부동산시장의 선진화를 위한 국제세미나

International Seminar on Transparency & Efficiency
in Real Estate Market

2004. 10

· 일시 : 2004년 10월 1일(금) 09:00~15:00
· 장소 : 국토연구원 강당(지하 1층)
· 주최 : 국토연구원

· Date & Hour : 1st October, 2004  09:00~15:00
· Place : KRIHS auditorium(underground 1 layer)
· Organizer : Korea Research Institute for Human Settlements(KRIHS)
세미나 일정(PROGRAM)

09:00~09:30 등록 (Registration)

09:30~09:40 개회사 (Welcome Speech)
이규방 (국토연구원장)
Kyuhang Lee (President of KRIHS)

09:40~10:35 발표 (Presentation)
REITs and the Quest for Improved Transparency and Efficiency in Public Real Estate Markets
: John L. Glascock (University of Cambridge)

Land Price and Effectiveness of Real-estate Policies in Japan
: 송현부 Hyun Boo Song (Japan Real Estate Institute)

10:35~10:50 휴식 (Break)

10:50~11:45 발표 (Presentation)
Transparency of Real Estate Market & Brokerage
: Hans Min (CB Richard Ellis Korea)

Current Issues of Real Estate Market and Policy Directions in Korea
: 손경환 Kyung Hwan Sohn (KRIHS)

11:45~13:00 중식 (Lunch)

13:00~14:30 토론 (Discussion)
사회(Chair) : 고철원장 (주택산업연구원)
Chul Koh (Korea Housing Institute)

토론자(Discussants)

권도엽 국장 (건설교통부 주택국)
Do Youp Kwon (Ministry of Construction and Transportation)

김경환 교수 (서강대학교 경제학과)
Kyung Hwan Kim (SoGang University)

박원기 국장 (경실련 도시개혁센터)
Won Gi Park (Citizens Coalition for Economic Justice)

배순현 산업연구위원 (국토연구원)
Ku Hei Bae (Korea Appraisal Board)

윤주현 교수 (건국대학교 부동산학과)
Juhyun Yoon (KRIHS)

이계연 팀장 (삼성화재 기업상품개발팀)
Kye Yun Lee (Samsung Fire and Marine Insurance)

장용동 부장 (헤럴드 경제)
Young Dong Chang (the Herald Business)

조성익 국장 (재정경제부 정책조정국)
Soung Ik Cho (Ministry of Finance and Economy)

조주현 교수 (건국대학교 부동산학과)
Joo Hyun Cho (KonKuk University)

14:30~15:00 질의 및 응답 (Q&A Period)
REITs and the Quest for Improved Transparency and Efficiency in Public Real Estate Markets

John L. Glascock, PhD
Grosvenor Professor of Real Estate
University of Cambridge
REITs and the Quest for Improved Transparency and Efficiency in Real Estate Markets?

1 October 2004

John L. Glascock, Ph.D.
Grosvenor Professor

Real Estate Finance
Department of Land Economy

Presentation/Discussion Outline

I. Setting of the issue
II. Brief USA History
III. Key Issues for Organization Form
IV. REITs and Social Housing
V. REITs and UK Property Firms
VI. Why REITs for Public Markets
VII. Why REITs Work
HM Treasury Consultation

- March 2004 (Property Investment fund) Document
- Very good in covering the key questions:
  - Management: internal versus external
  - Debt levels
  - Dividend accounting and required rates
  - Opportunities for small investors
  - Economic Stability/liquidity
  - Better transparency

I. Setting the Issue

- Market efficiency
  - What conditions help the market to operate efficiently and to maximize asset value?

- Government Concerns and Obligations
  - What conditions help the public well-being and operate to increase social welfare?
Transparency and Efficiency

- **Transparency**
  - in the UK and Europe— no tax at firm level
  - in USA— clean and clear information

- **Efficiency**
  - lower bid-ask spreads
  - lower net asset values
  - higher value to revenue (profit) ratios

From a Government Prospective

- ‘Fair’ taxation levels

- Economy stability

- No implication of safety

- by gov’t action!
Efficiency—depends upon Asset

- Generally, we would distinguish between:
  - Growth
  - and
  - Value assets

Asset Characteristics

- Growth — high beta
  - low debt and low rates of net cash flow
  - high rates of potential internal growth
  - high rates of return
- Value — low beta (defensive asset)
  - high debt and high rates of net cash flow
  - low rates of potential internal growth
  - good but low rates of unlevered return
Real Estate Characteristics:
Value Investment

- **Rate of return**— below market in long run
- **Beta**— usually between .4 and .7
  - Chan/ Hendershott/ Sanders (1990)
  - Gyourko/ Keim (1993)
  - Davidson/ Glascock 1995)
- **Defensive behaviour**
  - Glascock (1991) {counter-cyclical}
  - Glascock/ Michayluk/ Neuhauser (2004)

