Monitoring & assessing financial market development
A bird’s eye view

Sonja Juko, Senior Advisor for Monetary Policy and Financial Markets, Center for International Central Bank Dialogue

Disclaimer: Views expressed are those of the author and do not necessarily represent the views of Deutsche Bundesbank
Monitoring & assessing financial market development

Motivation: Role of financial market for CB (RECAP)

CB functions
(e.g. monetary policy, FX reserve management, financial stability etc.)

Data source
- Data collection and analysis of financial market developments provides basis for policy formulation (i.e. decisions) and implementation (i.e. operations)

Source of risk
- Financial market developments may undermine achieving the CB policy objectives or may call for policy measures

Arena for action
- Applies to financial market operations which the CB conducts in the context of its mandate

Venue for policy transmission
- Applies in particular to monetary policy which is transmitted through various channels involving financial markets
Monitoring & assessing financial market development

Motivation: Benefits of financial markets (RECAP)

Achievement of general economic objectives (that are relevant for CBs) depend on financial market development

- Contribute to **efficient allocation of economic resources**
- Support **economic growth**
- Promote **poverty reduction**
Aim of presentation

- Reflect on the motivation of CBs to monitor and assess financial markets (and their development)
- Reflect on conceptual approaches how financial market characteristics and developments can be assessed
- Reflect on stage of financial market development of LAC countries and identify basic issues in financial market development of individual countries
Monitoring & assessing financial market development
Motivation

- For what purposes do CBs monitor financial market developments?

- Which functions/areas of CBs require a continuous monitoring and assessment of financial market developments/conditions and why?
  - Which financial market segments are you monitoring with regards to your tasks at the CB and why?
Monitoring & assessing financial market development

**Motivation:** Depends on CB function

Motivation by CBs to monitor and assess financial market development differs depending on function

| Monetary policy                          | • Analyse policy transmission  
|                                         | • Assess effectiveness and weaknesses of policy implementation  
|                                         | • Identify policy measures which strengthen market related channels |
| Financial stability                     | • Analyse (systemtic) risks to financial stability (incl. market frictions)  
|                                         | • Identify and assess need for macroprudential measures to mitigate risks to financial stability caused by financial market developments |
| FX reserve management                   | • Analyse and assess universe of assets for investments  
|                                         | • Analyse risks of FX portfolio  
|                                         | • Prepare asset allocation decisions |
| Other                                   | • Statistics: Collect data & monitor developments in financial markets to update reporting requirements in order to incorporate important changes in financial markets in official statistics |
To access the survey please open the weblink below

https://sonjajuko9053.survey.fm/assessing-financial-market-development-1

Link for moderator: https://crowdsignal.com

How do you assess the stage of financial market development in your country? Rank your country on a scale from 0 to 1.

Note: 0 is lowest possible value, 1 is highest possible value
Conceptual approach to financial market monitoring

- How can financial markets and market developments be monitored, assessed & benchmarked?

- Which aspects (indicators) can/should be monitored in order to assess financial market developments?
  - ... in broad terms?
  - ... with a view to different financial market functions?
<table>
<thead>
<tr>
<th>Conceptual approach to financial market monitoring</th>
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</thead>
<tbody>
<tr>
<td>Financial sector assessment: Comprehensive approach (World Bank)</td>
</tr>
</tbody>
</table>

- Indicators of financial structure, development and soundness (Chapter 2)
- Framework for financial stability analysis and assessment (Chapter 3)
- Assessing financial structure and financial development
- Evaluating securities markets supervision (Chapter 5)
- Assessing the legal infrastructure (Chapter 9)
- Assessing information and governance infrastructure (Chapter 10)
- Assessing systemic liquidity infrastructure (Chapter 11)
- Sequencing financial sector reform (Chapter 12)
- Data sources for financial sector assessment (Appendix C)
Conceptual approach to financial market monitoring
Aspects to monitor relating to notion of market functions/functioning

...highlighted in the literature

- ... with a view to financial markets in general/as a whole (→ broad measures) or specific market segments (→ narrow measures)

