

Heterogeneous Patterns of Financial Development:

Implications for Asian Financial Integration

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Outline

- Introduction
- Financial integration and financial development
- Measuring financial development: Levels and patterns
- Data
- Results
- Conclusion

Introduction

- Economic dynamism of Asia Pacific region
 - “East Asian miracle”
 - Regional production networks
- Financial crises
 - 1997-98 vs. 2007-09
 - Challenges and responses

Financial integration and financial development

- Much less consensus on the net benefits of financial openness vs. trade openness
- East Asian financial integration
 - Increasing
 - Still not strong, especially relative to links to other regions
- Financial development is seen as a precondition (or a positive) for financial integration

Financial integration and financial development

- Financial development itself may have mixed implications for growth
 - Maybe “too much finance”
 - Mostly measured as financial **depth**
- Interactions
 - Institutional quality
 - Trade openness
 - Financial openness

Financial development

- World Bank (2012)
 - Depth
 - Access
 - Efficiency
 - Stability
- IMF (2015)
 - Depth, access, efficiency
- Aizenman, Jinjarak and Park (2015)
 - Depth (quantity) and efficiency (quality)
 - Sectoral data

Measuring financial development: Levels and patterns

- N indicators of financial development
 - Common scale for each indicator
 - Financial development is a vector, for economy i ,
 - $x_i = (x_{i1}, x_{i2}, \dots, x_{iN})$
- Level of financial development is an index

$$\bar{x}_i(w) = \sum_1^N w_n x_{in}$$

- Principal components is an alternative approach
- **Level Distance** between country i and country j is

$$\bar{x}_i(w) - \bar{x}_j(w)$$

Measuring financial development: Levels and patterns

- **Average Level Distance** is

$$\overline{LD}_i = \frac{1}{I-1} \sqrt{\sum_{j \neq i} [\bar{x}_i(w) - \bar{x}_j(w)]^2}$$

- **Pattern Distance** between two economies is

$$PD_{ij} = 1 - \text{corr}(x_i, x_j)$$

Introduced by
Kaur and Singh (2014)

- **Average Pattern Distance** is

$$\overline{PD}_i = \frac{1}{I-1} \sum_{j=1}^{I-1} PD_{ij}$$

Measuring financial development: Levels and patterns

- Idea is to see how close an economy is to other economies in a particular region (individually or on average), in terms of
 - Levels of financial development
 - Patterns of financial development
- World Bank (2012) distance measure combines level and pattern differences

$$D_{ij} = \sqrt{\sum_1^N (x_{in} - x_{jn})^2}$$

Data

Index Components

World Economic Forum: Global Competitiveness Index

| Category | Indicator |
|--------------------------------|---------------------------------------|
| Efficiency | Affordability of financial services |
| | Availability of financial services |
| | Financing through local equity market |
| | Ease of access to loans |
| | Venture capital availability |
| Trustworthiness and confidence | Soundness of banks |
| | Regulation of securities exchanges |
| | Legal rights of investors |

Additional Index Components

- Main Results
 - Institutional Environment
 - Business Environment
 - Based on WEF Financial Development Report 2012
- Appendix
 - Business Sophistication
 - Technology Sophistication
 - Openness
 - Institutional Environment 2

Economies

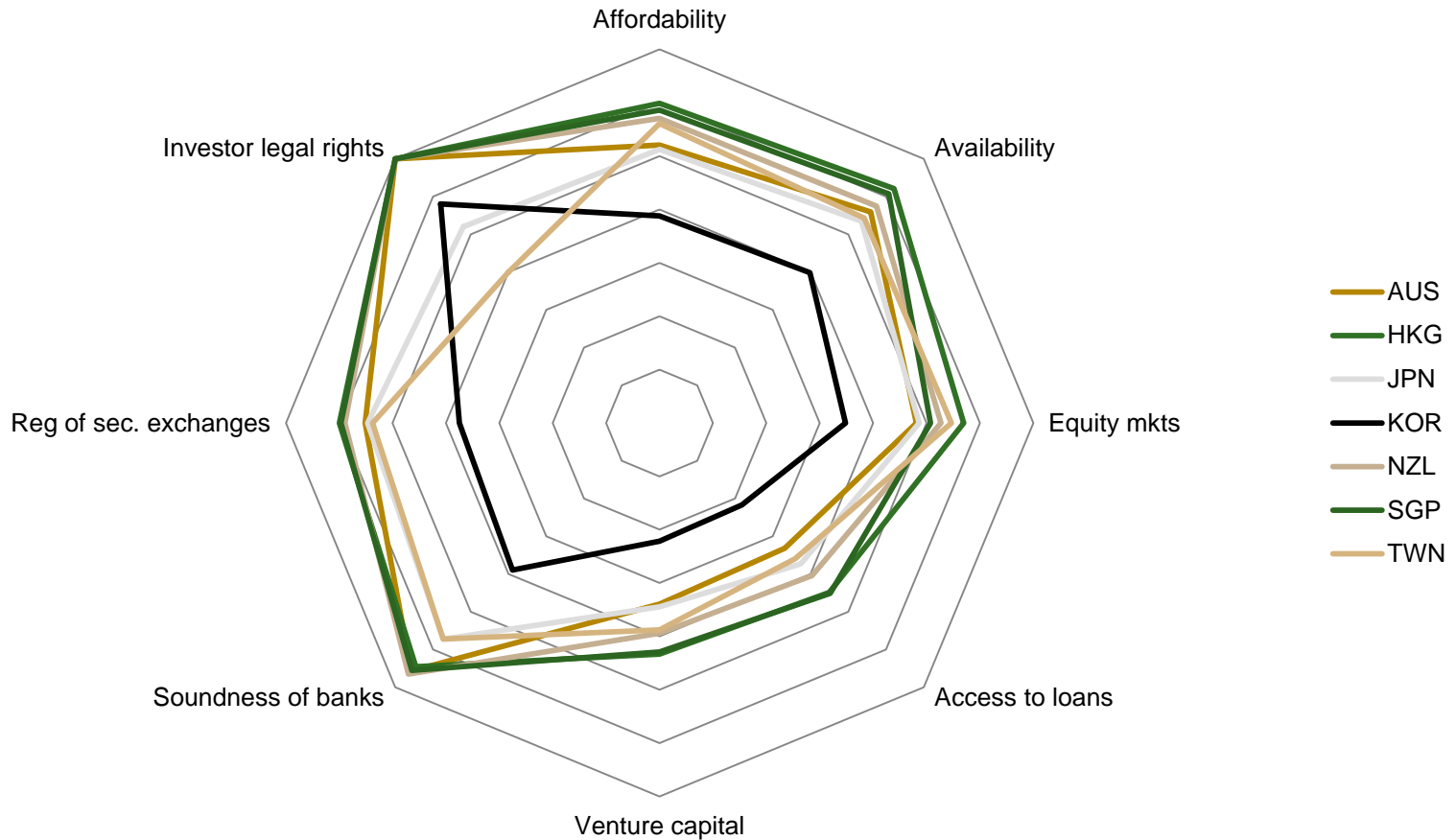
Economies in the Analysis

| | |
|-----------|-------------|
| Australia | New Zealand |
| Cambodia | Philippines |
| China | Singapore |
| Hong Kong | South Korea |
| Indonesia | Taiwan |
| Japan | Thailand |
| Malaysia | Vietnam |