20 Yr Average Annual Total Return
April 1982 - April 2002: USA Data

- Russell 2000 Growth
- Domestic High-Yield
- NAREIT Equity
- Whisler 5000
- NASDAQ Composite
- S & P 500
- S&P Utilities
- Russell 2000 Value

Return

April 1982-April 2002: USA Data
REITs in High Volatility
2001-02: 2 year Returns: USA Data

A Decade of GOOD Performance
European Public Real Estate and Equities, July 1994 to July 2004
(Euros, July 1994 = 100)
Defensive Behaviour

- Glascock (1991) shows counter cyclical beta
- Glascock/ Michayluk/ Neuhauser (2004) shows price drop for real estate about ½ that of general stocks
- shows that bid-ask spread widens less and closes faster for real estate
- shows REITs better than Utility Stocks

II. Brief USA History

REITS

- Early period - 60’s to mid 70’s failure
- Transition period- late 70’s early 90’s
  - To Equity
  - To internal Management
  - Limits to tax-benefits of LP/ individuals
- Growth to modern era- the 90’s
  - Trade-ins from LP/ Personal to REIT
  - Focused, larger Cap, low debt
Early Years: 1960s to Mid-1970s

- Legislation in 1960 -- started REITs
- Limited numbers between 1960 and 1972
  - Between 68-70, 58 Mort REITs created
  - Owned by I-Bankers, M-Bankers, Ins-Co’s
- Risky--Borrower short--lend long!
  - By 1975, Debt/Equity ratio at 4:1
  - One half of all assets in Dev/Construction
  - Most fin’d by C-paper--up to 75% of Debt CP

Outcomes the Early Years

- Most go bankrupt by mid 70s
- Small no. of firms with low capitalization
- Reliance on intermediation
- A lack of operation’s orientation
  - outside advisors/ weak corporate governance
  - lack of internal property mgt teams (Capozza)
- NAREIT Share Price Index (fell)
  - -33 percent in 73
  - -49 percent in 74
- 12 Yrs before Sec offering reaches early 70s again
Transition and Foundation for Growth: late 70s to early 90s

- Mort REITs failed, but equity did well in 70s
- E-Reits earned 12.9 versus S&P of 5.8
- 1986 Tax act reduced benefits of Limited Partnerships and Sole Proprietors
- Debt levels declined to about 50%
- More Public debt and less Com Paper
- ONLY 16 of 245 REITs made it 72-91!

Growth and Market Presence: the 1990s

- First large wave of IPO’s is in 1993-94
- 1993 IPO market is 117% of existing industry
- 1994 adds 46% more
- 1993 cap of 10 billion
- 1995 cap of 88 billion
- over 200 traded companies by late 90s
More on the 1990s

- By 1997, 25 REITs had Mkt CAP of $1 Bil
- 5 REITs with MKT CAP of over 2 billion
- Even with GROWTH, industry is still small: the industry smaller than MICROSOFT!
- Or GE Capital or Wal-Mart...
- Driven by trade-ins of Limited Partnership assets and UPREIT structure

---

**Equity REITs**

**Number of REITs by Year**

![Graph showing the number of REITs by year]
III. Some Key Issues— as we think about Regulation and Organizational Form

- Which ownership forms work best
- for which social activities:
  - asset management?
  - asset transformation?
  - asset holding (portfolio issues)?
  - asset transfer?
  - asset taxation and regulation?

Some Key Issues— asset management

- It appears that:
- Management is best in Sole-Proprietorship and Private (and well-structured L-P) Firms in early and growth phases of their life
- Management is best in Corporate form {Reits for us} in Mature Phase of firm life (and including late growth stage)
- Within a REIT, *internal* Management is Best
- Reits should use low Debt level—20-40 percent

- HOWEVER! tax benefits of S-P/ L-P/ PF
- May *prevent* movement to Corporate Form
Some Key Issues- asset transformation

- It appears that:
- **Asset transformation is best within a S-P, PF, or L-P arrangement** (particularly if it’s a Major or Total part of the firm)
- The key is reward to skills & risk
- Development is a HIGH risk and
- HIGH Human Capital Event

Some Key Issues- asset transformation

- Let's look at an example:
- **A group of Investors lead by a G-P invested about $30 Million Dollars in a developing country in 2000**
- In 2003, Value estimated at $100 mil
- Development is a HIGH risk/ HIGH HC
- **QUESTION**? How many of **You** want to Share this gain with Common Shareholders?
Some Key Issues – asset transformation

Recommendation:

- Take the risk and Return Privately
- (S-P or L-P or PF) then move the Operating and holding of recognized assets to a REIT
- The return to the REIT for operating the assets will be less, BUT MGT can be fairly compensated for their contribution and in-use assets facilitate cash-flow for dividends

Implication:

- Primary Asset transformation in a REIT is a Market for Lemons!
- Those firms who believe in their projects and expect reasonable level of success will NOT go REIT
- Only Managers who CANNOT fund their projects in Typical Manner will Take the Project to REIT Form—while there is not the expected return, it may win and they make a salary while trying!
**Asset Transformation is a Growth Activity**

- Growth activities require strong bonding of management and outcomes!
- Growth activities should not be financed by public debt—private debt is best.
- REITs use public debt.
- Growth activities involve low levels of market forecasting—thus risk is high and beta is high.

