While tariffs and foreign direct investment restrictions drop significantly in past decades, countries adopt a more discreet form of policy barrier: regulation, to protect domestic industries. The World Trade Organization consistently ranks regulatory barrier as the most significant barrier to globalization. However, measuring regulatory barrier in a systematic manner proves to be very challenging, due to two main reasons:

- **Pervasiveness**: Almost all regulations can be used as barrier to globalization.
- **Covertness**: Seemingly non-discriminatory regulation can have discriminatory effects.

**The Proposed Approach**

I propose to use annual reports submitted by U.S. firms to Securities and Exchange Commission (i.e. 10-K forms) to measure regulatory barriers faced by U.S. firms in other countries. First, I identify sentences in the annual reports that report the existence of barrier in other countries. Second, an dynamic item response model is employed to produce a numerical estimate for the barrier level of different countries.

**Text Processing**

I use a supervised learning approach to find sentences containing information on regulatory barrier. 

**Training Set:** 3,846 sentences

- “We have difficulty gaining market share in countries such as Japan because of regulatory restrictions and customer preferences.”
- “Burdens of complying with a variety of foreign laws, including more protective employment laws affecting our sizable workforce in Germany”
- “Laws and regulations in Japan, Korea and China are particularly restrictive and difficult.”
- “Recent industry and regulatory changes have negatively impacted John Deere’s competitive position in the potential high growth Russian markets during the fiscal year.”

**Classifier:** Bidirectional Encoder Representations from Transformers (BERT)

**Examples:**

- Greece: 6.606
- Uruguay: 6.568
- Egypt: 6.381
- Costa Rica: 5.805
- Iran: 5.664

**RESULTS: AVERAGE BARRIER**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Barrier</th>
<th>Rank</th>
<th>Country</th>
<th>Barrier</th>
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<td>Greece</td>
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<td>Ecuador</td>
<td>2.886</td>
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<td>5.805</td>
<td>33</td>
<td>El Salvador</td>
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<tr>
<td>5</td>
<td>Iran</td>
<td>5.664</td>
<td>34</td>
<td>France</td>
<td>2.884</td>
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</tbody>
</table>

**RESULTS: BARRIER CHANGE**

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<th>Change</th>
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<th>Country</th>
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<td>34</td>
<td>France</td>
<td>-2.900</td>
</tr>
</tbody>
</table>

**The Statistical Model**

In a given year $t$:

$$P(U_{ijt} = 1) = \Pr(\theta_j - b_{ijt}^a + c_{ijt}^a < 0) \times \Pr(\theta_j - b_{ijt}^b + c_{ijt}^b < 0)$$

The variable $U_{ijt}$ can take three possible values:

- $3$ firm $i$ does not enter country $j$
- $2$ firm $i$ enters country $j$ and reports barriers
- $1$ firm $i$ enters country $j$ but does not report barriers

**Variables and Priors**

**Nested Structure:**

$$X_{ijt} = \begin{cases} 
\text{Asset}_{ijt} & \text{Industry Level GDP}_{ijt} \\
\text{Asset}_{ijt} & \text{Internal Conflict Level}_{ijt} \\
\text{Asset}_{ijt} & \text{External Conflict Level}_{ijt} \\
\text{Asset}_{ijt} & \text{Poverty}_{ijt} 
\end{cases}$$

**Prior of the main parameter:**

$$\theta_{ijt} \sim N(0,1)$$

**Other parameters:**

$$b_{ijt}^a \sim N(0,10^2)$$

**Results:**

- **Barrier Level:**
  - Greece: 6.606
  - Sweden: 6.568
  - Ukraine: 6.381
  - Venezuela: 5.805
  - Iran: 5.664

- **Barrier Change:**
  - Greece: 2.894
  - Dominican Republic: 2.887
  - Ecuador: 2.886
  - El Salvador: 2.885
  - France: 2.884

**Introduction**

Measuring Regulatory Barrier Using Annual Reports of Firms

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**Validation:**

**Industry Composition**

Let us decompose the total barrier of the top three countries into industry level barrier:

**Validation: Correlation**

Finally, I correlate the estimated barrier with other important variables: Democracy Level, Number of Special Trade Concerns, Foreign Direct Investment, Trade. The results are in line with many findings in the related literature.