- Structure
- Depth (size)
- Access (inclusion)
- Efficiency
- Liquidity
- Soundness (stability)
Conceptual approach to financial market monitoring

Broad indicators (Svirydzenka 2016)

- **Financial development is multidimensional:** A wide range of financial institutions and markets facilitates the provision of financial services
  - Financial markets allow individuals and firms to diversify their savings, and firms can now raise money through stocks, bonds, and wholesale money markets, by-passing traditional bank lending

- **An important feature of financial systems (incl. financial markets) is access and efficiency**
  - Large financial systems (incl. financial markets) are of limited use if they are not accessible to a sufficiently large proportion of the population and firms or inefficient

- **One needs to look at multiple indicators to measure financial development more comprehensively to capture various functions**
  - Single indicators as proxies for financial market development have clear shortcomings!
Conceptual approach to financial market monitoring

Broad indicators (based on Cihak et al 2012)

Motivation

- Provide empirical shape and substance to the complex, multifaceted and amorphous concept of the —functioning of financial systems (i.e. institutions and markets)
- Characterize and compare financial systems across countries and over time
- Assess the relationship between measures of the financial system and key financial sector policies

Guiding questions

- How can one (empirically) characterize financial systems (i.e. institutions and markets)?
- How can one compare financial systems across countries and regions and through time?
Conceptual approach to financial market monitoring

Broad indicators (Cihak et al 2012): Matrix of indicators

### Four characteristics of financial markets

(a) the size **(depth)** of financial markets,

(b) the degree to which individuals can and do use **(access)** financial markets,

(c) the **efficiency** of financial markets in providing financial services,

(d) the **stability** of financial markets

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Table 1. The 4x2 Matrix of Financial System Characteristics
(with examples of candidate variables in each ‘bin’)

<table>
<thead>
<tr>
<th>FINANCIAL INSTITUTIONS</th>
<th>FINANCIAL MARKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private sector credit to GDP</td>
<td>Stock market capitalization plus outstanding domestic private debt securities to GDP</td>
</tr>
<tr>
<td>Financial institutions’ assets to GDP</td>
<td>Private debt securities to GDP</td>
</tr>
<tr>
<td>M2 to GDP</td>
<td>Public debt securities to GDP</td>
</tr>
<tr>
<td>Deposits to GDP</td>
<td>International debt securities to GDP</td>
</tr>
<tr>
<td>Gross value-added of the financial sector to GDP</td>
<td>Stock market capitalization to GDP</td>
</tr>
<tr>
<td></td>
<td>Stocks traded to GDP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEPTH</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts per thousand adults (commercial banks)</td>
<td>Percent of market capitalization outside of top 10 largest companies</td>
</tr>
<tr>
<td>Branches per 100,000 adults (commercial banks)</td>
<td>Percent of value traded outside of top 10 traded companies</td>
</tr>
<tr>
<td>% of people with a bank account</td>
<td>Government bond yields (5 month and 10 years)</td>
</tr>
<tr>
<td>% of firms with line of credit (all firms)</td>
<td>Ratio of domestic to total debt securities</td>
</tr>
<tr>
<td>% of firms with line of credit (small firms)</td>
<td>Ratio of private to total debt securities (domestic)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACCESS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net interest margin</td>
<td>Turnover ratio (turnover/capitalization) for stock market</td>
</tr>
<tr>
<td>Lending-deposits spread</td>
<td>Price synchronicity (co-movement)</td>
</tr>
<tr>
<td>Non-interest income to total income</td>
<td>Private information trading</td>
</tr>
<tr>
<td>Overhead costs (% of total assets)</td>
<td>Price impact</td>
</tr>
<tr>
<td>Profitability (return on assets, return on equity)</td>
<td>Liquidity/transaction costs</td>
</tr>
<tr>
<td>Boone indicator (or Herfindahl or H-statistics)</td>
<td>Quoted bid-ask spread for government bonds</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EFFICIENCY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-score (or distance to default)</td>
<td>Turnover of bonds (private, public) on securities exchange</td>
</tr>
<tr>
<td>Capital adequacy ratios</td>
<td>Settlement efficiency</td>
</tr>
<tr>
<td>Asset quality ratios</td>
<td></td>
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<tr>
<td>Liquidity ratios</td>
<td></td>
</tr>
<tr>
<td>Other (net foreign exchange position to capital etc)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>STABILITY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatility (standard deviation / average) of stock price index, sovereign bond index</td>
<td></td>
</tr>
<tr>
<td>Skewness of the index (stock price, sovereign bond)</td>
<td></td>
</tr>
<tr>
<td>Vulnerability to earnings manipulation</td>
<td></td>
</tr>
<tr>
<td>Price/earnings ratio</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>Ratio of short-term to total bonds (domestic, int’l)</td>
<td></td>
</tr>
<tr>
<td>Correlation with major bond returns (German, US)</td>
<td></td>
</tr>
</tbody>
</table>
Conceptual approach to financial market monitoring