**Lemons in REITs**

- Canary Wharf

- Went Bust—should such an effort be in a REIT?
- Should Gov’t imply safety?
Some Key Issues- asset transformation

- Caveat:
  - (Large) Firms pursuing selected transformations (renovations—asset use change) do not fall into this category
- If:
  - project is small part of overall activity, and
  - project is part of core focus
- Then REIT (Corporate Form) Works

Some Key Issues- asset holding portfolio issues

- It appears that:
  - REITS work well for—
    - small investors
    - pension funds
    - institutional investors
- This Occurs because Reits are
  - Very Good Defensive Stocks
    - Low Beta, Low risk/ low return
    - But great during periods of Volatility
    - Inflation Protection
Some Key Issues - Asset Transfer
(Ownership—mgt & shares—Transfer)

- It looks like:
  - REITs are better for transferring ownership than—
    - Private firms
    - Sole Proprietorships
    - Limited Partnerships
  - Less cost to negotiate Mgt transfer
  - Less cost to transfer ownership-liquid Shares
  - Even if at discount, there is a MKT
  - LP’s and S-P have virtually no (liquid) MKT!

Some Key Issues - asset taxation and regulation

- It looks like:
  - Gov’t gets more taxes from REITs
  - Gov’t gets more operational transparency

- WHY?
  - do investors Voluntarily pay more Taxes?
Some Key Issues - asset taxation and regulation

- **WHY?** do investors Voluntarily pay more Taxes?
- **Investors get:**
  - Liquidity - stock mkt for shares
  - Liquidity - mgt must pay dividends
    - Remember—dividends offer option
    - of partial liquidation
  - Better Price w/ Liquidity in Bad Times
  - Better Regulation-Corp Governance
  - SEC type protections

Some Key Issues - asset taxation and regulation

- **WHY?** do investors Voluntarily pay more Taxes?
- **Remember:**
  - What are the guaranteed by-law dividends of the LP?
  - How easy is it to Change MGT in an LP?
Some key issues— economy stability

- REITs appear to dampen property cycles!
- REITs have relative low debt— about 30-50%
- REITs tend to be long-term players
- REITs *do not* have to sell assets in downturn
- REITs get market feedback in up periods!

Some Key Issues Market Choice

- Limited Player/ High Wealth Driven L-Ps will remain Important and useful
- Investors would have meaningful choice in REIT versus L-P for mid-sized projects and for large numbers of L-P shares to MP share
- Successful L-P projects would have a good alternative way to monetize their success
- Portfolio Investors would get a defensive stock
- In an appropriate Regulatory Environment, REIT’s could provide good apartments for wealthy, middle, and lower middle class clients
Some final Thoughts-4 whys

- **Why would Gov’t give such tax breaks?**
  - They already give solid breaks to L-P & S-Ps and it’s likely that REITs will result in more taxes paid not less

- **Why would investors pay more taxes?**
  - They have virtually no liquidity and no corporate governance—REITs give them liquidity: shares & D iv

Social Housing in Lowestoft

- Clear lack of Integration
- With current housing stock
- And Market!
- Would a REIT Help?
IV. REITS and Social Housing
(Ownership—Mgt—Incentives—Subsidies)

■ Issue 1.

■ In social housing, it's difficult to change management— the local council usually controls the process and it's political, not economic!

■ REITs would make this more transparent and market driven.

REITS and Social Housing
(Ownership—Mgt—Incentives—Subsidies)

■ Issue 2.

■ In social housing, a management change usually means that another government takes over!

■ REITs would make it such that ownership did not change— just management. And the stockholders have clear interest in effectiveness.
REITS and Social Housing
(Ownership—Mgt—Incentives—Subsidies )

- Issue 3.

- In social housing, its difficult to understand how much subsidy is needed.

- With a REITs, the subsidy could be proportionate to market rent— How much do want social clients to pay relative to the market.

- {this implies that society wants the same housing for social clients as it does for market clients}
REITS and Social Housing
(Ownership—Mgt—Incentives—Subsidies)

- Issue 5.
- In social housing, (nearly) everyone is a social client.
- With a REITs, the social component could be a small part of the operation— and non-transparent {no one needs to know who is social and who is market}.

Social Housing in Harlow

- Multiple story
- Isolated Housing
- No Shortage of Land!
- Must be Social Policy to ‘isolate’ social clients
- Can REITs help?
REITS and Social Housing
(Ownership—Mgt—Incentives—Subsidies)

Issue 6.

In social housing, the cost of capital is difficult to calculate.

With a REITs, we could use cross-sectional data to *lease out* the implied cost of having social housing in the project— is it greater than just the proportionate rental subsidy?

