



ESSENTIAL AND EXPOSURE INDICES

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Definitions

Question:

Can a subset of a Broad Market Index (BMI) mimic the BMI?

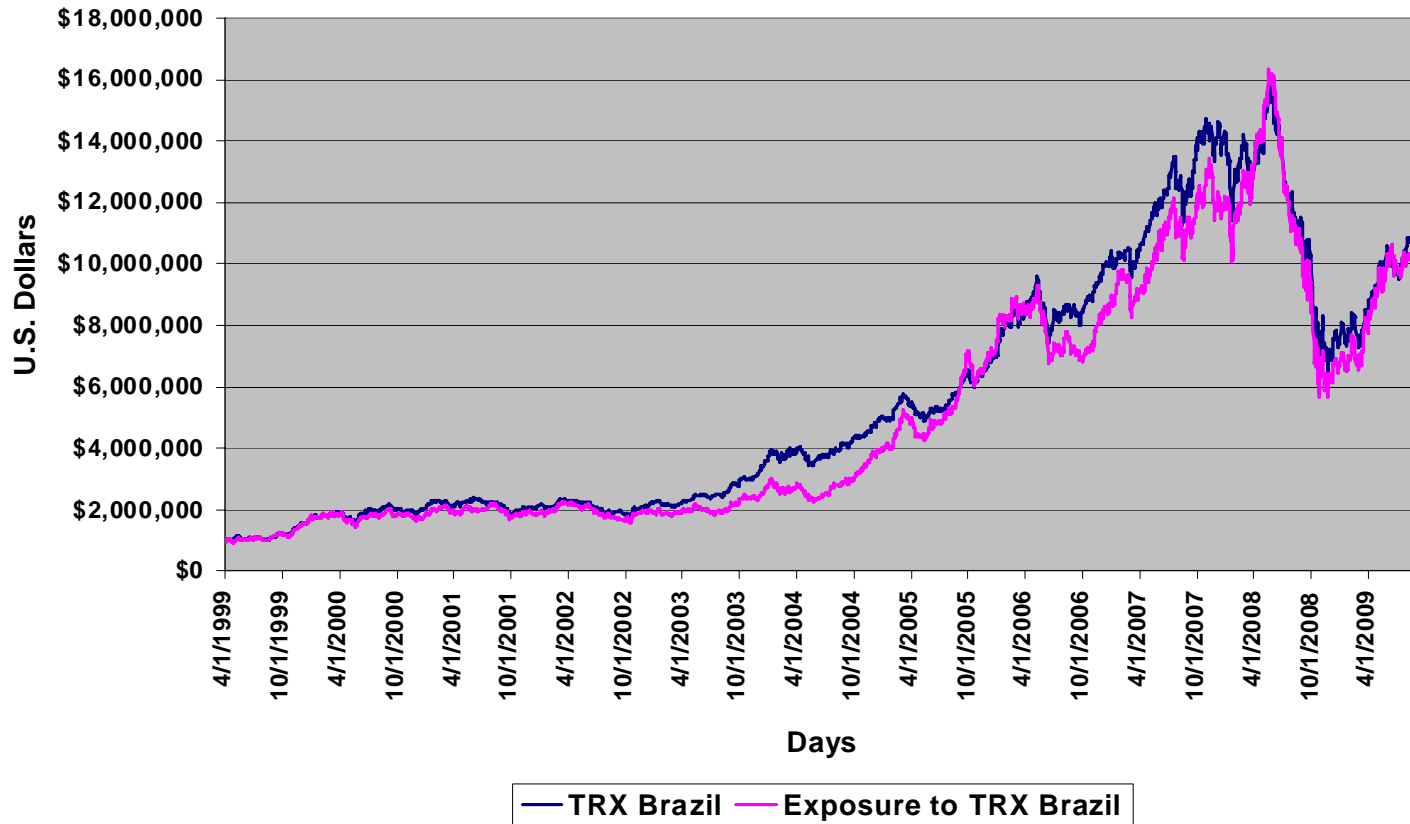
Answer:

Yes

- Essential Indices
 - Approx. 20% - 30% of the BMI constituents
- Exposure Indices
 - Approx. 10% - 20% of the BMI constituents

What You Can Get From Investing In Less?