**Broad indicators (Cihak et al 2012): Background**

- **Depth (size)**
  - To approximate the size of stock markets, the most common choice is stock market capitalization to GDP. For bond markets, the mostly commonly used proxy for size is the outstanding volume of debt securities (private and public) to GDP.
  - Ratio of the size indicators for banks and financial markets can be used to gauge the degree to which a financial system is bank-based or market-based.

- **Access (inclusion)**
  - A well-functioning financial system that overcomes market frictions will more effectively provide financial services to a wide range of firms and households.
  - To approximate access to stock and bond markets, measures of market concentration are used, the idea being that a higher degree of concentration reflects greater difficulties for access for newer or smaller issuers.

- **Efficiency**
  - For financial markets, efficiency measures focus on measuring transaction costs.

- **Soundness (stability)**
  - For financial markets, the most commonly used proxy variable for stability is market volatility.
Conceptual approach to financial market monitoring

IMF Financial development index (Svirydzenka 2016)

Index approximates financial development in general with a view to basic functions that financial institutions and markets (should) provide.

Figure 1. Financial Development Index Pyramid

Source: IMF staff, based on Čihák and et al. (2012)
Conceptual approach to financial market monitoring

Broad indicators: Data sources of financial development index

Selection focuses on well established key proxy variables that cover a sufficiently wide range of countries across a sufficiently long time period.

Financial market indicators mainly relate to equity (stock) market which are less relevant for central banks.

Methodological details

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Assessing characteristics of financial market development

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Correlations (Cihak et al 2012): Depth vs access

- Positive relationship between market depth and access
  - Depth (size & liquidity) of financial markets increases with rise in market access

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Correlations (Cihak et al 2012): Depth vs stability

- No clear relationship between market depth and stability

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Assessing characteristics of financial market development

Correlations (Cihak et al 2012): Access vs efficiency

- Positive relationship between market access and efficiency
  - Access to financial markets increases with higher market efficiency

![Chart showing the correlation between market access and efficiency](image)

*Indicates a significant correlation coefficient at the 5% level or better

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Correlations (Cihak et al 2012): Access vs stability

- No significant relationship between market access and stability

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Assessing characteristics of financial market development

Correlations (Cihak et al 2012): Efficiency vs stability

Weak, yet positive relationship between market efficiency and stability

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Benchmarking financial market development in LAC countries
Benchmarking financial market development

Data sources: Global Financial Development Database (World Bank)

Key facts about GFDD

- Dataset of financial system characteristics capturing various aspects of financial markets
- 214 economies
- 109 indicators
- Annual data
- Time series: from 1960 through 2016 for 109 indicators
- Last update: July 2018

Weblink to GFDD

High income countries score higher levels for financial market depth and efficiency, but not in terms of access and stability.

- Implies that financial stability and access is not guaranteed by higher levels of depth and efficiency.