---

REITS and Social Housing
(Ownership—Mgt—Incentives—Subsidies)

Issue 7.

In social housing, the *amount* of need is a local political issue.

With a REITs, the market would provide feedback— the REIT structure would also allow relatively ease of varying supply: since now we do not need a whole complex to be social.
REITS and Social Housing
(Ownership—Mgt—Incentives—Subsidies)

■ Issue 7-continued.

■ Remember that REIT’s will only want to build social housing that they can rent—thus, if they build too much, they would have to lower rents to attract clients—thus, get market feedback about the process.

■ HOWEVER, if REIT’s provide better housing than Council units, the demand will be greater.

IV. REITS and Social Housing
wrap-up

■ 1. Change of Management
■ 2. Mgt without Ownership Change
■ 3. Check on needed subsidy—market info
■ 4. Management Efficiency & Mkt data
■ 5. Mixed use and clientele effects for tenants
■ 6. Cost of Capital Assessment
■ 7. Market Check on supply
■ 8. Subsidies could be rent or capital provision
V. UK and Listed Property Firms

- Property Firms provide public access to RE
- BUT last 15 years they have underperformed the market—BUY USA REITs outperformed the market? Why?
  - Legally mandated dividends *Jensen*
  - REITs are more focused
  - REITs have less NAV discount

UK and Listed Property Firms

- UK firms paid substantially less dividends than did USA REITs!
  - less dividends mean-
    - less pressure on management
    - less cash flow to stockholders
    - less diversification benefits
    - less micro-structure protection
VI. WHY REITS for Public Markets

- Liquidity and Transparency of Operations
- Diversification benefits
- Facilitates ownership transition—trade-ins
- Promote economic/property stability
- Offers professional management
- Offers public debt/equity capital to RE
- Eases Management transition
- May offer benefits for public housing

VII. WHY REITS WORK

- Legally required dividend
- keeps management focused
- limits management flexibility
- (remember it’s a value asset)
- Tax Transparency limits use of Debt
- Low Debt/Equity orientation limits Risk
- in Downturns
- L-T nature concentrated Mgt efforts
- on Operations not Transformation
VII. WHY REITS WORK

- Also,

- REITS are treated (in USA) as if they are a private owner—all taxes and capital gains are passed to the individual investor. There are no penalties, except for reporting rules, for the corporate form.

Thank You

- Questions

- Discussion

- John L. Glascock, Department of Land Economy
References


Land Price and Effectiveness of Real-estate Policies in Japan

Hyun Boo Song, PhD
Chief Research Fellow
Japan Real Estate Institute
I. Центральное значение

II. Роль рынка

III. Анализ рынка

IV. Заключение
1. Urban Land Price Index of National Average

1) 1 (1955-1966)
2) 2 (1966-1976)
3) 3 (1976-1983)
4) 4 (1983-1993)
5) 5 (1993-2000)
<table>
<thead>
<tr>
<th>年度</th>
<th>1966</th>
<th>1976</th>
<th>1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>12月</td>
<td>12.9%</td>
<td>11.2%</td>
<td>6.5%</td>
</tr>
<tr>
<td>6月</td>
<td>24.9% (1.6%)</td>
<td>27.6% (1.6%)</td>
<td>24.9% (1.6%)</td>
</tr>
</tbody>
</table>

*GDP* 16.4% 7.7% 8.5%

*GNP* 11.2% 8.6%
<table>
<thead>
<tr>
<th>1985.3 - 90.3 (5%)</th>
<th>1990.9 - 93.9 (5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.9% (1.5%)</td>
<td>10.1% (1.6%)</td>
</tr>
<tr>
<td>24.4% (3.0%)</td>
<td>31.3% (3.9%)</td>
</tr>
</tbody>
</table>

1986.12 (Heisei) 4% 5.4% 5.9% 4.3% 1.8%

1994.3 - 04.5 (10%) 92.0%

-8.6% -3.1% -13.4% -5.4%
## II. 1.2.3.4.5.

### 1.

- **算訳**
  - **実際**
  - **1955年** - にoha 43
  - **6年**

### 2.

#### 1)

- **算訳**
  - **実際**
  - **1986年**
    - **5.7** （5.6）
    - **1990年**
      - **9.6** （8.2）

#### 2)

- **算訳**
  - **実際**
  - **1986年**
    - **5.4** （4.1）
    - **1990年**
      - **10.1** （7.7）
2) 客室タイプ

- アパート 3DK ≈ 150,000円 (1992年)
- マンション 3DK ≈ 780円 (23%)

3) 住居タイプ

- マンション 2DK = ×
- マンション 3DK 33.3% (1990年 = 2,378円)

