, a very small portion of the total value of their houses. Currently the imputed rent occupies only 5% of the national income and the household expenditure statistics shows about 12% of the total expenditure being allocated to housing, heat and water. Since consumption is about half of the national income the two statistical figures are consistent. We find these statistics simply unrealistic. To get a different feel, we would like to experiment with a couple of simple-minded exercises.

In principle, the imputed rent is calculated based on accumulated housing stock and sample rental value of the housing. Housing stock, as with other form of capital stock, eludes accurate measurement. At least, it is feasible to count the number of apartment units and single family dwellings. Imputed rent in the current Korean NIA (National Income Account) statistics (appeared as a part of finance, insurance, real estate and other service in the production table) is more problematic. The informal survey simply shows an average household in Seoul spends on housing approximately half of the imputed income (imputed because of the assessed value of housing expenditure in terms of the foregone interest income by owning the house). For example, the ratio between monthly income and the value of house/apartment for an average household in Seoul is very close to 0.01. Assuming a 1% monthly interest for simplicity, then the households are spending 50% of the total imputed income on housing services. If this calculation is true, then households' consumption occupies 68.9% of GDP and the total saving and investment ratio become 24% of GDP which is very close to that of ROC.¹⁰ The private saving's ratio also is lowered to 17% which is comparable to ROC's 19.6%. Perhaps this is closer to the reality and the commonly recognized behavioral pattern. Ironically, this correction will increase GNP by almost 50% but at the same time lowers the growth rate at least a couple of percentage points. Albeit debatable, this seems a sensible adjustment and at least it may resolve the puzzles posited at the introduction. We could take this as a lower bound of a new saving rate.

The ratio of imputed rent to GDP is shown to be around 3.8% in Korea during the period of 1990-1997. The comparable figures in Japan and ROC are 8.3% and 7.8%,

10. One may object to this sort of back-of-the-envelope calculation but this is quite convincing. For example, the average value of single-family house in US is around \$100,000 which will cost the owner approximately \$7,000 a year in terms of foregone interest income. An average rent of an apartment is \$600 to \$700 which is in line with an alternative of owning a house. If the median family income is \$50,000, the expenditure share of housing is approximately 14%. Approximately 14-15% of personal consumption expenditures is currently allocated to housing services.

respectively. We believe the Korean data is simply too low and suggest an alternative value of at least 12%. According to the household panel survey conducted by Daewoo Research Institute, the only annual survey of its kind since 1993, the ratio of rent to income of the urban non-owner households is .15 during 1993-1996. The Annual Farm Household Economic Survey conducted by Ministry of Agriculture, Forestry and Fisheries suggests that the ratio in the rural area is slightly higher than that for the urban counterparts. Hence, we can safely conjecture that the ratio of rent to income of the nation's non-owner households is at least .15. Let's say the ratio of imputed rent to income of the owner-occupied households is also .15. Then, since National Income is about 78% of GDP in Korea, the ratio of imputed rent to GDP is approximately 12%. This estimate will increase the level of GDP by 9%, raise the consumption ratio by 3 percentage points, and lowers the national saving rate by 3 percentage points to 32%. We may take this as the upper bound of the true saving rate.

If the statistical method of measuring the imputed rent, however consistently maintained over time, is downwardly biased, then the consumption is underestimated and hence saving is overestimated. The above exercise suggests that the true total saving rate may be anywhere between 24% and 34%, not 37%. Growth performance and casual observation indicate that it would be closer to 24%. The National Tax Administration (NTA) data on housing properties are used in calculating the imputed housing value (after being multiplied by the standard rents).¹¹ Note that the imputed rent is captured as an earning on the income side and the same amount is listed as consumption of housing service on the expenditure side. To make the matters worse, the asset bubbles on the make could dwarf imputed rent due to the fixed base-year standard rental value and hence further underestimate the true economic consumption.

IV. The Kim-Lau Controversy

The previous discussion attempted to show a possible justification for the inception and progress of real estate investment boom. The emphatic development of housing sector accompanies a frenzied real estate development and possibly the phenomenon of an asset bubble, which indeed was the case in a few Asian countries. The bubble instigates a social unrest and requires a long recovery period when burst. A lapse in the middle of growth process is a dead-weight loss.

Krugman (1994) reignited the debate on the sources of the East Asian growth. Kim and Lau (1994) and Young (1995) suggested that the growth of the East Asian development is mainly input-driven, implying that the absence of technological progress in the record could bring an end to the impressive growth record. Policy economists in the government circle, in particular, seemed overly provoked by the bold statement and some academic economists have scrutinized the empirical studies suspecting the validity of the finding. Although Krugman seemed more interested in defending the traditional capitalism and

11. The base year used in this sort of benchmarking lags always several years. When the asset bubbles are in the progress, the imputed rent using an earlier sample figure from the market could significantly underestimate the true value of the housing service.

playing down the role of government policies, the main source of his arguments lies in the fact that input growths exhausted most of the output increments. We wish to limit the relevance of our study to the input-driven growth process of the debate, leaving other aspects of the argument for future studies.

The neoclassical growth theory is the easiest way to understand the debate. Ignoring the exogenously determined technological progress, the theory predicts conditional convergence. The lower the initial level of the economy, the higher is the growth rate. If the East Asian growth is based on input growth, then without the technological improvement or the continued increase in the saving rate the growth process will soon end. If the true saving rate of Korea is around the mid-20%, not the mid-30%, and if the past investment have heavily concentrated on housing and its related activities, then the debate tells us how we might prolong the past growth performance. Korea could improve the saving rate, say to the level of Japan. This input-driven growth can also be made more effective by improving the efficiency of investment. Less housing and more machinery and equipment investment would certainly help enhance the labor productivity, if not consumer welfare.

There are other aspects of the debate. For example, trade and development economists will emphasize the role of openness in promoting growth and development. On this account, Korea certainly has to improve much more. Who in fact is involved in trade might have qualitative implications. Business group-dominated Korean development is under heated criticism and the role of ROC's small and medium enterprises in industrial development should be carefully compared and analyzed. Endogenous growth theories provide more challenging avenues toward the continued growth for the East Asian economies. Was the development up to this point a mere catch-up in technological and human knowledge development? If so, then the real development is to take place from now on, replacing the input-driven growth based on technology imitation. The role of governmental policies should now take a much different tack. Promoting intellectual property rights and utilizing taxation in R&D enhancement are clearly different from industry targeting and differential treatment of industries through non-market policies.

V. Concluding Remarks

The current research began from a simple question: if Asian countries showed drastically different reactions to the recent crisis, shouldn't we be able to provide more logically distinguishing characteristics of different groups of economies? The search began with the telltale signs of asset bubbles and soon reached to decomposition of the total investment.

Section II provided a theoretical underpinning for analyzing the housing construction boom in Thailand and Korea. This suggested that perhaps these countries curtailed investment opportunities that are more directly related to improving the economies' capacity of manufacturing and non-housing services. Given the high investment and saving rate of Korea, her growth performance was very close to ROC who was saving 50% less in terms of the percentage shares of GDP. The simplistic experiments were attempted to show the measurement error as a possible source of grossly overvalued total saving rate. Section IV touched upon the implications of the findings for the recent growth debate ala

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More has to be done. The theory must include bond market for a richer analysis. Statistical facts must be scrutinized and expanded to include some other countries. The measurement problems of different countries must be compared. Theory and empirical findings must be cross-referenced for better understanding on the future prospects and the correct assessment of the so-called Asian miracle.

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