### Benchmarking financial markets by income group

<table>
<thead>
<tr>
<th>Financial Institutions (Mean)</th>
<th>High income</th>
<th>Upper middle income</th>
<th>Lower middle income</th>
<th>Low income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>84</td>
<td>44</td>
<td>28</td>
<td>13</td>
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<tr>
<td>Access</td>
<td>55</td>
<td>32</td>
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<td>5</td>
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<tr>
<td>Efficiency</td>
<td>86</td>
<td>75</td>
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<td>35</td>
<td>38</td>
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<tbody>
<tr>
<td>Depth</td>
<td>51</td>
<td>27</td>
<td>16</td>
<td>10</td>
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<td>Access</td>
<td>53</td>
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<td>69</td>
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<td>45</td>
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<td>53</td>
<td>60</td>
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<td>44</td>
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Financial markets in LAC score among the lowest with a view to access and efficiency but high in terms of stability.

### Benchmarking financial markets by region

#### Table 3. Financial System Characteristics: Summary

<table>
<thead>
<tr>
<th>Financial Institutions (Mean)</th>
<th>High income</th>
<th>East Asia and Pacific</th>
<th>Europa and Central Asia</th>
<th>Latin America and the Caribbean</th>
<th>Middle East and North Africa</th>
<th>South Asia</th>
<th>Sub-Saharan Africa</th>
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<tr>
<td>Depth</td>
<td>69</td>
<td>43</td>
<td>37</td>
<td>37</td>
<td>33</td>
<td>32</td>
<td>17</td>
</tr>
<tr>
<td>Access</td>
<td>43</td>
<td>23</td>
<td>35</td>
<td>30</td>
<td>14</td>
<td>16</td>
<td>10</td>
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<tr>
<td>Efficiency</td>
<td>80</td>
<td>70</td>
<td>65</td>
<td>62</td>
<td>83</td>
<td>81</td>
<td>51</td>
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<tr>
<td>Stability</td>
<td>42</td>
<td>52</td>
<td>20</td>
<td>35</td>
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<td>32</td>
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<tr>
<td>Stability</td>
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<td>64</td>
<td>81</td>
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<td>54</td>
</tr>
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</table>
Financial market in LAC countries are little developed

Distribution Across Institutions and Markets, 2013

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Benchmarking financial market development


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Benchmarking financial market development
GAP-Analysis (Deng et al 2016)

- Simple cross-country comparison does not account for differences in underlying macroeconomic conditions

- Deviations of the financial development index from a prediction based on economic fundamentals can help identify under- or overdevelopment compared to countries with similar fundamentals
  
  - Predicted norms are computed using the following equation: 
  \[ FI_{it} = \delta_1 X_{it}^{FI} + \delta_2 Z_{it} + h_k^{FI} + e_{it}^{FI} \]
  
  - Gaps are the difference between the actual values of the index and the calculated norms
Benchmarking financial market development
GAP-Analysis (Deng et al 2016): LAC countries

Consistent with previous studies, Deng et al find that shortfalls in market access and efficiency are common in LAC


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Countries in LAC should explore the causes behind financial development gaps

- Deeper analysis allows to identify gaps in greater detail

Policy implications

- Given that macroeconomic fundamentals are often difficult to change in the short-term, policies to alleviate gaps in financial development should be tailored to address country-specific distortions

Source: IMF Staff estimates.
Benchmarking financial market development

Data sources: Financial development index (IMF)

Key facts

- Index summarizes how developed financial institutions and financial markets are in terms of depth (size & liquidity), access and efficiency
- Index database provides 9 indices for over 180 countries with annual frequency from 1980 onwards

Weblink to database

- [http://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B&sId=1481127141475](http://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B&sId=1481127141475)
Benchmarking financial market development

Financial development index (IMF): Financial markets in Top 20 countries

2009

2017

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Benchmarking financial market development
Financial development index (IMF): US & GER

**US (1982 – 2017):** Very deep and highly efficient markets, after problems with market access in earlier stage of market development

**Germany (1982-2017):** Market depth and efficiency significantly improved, most notably following the introduction of the euro
Benchmarking financial market development
Financial development index (IMF): PT & ES

**Portugal (1982-2017):** Financial market development improved significantly

**Spain (1982 -2017):** Financial market development improved significantly

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Link for moderator: https://crowdsignal.com

How do you assess the depth, access and efficiency of financial markets in your country? Rank each characteristic on a scale from 0 to 1.