Return on \$1M: April 1999 - November 2009



What Is The Difference?

For the Exposure index that is investing in about 10% - 20% of the stocks available in the Thomson Reuters Brazil Index (TRX Brazil):

- About \$750K less in return on a 10-fold increase on the initial \$1M investment
 - However, taking into account transaction costs due to turnover in each index
 - The difference over 10 ½ years is reduced to \$300K - \$400K
- About 0 (less than 1 bp) difference in average daily return exists
- And about 7% less in annual standard deviation

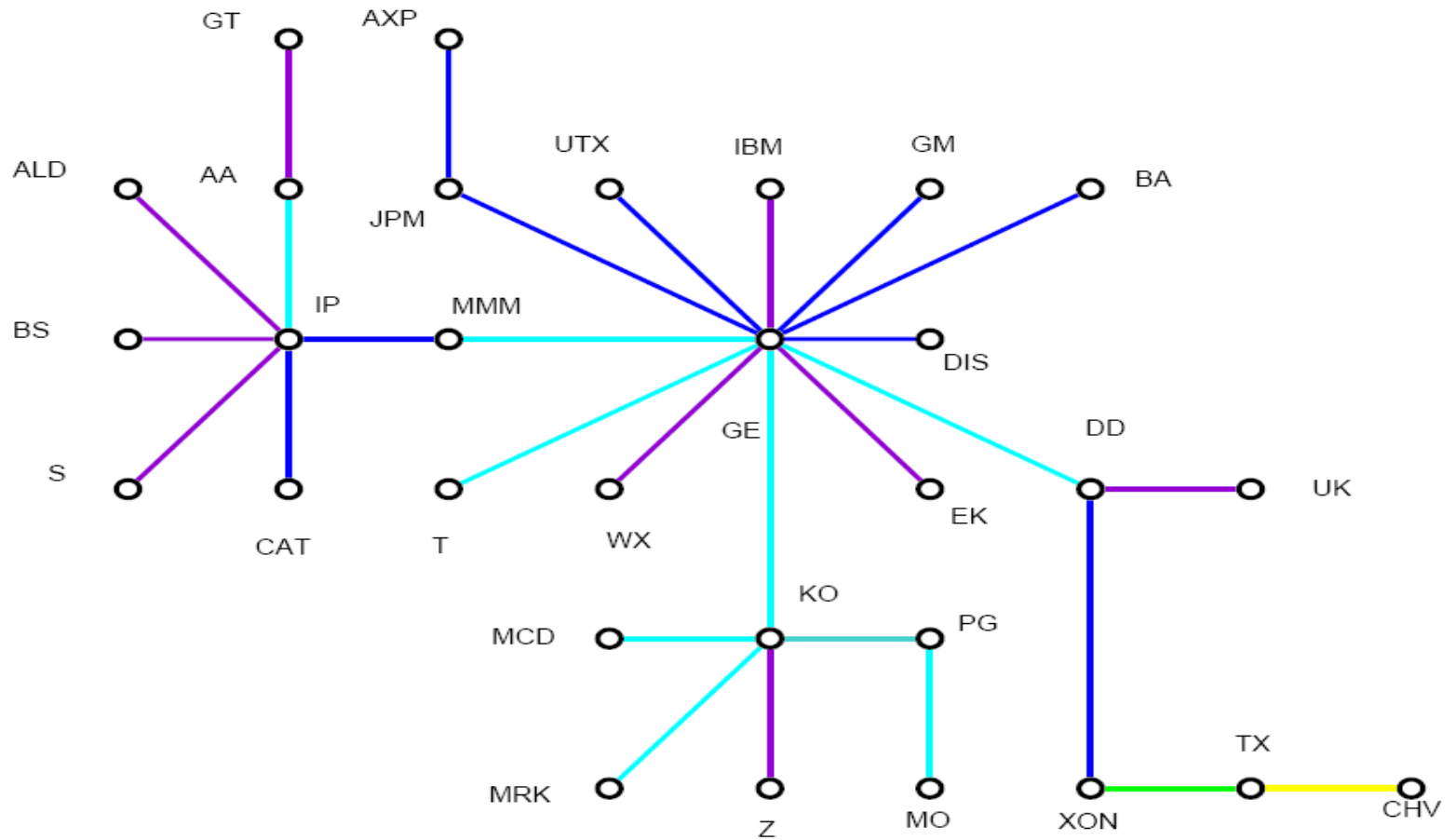
Construction

- So what allows this to happen?
- Paying attention to the structure of the data
 - Each stock has some relationship to another
 - Some relationships are strong
 - Some are weak (or nonexistent)
 - Some are in the middle