4) その他

III. 住宅の市場概況

1. 住宅の状況（1987年）

- 住宅価格（1987年）
- 住宅価格（1989年）
- 住宅価格（1991年）

2. 住宅の状況

- 住宅価格（1990年）
- 住宅価格（1990年）
- 住宅価格（1991年）

3. 住宅の状況

- 住宅価格（1991年）
- 住宅価格（1990年）
- 住宅価格（1991年）

- 住宅価格（1990年）
IV. 本論

* 本論の概要について


△△ → "本論の概要" の項目について
→ 以下にその概要について
→ 以下にその概要について
→ 以下にその概要について

△△ 本論の内容について

△△ 本論の内容について

△△ 本論の内容について

△△ 本論の内容について

△△ 本論の内容について

△△ 本論の内容について

△△ 本論の内容について

△△ 本論の内容について
日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所

日本不動産研究所
Transparency of Real Estate Market & Brokerage

Hans Min
Vice President of Investment Properties
CB Richard Ellis Korea
REAL ESTATE BROKERAGE SERVICES
TRANSPARENCY

Prepared By: Hans Min, Vice President - Investment Properties
CBRE Korea

October 1, 2004

REAL ESTATE MARKET
TRANSPARENCY –
BROKERAGE & R.E. SERVICES
The page contains a list of key points regarding real estate transparency and brokerage.

1. Information Available (Industrial, Retail, Residential info very rare in Korea)
2. Professional Services (Deal Process Analysis, Professionals with Experience in International Standards, Detailed Information Materials, Client Reporting)
3. Arms Length Transactions
4. Proper Valuations (Fair Open Market Value)
5. Local Documentation & Reporting
6. Fee Structure (Double Sided Fees)
7. Private Bidding Structure
8. Local Brokerage vs. International Agency Services
9. Willingness to Pay Fees

Additionally, there is a section titled "Information Available in the US" with a subtitle "US Industrial Overview." The page includes a chart or graph showing industrial availability data along with other relevant statistics.
Basic Deal Process in US

**STEPS IN A TYPICAL INVESTMENT DEAL:**

1. Offer is submitted from Buyer to Seller
2. Seller accepts offer and Purchase & Sales Agreement is prepared for both parties to sign
3. Seller’s representative submits the executed Contract to an “Escrow Company” – 3rd party, non-biased holder of the documents (an attorney is used in place of the Escrow Company in the eastern portion of the US)
4. Title Insurance is ordered (Insurance policy stating that the new Buyer’s name is true and correct and also insuring that there are no other parties claiming an interest in the ownership. It also insures that the description of the property is true and correct.)
5. Title Insurance company then has the Escrow Company send all of the documents to the County Recorder’s Office which records the documents and stores them to create the chain of title for future transactions on the same location (all of the information located in the Recorder’s office is public and accessible).
PUBLICLY HELD REAL ESTATE COMPANIES:

1. Due to the Enron scandal and the resulting Sarbanes-Oxley Act (July 20, 2003) corporate governance, ethics in business and compliance issues will increasingly dominate the day-to-day operation of companies in the real estate sector throughout this year and into the future to force greater transparency for shareholders.

2. In the US the National Association of REIT’s, the Appraisal Institute, AIMR (Association of Investment Management & Research), NCREIF (National Council of Real Estate Investment Fiduciaries), FASB (Financial Accounting Standards Board) and others have been at the forefront of promoting transparency.

3. Key to transparency in real estate is the adoption of and consistent application of accounting standards in financial reporting.

IDEAL REPORTING WOULD INCLUDE:

- Detailed quarterly and annual reporting
- Asset name
- Date purchased
- Cost & equity invested
- Debt level
- Ownership percentage
- Net operating income
- Current value
- IRR
- Market conditions

Source: CBRE Consulting, Ernst & Young
## Marketing Process

### Alternatives and Considerations

<table>
<thead>
<tr>
<th>Description of Program</th>
<th>Negotiated Sale</th>
<th>Controlled Sale</th>
<th>Public Auction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct senior-level negotiations with interested parties most likely to consummate a favorable transaction</td>
<td>Contact range of logical buyers based on likelihood of buyers placing high value on the property and their financial ability to consummate a transaction</td>
<td>Contact wide range of potential buyers and receive indications of interest from all interested buyers</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Potential Buyers Contacted</th>
<th>Narrowest</th>
<th>Controlled Sale</th>
<th>Broadest</th>
</tr>
</thead>
<tbody>
<tr>
<td>One to three</td>
<td>Typically up to fifteen</td>
<td>Typically fifteen or greater</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Disclosure</th>
<th>Narrowest</th>
<th>Controlled Sale</th>
<th>Broadest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited new contacts; focus on parties who have had contact in the past</td>
<td>Limited disclosure of existence of sales process; Information Memorandum circulated</td>
<td>General public disclosure through press release; Information Memorandum circulated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bidding Format</th>
<th>Narrowest</th>
<th>Controlled Sale</th>
<th>Broadest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive negotiation</td>
<td>Competitive one or two-step auction</td>
<td>Broad competitive two-step auction</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flexibility of Process</th>
<th>Narrowest</th>
<th>Controlled Sale</th>
<th>Broadest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high degree of flexibility to alter transaction structure during process</td>
<td>Some degree of flexibility to alter transaction structure during process</td>
<td>Limited degree of flexibility to alter transaction structure during process</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approximate Time to Signing</th>
<th>Narrowest</th>
<th>Controlled Sale</th>
<th>Broadest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three months or less</td>
<td>Three to four months</td>
<td>Four months or more</td>
<td></td>
</tr>
</tbody>
</table>
Objective
Create a competitive sale environment through effective process management