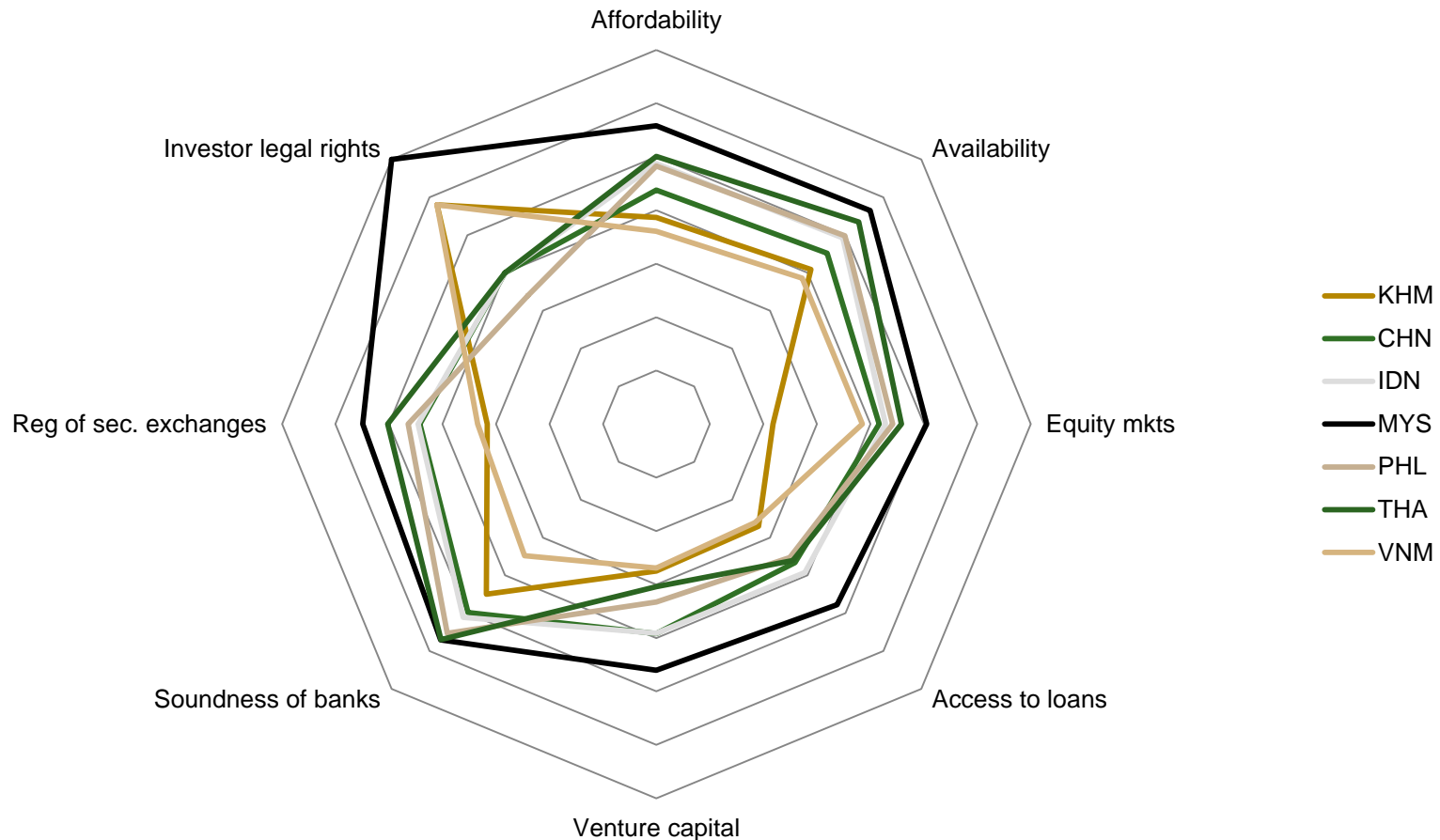
Fin Dev Index Levels

| | FDIndex8 | | FDIndex7 | | FDIndex10 | | FDIndex9 | |
|-----|----------|------|----------|------|-----------|------|----------|------|
| | 2010 | 2014 | 2010 | 2014 | 2010 | 2014 | 2010 | 2014 |
| AUS | 5.24 | 5.18 | 5.07 | 4.92 | 5.27 | 5.20 | 5.14 | 5.00 |
| CHN | 4.22 | 4.26 | 4.17 | 4.29 | 4.17 | 4.21 | 4.12 | 4.23 |
| HKG | 5.60 | 5.77 | 5.41 | 5.60 | 5.56 | 5.74 | 5.40 | 5.60 |
| IDN | 4.23 | 4.44 | 4.43 | 4.50 | 4.14 | 4.35 | 4.29 | 4.39 |
| JPN | 4.44 | 4.86 | 4.33 | 4.82 | 4.53 | 4.94 | 4.46 | 4.91 |
| KHM | 3.63 | 3.63 | 3.31 | 3.32 | 3.54 | 3.55 | 3.29 | 3.30 |
| KOR | 3.75 | 3.65 | 3.54 | 3.34 | 3.90 | 3.83 | 3.75 | 3.61 |
| MYS | 5.22 | 5.48 | 4.97 | 5.26 | 5.09 | 5.39 | 4.88 | 5.21 |
| NZL | 4.91 | 5.53 | 4.70 | 5.32 | 5.05 | 5.58 | 4.90 | 5.42 |
| PHL | 3.94 | 4.33 | 4.11 | 4.46 | 3.82 | 4.24 | 3.93 | 4.33 |
| SGP | 5.51 | 5.67 | 5.30 | 5.48 | 5.55 | 5.68 | 5.39 | 5.54 |
| THA | 4.35 | 4.54 | 4.49 | 4.62 | 4.27 | 4.43 | 4.37 | 4.48 |
| TWN | 4.73 | 4.88 | 4.92 | 5.01 | 4.76 | 4.91 | 4.92 | 5.02 |
| VNM | 4.03 | 3.65 | 3.77 | 3.35 | 3.96 | 3.63 | 3.75 | 3.39 |