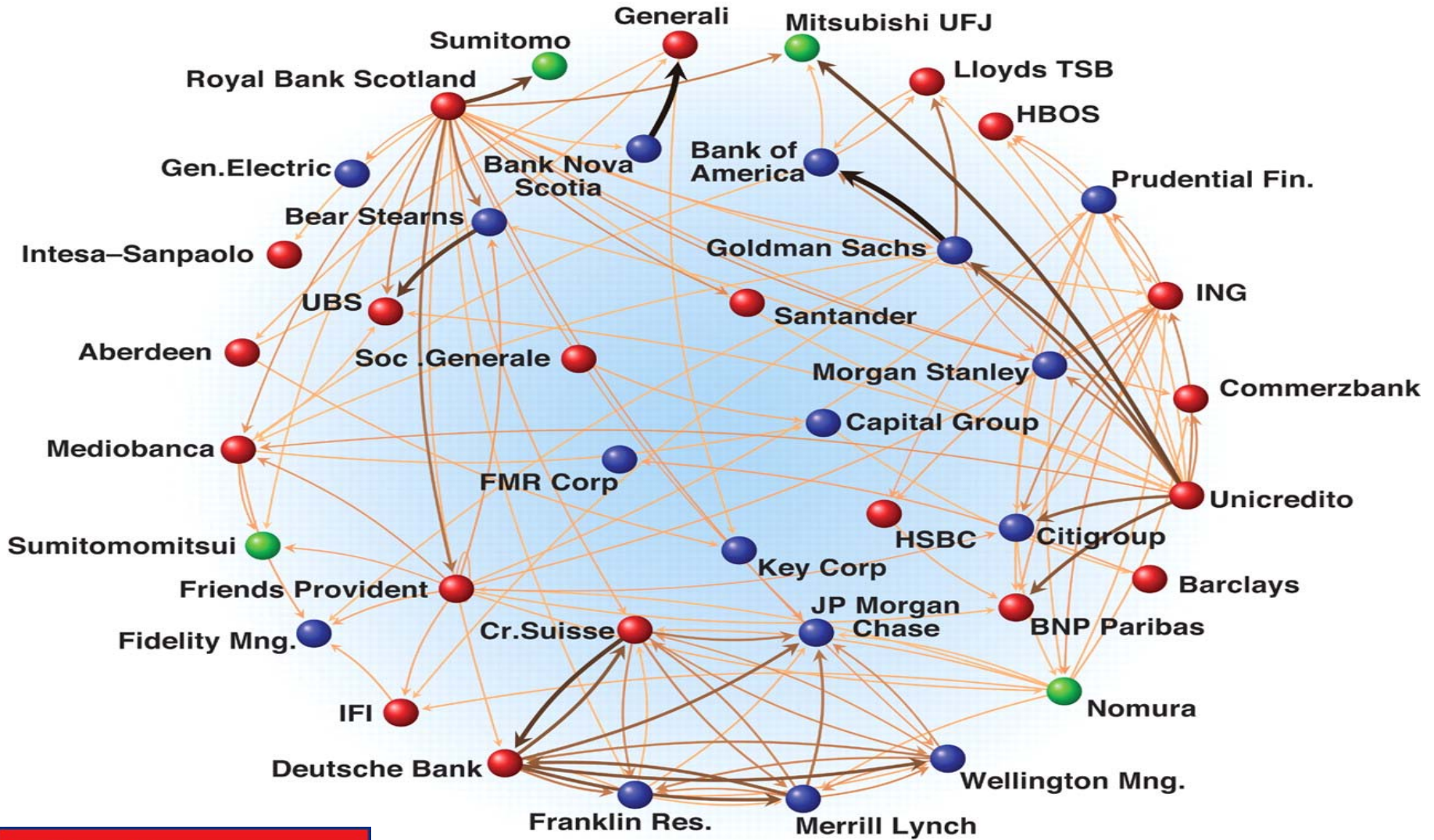
Construction

- Paying attention to these pair-wise relationships is paying attention to structure or the topology of the data
- So the more attention you pay to the relationship of the data in its natural space
- The more information becomes available

An Example



A sample of the international financial network where the nodes represent major financial institutions and the links are both directed and weighted and represent the strongest existing relations among them