<table>
<thead>
<tr>
<th>CBRE Key Tasks To Achieve Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fully understand client’s objectives and requirements for the transaction</td>
</tr>
<tr>
<td>2. Conduct a completely transparent and timely sale process</td>
</tr>
<tr>
<td>3. Distribute comprehensive / quality marketing materials</td>
</tr>
<tr>
<td>4. Conduct a calculated marketing program, designed to gain critical insights on buyer acquisition strategy</td>
</tr>
</tbody>
</table>

Objective
Obtain maximum market value sale proceeds for client

<table>
<thead>
<tr>
<th>Marketing Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sale Process Dynamics</strong></td>
</tr>
<tr>
<td><strong>1. Sale Preparation</strong></td>
</tr>
<tr>
<td>• Conduct valuation analysis</td>
</tr>
<tr>
<td>• Develop marketing story and strategy</td>
</tr>
<tr>
<td>• Agree on list of buyers to contact</td>
</tr>
<tr>
<td>• Prepare teaser and info memo (3-4 weeks)</td>
</tr>
</tbody>
</table>

| **2. Teaser Distribution** |
| • Contact logical group of potential buyers and distribute teasers and process documents |
| • Continual communication with potential buyers, particularly tier I (2-3 weeks) |

| **3. Receive Indication of Interest** |
| • Receive and analyze indication of interest |
| • Sign confidentiality agreements with interested parties |
| • Prepare data room (2-3 weeks) |

| **4. Distribute Info Memo** |
| • Comprehensive info memo distributed to potential buyers |
| • Bidding instruction distributed, including a required for binding bid |
| • Provide any clarification information |
| • Stay in constant dialogue with potential buyers |

| **5. Receive Binding Bids & Short List Bidders** |
| • Evaluate bids |
| • Short list two to three bidders for parallel due diligence and negotiations |
| • No exclusivity provided |
| • Distribute transaction documents |

| **6. Conduct Parallel Due Diligence & Negotiations** |
| • Conduct site visit and data room due diligence |
| • Create difficult environment for any downward adjustment to valuation based on due diligence |
| • Negotiate simultaneously with all short listed bidders until a bidder with acceptable terms emerges |

Marketing Process
Marketing Process

Close
## SEOUL MARKET REVIEW

### Seoul: World Class Real Estate Market
Asia’s Most Preferred Investment Market

"CBRE GRC’s survey of 20 key investors worldwide in late-2003 ranks Seoul as Asia’s most preferred investment market”

<table>
<thead>
<tr>
<th>Variable</th>
<th>Seoul</th>
<th>HK</th>
<th>S’pore</th>
<th>Taipei</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political Stability</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Quality of Government</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Regulatory Environment</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Market Transparency</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Liquidity (Real Estate Market)</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Currency Volatility</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Currency Convertibility</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Availability of Suitable Product</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Lease Structure</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Score</strong></td>
<td>37</td>
<td>36</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td><strong>Ranking</strong></td>
<td>14*</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
</tr>
</tbody>
</table>

Why Seoul?
- Strong Market Liquidity
- Good Availability of Product
- Landlord-friendly Lease Structure
- Capital Convertibility
- Market Transparency

Source: CBRE GRC, November, 2003
Note: 5 = excellent, 1 = poor
Seoul Grade A Office Market Review
Supply, Demand & Vacancy (2004 Q2-2008)

Note: * 3rd party lease area only, excluding owner-occupied area

Seoul Grade A office demand is expected to outpace supply in 2005-2007

Grade A Rents in 3 districts are expected to grow in-line with inflation (3-4% p.a.) over term

Note: based on monthly rent only (excluding security deposit and maintenance charges).
Seoul: World Class Real Estate Market

Asia’s Largest Office Market (exc. Japan)

Seoul Office Market is app. 50% and 100% larger than Hong Kong and Singapore, respectively