Patterns of Financial Development, Developed Economies, 2014



Patterns of Financial Development, Emerging Economies, 2014



Results

Level and Pattern Differences

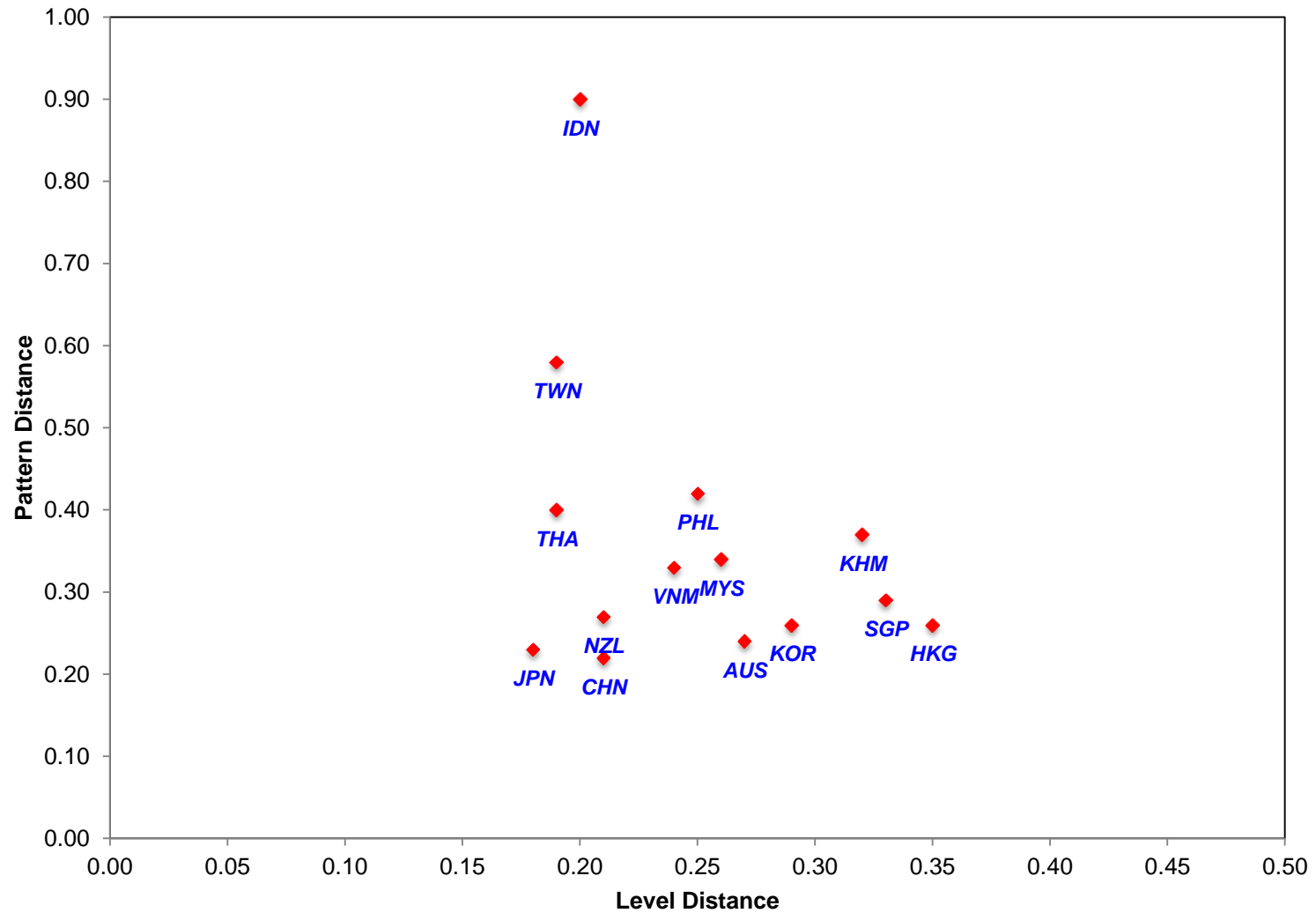
FDIndex8, 2010

Level Difference

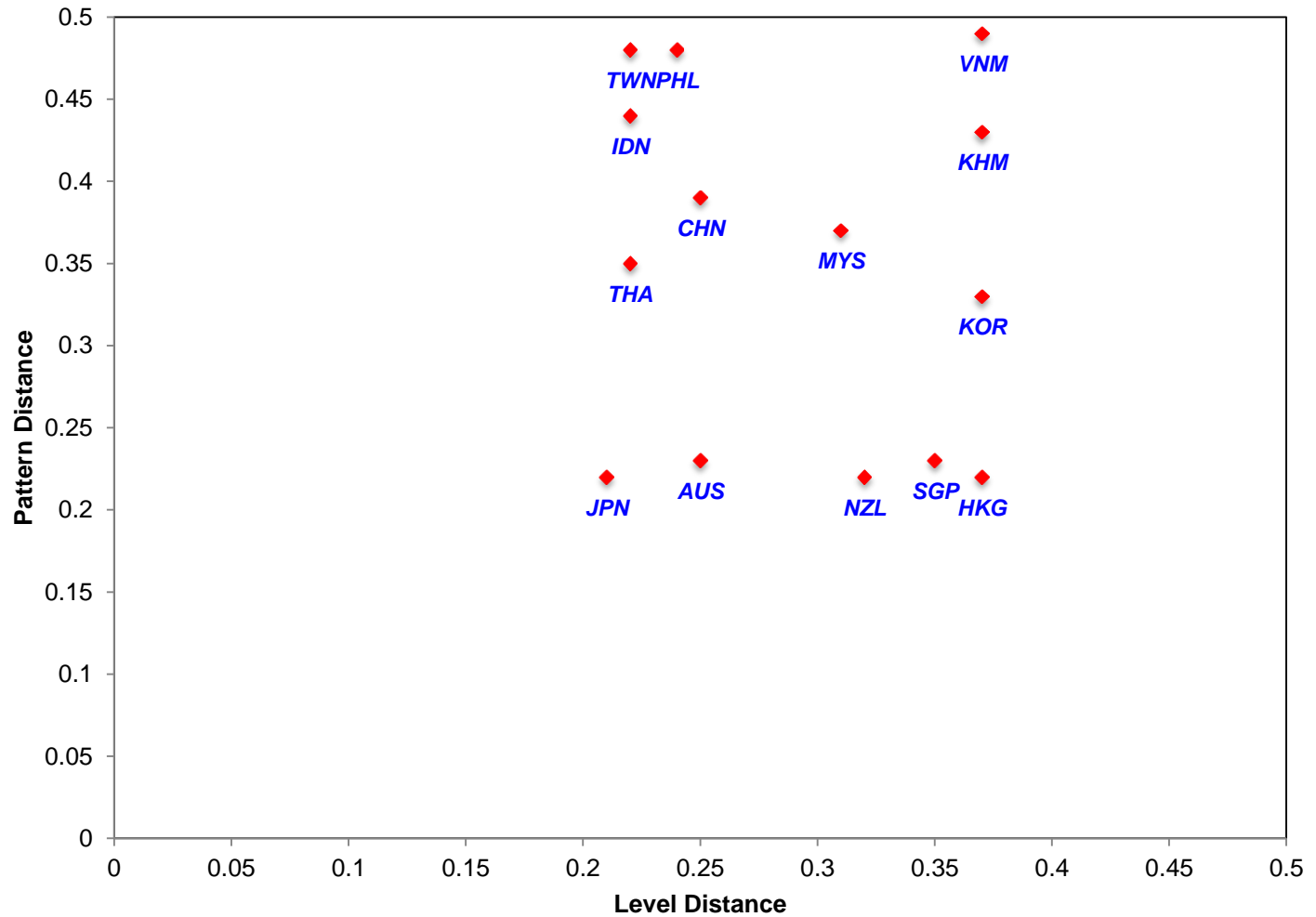
Pattern Difference

| Country | Average | Range | Min | Max | Average | Range | Min | Max |
|---------|---------|-------|-------|-------|---------|-------|------|------|
| AUS | 0.27 | 1.98 | -0.37 | 1.61 | 0.24 | 0.96 | 0.02 | 0.98 |
| CHN | 0.21 | 1.98 | -1.38 | 0.59 | 0.22 | 0.68 | 0.08 | 0.76 |
| HKG | 0.35 | 1.89 | 0.09 | 1.98 | 0.26 | 1.09 | 0.04 | 1.13 |
| IDN | 0.20 | 1.98 | -1.38 | 0.60 | 0.90 | 1.18 | 0.18 | 1.36 |
| JPN | 0.18 | 1.98 | -1.16 | 0.82 | 0.23 | 0.76 | 0.06 | 0.82 |
| KHM | 0.32 | 1.85 | -1.98 | -0.13 | 0.37 | 1.31 | 0.05 | 1.36 |
| KOR | 0.29 | 1.98 | -1.85 | 0.13 | 0.26 | 1.04 | 0.03 | 1.07 |
| MYS | 0.26 | 1.98 | -0.38 | 1.59 | 0.34 | 1.30 | 0.03 | 1.33 |
| NZL | 0.21 | 1.98 | -0.69 | 1.29 | 0.27 | 1.04 | 0.02 | 1.06 |
| PHL | 0.25 | 1.98 | -1.66 | 0.32 | 0.42 | 0.68 | 0.01 | 0.69 |
| SGP | 0.33 | 1.98 | -0.09 | 1.89 | 0.29 | 1.20 | 0.03 | 1.23 |
| THA | 0.19 | 1.98 | -1.25 | 0.72 | 0.40 | 0.68 | 0.01 | 0.69 |
| TWN | 0.19 | 1.98 | -0.87 | 1.11 | 0.58 | 0.81 | 0.10 | 0.91 |
| VNM | 0.24 | 1.98 | -1.58 | 0.40 | 0.33 | 1.24 | 0.03 | 1.27 |