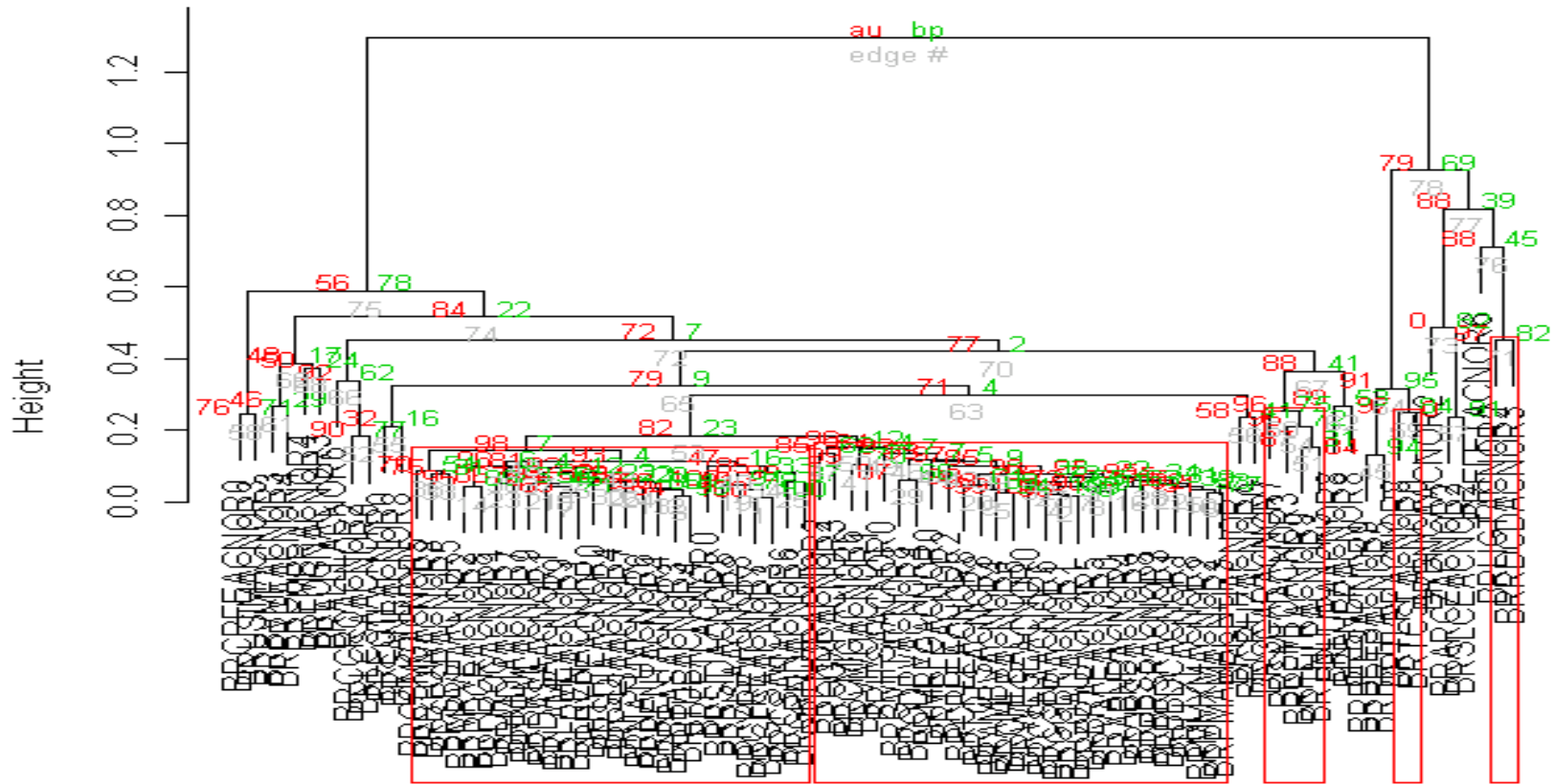


Construction

- So the same as in the ultrametrics and network graph slides
- The interconnectedness of stocks can be determined
- And their relationships to one another can be computed
 - Strong, weak or in-between
- And then ordered

Thomson Reuters Brazil Index (TRX Brazil): 6.30.09

Cluster dendrogram with AU/BP values (%)



Distance: correlation
Cluster method: average

Construction

- 56 out of 83 securities are found to have a significant relationship with at least one other stock
- The 2 large blocks have more than 20 securities in each
- One block has 4
- And two blocks have only 2

Construction

- An analysis was done similar to the one for the Dow
- In order to determine how many securities in blocks 1, 2 & 4 are “mother” stocks
- The “mother” analysis found 5 “mother” stocks” in block 1, 6 in block 2 and 1 in block 4
- So 14 stocks in total (out of 80) will be in the Exposure index

OK – but what do the blocks and mother stocks refer to ?

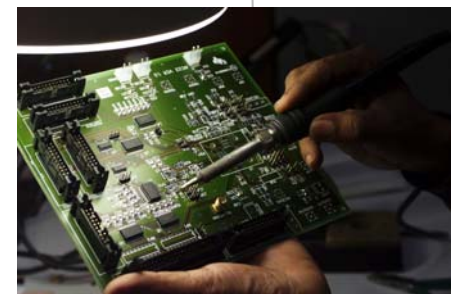
Construction