Source: CBRE GR&C, June 2004
Note: * Metro Areas

Seoul Grade A office rent is comparable to that of major cities in the world*

Source: CBRE GR&C Research, June 2004
Note: * Metropolitan Area

Seoul Grade A rent has been on the rise since 2002 unlike other major cities

Source: CBRE GR&C, June 2004
Note: * Metro Areas

<table>
<thead>
<tr>
<th>City</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston*</td>
<td>$54.91</td>
<td>$46.65</td>
<td>$44.09</td>
</tr>
<tr>
<td>Chicago*</td>
<td>$50.48</td>
<td>$57.07</td>
<td>$60.44</td>
</tr>
<tr>
<td>Frankfurt</td>
<td>$52.37</td>
<td>$52.38</td>
<td>$52.37</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>$146.33</td>
<td>$150.96</td>
<td>$115.43</td>
</tr>
<tr>
<td>Los Angeles*</td>
<td>$28.74</td>
<td>$27.67</td>
<td>$26.96</td>
</tr>
<tr>
<td>Manhattan (NY)*</td>
<td>$54.65</td>
<td>$49.56</td>
<td>$52.29</td>
</tr>
<tr>
<td>San Francisco*</td>
<td>$46.94</td>
<td>$31.88</td>
<td>$27.19</td>
</tr>
<tr>
<td>Seoul</td>
<td>$27.15</td>
<td>$31.88</td>
<td>$46.74</td>
</tr>
<tr>
<td>Shanghai</td>
<td>$24.76</td>
<td>$25.73</td>
<td>$30.70</td>
</tr>
<tr>
<td>Singapore</td>
<td>$41.11</td>
<td>$34.54</td>
<td>$28.11</td>
</tr>
<tr>
<td>Taipei</td>
<td>$45.11</td>
<td>$41.10</td>
<td>$37.61</td>
</tr>
<tr>
<td>Tokyo (5 Ward)</td>
<td>$122.34</td>
<td>$118.04</td>
<td>$118.07</td>
</tr>
</tbody>
</table>
Seoul: World Class Real Estate Market

Lowest Market Volatility in Asia

Seoul has the most stable Grade A office market compared with World’s Major Cities.

Asia Historical Vacancy Rate

<table>
<thead>
<tr>
<th>City</th>
<th>Vacancy (2000-2004 Q1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Seoul</td>
<td>5.9%</td>
</tr>
<tr>
<td>Tokyo</td>
<td>8.8%</td>
</tr>
<tr>
<td>HK</td>
<td>13.2%</td>
</tr>
<tr>
<td>S’pore</td>
<td>17.9%</td>
</tr>
<tr>
<td>Taipei</td>
<td>17.7%</td>
</tr>
<tr>
<td>Shanghai</td>
<td>42.5%</td>
</tr>
</tbody>
</table>

Even during the 1997 IMF Crisis, Seoul Grade A Vacancy does not exceed 10%

2000-2004 Volatility Index

Seoul: World Class Real Estate Market

Consistently Maintains Lowest Vacancy in Asia

Since 2000, Asia’s major cities experienced an overall increase in vacancy rate. Seoul Grade A vacancy, on the other hand, declined slightly.

2000-2003 Vacancy Rate for Asia

Source: CBRE GR&C Research, June 2004

Note: * Measured by relative 4-yr annual standard deviation of vacancy.
Source: CBRE GR&C Research, June 2004
Seoul is one of the World’s Highest Yielding Office Market

<table>
<thead>
<tr>
<th>City</th>
<th>Prime Office Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seoul</td>
<td>8.5%</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>6.5%</td>
</tr>
<tr>
<td>London</td>
<td>5.5-6.25%</td>
</tr>
<tr>
<td>Tokyo</td>
<td>4.5%</td>
</tr>
<tr>
<td>Taipei</td>
<td>5-6%</td>
</tr>
<tr>
<td>Shanghai</td>
<td>5.8%</td>
</tr>
<tr>
<td>Frankfurt</td>
<td>4.9%</td>
</tr>
<tr>
<td>Singapore</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Higher NOI yield makes investment more attractive to low leveraged based investors such as German open-ended funds, REITs, etc.

Since Jan. 2003, Foreign Investors acquired app. $1.4 billion Seoul office properties

Seoul Real Estate Market Review

Market Evolution: Opportunistic (IRR) to Stabilized (NOI)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Type</td>
<td>Opportunistic Funds</td>
<td>Strategic</td>
<td>Institutional</td>
</tr>
<tr>
<td>Return Requirement</td>
<td>25% IRR+</td>
<td>17.5-20% IRR</td>
<td>8-8.5% NOI</td>
</tr>
<tr>
<td>Trans. Value (#)</td>
<td>1,028 mm (16)</td>
<td>4,281 mm (98)</td>
<td>596 mm (12)*</td>
</tr>
</tbody>
</table>

Sample of Investors:

- Goldman Sachs
- Lehman Brothers
- Morgan Stanley
- Lone Star
- Lend Lease
- Carlyle Group
- Westbrook
- Deka
- DB Real Estate
- DiVA
- Eko
- FINEOS (TMN)
- GIC
- ING-Resimac
- Samsung Life
- Korangco
- Prudential (UK)
- AXA
- Kyobo Life
- Mirae Asset
- My Alset
- Military Mutual Aid Assoc.
- National Pension Fund
- Ascendas