Note: 0 is lowest possible value, 1 is highest possible value.
Financial market development appears quite heterogeneous in LAC countries
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Financial development index (IMF): LAC countries – Market depth

FD Markets, Depth

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Financial development index (IMF): LAC countries – Market access

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Benchmarking financial market development

Financial development index (IMF): LAC countries – Market efficiency

FD Markets, Efficiency

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Financial development index (IMF): Institutions vs markets in LAC

Bahamas (1982 – 2017): Levels of market depth and efficiency remain extremely low, access declined

Barbados (1982 – 2017): Small improvement due to increased market depth

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Benchmarking financial market development
Financial development index (IMF): Institutions vs markets in LAC

- **Brazil (1982-2017):** Significant increase across all dimensions. Market efficiency has reached high level

- **Chile (1982-2017):** Market depth and access increased substantially

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Benchmarking financial market development
Financial development index (IMF): Institutions vs markets in LAC

- **Colombia (1982-2017):** Market depth and access increased visibly, efficiency stays weak

- **Dominican Republic (1982-2017):** Market depth, access and efficiency remain almost unchanged at extremely low levels

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Guatemala (1982-2017): Market depth, access and efficiency remain almost unchanged at low levels

Honduras (1982-2017): Market depth increased somewhat, access and efficiency remain unchanged at extremely low levels
Jamaica (1982-2017): Market depth increased visibly, access and efficiency remain unchanged at low levels

Mexico: (1982-2017): Market depth and access increased substantially

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**Nicaragua (1982-2017):** Market depth, access and efficiency remain almost unchanged at extremely low levels

**Trinidad (1982-2017):** Market depth has improved but access and efficiency stay very weak

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Financial development index (IMF): Institutions vs markets in LAC

**Argentina (1982 – 2017):** Highly unstable development, access overall improved, while efficiency declined

**Peru (1982 – 2017):** No clear improvement, depth and access improved, while efficiency declined

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Where to look for more country-specific insights
Financial sector assessment program (FSAP)

The Financial Sector Assessment Program (FSAP) provides a comprehensive and in-depth analysis of a country’s financial sector

FSAP assessments are a joint responsibility of IMF and World Bank in developing economies and emerging markets and of the IMF alone in advanced economies

- Financial stability assessment, which is the responsibility of the IMF
- Financial development assessment, the responsibility of the World Bank

Goal of FSAP assessments is twofold: to gauge the stability and soundness of the financial sector and to assess its potential contribution to growth and development.

- Assess development aspects: FSAPs examine institutions, markets, infrastructure, and inclusiveness; the quality of the legal framework and of payments and settlements systems; obstacles to competitiveness and efficiency; progress in financial inclusion; and access to retail payment digital technology
- Examine the financial sector’s contribution to economic growth and development
- Issues related to the deepening of domestic capital markets are particularly important in developing and low-income countries

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In LAC countries, average financial market development measured with a view to depth, access and efficiency is well below levels reached in advanced economies and has little improved over time.

Behind regional averages are differences among individual countries and with respect to the different dimensions of market development:

- As regards financial market development over time: Improvements most notable in BRA, CHI, MEX
- As regards specific characteristics of financial market development: Access and efficiency score generally lower than depth

Financial market development improved in some countries during specific periods (in particular 1980s-1990s)
Key takeaways

- In light of their mandate (objectives) and related functions, CBs have a particular interest in monitoring and assessing financial market developments.

- Broad analytical approaches to monitor and assess financial market development capture different aspects of functioning markets: Depth, access and efficiency.

- Based on broad measures, financial market development in most LAC countries stands at low levels leaving ample scope for improvement in particular with a view to market access and efficiency.

- **Question:** What can countries do to encourage financial market development?
References


Contact: sonja.juko@bundesbank.de
The financial development index is constructed using a standard three-step approach found in the literature on reducing multidimensional data into one summary index:

(i) normalization of variables;
(ii) aggregation of normalized variables into the sub-indices representing a particular functional dimension;
(iii) aggregation of the sub-indices into the final index.

The procedure follows the OECD Handbook on Constructing Composite Indicators (OECD, 2008).
Benchmarking financial market development

Financial development index (IMF): LAC countries – Index components

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