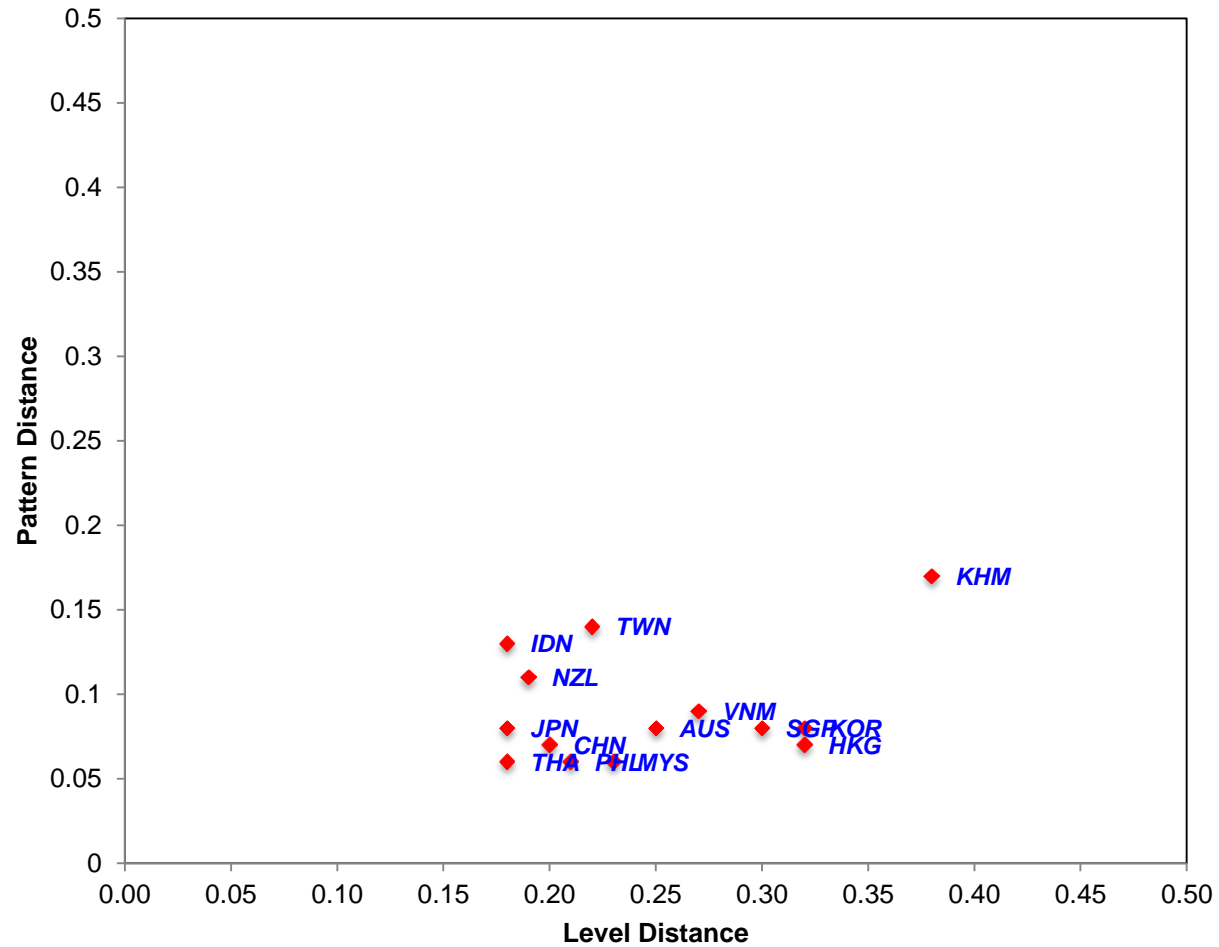
FDIndex8 2010



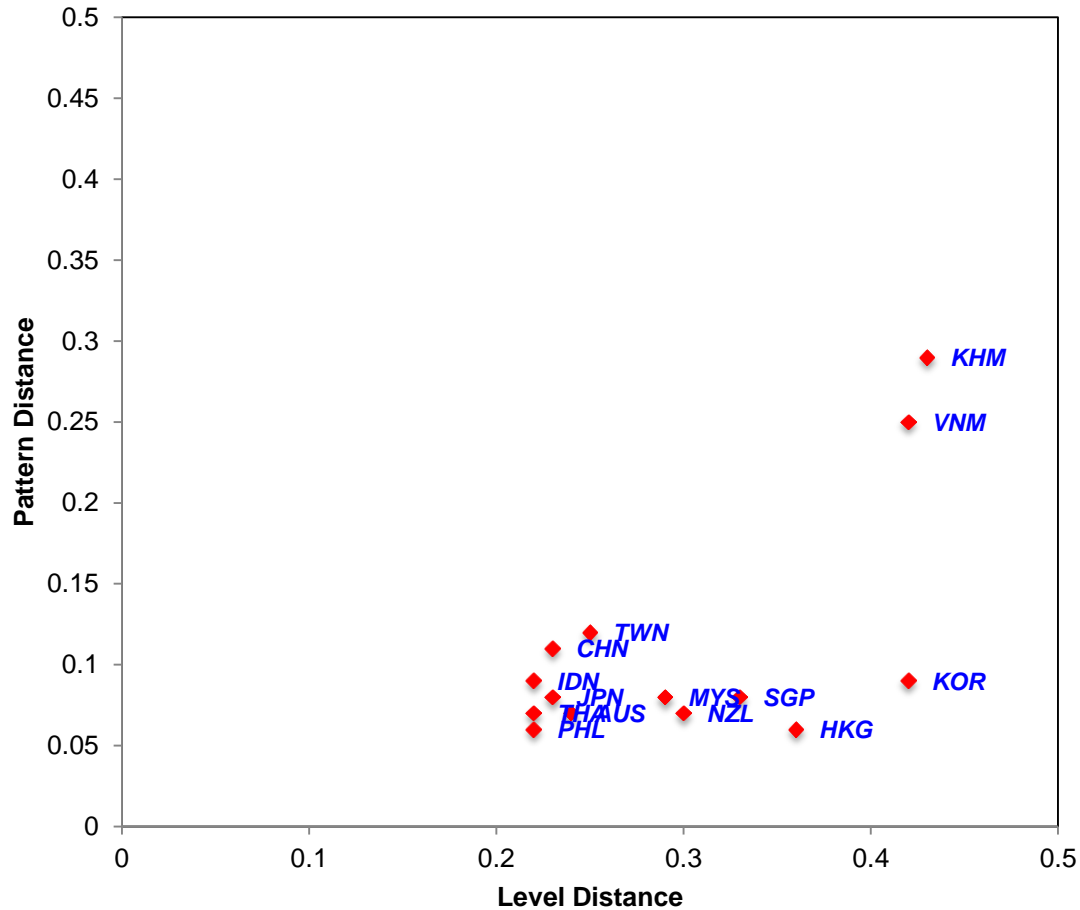
FDIndex8 2014



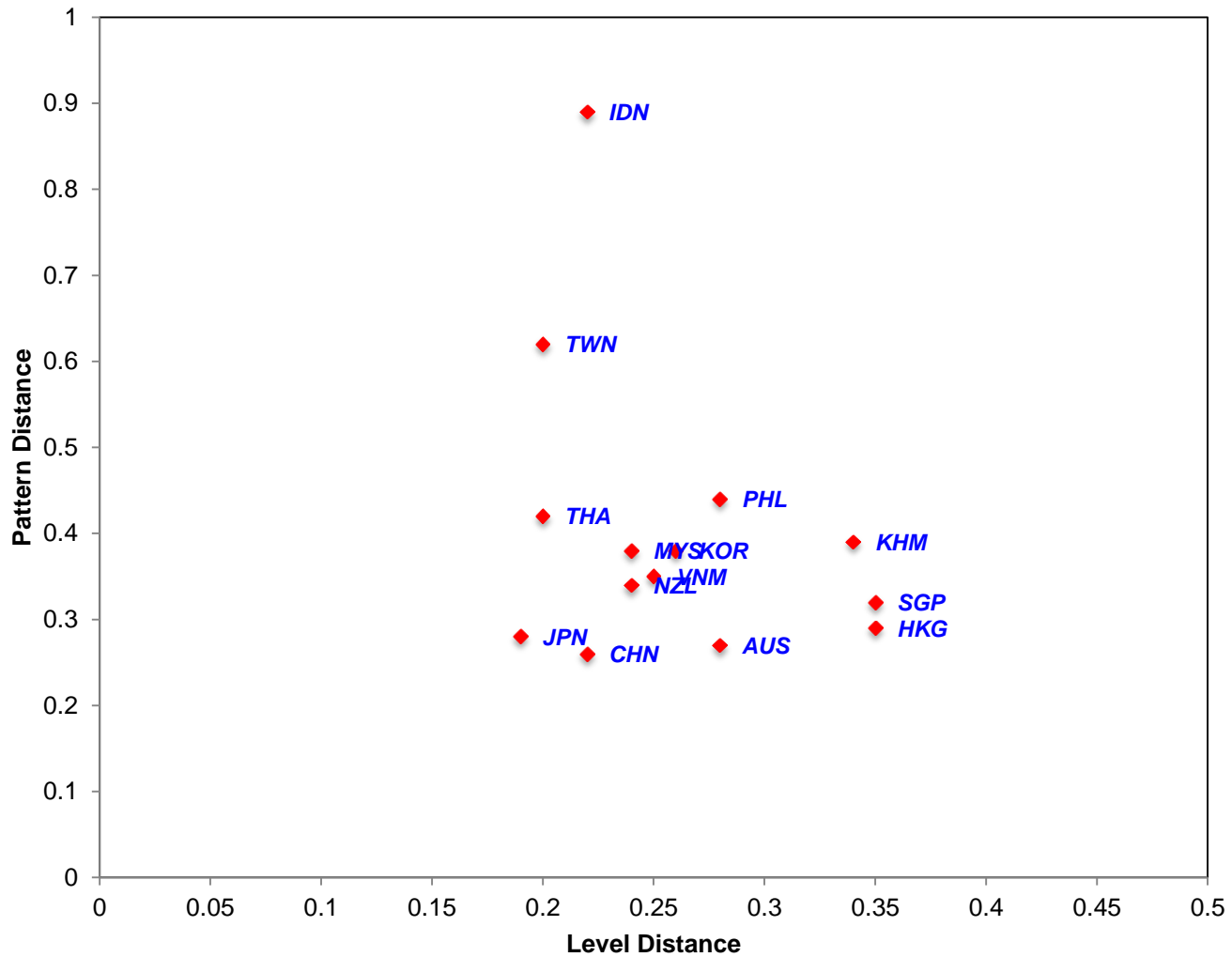
FDIndex7 2010



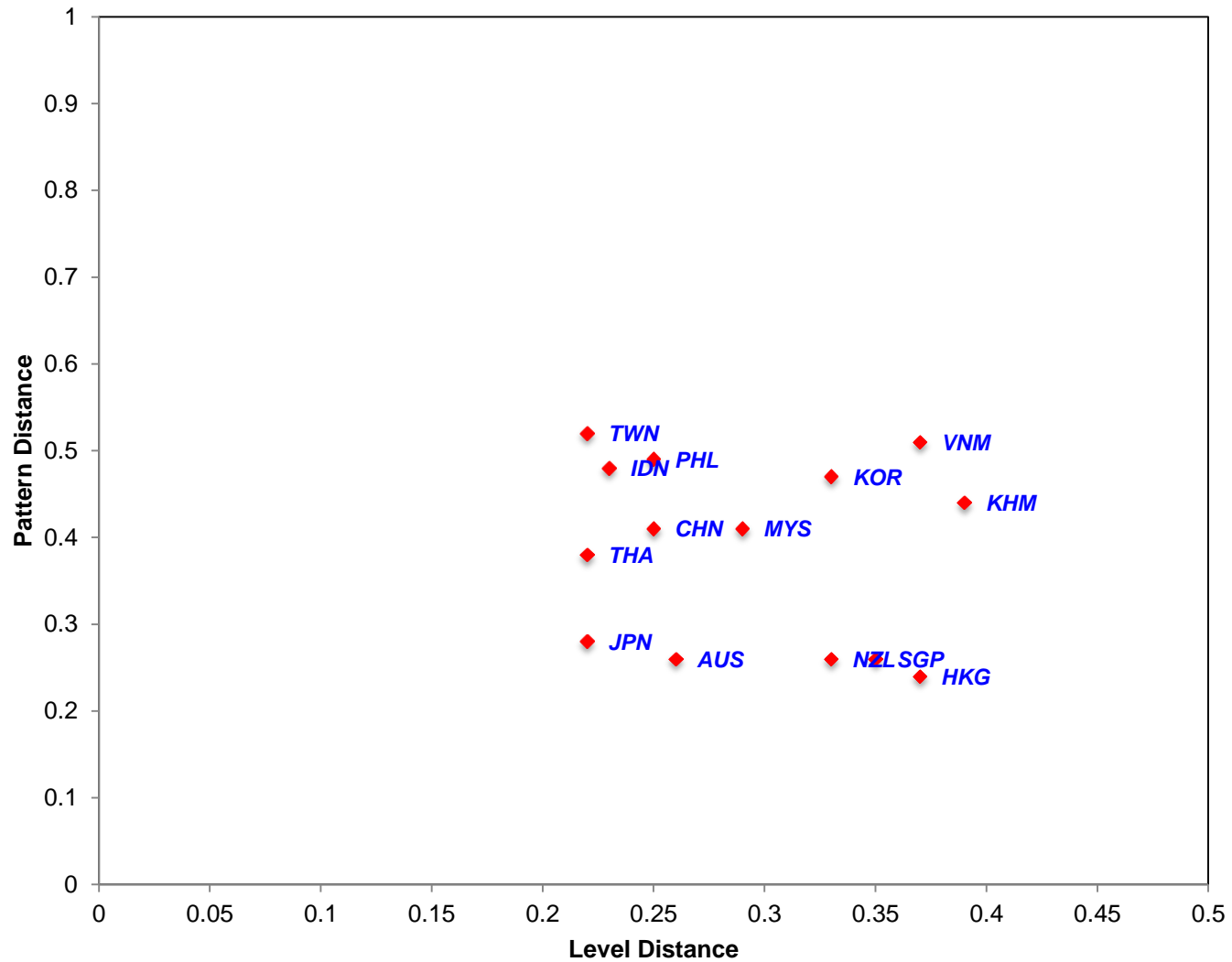
FDIndex7 2014



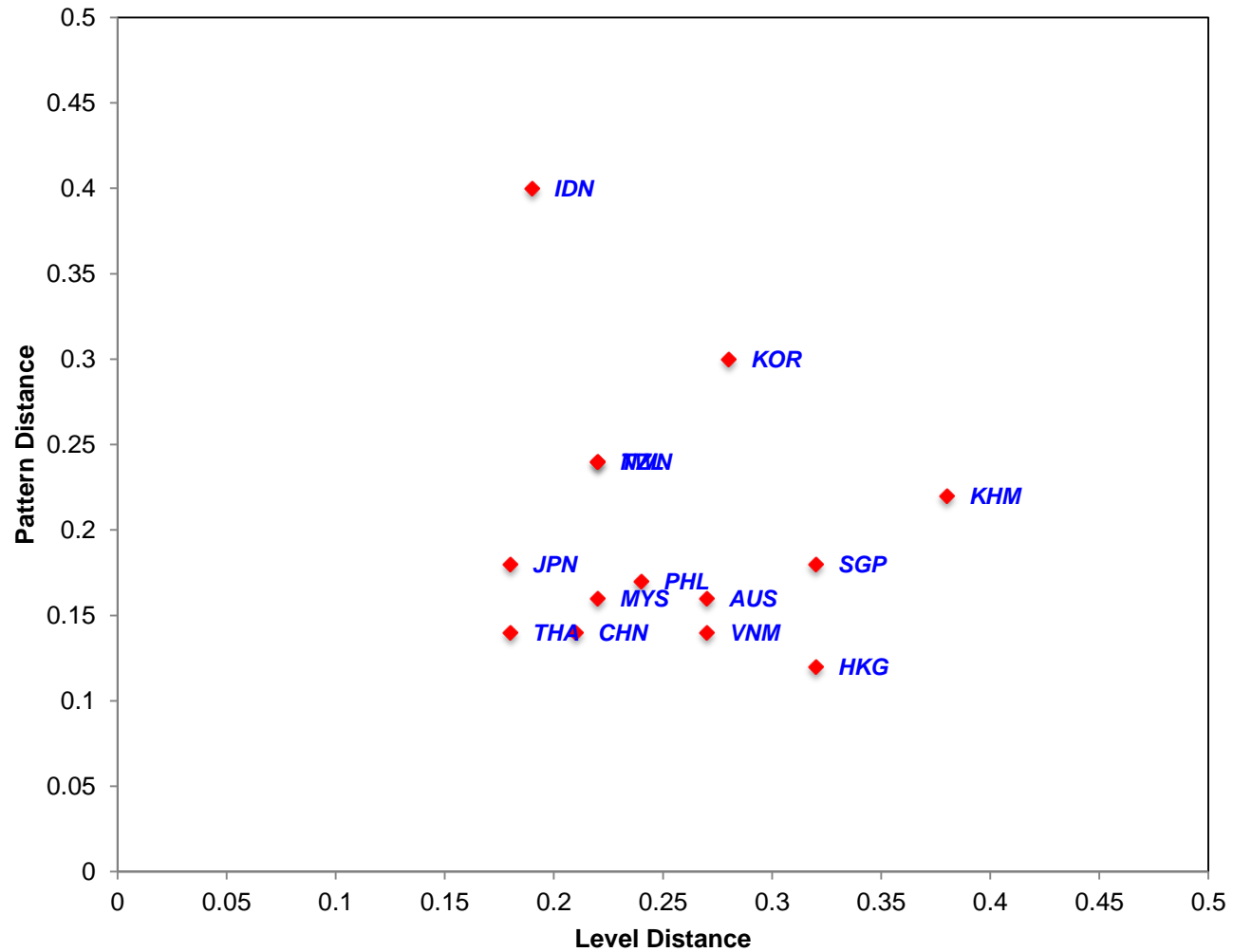
FDIndex10 2010



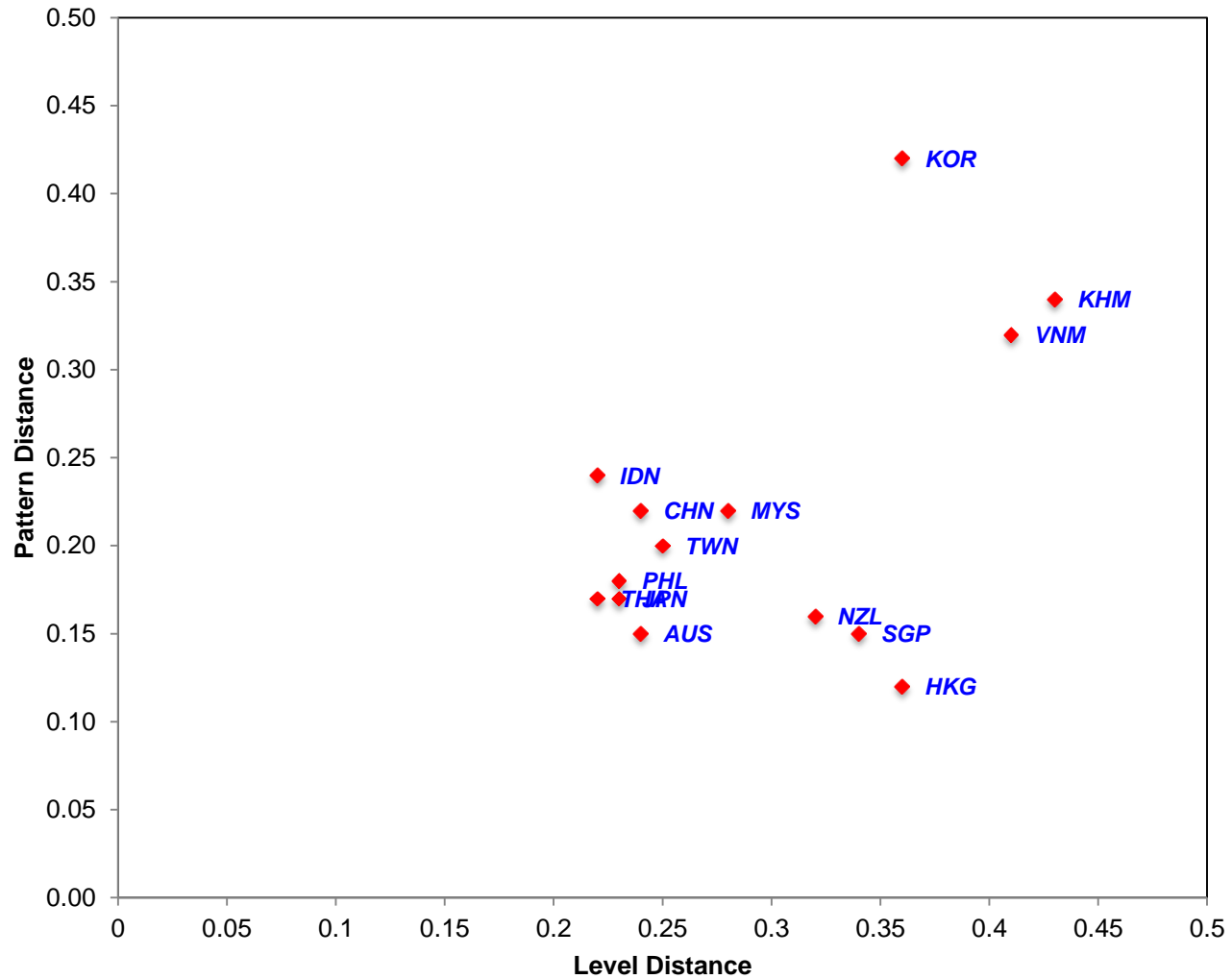
FDIndex10 2014



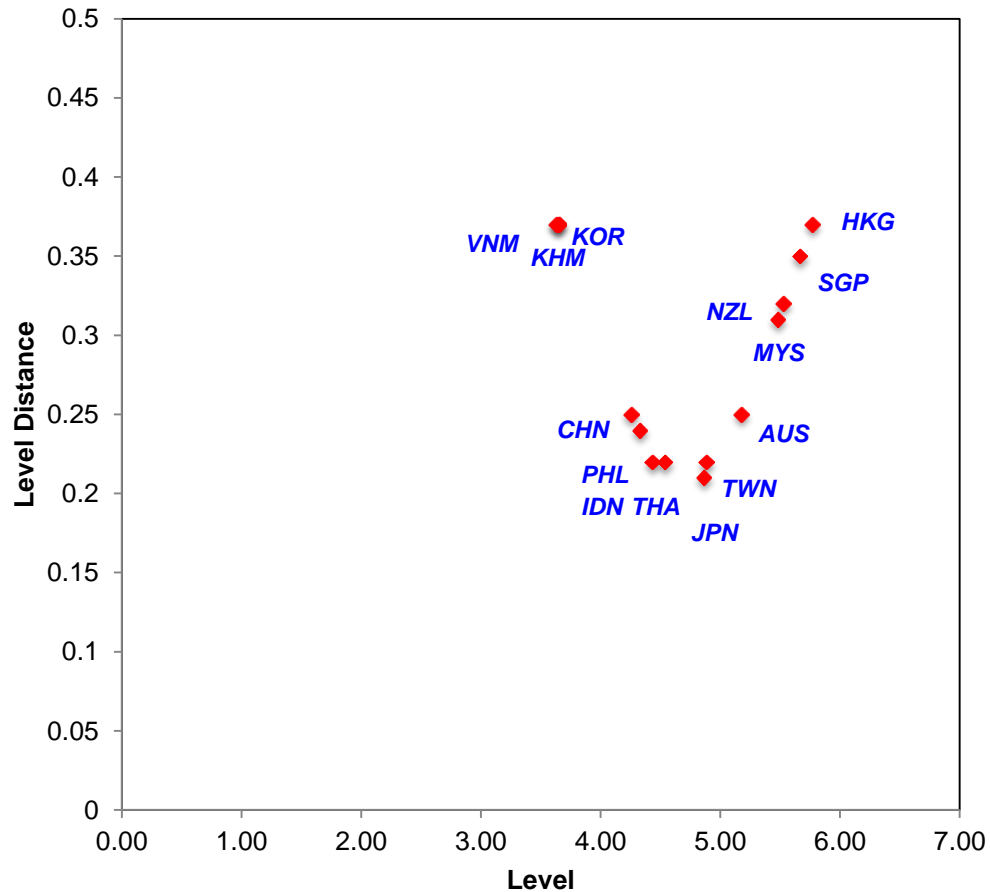
FDIndex9 2010



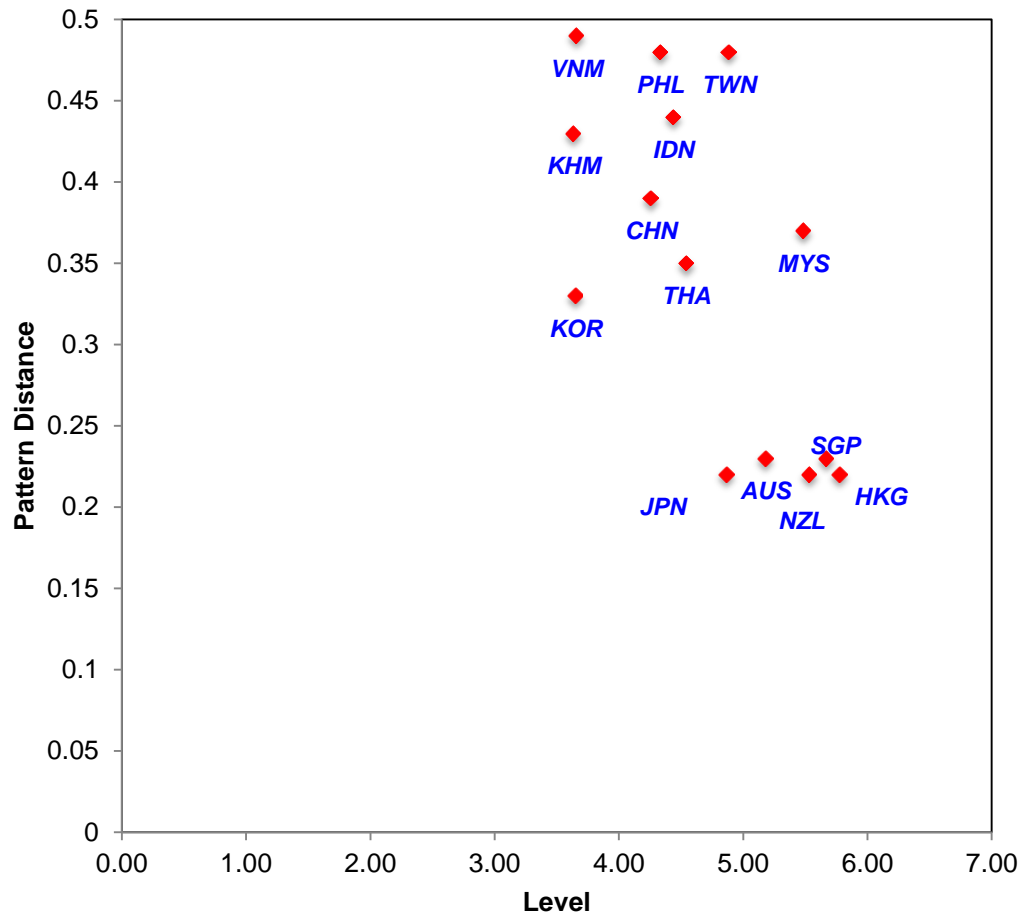
FDIndex9 2014



Level Distances vs. Levels, FDIndex8, 2014



Pattern Distances vs. Levels, FDIndex8, 2014



Clustering based on Levels of Financial Development

| | | | | | | | | | | | | |
|-----|------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------|----------------------|