Note: up to Q2 2004
## Seoul Real Estate Market Review

### Office Investment Historical Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004 Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBD</td>
<td>-</td>
<td>10</td>
<td>9</td>
<td>11</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$731 mm</td>
<td>$469 mm</td>
<td>$501 mm</td>
<td>$589 mm</td>
<td>US$228 mil.</td>
</tr>
<tr>
<td>GBD</td>
<td>2</td>
<td>2</td>
<td>14</td>
<td>21</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$139 mm</td>
<td>$56 mm</td>
<td>$817 mm</td>
<td>$470 mm</td>
<td>$584 mm</td>
</tr>
<tr>
<td>YBD</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$50 mm</td>
<td>$52 mm</td>
<td>$200 mm</td>
<td>$311 mm</td>
<td>$340 mm</td>
</tr>
</tbody>
</table>

### Total Foreign

<table>
<thead>
<tr>
<th>Year</th>
<th>3</th>
<th>11</th>
<th>14</th>
<th>11</th>
<th>7</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$189 mm</td>
<td>$768 mm</td>
<td>$1,093 mm</td>
<td>$449 mm</td>
<td>595 mm</td>
<td>398 mm</td>
</tr>
</tbody>
</table>

### Total Domestic

<table>
<thead>
<tr>
<th>Year</th>
<th>-</th>
<th>2</th>
<th>15</th>
<th>28</th>
<th>23</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$71 mm</td>
<td>$393 mm</td>
<td>$833 mm</td>
<td>$918 mm</td>
<td>198 mm</td>
</tr>
</tbody>
</table>

### Investors Profile

- CBD: Rodamco, Lone Star, GIC, Pricoa, Morgan, Goldman
- GBD: Rodamco, Pricoa, Morgan, Goldman, Macquarie, Ascendas REIT
- YBD: LIM/Prudential UK, Kyoritz, GE Capital, ING, Prudential, DBRE, Samsung Life, GIC, Daeryung

#### As of June, 2004
Current Issues of Real Estate Market and Policy Directions in Korea

Kyung-Hwan Sohn, PhD
Chief of Land & Housing Research Division
Korea Research Institute for Human Settlements
Current Issues of Real Estate Market and Policy Direction in Korea

2004. 10. 1
Kyung Hwan Sohn
Korea Research Institute for Human Settlements (KRIHS)
I. Real estate market trends

- Land price index
- Housing price index

Graph showing trends from 1975 to 2000.
I. 2000
- 2000
- 2000

![Graph showing interest rate and Seoul Apartment Price Index from 1996 to 2003.](image)

* Note: Graph details include various data points and trends over the years.

I. データベース構築

- データベースの設定 2.224 (6) は
- データベースの作成

II. データベースの操作

- データベースの操作
- データベースの更新
- データベースの検索
- データベースの削除
II. Project Scope

- **Project Title:** American Center (Center Building)
- **Client:** USA (Center Building)
- **Contractor:** USA (Center Building)
- **Location:** USA (Center Building)

- **List Types:**
  - Open Listing
  - Exclusive Agency Listing

- **Other Details:**
  - **List Number:**
  - **List Date:**
  - **Contract Duration:**
  - **Notice Period:**

- **Contact:**
  - **Name:**
  - **Title:**
  - **Email:**
  - **Phone:**

- **Additional Information:**
  - **Notes:**
  - **Documents:**
  - **Files:**

- **Attachments:**
  - **PDF:**
  - **Image:**
### II. roprietary information

1. [proprietary information](1998)
   - 2005[proprietary information](163)

2. [proprietary information](2002)
   - 50 [proprietary information](163)

3. [proprietary information](2004)
   - [proprietary information](1997)

4. [proprietary information](2004)
   - [proprietary information](163)

*Note: All proprietary information is subject to confidentiality agreements.*
II. Adaptive Expectation

- $\hat{\theta}(t) = \frac{1}{t} \sum_{s=1}^{t} Y_s$
- $\hat{\theta}(t) = \frac{1}{t} \sum_{s=1}^{t} Y_s$

- $\hat{\theta}(t)$ is the average of past observations.

III. Expectation-based Forecasting

- $\hat{\theta}(t) = $ (adaptive expectation)
III. Main Points

- REITs, MBS, etc.
- Application of REITs in modern finance
III. サイクル実験結果

- サイクル実験の結果を以下に示します。

### 1. 実験1
- 実験条件: 2003年
- 実験結果: ±0.000 ±0.000

### 2. 実験2
- 実験条件: 1998年
- 実験結果: ±0.000 ±0.000

### 3. 実験3
- 実験条件: 1998年
- 実験結果: ±0.000 ±0.000

<table>
<thead>
<tr>
<th>実験</th>
<th>実験結果</th>
<th>実験結果</th>
<th>実験結果</th>
<th>実験結果</th>
</tr>
</thead>
<tbody>
<tr>
<td>実験1</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
</tr>
<tr>
<td>実験2</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
</tr>
<tr>
<td>実験3</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
<td>±0.000 ±0.000</td>
</tr>
</tbody>
</table>

### サイクル実験の応用
- データベースの管理
- 実験結果の保存
- 実験結果の分析

### DB
- データベースの管理
- 実験結果の保存
- 実験結果の分析