- Blocks tend to be composed of Thomson Reuters Business Classification (TRBC) sectors – **Basic Materials**, **Energy**, what have you
- These sectors maybe exist in separate blocks
- Or grouped together in a block



Construction

- As an example in the first large block is predominantly **Consumer Goods, Industrial Goods & Services**
- And in second block is predominantly **Financial, Healthcare, Services and Technology**



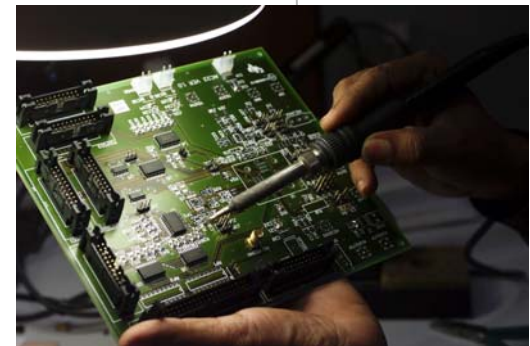
Construction

- However, both clusters contain significant commonalities
- In the first, the equities in the **Service** sector are almost all related to the shipping industry, which obviously serves to distribute **Consumer** and **Industrial Goods** in Brazil's export-led economy



Construction

- In the second, the equities in the **Financial Services** and **Technology** sectors are related to companies that either provide services or do business with healthcare companies (e.g. health insurance companies, drug companies, management services, healthcare based REITs, etc.)