| AUS | AUS | AUS | AUS | AUS | AUS | AUS | AUS | AUS | AUS | | | |
| KHM | KHM | KHM | | | | | | | | | | |
| CHN | CHN | CHN | CHN | CHN | <i>CP</i> | <i>CP</i> | <i>CP</i> | <i>CPITh</i> | <i>CPITh</i> | <i>CPITh</i> | | |
| HKG | HKG | HKG | HKG | HKG | HKG | HKG | <i>HS</i> | <i>HS</i> | | | | |
| IDN | IDN | IDN | IDN | IDN | IDN | <i>ITh</i> | <i>ITh</i> | | | | | |
| JPN | JPN | <i>JTw</i> | <i>JTw</i> | <i>JTw</i> | <i>JTw</i> | <i>JTw</i> | <i>JTw</i> | <i>JTw</i> | <i>JTw</i> | <i>JTwA</i> | <i>JTwACPITh</i> | <i>JTwACPIThMNHS</i> |
| KOR | <i>KoV</i> | <i>KoV</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> | <i>KoVKh</i> |
| MYS | MYS | MYS | MYS | <i>MN</i> | <i>MN</i> | <i>MN</i> | <i>MN</i> | <i>MN</i> | <i>MNHS</i> | <i>MNHS</i> | <i>MNHS</i> | |