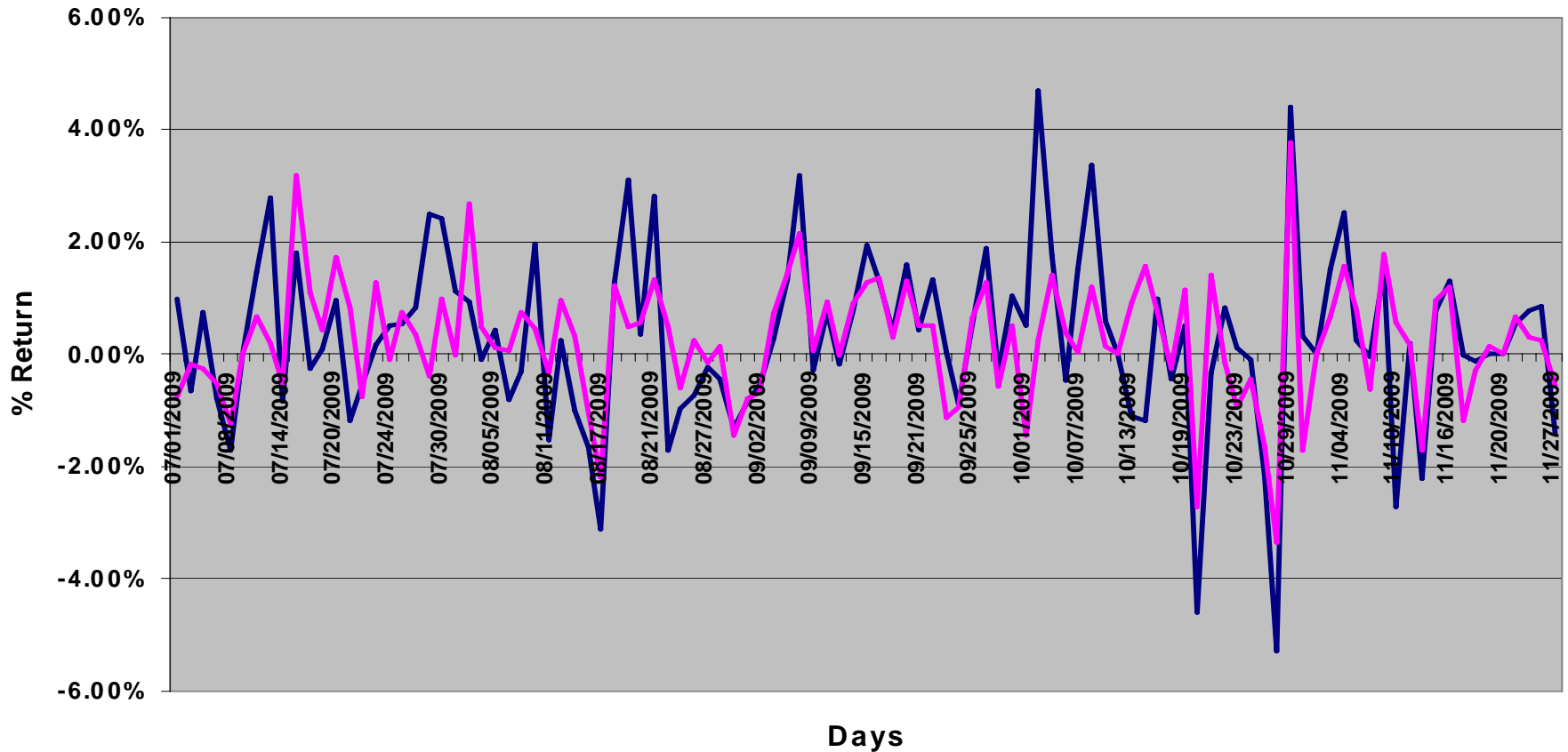


Construction

- Equities in both of these clusters are drawn from a range of different clusters, showing that these two partitions are truly distinct
- Demonstrating that adhering to the topology of the data means higher order effects can be removed so new structure – a fine-graining of sector behavior– can be revealed