| NZL | NZL | NZL | NZL | | | | | | | | | |
| PHL | PHL | PHL | PHL | PHL | | | | | | | | |
| SGP | SGP | SGP | SGP | SGP | SGP | SGP | | | | | | |
| TWN | TWN | | | | | | | | | | | |
| THA | THA | THA | THA | THA | THA | | | | | | | |
| VNM | | | | | | | | | | | | |

Clustering based on Patterns of Financial Development

| | | | | | | | | | | | | |
|-----|-----------|------------|-------------|-------------|-------------|-------------|-------------|--------------|----------------|----------------|------------------|--------------------|
| AUS | <i>AN</i> | <i>ANS</i> | <i>ANSH</i> | <i>ANSH</i> | <i>ANSH</i> | <i>ANSH</i> | <i>ANSH</i> | <i>ANSH</i> | <i>ANSH</i> | <i>ANSHJ</i> | <i>ANSHJKoMV</i> | <i>ANSHJKoMVKh</i> |
| KHM | KHM | KHM | KHM | KHM | KHM | KHM | KHM | KHM | KHM | KHM | KHM | |
| CHN | CHN | CHN | CHN | CHN | CHN | CHN | CHN | | | | | |
| HKG | HKG | HKG | | | | | | | | | | |
| IDN | IDN | IDN | IDN | <i>IP</i> | <i>IP</i> | <i>IPTh</i> | <i>IPTh</i> | <i>IPThC</i> | <i>IPThCTw</i> | <i>IPThCTw</i> | <i>IPThCTw</i> | <i>IPThCTw</i> |
| JPN | JPN | JPN | JPN | JPN | JPN | JPN | JPN | JPN | JPN | | | |
| KOR | KOR | KOR | KOR | KOR | <i>KoM</i> | <i>KoM</i> | <i>KoMV</i> | <i>KoMV</i> | <i>KoMV</i> | <i>KoMV</i> | | |
| MYS | MYS | MYS | MYS | MYS | | | | | | | | |
| NZL | | | | | | | | | | | | |
| PHL | PHL | PHL | PHL | | | | | | | | | |
| SGP | SGP | | | | | | | | | | | |
| TWN | TWN | TWN | TWN | TWN | TWN | TWN | TWN | TWN | | | | |
| THA | THA | THA | THA | THA | THA | | | | | | | |
| VNM | VNM | VNM | VNM | VNM | VNM | VNM | | | | | | |

Conclusions (1)

- Financial development is considered a beneficial precursor to financial integration
- We provide a way of separating levels and patterns of financial development
- The components of financial development index matter more for levels than for patterns in our data

Conclusions (2)

- We provide a way of measuring closeness in levels and in patterns among countries in a region and apply it in a cluster analysis
- Differences in patterns are less stable over time than differences in levels in our data
- These kinds of calculations can be a useful preliminary tool for assessing prospects for beneficial financial integration among a given set of economies.