TRX Brazil and Brazil Exposure: 2nd Half 2009

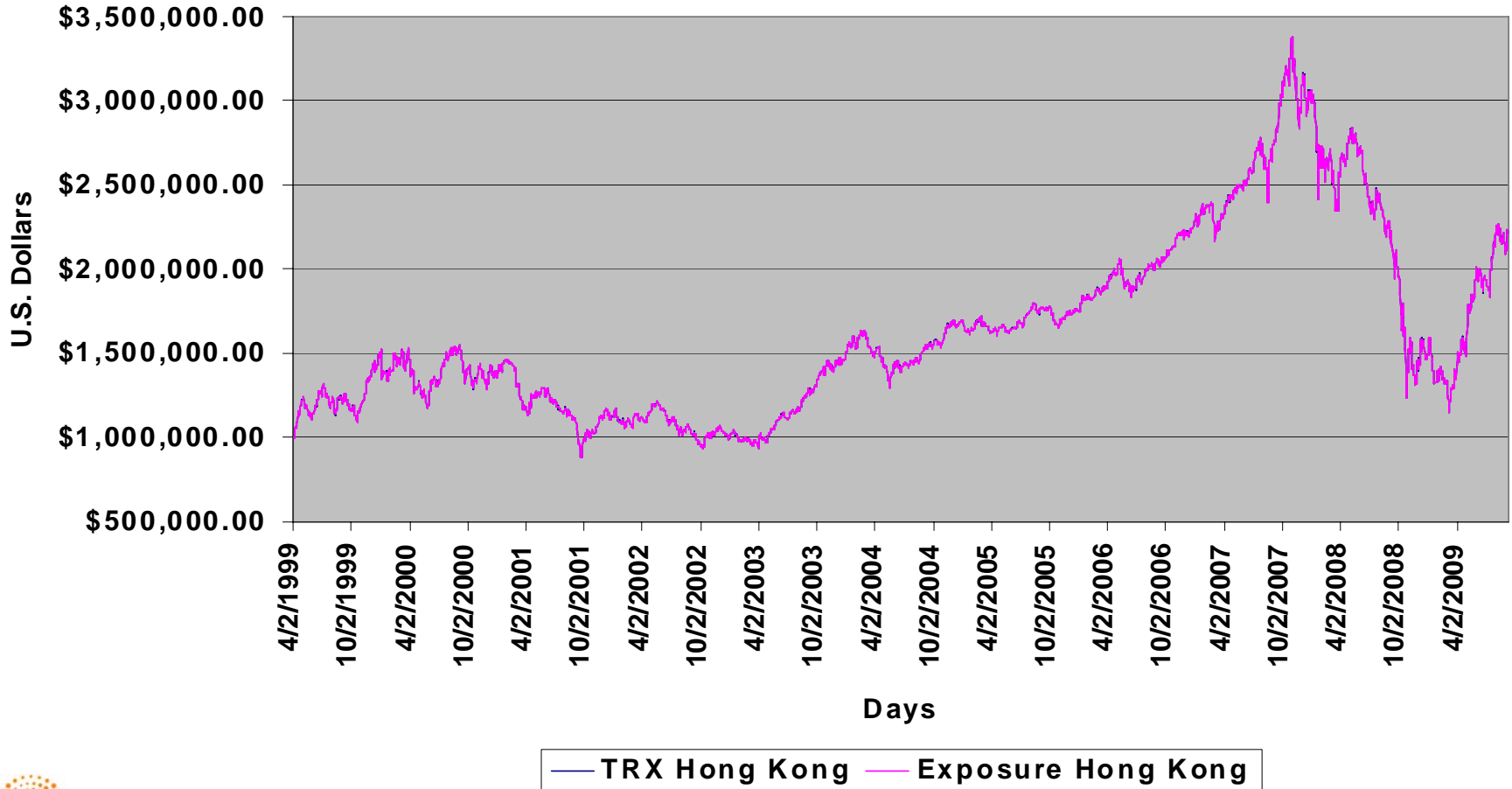
Daily Returns



— TRX Brazil: Daily returns — Exposure Brazil: Daily Returns

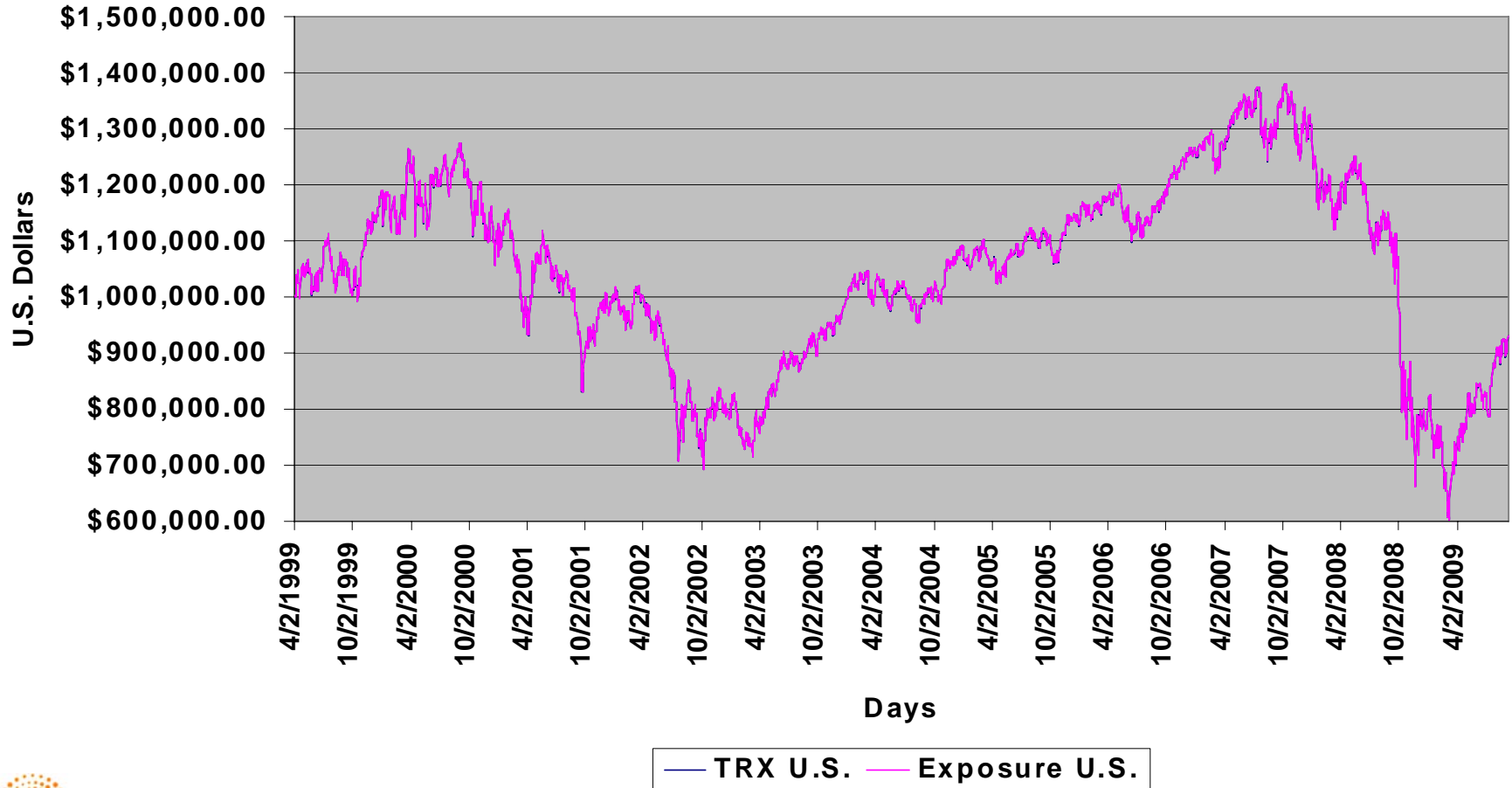
Hong Kong

Return on \$1M: TRX Hong Kong & Exposure Hong Kong



United States

Return on \$1M: TRX U.S. & Exposure U.S.



Conclusions

- So a subset of a BMI *can* mimic the BMI
 - This subset is best constructed hewing to the natural space the securities lie in (their topology)
 - Paying attention to the relationships between securities means a fine structure can be revealed
 - And a natural ordering of the finer structure generates exposure and essential indices

Conclusions

- While Essential indices were not shown here
- They typically look like the U.S. & HK exposure indices
- With some indices showing enhanced beta qualities
 - The subset outperforms the BMI

QUESTIONS?



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THANK YOU